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Free Communications I - Donor Management / Organ Transplantation

Room III.

Organ Donation Programmes in Hungary within the Eurotransplant area

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Introduction: The Hungarian National Blood Transfusion Service is the national institute for organ donation and transplantation. HNBTS operates the Organ Coordination Office, the accredited laboratories (immunogenetics, blood group serology, donor screening), manages the central transplant waiting lists, maintains the National Organ Donor and Transplant Registry, and provide all organ donation related transports. This organization is the National Competent Authority (besides the Ministry) and the contracting partner of the Eurotransplant (ET).

Method: Meanwhile Hungary contracted to be full member of ET in 2013, we implemented several parallel activities to promote organ donation nationwide focusing on two main target groups. Concerning public awareness, we started our secondary school education programme via medical students, we actively contribute in the annual Organ Donation Day, we publish information on brain death, organ donation, transplantation and religious aspects (leaflets, social media, YouTube), and the OCO write thanksgiving letters to the closest relatives of all the deceased donors. On the other side we promote and support the health care professionals regarding organ donation with our standard operating procedure for donor hospitals, and with our quality assurance programme (including donor hospitals and procurement surgery), with national training programmes for MDs and nurses in donor hospitals, and for procurement surgeons.

Results and discussion: After the first 3 years of international organ exchanges with ET, the number of deceased donors increased by 31%, the number of donated organs by 54% and the number of transplanted organs by 66%. High urgent requests increased by 53% and the transplant rate more than doubled for them. We could decrease the waiting time for our hypersensitized patients, and the HLA match for kidney transplant became better. The number of waitlisted patients also increased by 25%, meanwhile the mortality rate stayed similar.

Conclusion: Number of organ transplantation is highly influenced by the number of available organs next to the international organ exchanges which is effective and helps the equity. The deceased and living donor rates vary significantly among ET member states, therefore the maintenance and development of the organ donation programmes has to be remained at national level. The parallel timing of the development for organ donation seemed to be effective and finally the life years gained by transplant procedures highly exceeded the progression of the deceased donor rate. Success in field of organ donation and transplantation requires commitment and collaboration that we could achieve.

Keywords: *organ donation promotion, donor transplant coordination, National Competent Authority*

Donor transplant coordination in Hungary

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Introduction: Donor transplant coordination is one of the most developing area of the Hungarian health care system. Several relevant factors have influenced the structure of coordination since it was implemented as nationwide network during the last 15 years. The three-level donor coordinator system is operated by the Hungarian National Blood Transfusion Service, Organ Coordination Office (OCO), which is the national organ procurement organization.

Method: The presentation introduces the roles, responsibilities, professional backgrounds, experience levels of the three types of donor transplant coordinators in Hungary; they are national-, organ procurement and hospital coordinators.

Results and discussion: The main functions of the OCO in cooperation with Eurotransplant to centrally coordinate organ procurements in Hungary and to organize the organ offers from other Eurotransplant member states.

The OCO:

- operates 7/24 availability for donor referrals and organ offers
- operates the Hungarian National Organ Donor Registry which is the tool of:
 - data collection to identify donor and organ characteristics for transplantation
 - registration and documentation of the whole donor-transplant procedure and ensure traceability
 - living donor follow-up
- mediates between donor hospitals, organ procurement centers, laboratories, transplant centers and Eurotransplant
- organizes the organ procurements and international organ exchanges in Hungary under the umbrella of Eurotransplant
- organizes the organ exchanges to Hungarian recipients in close collaboration with Eurotransplant
- organ procurement coordinators support the transparent, safe, seamless process in the operating room
- hospital coordinators support the donor detection and local organization within the framework of the hospital level quality assurance programme, based on the „Spanish-model“

Conclusion: In the last few years donor transplant coordination became an independent health care professionalism in Hungary which offer special carrier option for registered nurses and medical doctors as well. Donor transplant coordination needs continuous adaptation to international and national frameworks and coordinators need up to date multidisciplinary knowledge in the service of life saving transplantations.

Keywords: *health care professionalism, donor referral, transplantation, Eurotransplant*

Quality Assurance Program for organ donation in Hungary

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Introduction: The Council of Europe stated in „Recommendation Rec(2006)16” that „quality improvement programme for organ donation should put in place in every hospital where there is a potential for organ donation”.

Method: The Hungarian National Blood Transfusion Service, Organ Coordination Office (OCO) implemented the pilot quality assurance program in 2010. After a successful test period we have started to build up a gradually expanding nationwide program based on several European methods. The third level of the donor coordinator system was established in the donor hospitals by employing hospital coordinators.

The presentation introduces the main purposes of the quality assurance program for organ donation and the role of the hospital coordinator.

Results and discussion:

Purposes of the program are:

- to measure the hospital's organ donation potential,
- to monitor the whole process of organ donation in intensive care units,
- to detect obstacles to the process of organ donation process,
- to improve the number and quality of organ donation.

Hospital coordinators are intensive care specialists in their own hospitals. The implementation started in relatively active donor hospitals in the past, but the Organ Coordination Office detected recent relapse in donation rate. The number of involved hospitals increased every year, and now there are coordinators in most of county hospitals and neurosurgery facilities.

The roles of the hospital coordinator are:

- data collection on hospital characteristics and keep contact with the organ procurement organisation (OCO),
- systematic review of medical records of all patients died in ICUs to detect potential donor losses,
- initiate modification of protocols if needed to improve donor detection,
- participate in donor management in case there is a potential donor in the hospital, with special attention to family approach.

Conclusion: Hospital coordinators have built a closer relationship with other departments such as neurology, neurosurgery or emergency department. Retrospective review of 13870 hospital deaths has been performed since the program started. The number of potential donors in 2016 in the involved hospitals increased with an average of 36.1% compared to the year before the implementation. The Hungarian Organ Coordination Office encourages the extension of the program to involve every hospital that has potential for organ donation.

Reference: Recommendation Rec(2006)16 of the Committee of Ministers to member states on quality improvement programmes for organ donation

Keywords: *hospital coordination, quality improvement system, donation potential*

Coordination in Lung Transplantation: The Hungarian Experience

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Background: In 2015 the Hungarian Lung Transplantation Program was launched in close cooperation with the Vienna Lung Transplant Program. The work pattern of the transplant coordinator in this new program was defined to cover both pre-transplant evaluation and on-site organ procurement issues.

Material and methods: Between 12/12/2015 and 31/12/2017 139 patients were screened for lung transplantation. Underlying diagnosis was COPD (50), cystic fibrosis (35), idiopathic pulmonary fibrosis (29), primary pulmonary hypertension (10), bronchiectasis (3), pulmonary fibrosis (3), Eisenmenger Syndrome (2), Sarcoidosis (2), BOOP (2), Eosinophil granulomatosis (1), lymphangioleiomyomatosis (1), SLE (1). To facilitate quick diagnostic workup, which is essential for the calculation of LAS in the Eurotransplant area, and also transparency in decision-making, own on-line evaluation software was developed. Final decision about listing was done by the National Lung Transplantation Committee. In the same period of time 59 lung procurements have been performed in 7 different countries. Final decision about transplantation of explanted lungs was done by the procurement team after consultation with the transplant centre, taking into account all available objective data, size estimation and subjective quality assessment of the procurement surgeon, using also transfer of photo documentation.

Results: After evaluation 69 patients have been registered on the Eurotransplant Lung Waitlist and in 70 cases lung transplantation was considered as contraindicated. Mean evaluation time was 95 days. Mean/median time between listing and lung transplantation was 68 days. 14 patients passed away from the waitlist. 64 donor lungs out of 153 offers have been turned down due to quality reasons and 89 lungs could be successfully transplanted, 41 in Hungary.

Conclusion: Effective coordination is essential both for the evaluation of lung transplantation referrals and for realization of organ offers in the setup of a new lung transplant program. On-line data processing tools and devices are indispensable support devices in our experience.

References: Attila Farkas^{1,2}, Balázs Gieszer, ^{1,2}, Áron Ghimessy ^{1,2}, Peter Radecky ^{1,2}, Levente Bogyó ^{1,2}, Klára Török^{1,2}, Csilla Szundi^{1,2}, Ferenc Rényi-Vámos^{1,2,3}, György Lang ^{1,2,3} 1, Department of Thoracic Surgery, National Institute of Oncology, Budapest, Hungary 2, Thoracic Surgery Clinic, Semmelweis University, Budapest, Hungary 3, Department of Thoracic Surgery, Medical University of Vienna, Austria

Keywords: *on-site organ procurement, pre-transplant evaluation, cooperation*

From end-stage heart failure - through cardiac transplantation - to a healthy life; From the center coordinator's point of view

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Nowadays heart failure is the leading cause of hospitalization in people older than age 65. The most optimal therapy for end-stage heart failure is heart transplantation (HTX). It is quite important to send people suffering from heart failure to heart failure ambulances or centers. It's really hard to make the decision about the optimal time of getting onto the HTX waiting list, that's why it's important to refer the patient to the HTX waiting list committee in time. The waiting list committee often asks for additional examinations, so that the results could help them make the best decision.

The time that a patient spends on the HTX waiting list depends on several things, for example on their blood group or body weight. Obesity is a major issue, as it significantly lengthens the waiting time and means quite higher risk for the operation. If a patient manages to lose weight, or anything happens that may influence their operability (e.g. infections), it's important to report it to the HTX center coordinator. In case of a potential transplantation, the recipient gets a phone call by the center coordinator, so patients on active waiting list should keep in mind that they always have to be available via telephone and to stay in the country.

Patients after cardiac transplantation should attend frequent controls (endomyocardial biopsy, echocardiography, etc.) by a strict protocol. The reason for that is that lifelong immunosuppressive therapy is required after HTX, and the carefully tailored dosing of immunosuppressive regime is the key to avoid rejection; and on the other hand infections, malignant diseases or drug side effects. The visits of each patient are recommended to take place in a given HTX follow-up center, so that the follow-up team could follow the patients' history from the early postoperative period and could handle the specific issues after HTX

Keywords: *heart transplantation, heart transplant waiting list, immunosuppressive therapy*

The influence of multimodal hemostasis management on the King's College Therapeutic Intervention Scoring System (King's-TISS)

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Introduction with Hypothesis: The Therapeutic Intervention Scoring System (TISS-28) adapted to liver transplantation by King's College Hospital (King's-TISS) allows the grading of 138 activities to determine the nursing workload, diagnostic, monitoring and therapeutic needs of patients: supportive therapy (4 points), drug therapy (3 points), diagnostics (2 points), monitoring, invasive procedures (1 point). (1.) The aim of the study was to evaluate the influence of multimodal hemostasis approach on King's College TISS score in the first perioperative 48 hours of bloodless liver transplantation.

Patients and Methods: The prospective study was conducted at the Department of Transplantation and Surgery, Intensive Care Unit. The study participants were bloodless liver transplanted patients (n=51). Demographic data, MELD, DRI, APACHE II, SOFA scores and LOS were recorded. The King's-TISS activities were grouped by organ systems (neurological, ventilation, cardiology, homeostasis, hemostasis management) with nursing procedures (monitoring, invasive access care, basic patient care) and these activities were also recorded in the first 48 hours. The special hemostasis management of liver transplanted patients, coagulation assays, hemostasis reserve capacity (HRC) calculation and coagulation factor replacement were similarly documented. The nursing workload with and without multimodal hemostasis management assessed by TISS score (King's vs. HRC) was analyzed. The data are given mean±SD and were analyzed with rAnova by SPSS 20.0.

Results: The mean age of the patients was 49±14 years, BMI 26±4, the MELD score 10±4, DRI 1.5±0.4, APACHE II. 16±5, SOFA 5±2, ICU LOS 4.3±1.2. The total of King's-TISS score points were decreased roughly by >= 30% daily, from 116±2.9 to 78.6±7.9 to 48 and 64.7±9.8 (p=0.001). More specifically the neurological-, ventilation-, vasopressor support and invasive access care points decreased roughly by 80%, but the homeostasis-, monitoring-, basic patient care points were unchanged. According to the hemostasis monitoring activity points were doubled, however the multimodal hemostasis management (TISS-HRC) increased by another 13-16 points the original King's-TISS score daily.

Conclusion: The King's-TISS score is reliable indicator of diseases severity and nursing workload in perioperative care of liver transplantation (LTx). The TISS-HRC score could replace the King's-TISS score providing more complete picture of perioperative hemostasis nursing activity during the first few days, following LTx.

References: 1. Foxton MR et.al, (2010) Increased model for end-stage liver disease score at the time of liver transplant results in prolonged hospitalization and overall intensive care unit costs. *Liver Transpl.* May;16(5):668-77. doi: 10.1002/lt.22027

Keywords: *liver transplantation, nursing workload, hemostasis management*

Advantages of IFNA's Anesthesia Program Approval Process (APAP)

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Background: The IFNA believes that it is possible to improve anesthesia patient care through a voluntary Anesthesia Program Approval Process (APAP) for non-physician anesthesia programs. IFNA is aware of several models of anesthesia care delivery worldwide. There are anesthesiologists working alone, anesthesiologists supervising non-physician anesthesia practitioners (NPAP), and NPAP working alone (1). Considering this situation and for inclusive reasons the education committee has developed three levels of recognition. <http://ifna.site/app/uploads/2017/06/Operational-Policies-APAP-June-2017.pdf>

Advantages of APAP: A published set of standards with a three level threshold of approval is designed to improve educational organizations by upgrading existing standards, defining criteria and performance indicators, and applying existing international standards(2). In cases of cross border migration it helps to facilitate comparison of the various NPAP groups and it can provide technical assistance to new national and regional programs (3). Measuring education programs against a defined set of standards, developed by experts of the profession, education ministers and heads of education institutions can be assured that the programs have met certain standards of quality.

Conclusion: In order to establish and/or improve IFNA standards worldwide it is IFNA's goal to have at least one program recognized in every member country. We know about the varying scopes of practice and therefore the three levels of approvals were created.

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Keywords: *education, quality improvement, professional standards*

Opinions of Operating Room and Surgical Ward Staff towards WHO Surgical Safety Checklist

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Introduction with hypothesis: The perceived importance of checklist items by all team members is an essential factor that affects checklist usage [1]. This research is aimed at evaluating the opinions of the operating room and surgical ward staff towards WHO surgical safety checklist.

Methods: This was a questionnaire study. The questionnaire features questions such as gender, age, job role and years of experience, every item on the WHO surgical safety checklist was evaluated, and responder could provide freehand comments on the subject. The researchers visited hospital and collected data from December 2017-January 2018. Sample population includes 27 surgeons, 34 anaesthetists, 19 operating room and 38 surgical ward nurses of the university hospital in western part of Turkey. Collected data were analyzed using SPSS 18.0. with frequencies, percentages, mean and standard deviation. This study was approved by the Ethical Committee of Namık Kemal University Medical Faculty, No: 2017/128/12/16.

Results:61% were women, 47% were under 30 years old, 83.1% had over 1-year job experience in the sample population. The mean score of item importance varied from 4.25 to 4.79. Item "patient's identity, procedure, operation site verification"(4.79±0.50), "preoperative fasting" (4.76±0.53) had the highest scores. "Blood sugar control" (4.25±1.08), "team members introduced" (4.32±0.53) had the lowest scores. "Allergy", and "prophylaxis of antibiotic and deep vein thrombosis" was suggested to be transferred to the "before the patients leave the ward" section.Compact checklist for local and emergency surgeries and an online system won't allow doing any procedure before checklist is completed were suggested.

Discussion: In Turkey, adaptation of the WHO Surgical Safety Checklist is administered in 4 "domains": Before the patients leave the ward; on arrival of patient in the operating room, before surgical incision (time-out), and before patient leaves the operating room. Perceived importance of checklist items by all team members is crucial to identify possible improvements to the checklist. "Patient's identity, procedure, operation site verification" perceived as the most important item on the checklist. Similar to this finding, in Levy et al.'s study, confirmation of patient name and procedure are the most commonly performed checkpoints [2]. This result is normal because any problem detected in this item can cause direct harm to the patient. Both of items perceived as they have less importance are listed in the time-out section. This is supported by Rydenfält et al's. [1] results showed that time-out is not always applied and may be seen as a double-checking routine. Helmiö et al. [3] discovered that over 20% of surgeons and nurses don't consider "team members introduced" as important. This was similar to our findings; staff perceived this item as one of the least important. "Allergy", and "prophylaxis of antibiotic and deep vein thrombosis" was suggested to be transferred to the "before the patients leave the ward". This is controversial because in "before the patients leave the ward" surgeons are absent and can't confirm the need for an antibiotic and prophylaxis of deep vein thrombosis.

Conclusion: All checklist items were considered necessary. However, a compact checklist for local and emergency surgeries, and an online system that won't allow doing any procedure before checklist is completed was suggested.

References: 1. Rydenfält C, Johansson G, Odenrick P, Åkerman K, Larsson PA. Compliance with the WHO Surgical Safety Checklist: deviations and possible improvements. *International Journal for Quality in Health Care.* 2013; 25(2):182-7. 2. Levy S M, Senter C E, et al. Implementing A Surgical Checklist: More Than Checking A Box. The 7th Annual Academic Surgical Congress, February 2012.

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Keywords: *patient safety, operating room, surgery*

How much we use surgical safety checklist? Retrospective Study

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Introduction with the hypothesis: Nowadays, surgical interventions are frequently used as a treatment. Adverse events are major cause of morbidity and mortality in surgery and can prevent with high quality surgical care [1]. All phases of the surgical safety checklist must be valued by all team members. In this study, it was aimed to determine the completeness rate of surgical safety checklist and to determine the uncompleted sections and to take precautions.

Methods: A retrospective study was conducted in the University Hospital between January and December 2017. Every phase on the WHO surgical safety checklist completeness rate was evaluated and missing sections were identified. A total of 9252 cases were assessed. Collected data were analysed using SPSS 24.0 with Descriptive statistical methods (frequencies, percentages). The Cochran's Q test was used to compare the completeness rates between the sections. This study was approved by the Ethical Committee of Namık Kemal University Medical Faculty, No: 2017/126/12/14.

Results: Before surgical incision (time-out) had the lowest completeness rate (0.3567%), "before the patients leave the ward" and "patient leave the operating room" sections had the highest completeness rate (0.0108%). "Team members introduced" item in before surgical incision (time-out) section had lowest completeness rate. (0.173%).

Discussion: Medical errors are problem for countries, but most of the medical errors can be prevented [2]. The report of the WHO has further highlighted the priority of surgical care [3]. In Turkey, an adaptation of the WHO Surgical Safety Checklist is administered in 4 "domains": Before the patients leave the ward; on arrival of the patient in the operating room, before surgical incision (time-out), and before the patient leaves the operating room.

All sections of the SSC provides an opportunity for the team consider important information about the surgery and discuss safety surgery and postoperative plans. It affects considerably patient care. Bartz-Kurycki and et al (2017), results showed that despite some improvement in overall checklist compliance, adherence to certain checkpoints declined over the course of the study [2].

Conclusion: Section one "before the patients leave the ward" and section four "sign-out" have higher completeness rates than other two sections.

References: 1. Keijzer WW, Agha RA, Greig A. WHO Safer Surgery checklist amongst paediatric emergency plastic surgery patients in an UK hospital. *Annals of Medicine and Surgery*. 2017;(21):49-2 2. Bartz-Kurycki MA, Anderson KT, Abraham JE, Masada KM, Wang J, Kawaguchi AL, et al. Debriefing: the forgotten phase of the surgical safety checklist. *Journal of Surgical Research*. 2017; (213);222-27. 3. Patel J, Ahmed K, Guru KA, Khan F, Marsh H, Khan MS, et al. An overview of the use and implementation of checklists in surgical specialties- A systematic review. *International Journal of Surgery*. 2014; (12);1317-23

Keywords: *patient safety, operating room, surgery*

Norwegian Standard for the Safe Practice of Anaesthesia

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Introduction: The purpose of the Norwegian Standard for the Safe Practice of Anaesthesia is to protect patients by ensuring good practice in anaesthesia in Norway. The Standard establishes normative guidelines for everyone who provides anaesthesia care, irrespective of their geographical location or the organisation they work for [1,2]. The Norwegian Standard for the Safe Practice of Anaesthesia was first published in 1991. It was then revised in 1994, and subsequently in 1998, 2005 and 2010. The revision process is carried out jointly by the The Norwegian Association of Nurse Anaesthetists (NANA) and the Norwegian Association of Anaesthesiologists (NAA). The aim of this project was to revise the document, as well as to translate this to English to reach an international audience.

Methods: NANA and NAA put together a group consisting of six anaesthesiologists and three nurse anaesthetists from different parts of Norway, and from both clinical and academic locations. The process was a recursive, not a linear process, constantly moving back and forth throughout the phases. Each part of the document was discussed until consensus was reached. The work was carried out with a three-day meeting in the autumn of 2015, two-day meetings in January and May 2016, as well as communication by email. After the meetings, the Standard was sent out for consultation and feed-back in the professional communities of nurse anaesthetists and anaesthesiologists. The Standard was adjusted following input from the professional communities, and consensus between the anaesthetic providers in Norway was reached. The document was implemented in each of the communities respectively from September 2 2016 at the AGM of the NANA and October 27 2016 at the AGM of NAA. The Standard was then translated to English by professional translators, Språkverkstanden, and sent out for consultation once more. After several adjustments, the Norwegian anaesthetic providers reach an agreement on the final English version of the revised Standard for the Safe Practice of Anaesthesia.

Results: The work has consistently been characterized by mutual respect and understanding of the various professions' input and argumentation. There has been a stated intention among the members of the working group to get a product that both

professions could endorse. Areas that have been further emphasized are increased patient focus, importance of the team's combined competence, clarification of the role and function of the professions respectively, and division of labour.

Discussion: The Standard is designed as a normative guideline for those who provide anaesthesia. The document is therefore intended as a basis and a guideline for good practice. Authorized health personnel primarily comply with the requirements for justifiability described in the Health Personnel Act §4 first and second paragraphs. Beyond this, there are few legislations that limit or describe how anaesthesiological work is to be performed. The Standard clarifies this issue, and has therefore been used both in court cases and by the Norwegian Board of Health in supervisory matters as a normative for anaesthetic activities. Feedback from the professional communities indicate that the document is well implemented in clinical practice. Whether the document is rooted in the procedures and guidelines in anaesthetic departments and hospitals remains unknown.

Conclusion: The revision process emphasizes the importance of a well-functioning interprofessional collaboration between nurse anaesthetists and anaesthesiologists to ensure patient safety and quality within anaesthetic practice. Patient safety is also maintained through satisfactory and similar anaesthesiological practice in Norway.

References: The Health Personnel Act. Lov-1999-07-02-64. . 2. Borgarting Court of Appeal. Judgement of 2 March 2004. LB-2002-2517.

Keywords: *Standard, safe practice, patient safety,*

Development and Monitoring Of Clinical Effectiveness Indicators of Anesthesia Dept. In Accordance With The Standard ISO 9001/2000

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Introduction: The Onassis Cardiac Surgery Center(OCSC) in order to be certified for quality system ISO 9001/2000 prepared for all section and departments, hospital care protocols(HCP). The importance of HCP is to ensure the smooth flow of medical and nurse care provided, standardizations of actions, define the powers and responsibilities to enable quality control and planning of improvement interventions. The quality of health services, which provides the OCSC monitored through evaluation of outcome indicators. In Anesthesiology department we use clinical outcome indicators, which record the enforcement of the HCP process and exemption of the standard.

Purpose of the investigation is to show that the daily record of operation of the anesthesia department and monitoring of multivariate data from the electronic file maintenance contribute: to better management of electronic-mechanical equipment, preventing damage, and malfunctions that may prove critical for the state of health of the patient, but also in the objective evaluation of staff.

Material-Method: Our research on time 6 years. In total we processed the data from 8100 cases. Made a comparative examination of the state of all indicators on a quarterly basis and emphasized the points identified deviations from the standard system and malfunctions. The statistical data analysis was performed with the statistical package SPSS 17.0 and significance level was defined as $\alpha = 0.05\%$.

Results: mean residence time of patients in the preparation chamber was reduced by 14 minutes, from 29min to 15min per patient. Malfunctions in the equipment in some cases decreased by 100% while the average reduction was 45%.

Keywords: *clinical indicators, quality control, anaesthesia equipment*

Use of WHO Surgical Safety Checklist Improved Work Processes in Operating Theatre and Patient Outcome - a Stepped Wedge Cluster RCT

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Introduction with Hypothesis: One in ten patients experience complications associated to surgery. Introduction of surgical safety checklists might prevent surgical complications through improved teamwork, communication and consistency of care. Few studies have investigated the mechanisms behind such improvements. Randomized trials are warranted. We hypothesized that high-quality implementation of the WHO Surgical Safety Checklist improve care processes, and patient outcomes following the Donabedian's theoretical framework on Structure, Process and Outcome [1,2].

Methods: Our study was designed as a Stepped Wedge Cluster RCT and was conducted in two Norwegian hospitals in 2009-2010 [1,2]. The checklist intervention was sequential rolled out with 3-4 weeks time intervals between introduction of the intervention to each cluster (orthopedic, cardio-thoracic, neuro, general surgery and urology). Primary outcomes were complications (respiratory, cardiac, infections, wound ruptures, bleeding, neurologic, embolisms, mechanical, re-operations and other), length of stay and mortality up to 30-days. Further, work processes as use of forced air warming blankets and timeliness of antibiotic prophylaxis were study outcomes. Checklist compliance was recorded by nurse anaesthetists and operating theatre nurses. Outcome data was registered as routine practice by surgeons in the patients' medical records using the International Classification of Diseases tenth version (ICD-10) codes. The research team verified the complications through review of patient records. All surgical team members were blinded for study outcomes, and data assessors were blinded for the intervention [1,2].

Results: In 5295 surgical procedures, we identified a relative reduction of surgical complications at 42%, $P < 0.001$ [1]. The absolute risk reduction was 8.4 with 95% Confidence Interval at 6.3 to 10.5. Mortality was not significantly reduced from 1.6% in control group to 1.0% in intervention group, $P = 0.151$ [1]. Length of stay was reduced by 19.3 hours, $P < 0.022$ [1]. Use of forced air warming increased from 35.3% to 42.4% $P < 0.001$, antibiotics provided before incision increased from 54.5% to 63.1%, no antibiotics provided decreased from 33.0% to 27.1%, and after incision from 12.5% to 9.8%, $P > 0.001$ [2].

Discussion: Even mild hypothermia is well known to increase bleeding and need for blood transfusion. The checklist induced increased use of forced air warming blankets. Reduction of intra-operative blood loss and less need of blood transfusion was associated to increased use of checklist and preservation of normothermia. Utilization of the checklist was also associated to improved timeliness of antibiotics provided before incision. This improvement was also significantly associated to reduction of post operative infections, when using logistic regression [1,2].

Conclusion: High-quality implementation of checklists improves both work processes in the operating theater and patient outcomes.

Reference: 1. Haugen, AS, Søfteland E, Almeland SK, et al. Effect of the World Health Organization checklist on patient outcomes: a stepped wedge cluster randomized controlled trial. *Ann Surg.* 2015;261:821-828. / 2. Haugen, AS, Wæhle, HV, Almeland, SK. Secondary Analysis From a Large Stepped Wedge Cluster Randomized Controlled Trial in Norway. *Ann Surg.* 2017. Nov 6. [Epub ahead of print]

Keywords: *Surgical Safety Checklists, Quality Improvement, Implementation*

Tuesday, 19 June 2018

Free Communications III – Safety Issues: TIVA

Room III.

Why TCI is better than TIVA?

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Although the target-controlled infusion (TCI) of propofol is available since 1996, it is not widely used in every day anaesthesia practice. This lecture will discuss the major advantages to both patient and anaesthetist and will provide ample practical information on technical issues.

When using total intravenous anaesthesia (TIVA), the anaesthetist calculates the dose of infusion rate according to the weight of the patient. However, this is not a linear relationship, but a rather complex mechanism between the dose and blood and effect site concentrations. Simple infusion regimens may cause overdosing as propofol cumulates. This may not be obvious during anaesthesia and it is difficult to predict from clinical signs. The TCI pumps use a computer-based three compartment modelling where the pump makes dose adjustments automatically, based on the individual patient characteristics. This may sound complicated, but it should not be. Author is convinced that using TCI system is something for everyday use. Discussion will focus on recovery of patient from TCI propofol, using decrement time and concentrations. An interesting point will be to show effects of using the patient's favorite music during TCI propofol anaesthesia.

What will the future bring in this area: there will be a closed-loop system where propofol blood concentration will be estimated from exhaled gas analysis. This is not so far away; but even then, the anaesthetist will and have to be there by the patient at all times to ensure patient safety.

Keywords: TCI, TIVA, propofol

Target control infusion (TCI) of intravenous anaesthetics in pediatric patients

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Target Control Infusion (TCI) is a concept developed in order to make dosing of intravenous anesthetic drugs simpler and more precise. Consequently, the drugs and the drug effects are the same as with manual dosing, the target organs "do not care" about how the drug molecules have arrived in plasma or at the effect site.

TCI is based on computer programs inside the infusion pump, which attempt to deliver (by bolus infusion, plain infusion and programmed stop intervals) a preset concentration of drug in plasma (i.e. Plasma-TCI) or at the effect site in the brain and spinal cord (i.e. Effect-TCI). The computer programs are developed from experiments with strictly controlled dosing to patients or volunteers in combination with plasma concentration measurements and (for effect-site modeling) the clinical effect (i.e. sleep, BIS, unresponsiveness) estimates. As the clinical effects are delayed for some minutes (differ with drug and model) an important part of the effect-TCI is to account for this delay and compensate by transient over-dosing during induction and increased dosing, and prolonged stop during dose-reduction. So far, commercial TCI models in children have been without the effect-site option, due to lack of reliable data and validation.

In pediatric anesthesia, i.e. in children more than 1 year of age, TCI use of propofol, eventually together with manual dosing of remifentanyl (or other opioids) are relevant to discuss for everyday routine use. As children are not "small adults", using an adult TCI program or model with the correct weight of the child, most often turn out wrong. Compared with an adult, for propofol, the child has a higher volume of distribution, a higher clearance and a decreased sensitivity for drug effects. Consequently, both the induction dose and maintenance infusion doses during TCI needs to be higher per kg than in adults. For remifentanyl the clearance is slightly increased in children, whereas sensitivity and distribution volume is similar, thus a somewhat higher maintenance dose is needed. For propofol, specially designed children TCI algorithms should be used, most known are the Kataria and Paedfusor models. The Kataria do not distinguish between a young child or an older child. The Paedfusor takes into account higher clearance and distribution in the very young. New all-purpose models for propofol are presently being developed; most promising seems be the Eleveld model, which may be used both in children and in adults (1). For remifentanyl, the adult Minto model do not fit well with the increased clearance of remifentanyl in children. However, there are promising, ongoing attempts also on making TCI-models of remifentanyl in children (2).

References: Eleveld DJ1, Proost JH, Cortínez LI, Absalom AR, Struys MM. A general purpose pharmacokinetic model for propofol. *Anesth Analg*.2014 Jun;118(6):1221-37. / Eleveld DJ1, Proost JH, Vereecke H, Absalom AR, Olofsen E, Vuyk J, Struys MM. An Allometric Model of Remifentanyl Pharmacokinetics and Pharmacodynamics. *Anesthesiology*.2017 Jun;126(6):1005-1018

References: 1) Eleveld DJ1, Proost JH, Cortínez LI, Absalom AR, Struys MM. A general purpose pharmacokinetic model for propofol. *Anesth Analg*. 2014 Jun;118(6):1221-37. 2) Eleveld DJ1, Proost JH, Vereecke H, Absalom AR, Olofsen E, Vuyk J, Struys MM. An Allometric Model of Remifentanyl Pharmacokinetics and Pharmacodynamics. *Anesthesiology*. 2017 Jun;126(6):1005-1018

Keywords: Target Control Infusion, TCI, pediatric anesthesia

TIVA and TCI practical aspects- nurse perspective

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The increased use of TIVA & TCI practices for intravenous anaesthesia has demonstrated many advantages including, a significant cost saving from a reduction in drug prices. Intravenous anaesthesia and analgesia have become an increasingly common method used in the treatment of diverse medical specialties There are many aspects of medicine which could benefit from TIVA and TCI

including diagnostic procedures for example, endoscopy and, short surgical procedures, to longer and more complex brain or spinal neurosurgeries. Regardless the discipline, everyone might be exposed to the benefits of these techniques.

Anaesthetic Nurses need to be practically prepared to assist with TIVA and TCI preparation and should remember 3 important elements: choice of correct syringe size and manufacturer, choice of correct administration set and correct drug dilution, dependent on drug protocol used.

Anaesthetic drugs prices have decreased, this is especially noticeable with Propofol. Having said that, it is worth mentioning that some drugs like Remifentanyl, for example, is not always as affordable as other drugs. Commercial awareness can lead to smart practices that promote cost effectiveness and drug waste reduction. Within the presentation are recommendations to optimize drug usage.

"To err is human", it is not uncommon to make mistakes especially in such a dynamic, high pressure environment as the anaesthetic nurses' work place. The development of medical devices (infusion pumps) for TIVA and TCI performance has provided a complex and multi-layered error reduction system which enhances both patient and clinician safety. How to best use the equipment? How to make life easier and safer for the anaesthetic nurse, anaesthetist and patient? Answers to these and many other questions will be discussed in the presentation provided.

Keywords: *Nurse Anesthesia Practice*

The Contribution of Registered Nurses in Anesthesia Practice in South Korea

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Introduction: Certified Registered Nurse Anesthetists (CRNAs) were recognized by law as legitimate anesthesia providers in Korea 44 years ago [1,2,3]. Since 2005, CRNAs have been educated at the graduate level and certified by national certification examination. But in recent years, the number of graduate level educational programs has decreased and the number of practicing CRNAs has declined correspondingly [1,2]. To meet the shortfall of anesthesia providers, specialty nurses and peri-operative nurses are trained on the job to perform anesthesia related services. The purpose of this study is to assess the involvement of Registered Nurses in Anesthesia (RNAs) and CRNAs in anesthesia care in South Korea. The authors also examined whether there is a defined scope of practice for these two levels of nurse anesthesia providers.

Methods: A confidential survey was administered via email and post mail to a sample of Registered Nurses involved anesthesia practice. Preliminary descriptive statistics were calculated to explore the characteristics of the participants. The chi-square independent test for categorical variables and independent two sample t-test for continuous variables were used to compare the two categories.

Results: Of the 308 respondents, only 42 (13.64%) are CRNAs and the remaining 266 practice without certification. While all were involved in performing anesthesia, RNAs were more likely to work under supervision. The RNAs work under a number of different job titles, such as Anesthesia Department Nurse (n=152), Anesthesia Specialty Nurse (n=14), Recovery Room Nurse (n=89) and Operating Room Nurse (n=11). Among RNAs, more than half indicate they would like to pursue graduate level education to become Certified Registered Nurse Anesthetists (n = 171, 55.52%). Interestingly, almost 34% of the participants plan to leave anesthesia practice within the next five years, before they are eligible for retirement (n = 104, 33.76%). In addition, almost 20% of participants indicated they plan to retire within five years (n = 60, 19.49%). Most RNAs hold only a bachelor's degree or less and almost 56% indicate they would like to pursue an advanced degree as a CRNA. However, graduate opportunities to progress from RNA to CRNA are very limited. The RNAs work under different job titles, which may imply they are not recognized properly as anesthesia providers.

Conclusion: The authors conclude that RNAs are an integral part of anesthesia services in Korea. Their major concerns are that RNAs have not passed a certifying examination and there are no clear standards for their education and scope of practice. As a possible solution, the authors recommend a university-led effort to provide an educational pathway for RNAs to obtain advanced nursing degrees and certification as anesthesia providers.

This research was funded by IFNA Foundation Grant 2017

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Keywords: CRNA, Registered Nurse in Anesthesia (RNAs), Scope of Practice, Elements of Anesthesia care

Developing a Guideline for Endotracheal Suctioning of Adults with Artificial Airways in Chinese Peri-Anesthesia Settings: Using ADAPTE Approach

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Introduction: Most patients during peri-anesthesia care require intubation or tracheotomy. Endotracheal suctioning is one of the most common invasive procedures for these population who have artificial airways in place [1]. Endotracheal suctioning is associated with a few adverse effects and leads to a few distressing experiences and even pain for patients. It is important to develop a clinical practice guideline for the potentially hazardous procedure to support health care providers' practice, especially in peri-anesthesia settings. The study aimed to adapt a guideline for endotracheal suctioning of adults with artificial airways in Chinese peri-anesthesia settings.

Methods: This study was guided by the ADAPTE framework [2]. The study was consisted of set-up, adaptation and finalization phases. A heterogeneous consultant panel was established to contribute guidance and suggestions to the guideline development

during the whole process. Then, relevant evidence documents were searched, selected, appraised and synthesized to develop the draft guideline. After revisions, the adapted guideline for endotracheal suctioning of adults with artificial airways in Chinese peri-anesthesia settings was disseminated to the external reviewers and evaluated by these reviewers.

Results: The search yielded 799 citations for screening in this study, of which we included seven guidelines for quality appraisal and analysis. Using AGREE II appraisal, these seven documents had high scores (at least >70%) in the domains "scope and purpose", "clarity of presentation" and "editorial independence". It took five discussion meetings and 129 changes to develop a 155-page adapted guideline, which was comprised of 17 sections covering the four main topics: key recommendations, implementation toolkit, introduction and background of the guideline and the adaptation process. The 26 key recommendations with JBI grading system be condensed and categorized into three procedure phases: preparation prior to (4 points of care), procedure during (11 points of care), and evaluation after endotracheal suctioning (2 points of care).

Discussion: Consultant panel and external reviewers were comprised of interdisciplinary teams, such as leaders, educators, researchers, clinical nurses and physicians, and patients. Involving patients in the adaptation process made research more accountable and transparent, provides different insights leading to innovative discoveries, and ensures that the adapted guideline is strongly relevant to patients' concerns. Based on the framework of "Knowledge to Action Cycle" [3], the guideline developed in this study could be the foundation of implementing evidence-based endotracheal suctioning in clinical settings. Also, the list of the key recommendations could support a framework for a survey questionnaire or observation guide on practice of anesthesia care providers for endotracheal suctioning and then explore the discrepancy between evidence-based practice and actual clinical practice.

Conclusions: It was the first study using the ADAPTE approach to develop an adapted guideline in peri-anesthesia settings. The adapted guideline for endotracheal suctioning not only addressed the knowledge gap, but also laid the ground work for the future comprehensive quality improvement and knowledge translation.

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Keywords: *Endotracheal Suctioning, Evidence Based Practice, Clinical Practice Guideline, China*

Intraoperative Patient Handover Between Anesthesia Providers: A Scoping Review

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Introduction: The intraoperative patient handover between anesthesia providers is one of the most perilous procedures in operation rooms, and if carried out improperly can be a major risk factor to patient safety. One study illustrated that more than 50% of patient care information were lost in the perioperative setting [1]. Given the paucity of evidence specifically underpinning the intraoperative patient handovers between anesthesia providers, the purpose of this scoping review is to bridge the gap in knowledge of this critical process.

Methods: Unlike systematic reviews addressing the relatively precise questions, scoping reviews are aimed to map the existing literature on a particular topic and investigate the nature, extent, range and methodology of the included studies. This scoping review followed Arksey and O'Malley's framework incorporating a few subsequent advanced recommendations, which has been widely applied to synthesize knowledge [2]. There were five stages in this study: 1) Identifying the Research Question, 2) Identifying relevant studies, 3) Study Selection, 4) Charting the data, 5) Collating, summarizing and reporting the results.

Results: A total of 21 English studies were included in this review, which could be categorized into three main topics based on the aims of the studies, including relationship between handovers and outcomes, perceptions on handover practices, and interventions to improve handover practices. Five studies out of seven showed a significant association between intraoperative anesthesia handovers and adverse outcomes. Only one-fourth of the participants had a policy describing intraoperative anesthesia handovers and three out of our participants embraced standardizing the handover process. Seventeen factors were found to influence the quality of handovers. Checklists and simulation training were the most commonly used approaches to improving intraoperative anesthesia handovers.

Discussion: Although most of the studies showed the statistically significant association between the presence of handovers and the adverse outcomes, the conclusion that intraoperative anesthesia handovers were harmful to patients cannot be reached as the data were not pooled. There were a few limitations in these studies as the retrospective research design was used, including the correlation relationships, potential confounding variables, and not standardized and validated handover process. Checklists were the most commonly used methods to standardize the delivery of intraoperative anesthesia handovers in the studies on interventions to improve handover practices. More research illustrated that using a consistent and predictable handover process, which was appropriate in the individual context, was much more important than determining the universally employed content or structure of the handover [3]. Simulation training was illustrated to be the effective approaches to preparing anesthesia providers delivering patient handover, as intraoperative patient handovers between anesthesia providers were complex social interactions influenced by many environmental factors.

Conclusions: Intraoperative anesthesia handovers are complex social interactions aimed to build mutual understanding of patients among providers. Exploring the phenomenon of intraoperative patient handovers between anesthesia providers is prudent and may benefit from knowledge in the fields of psychology, sociology, and/or anthropology.

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Keywords: *Patient Handoff, Transfer of Care, Anesthesia, Intraoperative Care, Continuity of Patient Care*

Video-Laryngoscopy as a Primary Airway Management Tool in Patients undergoing Bariatric Surgery - a retrospective analysis

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Background: Obesity is one of the several factors that need to be considered as part of an airway evaluation because of its association with high risk of aspiration of gastric contents other airway or ventilation associated complications during anesthesia induction (1). To effectively manage airways in obese patients, anaesthesia providers must be proficient in airway evaluation and management in all types of patients (2). We therefore found it meaningful to evaluate the use of McGrath laryngoscopy as a first line option for airway management in patients undergoing bariatric surgery.

Methods: Muri Hospital is a national reference centre for bariatric surgery in Switzerland (3). From 2015 until 2017 approximately 400 patients underwent gastric bypass or sleeve gastrectomy surgery in our hospital. Anaesthesia protocols of all patients receiving bariatric surgery were reviewed. Analysis was made regarding somatometric data and other preoperative measurements. Anesthesia incidence of difficult tracheal intubation and potential complications during induction in anesthesia such as difficult ventilation, tachycardia, hypoxemia, aspiration were documented as well. Airway management was carried out by experienced nurse anaesthetists, anaesthesiologists and student nurse anaesthetists.

Results: Tracheal intubation of obese patients can be safely and successfully performed using the McGrath Laryngoscopy in a high volume Swiss reference center for bariatric surgery. Absolute obesity, body mass index, somatometric data and airway evaluations parameters such as Mallampati Score, neck circumference, and width of mouth opening were not associated with intubation difficulties. In the large majority of patients, the trachea was successfully intubated by McGrath Laryngoscopy during the first attempt and without a statistically significant ratio of complications.

Discussion: These findings support the hypothesis that McGrath laryngoscopy may result in better airway accessibility and may permit the endotracheal intubation procedure to be performed with fewer airway and hemodynamic complications. Videolaryngoscopy based endotracheal intubation led to fewer attempts and is consistent with the recommendation of the American Society of Anesthesiologists Difficult Airway Task Force to limit laryngoscopic attempts and as a consequence, decrease complications. However, as this is a retrospective analysis

(This is an abstract of an unpublished study. Therefore the results are not shown in detail)

Reference: (1) Hodgson, E. (2016). Airway management of the morbidly obese patient. *Journal Of Perioperative Practice*, 26(9), 196-200. (2) Aidan Cullen, Andrew Ferguson, Perioperative management of the severely obese patient: a selective pathophysiological review, *Canadian Journal of Anesthesia/Journal canadien d'anesthésie*, 2012, 59, 10, 974 (3) Swiss Society for the Study of Morbid Obesity and Metabolic Disorders <http://www.smob.ch/de/component/jdownloads/send/1-root/41-zentrumsliste-4-2017>

Keywords: *Airway Management, Morbid Obesity, Videolaryngoscopy*

Infantile fibromatosis - case report

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Infantile fibromatosis is a type of fibromatosis that typically affects children less than five years of age. Patients are usually brought to a physician's attention because of the discovery of a large mass. The most common sites of involvement are the shoulder girdle and muscles and fascia of the head and neck and thigh. Involvement of the long bones may be associated with tumors of the leg. Infantile fibromatosis does not metastasize but can recur locally following surgical excision. The treatment philosophy is to perform as complete a surgical excision as possible without interfering with function or causing disfigurement.

Case report: Present a girl aged 16 months with laryngeal obstruction caused by tumor compression. The postoperative monitoring of a patient with the diagnosis of infantile fibromatosis requires the professional work of nurses with respect to hygienic and epidemiological procedures. Health care is based on the ability to notice all changes in the general condition of the patient. Also, the nurse's task is to control vital functions, fluid balance, respiratory support, and to regularly maintain a complete hygiene of the body, especially on the oral cavity because the patient is intubated.

Discussion: K.N., a 16-month-old girl, was admitted to a children's hospital for acute laryngitis who did not respond to the treatment. Due to the risk of respiratory failure and the deterioration of the child's parameters of vital functions, the child is transferred to the intensive care unit because mechanical ventilation is required.

Due to the asymmetry of the neck and palpable tumor mass, all necessary diagnostics were performed. The results have revealed a possible hemangioma diagnosis, and Propranolol was included according to the protocol. A child was still in severe general condition and with the recommendation of the consultations an operation was performed, where the tumor mass, from the neck and part of the mediastinum, was completely removed.

On the fifth postoperative day the child is separated from the mechanical ventilation, followed by a period of stabilization, afebrillity, and gradual nutrition. The well monitored nutrition was at first through the nasogastric tube and then through the mouth. Afterwards physical treatment was included. In the thirteenth postoperative day, the child begins to febrile again with elevated parameters of the infection and positive parameters for toxic hepatitis. As there was no longer a need for the child to stay in the intensive care unit, a consult was arranged to move the child to the department of hematooncology and to proceed with further treatment. The pathohistological analysis confirmed that it was a infantile fibromatosis.

Conclusion: Although infantile fibromatosis is very rare, it is possible for it to occur and cause obstruction in the upper respiratory tract. The infant was admitted to treatment for acute laryngitis that did not respond to the therapy. In the further course of treatment, the patient's condition improves, the vital parameters are stable. The treatment of the physiotherapist continues. At

the end of the antibiotics, laboratory analysis is checked and results have shown that they were within the limits of reference values. Modern technology has led to advances in healthcare treatments including very rare and previously incurable diseases. Well-educated medical staff has raised healthcare to an impressive level.

Reference: 1. Goldblum JR, Folpe AL, Weiss SW. Fibrous Tumors in Infancy and Childhood. In: Enzinger's and Weiss's Soft Tissue Tumors, 6th ed. Elsevier Saunders, Philadelphia, PA; 2014:256-287. 2. Muniz ML, Lobo AZ, Machado MC, Valente NY, Kim CA, Lourenço SV et al. Exuberant juvenile hyaline fibromatosis in two patients. *Pediatr Dermatol.* 2006 Sep-Oct;23(5):458-64. 3. Larralde M, Santos-Muñoz A, Calb I, Magariños C. Juvenile hyaline fibromatosis. *Pediatr Dermatol.* 2001 Sep-Oct;18(5):400-2. 3. Hutchinson I. Juvenile systemic hyalinosis--a rare cause of gingival hypertrophy: a case report. *Int J Paediatr Dent.* 1996 Mar;6(1):39-43.

Keywords: *child, Intensive Care Unit, mechanical ventilation, pathohistological, operation*

E-learning as an educational tool for management of difficult intubation

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Background: Problem with management of the unexpected difficult airway is one of the worst single risk factors associated with anesthesia. There is always a need for structured practical training in management of the unexpected difficult airway. Experience from training of clinical simulation sessions in the anaesthesiological department support the need. An e-learning course is an educational tool that can complement the practical teaching and help train the algorithm based on Difficult Airway Society guidelines 2015[1], so that no patient injury occurs due to unexpectedly difficult airway.

Purpose:

- To develop a course as a supplement to the practical instruction in management of difficult intubation
- To add a training tool to the airway management algorithm

Method:

- Course: The course is developed in cooperation between the Anaesthesia Department at Vejle Hospital and the Center for E-learning in The Region of Southern Denmark. The target group for the course is anesthetic physicians and nurses, both during training and as brush-up course for trained staff. The course consists of several parts: Video / Case / Quiz. Through a series of questions, one can test knowledge of respiratory assessment, management of the difficult airway, expected difficult intubation and unexpected intubation. The course also provides knowledge of special techniques like jet-ventilation and two-hand ventilation technology, and links to relevant guidelines are available. The learning course takes about 30 minutes to complete, it can be repeated and the results are only available to the individual. The product will be pilot-tested by four relevant users. Each participant will receive an evaluation questionnaire after completion of the course, and based on their assessment, the course will be adjusted before final release. The course has been developed in relation to handling the difficult airway at Vejle Hospital, and the content is adapted to this.
- Evaluation: Each participant will receive an electronic questionnaire after completion of the course. The purpose is to evaluate the participants' assessment of the usefulness of the course as a method of learning and repetition. Furthermore, the participants will register whether the course was taken based on new learning, repetition or curiosity.

Results: Results are expected to be available for presentation at the congress. The course has been developed; pilot test will be conducted in February. The course is planned to be released in March 2018 and the evaluation study will be conducted in May 2018

References: 1. *British Journal of Anaesthesia*, 115(6): 827- 48(2015) Difficult Airway Society 2015 guidelines for management of unanticipated difficult intubation in adults.

Keywords: Patient Safety, Teamwork, Quality, Special Knowledge, Airway obstruction

Tegaderm™ film transparent dressing improves difficult mask ventilation in adult patients with a beard

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Introduction: The presence of a beard has been an independent risk factor for both difficult and impossible mask ventilation (Kheterpal, et al., 2006; Kheterpal, et al., 2009). The purpose of this pilot study was to examine the effectiveness of Tegaderm™ film transparent dressings placed around the mouth to improve mask seal and tidal volumes during positive pressure ventilation during induction of general anesthesia. It was hypothesized that the use of Tegaderm™ transparent dressings around the mouth will significantly improve mask seal during positive pressure ventilation.

Methods: 10 adult male individuals with a full beard scheduled to undergo general anesthesia agreed to participate in this study. After 3 minutes of preoxygenation and intravenous induction three attempts to ventilate with an oral airway were attempted. Tidal volumes were recorded. Then, three to four large Tegaderms™ (10 cm x 12 cm) were applied around the mouth incorporating the Vermillion border of the lip and oral commissures. Three more attempts to ventilate were attempted and tidal volumes recorded with the transparent dressings in place. Intubation proceeded immediately following ventilation with the transparent dressings in place.

Results: Statistically significant improvements in mask ventilation tidal volumes were observed: 250 ±56 mL (without Tegaderm™), 485 ±72 mL (with Tegaderm™) (P< 05). The anesthesia provider also perceived improved tactile performance related to mask slippage and ability to access the jaw.

Discussion: Tegaderm™ film transparent dressings provided a safe, clean, non-slippery efficient seal. Application only took a few seconds and only a small amount of tangential force was needed for removal, preserving the beard. Larger-sized Tegaderms™ are

recommended to avoid curling of the edges and a better seal. Other methods have discussed applying Tegaderms™ with the patient awake without incidence of claustrophobia (McGuigan, 2014). However, this study sought to compare effectiveness of mask ventilation with and without transparent dressings necessitating application post-induction.

Conclusion: Using Tegaderm™ transparent dressing represents a novel and effective technique to maintain mask seal and improve ventilation during induction of anesthesia in a bearded patient. It should be part of the anesthetic plan when difficult mask ventilation is expected for the patient with facial hair.

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Keywords: *Difficult mask ventilation, Tegaderm, beard, ventilation, transparent dressing*

Pediatric difficult airway management. Lessons learned from the Pediatric Difficult Intubation (PeDI) registry

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Introduction: Pediatric difficult airway management can differ from adults. Some of the pediatric difficult airway challenges are due to the normal developmental anatomic differences of the pediatric airway, and higher rates of oxygen consumption [1]. The Pediatric Difficult Intubation (PeDI) registry was developed as a multicentre registry to identify risk factors for difficult tracheal intubation, assess the complications of pediatric difficult intubation, and create recommendations to improve patient safety [2].

Methods: A literature search and review related to the pediatric difficult airway management and PeDI registry was conducted (January 2018) using PubMed and Google Scholar.

Results: 12 articles were identified and reviewed in relevance to PeDI registry. Risk factors for difficult tracheal intubation that resulted in non-severe complications (hypoxemia, laryngospasm, bronchospasm, vomiting) and severe complications (severe airway trauma, cardiac arrest, pulmonary aspiration) were identified as: weight less than 10 kg, multiple tracheal intubation attempts, short thyromental distance, and multiple direct laryngoscopy attempts [2].

Discussion: There are many normal anatomical and physiological differences between the pediatric airway and the adult airway. Infant/child larynx is located more cephalad, epiglottis is U-shaped and short, infant's tongue is larger in relation to oral cavity, and cricoid is the narrowest portion. Children have higher oxygen consumption rates that predispose them to faster rates of arterial oxygen desaturation during apnea episodes. Passive oxygenation via nasal cannula or extraglottic airway during intubation will delay hypoxemia and will allow more time to secure the airway with fewer attempts [2]. Data gathered using PeDI registry showed that 20% of children with difficult tracheal intubation had at least one complication (hypoxemia as the most common non-severe complication and cardiac arrest as the most common severe complication) [2]. More than two direct laryngoscopy attempts were associated with more complications. Limiting the number of direct laryngoscopy attempts and a timely transition to indirect technique (Glyde-scope, Fiber-optic scope) should be a priority for the anesthesia team.

Conclusion: Difficult intubation cannot always be anticipated especially in the pediatric patient. Thorough planning and preparation is important for management of any pediatric airway. Utilization of preoperative difficult airway checklist, choice of induction medications, equipment availability, limited attempts for less experienced staff, and the use of passive oxygenation have been shown to decrease some of the complications inherent to the management of a pediatric difficult airway.

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Keywords: *direct laryngoscopy, child, difficult intubation*

Efficacy and Safety of sedation during head surgical procedures

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Introduction with Hypothesis: We conducted a survey of French nurse anaesthetists (NA) about their practice of conscious sedation for head surgery (CSHS). We evaluated the incidence and nature of complications during head surgeries performed under conscious sedation. We investigated the practice in France and wanted to give an indication of compliance by French NA.

Methods: An 11-item survey was emailed to 50 NA in France and after analysing them, we conducted a study with seventy-one patients undergoing head surgery under conscious sedation from January 2017 to January 2018. Age, sex, body mass index, medical history, American Society of Anaesthesiologists (ASA) classification, previous sedation experience, stress level, premedication use, amount and type of sedative used, surgical duration, sedation level, incidents and recovery time were evaluated for all patients.

Results: 69 patients were included. Average age was 69.5 years. ASA class I, class II and class III were observed for 30.3%, 40.9% and 28.7% patients, respectively. 14 patients had previous conscious sedation experience. 62.3 % of patients felt much stressed, and 39.1% patients felt no stress at all. The airway was managed with nasal airway and blood pressure, cardiac rate and oxygen saturation were routinely measured. Respiratory rate (RR) was measured in 87% of patients. 62% of patients benefited from soft music during the procedure. Propofol combined with sufentanyl was routinely administered to 100% of patients. Ketamine was used in 73.9% of patients [1], and Midazolam in 14.5%. Post-operative nausea and vomiting were prevented in 92.7% of patients. Intravenous paracetamol alone was given to 66.6% of patients. 26.1% received a combination of paracetamol and ketoprofen. The rest of patients received other combinations of drugs. Intraoperative sedation levels were 21.7% alert and relatively calm; 74% light sedation, awoken to voice and 4.3% deep sedation with no response to voice. Complications associated with sedation occurred in 18 (26.1%) patients. There were no serious adverse events. 9 patients developed oxygen desaturation (< 95%) and/or bradypnoea during the procedure. Two patients exhibited paradoxical excitement. Hypertension in one patient. Three patients felt pain during propofol or paracetamol injection. One patient felt discomfort and one other patient felt pain during the local anaesthetic infiltration. In post-anaesthesia care unit one patient needed atropine due to a vasovagal episode. No prolonged recovery time was observed after the procedure.

Discussion: Our results suggest that complications associated with conscious sedation using the titration technique for minor head surgeries are mostly minor and can be successfully managed. Hemodynamic management must include surveillance of RR as it is involved in most of the complications. Even if safe, conscious sedation technique is stressful for patients. No pre-medication is used. As stress levels and previous conscious sedation experience are significantly associated with sedation-related complications, NA may play an important role to manage it. We have realised that when patients arrived at the operating room they hardly know what "conscious sedation" meant and this caused an extra stress.

Conclusion: We are working to set solid procedures for conscious sedation when no head access is available and this include surveillance of RR. We have organized a working group to create information flyers for patients that they will receive after the anaesthetic consultation in order to reduce patient stress levels and ensure a total security of CSHS.

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Keywords: *Nurse anaesthetist; conscious sedation*

Comparison of laryngeal mask airway insertion methods, including the external larynx lift with pre-inflated cuff, on postoperative pharyngolaryngeal complications: A randomised clinical trial

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Background: Postoperative pharyngolaryngeal complications are commonly reported following laryngeal mask airway (LMA) insertion. After induction of anaesthesia, the airway structures fall backwards under the influence of gravity, and this may contribute to difficulty in placement of a LMA. External airway alignment by lifting the larynx during insertion of an airway may avoid collision of the airway with laryngeal structures.

Objective(s): To compare pharyngolaryngeal complications after either conventional airway insertion with or without cuff semi-inflation and a method, including an external larynx lift. **DESIGN** Randomised controlled, double-blind, clinical trial. **SETTING** Ambulatory surgical operating rooms of a university hospital.

Patients: American Society of Anaesthesiologists class 1 to 3 patients undergoing ambulatory surgery scheduled to receive general anaesthesia for which a LMA was not contraindicated.

Interventions: Patients were randomised into three groups for LMA placement: G1, deflated airway; G2, pre-inflated cuff; G3, pre-inflated cuff with external lifting of the larynx. Assessment of pharyngolaryngeal complications (blinded assessor) was made at the time of LMA removal and again at 1, 2 and 24 h. **MAIN Outcome measures:** A pharyngolaryngeal complication, defined as a composite of one or more of sore throat, dysphonia or dysphagia at any time point, or blood on the airway at removal. **RESULTS** Of the 450 consecutive patients, 441 were studied. There were no differences in insertion times or number of insertion attempts among the groups. There was no difference in pharyngolaryngeal complications among the groups: G1, 57%; G2, 55%; G3, 52%, (P

= 0.77). Blood on the airway was observed less frequently in G3 (9%) compared with G1 and G2 combined (17%): difference-8% (95% confidence interval of the difference-0.8 to-16%, P = 0.01).

Conclusion: The external larynx lift technique was associated with a lower incidence of blood on the airway at removal, suggesting that the method may decrease trauma to the tissues of the upper airway during insertion.

Trial registration: Clinicaltrials.gov identifier: NCT01749033.

Keywords: *Laryngeal Masks, Larynx, Dysphonia, Wounds and Injuries*

The Probable Long-term Catastrophic Consequence from a Short-term Intubation. A survey of patients diagnosed as Idiopathic Subglottic Stenosis

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Subglottic stenosis (SGS) is a gradual narrowing of the trachea. Intubation with an endotracheal tube (ETT) is the known cause of 90% of SGS with a reported rate of stenosis following an intubation from 0.9-8.3%¹. Koshkareva et al reports the incidence of stenosis following an intubation at 1% to 11%.²

Idiopathic subglottic stenosis (ISS) is a category of stenosis that means stenosis of *no known cause*. Although an intubation is the causative factor in the majority of SGS cases, it has been strangely excluded in the investigation for cause in patients labeled idiopathic. Random limitations have been found in literature searches that seem to preclude the inclusion of an intubation as an etiology. Some of these limitations include: an intubation must be within 2 years to be the cause, an intubation must not be remote, since more women than men are affected it must be hormones and an intubation must be prolonged to be the cause. It is found that these limitations have no scientific evidence to support them. In fact, the author of one survey of ISS patients admitted that the 2-year time limit is a random, made-up number not based on any scientific research (email communication with an author of the Vanderbilt study). Other examples of these limitations: Valdez, in a retrospective analysis of ISS patients, only included recent intubations and excluded intubations that were not prolonged³. Wain, in *Postintubation tracheal stenosis* recommended that any patient who develops symptoms of airway obstruction must be considered to have an organic lesion but specifies that an intubation/ventilation must have occurred in the 'recent' past⁴. No explanation was offered as to what 'recent' past refers to nor why any past intubation should be excluded. Koshkareva et al, in an examination of risk factors of adult laryngotracheal stenosis only included patients that only had a history of a previous tracheostomy or prolonged intubation⁵. Short term intubations for non-airway cases were excluded; no reason given for these limitations.

The similarities of intubation-caused SGS and ISS are striking. 90% have a history of intubation. The majority of ISS patients have their site of stenosis at right below the vocal cords-exactly where the cuff sits. Pathophysiology, patient history and treatment are other commonalities. Patients rarely know if they were intubated and doctors rarely search old records. ISS is called 'rare' but there are 3,000 members on one closed face-book support group with more members being "weclomed" every week.

The effects of SGS on a patient's life is catastrophic. Patients⁶ describe loss of jobs, financial insecurity, loss of health insurance, the hopelessness of treatment modalities, constant fear of dying, the inability to ride bikes with their children and the embarrassment of being in public with their "Darth Vader" voices (recurrent laryngeal nerve injury). If some of these cases of subglottic stenosis are preventable, everything must be done to protect patients from this suffering. No factors in the search of cause should ever be excluded. A survey was administered to ISS patients to test the hypothesis that cases previously identified as idiopathic are instead possible intubation related and therefore *preventable*. The results of this survey of 314 ISS patients will be discussed in this learning session. The talk begins with a self assessment of routine airway management and knowledge level followed by a PowerPoint presentation of pathophysiology of SGS and the scientific research of tracheal ischemia that supports cuff pressure monitoring. The leading theories of ISS will be dissected and alternative theories offered. (If given an hour time, the talk will conclude with an ISS patient telling their story of surgery, symptom development and life after diagnosis and why all preventable measures in anesthesia must be used.)

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Keywords: *Subglottic stenosis, idiopathic subglottic stenosis, endotracheal tube intubation, cuff pressure, patient safety.*

The final count-down! Can time in PACU be used to predict clinical deterioration on the ward?

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Objectives: To compare the rate of rapid response team (RRT) activation, cardiac arrest, unanticipated intensive care unit (ICU) admissions and survival to discharge in patients that required a Post Anaesthetic Care Unit (PACU) length of stay of greater than two hours due to clinical reasons with a control group with a length stay in PACU of less than 35 minutes (median).

Design, participants and setting: Purposive-sampled retrospective medical record audit of patients admitted to PACU between January 2014 and June 2015 in an Australian tertiary hospital.

Results: A total of 1864 patients were included in the analysis (n = 931 prolonged stay and n = 933 control group). Prolonged stay for clinical reasons was higher amongst patients who were older, had high ASA, had surgery during the week, and were discharged

to surgical wards during the afternoon/late nursing shift. RRT activation following discharge from PACU occurred in 69 (7%) of patients in the prolonged stay group compared to 12 (1%) in the control group ($p < 0.001$). There were no cardiac arrests recorded in either the study group or the control within the 24 hours post PACU discharge period.

Conclusion: Prolonged stay in the PACU for 2 or more hours due to clinical reasons is associated with a higher incidence of clinical deterioration in the ward setting requiring RRT intervention within 24 hours following discharge from PACU.

Implications for practice: Our study has identified that there is significant predictive value in determining deterioration for patients that remain under active treatment in PACU for clinical reasons for greater than 2 hours. Cognisance of the same may begin to alter clinical practice pertaining to the location and level of care provided to the "at-risk" PLOSC patients. One suggestion might be to initiate dialogue with patient flow administrators to determine an appropriate destination of care. Another approach might include an ICU outreach consultation for patients with a PLOSC in PACU. We suggest that PLOSC in PACU should at least give rise to communication with the team leader of nursing staff on the ward with respect to altering nurse-to-patient ratios and should form a component of handover to receiving ward nurses.

Keywords: *Post Anaesthetic Care Unit, Clinical Deterioration, Rapid Response Team*

Patients' experience of positioning with a roller cushion during pancreatic surgery – a quality improvement study

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Introduction: In pancreatic surgery, the patient is placed in the supine position with the arms outwards. The purpose of safe positioning is to avoid nerve and / or tissue damage during surgery, but it is also important that all staff have access to the patient. Good teamwork in the operating room for optimal positioning of the patient is required [1,2]. A new method has been implemented where a roller cushion is placed between the patient and the mattress in height with the Xiphoid Process to offer the surgeon better working conditions to perform the technically difficult surgery. The pillow is 10 cm high and the positioning seems to be un-physiological. There is a lack of evidence regarding positioning with this new roller cushion which may lead to injury to patients.

Aim: To investigate patients' experiences of postoperative symptoms following positioning on a roller cushion during pancreatic surgery.

Methods: In this quality improvement study we use the PDSA - circle (Plan, Do, Study, Act) [3], often used in quality and improvement studies in healthcare. In the phase (Plan) we identified a problem: Are there problems with this roller cushion and will it cause the patients postoperative symptoms? In the phase (Do) we constructed a questionnaire and asked the patients on postoperative day (POD) 1 and 5 if they experienced any pain, numbness or stiffness in the neck, shoulder, back or arms. In the phase Study, we evaluated data. The last phase is Act. If postoperative symptoms occurs we need to change the new routine. If we can't observe any problems, we will continue with the new routine and have at least evaluated it.

Results: 43 patients were included. The result shows that it was mainly neck-pain (18%) and pain in shoulders (16%) that occurred on postoperative day 1 (POD1), but also numbness in arms and hands (14%) emerged. Redness on the back were also noticed. It seems that the patients experience more backpain (11%) on POD5, and they still have pain in the shoulders (16%). Three of the patients still reported problems with numbness in arms (7%). One patient still has problems with numbness in right arm and has contact with a neurologist. The comparison between high and low roller cushion doesn't show big differences, however it seems that patients have more postoperative complications day 5 with the lower roller cushion

Discussion and Conclusion: This quality improvement study has investigated patients' experiences of postoperative symptoms following positioning on a roller cushion. According to the result, it is difficult to say if it is the roller cushion that causes the postoperative complications. Therefore, it is of utmost importance to confirm a randomized controlled study to compare patients positioned on a roller cushion with a group of patients without the roller cushion during pancreatic surgery. There is a need to discuss this with the surgeons as the purpose of proper and correct positioning is to avoid nerve and / or tissue damage during surgery.

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Keywords: pain, patient safety, quality improvement

Status and equipment conditions of nurse anesthetists in post anesthesia care unit

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Introduction: The postoperative period is the final stage of perioperative process and begins with the admission of the patient to the post-anesthesia care unit (PACU) [1]. PACU is designed for close follow-up of patients recovered from the acute physiologic effects of anesthesia and surgery and for proper transport of patients to their services[2]. In the PACU field nurse, nurse

anesthetists, anesthesiologist, special equipments for high level hemodynamic and respiratory monitoring and support and drugs must be found [3]. The placement of PACU should be where the anesthesiologist and surgeon can easily arrive and the patients can be reached to the operating room urgently if necessary. Also, PACU should include all emergency furnishing (such as resuscitation and surgical equipments). Therefore it is important to determine the existing PACU situations, their compliance with standards and evaluation their deficiencies [4].

Objective: The purpose of this study is the estimation of the PACU conditions and equipment of the nurse anesthetists in different hospitals.

Material and Methods: 105 nurse anesthetists, working different public, private and university hospitals PACU were accepted. Information was obtained from one participant from each hospital to prevent duplication of information. The information was collected via e-mail with a questionnaire on participants' Google forms. Participants were informed about the research during the period of 06.03.2017 - 12.06.2017. The results were evaluated as percentage distributions.

Results: 61.9% (n=65) of the participants were female, mean age was 29.9 and age range was 18-49 (n=105). The vocational duration is 10,09 years, while the year interval varies between 1-27. 21.3% (n=36) of the participants were working in private hospitals, 25.7% (n=27) were in public hospitals, 21% (n=22) were in education and research hospitals and 18.1% in university hospitals. In 78.1 % (n=82) of cases PACU was placed in operating suit, in 11.4 % (n=12) of cases at least 4 operating rooms were found and in 58.1 % (n = 61) of cases nurse anesthetists were working in PACU. In the evaluated PACUs had oxygen delivery system 97,1%, pulse oximeter 86,7%, electrocardiography monitor and aspiratory system 84,8%, noninvasive blood pressure monitor 77%, oral-nasal airway 69,5%, ambu mask bag system 60%, laryngoscope and endotracheal tubes 46.7%, thermometer 34.3%, kapnograph 16.2% and neuromuscular monitor 5.7% for per patient bed. 64.8% of the participants reported that 3 or more patients per nurse anesthesia were followed in the PACU. 48.6% of the hospitals had a waiting room at the same floor with PACU for patients' relatives, whereas 48.6% of the hospitals did not have any special area for this purpose.

Conclusion: In our study, we established that in most of the centers, there are deficiencies in equipment for per patients bed. There was no temperature monitor for postoperative monitoring in most centers. Especially the number of capnographs and neuromuscular monitors which will detect early onset of respiratory arrest and prolonged neuromuscular blockade is inadequate. The provision of standards for the equipment contained in the PACU is of great importance for patient safety. Attempts should be supported to increase the standards and to identify and complete the deficiencies.

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Keywords: *Post Anesthesia Care Unit, equipment, nurse anesthetist*

Face to the “Insect Cancer” – Apply Clinical pathways to Care the Ex vivo liver resection followed by auto-transplantation for Hepatic echinococcosis in Anesthetic Nursing

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Introduction with Hypothesis: Echinococcus multilocularis, the zoonotic agent of human alveolar echinococcosis, is endemic in the northern hemisphere, especially in Western China. For patients with end-stage hepatic alveolar echinococcosis (AE), in vivo resection is usually very difficult. Ex vivo liver resection followed by auto-transplantation offers an effective approach to cure hepatic alveolar echinococcosis with non-resectable lesions. Contrasted with living donor liver transplantation, the operation and unhepatic time of auto-transplantation are both much longer. Optimal perioperative anesthetic management is crucial in this setting, and the anesthesia team should be familiar with the hepatic transplant procedure.

Clinical pathways (CPs) are multidisciplinary care plans with essential care steps for patients with specific clinical problems (Rotter et al., 2010). CPs were introduced in China in 2009 to assure quality, reduce risks, and increase resource efficiency. We apply CPs in liver auto-transplantation in order to achieve better quality of anesthetic nursing.

Methods: In anesthetic nursing for liver auto-transplantation, we protocolized Standard Operating Procedure (SOP), in whole perioperative stage distinguished between three stages, preoperative, during and postoperative stage, that based on Clinical pathways (CPs) to administrate anesthetic nursing, for example, Preoperative evaluation (ASA, Nursing diagnosis), Preparation (Anesthetic and Nursing Plan: medication, equipment, and so on...), induction, pipe insertion, surgical posture, preserve anesthetics, hemodynamic monitoring and management, preventability of pressure ulcer and body temperature, and safety transfer. Data were drawn from our anesthesia records. We studied retrospectively 5 patients (3 males, 2 females) with hepatic alveolar echinococcosis who underwent liver auto-transplantation in our hospital from 2016 to 2017, and compared the rates of nursing adverse events during the operations with other laparotomy.

Results: Although the anesthetic nursing of liver auto-transplantation is much more complicated than other laparotomy (mean operation time is 1246.8 minutes; mean blood loss is 3090ml; mean red blood cell transfusion is 9 units), hypothermia, medication errors and pressure ulcer haven't been observed, while the rates of them were 4.3% in other laparotomy during 2016 to 2017.

Discussion: Because hemodynamic instability is common in LT, additional hemodynamic monitoring is required. To clarify each monitoring line, we made the common sense that “blue” pressure monitoring set for CVP, “red” for ABP and “yellow” for PAP. Furthermore, we also used dedicated label to differentiate each. Sufficient intravenous lines in the upper part of the body should be inserted for possible rapid fluid resuscitation once massive bleeding occurs. We stipulated that peripheral intravenous lines for fluid resuscitation and blood transfusion while central intravenous lines for pushing or pumping drugs. Furthermore, stable hemodynamics may be supported by using kinds of drugs to increase the systemic vascular resistance. To prevent giving wrong drug, we set each drug a certain concentration and use colorful labels to differentiate them. Thus, no medication errors had occurred. Hypothermia (core temperature <35°C) causes multiple physiologic disturbances, including coagulopathy and cardiac dysfunction. Patients undergoing liver transplantation might be at particular risk of hypothermia owing to extended operating time, wide surgical field, and the absence of hepatic heat production during the anhepatic phase. Our ambient temperature was thermostatically controlled at 23°C in principle. A circulating water mattress set at 42°C was placed over the operating bed. Patient extremities were wrapped with cotton blankets. All fluids and transfused blood through peripheral intravenous lines were warmed. Of these 5 recipients, 1 developed hypothermia during unhepatic period, but recovered to 36°C in 15 minutes.

Conclusion: Nowadays, combining extreme surgical techniques such as *ex vivo* resection with liver autotransplantation can be considered to cure “Insect Cancer”. Considering the complexity and high risk of this kind of operation, adequate peri-anesthetic efforts should be made. We apply clinical pathways in anesthetic nursing to achieve less complications, such as pressure ulcer, hypothermia, blood transfusion or drug error, in order to decrease length of stay and hospitalization costs.

At the same time, CP success depends on traditional factors such as qualifications, competencies, program design and many institutional factors, especially incentives to shape physician prescribing behaviors.

Keywords: Alveolar echinococcosis, Care plan, SOP, Transplantation

Nitrous oxide during venous cannulation in children

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Introduction: Venous cannulation in children is a stressful procedure which may be associated with subsequent nightmares, separation anxiety, and anxiety for healthcare professionals. Nitrous oxide reduces pain during venous cannulation and it also enhances cooperation [1]. In the Anesthesia and Operation's Department, Rigshospitalet, Center of Head and Orthopaedics (HOC), we have recently implemented the use of nitrous oxide inhalation in children needing venous cannulation. The aim of this study is to investigate whether this new regimen provides adequate pain relief during venous cannulation. The hypothesis is that more than 80% of pediatric patients were pain free after venous cannulation using nitrous oxide, defined as a CHEOPS score below 6.

Metode: The staff on the ward called the NA, who brought the portable nitrous oxide inhalation system. The NA evaluated the child according to the pediatric difficult venous access scale (P-DIVA) which includes four steps. 1) visibility of vein after tourniquet

placement, 2) palpability of vein after tourniquet placement, 3) age of patient, 4) history of prematurity [2] After inhalation of nitrous oxide for 3 minutes, venous cannulation was performed. Level of pain during the procedure was assessed according to the CHEOPS pain scale, which includes an 6 domains; cry, facial, child verbal, torso, touch, and legs, Each domain is scored on a 0-3 scale [3] In addition, the following data were collected: use of facemask during the entire procedure, duration of the procedure and if the child held the facemask during the procedure.

Results: A total of 15 children, age 3-17 years were included in the study. The mean average age was 7 years. The study revealed that 80% of the children had a CHEOPS score of ≤ 6 . Twelve children had a CHEOPS score of 5-6, and 3 children scored 7-8. The facemask was on throughout the procedure in all children. The mean average of the procedures was 6.7 min.

Discussion: The study revealed that 80% of the children had adequate pain relief. Our results are consistent with other clinical studies with children and nitrous oxide [1] The CHEOPS scale has been evaluated in children and found useful and reliable [3] However, a source of error may be that the score does not only reflect the child's pain experience, as a high score can reflect fear and insecurity. *Venous cannulation is commonly performed procedure* cannulation Ketamine or Midazolam have often been used if children are anxious or have a P-DIVA > 4, these drugs may have significant side effects [1]

Conclusion: The use of nitrous oxide during venous cannulation in children, shows promising results, as 80% of the children have a CHEOPS score below 6.

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Keywords: Nitrous oxide - children - Venous cannulation - CHEOPS score

Non-intubated anaesthetic technique during video-assisted thoracoscopy for lobectomy: the anaesthetic nurse's perspective

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Introduction: Video assisted thoracoscopic surgery (VATS) has become a frequently used and widely accepted procedure in the thoracic surgery. Conventionally, isolated lung ventilation has been performed by the aid of double lumen tubes (DLT) or bronchial blockers (BB) [1]. Nevertheless, a novel anaesthetic approach has developed during the last decade, when intravenous anaesthesia combined with regional anaesthetic techniques was used without intubation (NITS) and with the maintenance of spontaneous breathing, applied mainly for biopsy, small anatomical resections and mediastinal tumour removal. The theoretical benefit of this technique is avoiding the potential harmful effect of mechanical ventilation [2].

Methods: The NITS method has been used in our institute as a routine for complete anatomical resections since January 2017. In a prospective observational case-control, non-inferiority study patients undergoing NITS were compared to patients managed with one lung ventilation (OLV). Anaesthesia is induced and maintained with target control infusion of propofol. Depth of anaesthesia is monitored by Bispectral Index targeting a value of 40-60. In the NITS-group spontaneous breathing was preserved and airway secured with laryngeal mask. Regional anaesthesia of unilateral vagal blockade was performed by the surgeon.

Results and Discussion: Over a period of 12 months 61 patients were involved in our study, 36 undergone NITS and 25 patients had OLV. There was no difference between the two groups in demographics (age, gender, type of tumor) and length of surgery. There was no significant difference in respiratory function. However, chest drains were removed significantly earlier in the NITS-group: 2[2-4] vs. 3[3-4] days.

Conclusion: Our data suggest that NITS is at least a non-inferior alternative of OLV and may also provide benefits for patients undergoing lobectomy such as shortened need for chest drains and earlier discharge.

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Keywords: non intubated, spontaneous breathing, double lumen tube, bispectral index, target controlled infusion, ventilation

Dexmedetomidine or remifentanil as part of multi-target anesthesia in elective colorectal surgery: a retrospective analysis on patient outcome after implementation of ERAS

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Objectives: Implementation of multidisciplinary approached ERAS programs result in a significant improvement of perioperative care and reduced length of stay (LOS). After implementation of full ERAS (January 2017), we were able to reduce complications by more than 40% and to achieve a significant reduction in LOS. At implementing of full ERAS, a new multi-target anesthesia protocol was introduced with among others the use of either dexmedetomidine or remifentanil, based on the choice of the attending anesthesiologist. No epidurals were used. The objective of this retrospective analysis is to analyze whether the use of either dexmedetomidine or remifentanil contributes to reduction in LOS, maximal NRS scores on the PACU and opioid intake during admission.

Methods: After approval of the Medical Ethical Committee, a search in our database system was performed (January - December 2017) for patients who underwent elective open and laparoscopic colorectal surgery that received either dexmedetomidine or remifentanyl. Primary outcome measures were LOS, maximal NRS at the PACU and opioid use during admission. Patients with readmissions and reoperations within 30 days after the surgery were excluded from this study.

Results: Two-hundred-sixty-nine patients could be identified (m=145 (53.9%), f=124 (46.1%), mean age of 67.5 +/- 9.5 y). Eighty-eight (32.7%) of the patients received dexmedetomidine during surgery and 181 (67.3%) patients received remifentanyl. LOS for the dexmedetomidine group was 4.06 +/- 2.83 (days, mean and SD) and for the remifentanyl group 4.41 +/- 3.00 (days, mean and SD), p = 0.36. Patients receiving dexmedetomidine showed significantly less pain (highest NRS (mean and SD) at the PACU: 2.78 +/- 2.36 vs 3.71 +/- 2.57 (p < 0.01). Opioid use at the first three days after surgery was lower and statistically significant after day 1 in patients where dexmedetomidine was used (28.6% vs 44.8%; p = 0.014)

Conclusions: This observational study indicates that patients receiving dexmedetomidine as part of a multimodal anesthesia have better post-surgery outcomes compared with remifentanyl, illustrated by lower pain scores and less use of opiates.

Keywords: *ERAS, Dexmedetomidine, Remifentanyl, colorectal surgery*

Patients lived experience of heat conservation measures during the perioperative period

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Introduction with hypothesis: There are amount of studies about hypothermia and prevention but it's scarce when it comes to how the patients experience the prevention. Patients that got a forced-air cover sense a higher temperature comfort and are less anxious [1] and patients that got a forced-air gown that they could adjust the temperature on their own experienced a higher sense of temperature comfort and a low level of anxiety [2]. In prehospital context patients experienced that a heated madrassas gives them a sense of safety, so they felt less tense, and more relaxed. Furthermore, a feeling of comfort and that the heat was spread through the whole body [3]. In 2008 and 2009 Sweden released recommendations how to maintain the patients normal body temperature. This included both passive and active warming like, warm blankets, well-heated rooms, legcover, heated intravenous fluids and forced-air cover. The access, knowledge and adherence to these recommendations was investigated and the results shows high access, low adherence and that little more than half of the nurse anesthetist have knowledge of the recommendations. This study led to the question, how does the patients feel about the prevention? The aim is: Describe the patients lived experiences of heat conservations measures during the perioperative period.

Methods: An inductive qualitative study with 15 in-depth interviews of patients from four different hospitals were analyzed with Reflective lifeworld research. The patients that participated were between 29-82 years old, seven men and eight women. The hospitals were located in south, east, west and north parts of Sweden and represents one university hospital, two regional hospital and one minor hospital.

Results: There are individual variations between being warm enough, too hot or freezing, and it is important to take into account the unique person's everyday temperature experience. Heat has differnt meaning and priority depending on time (pre-, intra och postoperative), space and general condition. Being undressed means, in one hand, lack of autonomy in order to maintain a normal body temperature, but there is also an option to use different heat conservation measures as well as the ability to ask for help. Heat provides a sense of security, calmness and being embraced, which is described as a home feeling.

Discussion: The feeling of safety and relaxation seems to be the same as in the prehospital context [3] but the surprising part was the patients' sense of home feeling and to be embraced when they were given a warm cover. A little thing as a warm cover can give so much security and good experience of the surgery.

Conclusion: By giving patients, a warm cover or a blanket the staff at the operating department can prevent worries and give the patients a feeling of security and that they are embraced. The staff have to keep in mind that the patient is a unique human with a unique personal normal body temperature. Ask the patient more often if they are hot or if they are cold, especially in the postoperative units. Since a lot of patients' feels exposed and vulnerable in their hospital cloths it is better to give them a cover or blanket to protect themselves and in order to keep their integrity.

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Keywords: *Hypothermia Prevention Comfort*

Nurse anesthetist adherence to recommendations about how to maintain patients normal body temperature during surgery

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Introduction with Hypothesis: Mild perioperative hypothermia during surgery is common, 46% [1] of the patients develop it and are at risk for clinically adverse event. Best practice to avoid hypothermia is to maintain the patients' normal body temperature during the perioperative period [2]. If the patient got prevention like forced-air cover before the induction, then the temperature drop due to redistribution can be minimized [3]. Two evidence-based recommendations were released about maintaining the patients normal body temperature in 2008 and 2009 in Sweden. The aim is: Does the patients receive the recommended care? Does the nurse anesthetist have access and knowledge to the recommendations?

Methods: A non-experimental, prospective survey design was used where 70% of the hospital in Sweden participated. Two questionnaires were developed and used, one to head managers and one for nurse anesthetists whom had adherence to 1169 patients at the operating department.

Results: A majority of the patients (63 %) was in an operating theater with temperatures below the lowest recommended limit, during their surgery. The nurse anesthetist access to recommendations was high but their adherence was between 5-67 %. Surprisingly only 1/3 of the patients got a forced-air cover and only 1/5 of them got it before induction. About 57-60% of the nurse anesthetist have knowledge about the recommendations. The most common explanation to why they did not adhere was short surgery.

Discussion: Even though a forced-air cover is recommended worldwide, only 1/3 of the patients in this study got one. Another noteworthy problem was that the explanation that the surgery is short is not a valid argument to not provide the patients with proper heat conservation measures. Being as the biggest temperature drop happens within the first 30 minutes of anesthesia due

to redistribution. This means that every patient getting regional or general anesthesia are in need of heat conservation measures before induction and during the surgery.

Conclusion: To reach a higher level of adherence there are some steps that are important. The recommendations need to be clarified due to the fact that some recommendations are open to free interpretation. Furthermore, there are needs for the recommendations to be implemented in the local guidelines at the operating department. Moreover, there are need for enough material and equipment in order to be able to follow the recommendations. Repeated education about redistribution and the recommendations to both the operating department staff and the surgeons are needed. Finally, there are needs of enough resources for a person that can advocate the implementation.

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Keywords: *Hypothermia Perioperative Prevention*

Serious cranial trauma in a resuscitation environment: practice evaluation

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Introduction: The prognosis of severe cranial trauma depends on the precocity of data-based management of multimodal monitoring and the existence of a multidisciplinary team. The main objective of this study is to evaluate resuscitation practices in subjects with severe cranial trauma and to discuss behaviors based on recommendations.

Method: It's a retrospective, descriptive and transversal study. It was designed as a study by self-reported questionnaire conducted in 2016 in Tunisia. 60 doctors participated in this study 15% senior, 30% resident in 4th year, 25% residents in 3rd year and 30% in 2nd year.

Results: 81.67% of these physicians did not use ICP monitoring; 88.33% did not measure PPC; 76.7% did not measure the SvjO₂; 46.7% had practiced Transcranial Doppler fluently; 71.7% did not use EEG; 83.3% used brain CT repeatedly to monitor brain damage; For 41.7%, 20mmHg was the therapeutic threshold value of the PIC; for 33.3%, 70mmHg was the threshold value of the PPC and 80% never applied the concept of Lund. Among physicians 61.67% used mannitol in case of intracranial hypertension, 43.34% used hyperventilation if the presence of intracranial hypertension, 85% were sedated patients and 68.3% used systematically anticonvulsant. If ICHT, 31.67% of physicians used decompressive craniectomy. If PAM <90mmHg 46.7% used vasoconstrictors mainly norepinephrine.

Conclusion: Throughout our survey, resuscitation practices for TCG subjects in Tunisia were not consistent with the recommendations. A reflection must follow to better correct these practices and adapted to our context

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Keywords: *cranial trauma; resuscitation; medical care; intra cranial pressure; monitoring*

Patient's experiences of computer tomography-guided ablations of liver tumors using microwaves

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Computer tomography (CT) guided ablations of liver tumors using microwaves is a relatively new type of treatment. Studies examining treatment results and complications have been made but how the patients undergoing the treatment experience the care process has not yet been described closely. The aim of this study was thus to describe the experiences of patients undergoing CT-guided ablations of liver tumors using microwaves, focusing on identifying suffering during the time of care. A qualitative method was chosen, with a somewhat deductive approach. Eight semi-structured interviews were held and transcribed, and the data was analyzed using direct content analysis. For deductive application of categories, terms from Katie Erikssons theories on suffering were used. Both experienced actual suffering as well as potential suffering prevented or lessened were identified to present positive as well as negative experiences. The result was identification of suffering of illness such as pain, weariness, mictional dysfunction, breathing difficulties and anxiety directed towards a variety of aspects concerning situation and care; suffering of care such as lack of information, powerlessness, guilt and the feeling of being exposed; suffering of life such as regret

and the feeling of mortal threat. Findings also include the opposite of many of the sufferings mentioned above, for example feeling of ease, thankfulness, hope and relieved pain. The conclusion was that the result largely confirms previous findings concerning complications from this kind of surgery as well as patient's experiences of cancer and going through surgery. The respondents' overall experience of the healthcare was found to be positive.

Keywords: *computer tomography, ablation, experience, neoplasms, anxiety*

Applying Bispectral Index Monitoring to reduce the incidence of Postoperative Delirium

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Geriatric patients represent a uniquely vulnerable group very sensitive to the stresses of hospitalization, surgery and anesthesia. It is well recognized that elderly patients have less CNS reserve than younger patients. Postoperative delirium (POD) is the most common surgical complication in older adults, occurring in 5 - 50% after surgery. Delirium is a serious complication for older adults because an episode can initiate a cascade of deleterious events, including major postoperative complications, prolonged hospitalization, loss of functional independence, reduced cognitive function, and death. [1] POD is an acute confusional state characterized by inattention, abnormal level of consciousness, thought disorientation, and fluctuating course, representing acute brain failure. Providers caring for surgical patients should perform preoperative assessment of POD risk factors, including age > 65 years, pain, chronic cognitive decline or dementia, poor vision or hearing, severe illness, and presence of infection. [2] POD, a compelling quality improvement target, because it's preventable in up to 40% of patients, therefore ideal for preventive interventions to improve outcomes of older adults. [3] Many elderly patients have Mild Cognitive Impairment at baseline. The cognitive deficit may not be readily apparent preoperatively, but is unmasked by the peri-operative experience. Anesthetists should attempt to minimize peri-operative risk in the vulnerable elderly by thoughtful pre-operative assessment of organ function and reserve, meticulous intra-operative monitoring and drug selection/titration, vigilant post-operative monitoring and pain control. Hip Fx patients have highest incidence POD 35-65%. Trials by Sieber, et al. examined use of sedation with spinal anesthesia for Hip Fx repair. Investigators observed routine practice of anesthetists administering Propofol sedation with spinal anesthesia. Bispectral index (BIS) monitoring applied to each subject yet blinded to providers. Results showed that a third of patients have electroencephalographic (EEG) evidence of general anesthesia (GA). The authors then observe the outcomes if sedation were titrated to specific target using BIS. Results showed elderly Hip FX patients randomized to light sedation group (BIS-80) had considerably less POD vs. deep sedation group (BIS-50). Patients in BIS 50 group had a higher incidence of mortality. BIS guided sedation reduced POD by 53%. (4,5) The 2013 CODA trial by Chan et al. replicated Sieber's results, enrolling 961 elderly patients for GA >2 hrs. BIS guidance resulted in decreased Propofol 21%, volatile agents 30%, 4.3 min. faster emergence, PACU stay reduced 12.5 min., significantly fewer postop infections, POD 27% reduction and POCD 31% decrease at 3 months. For every 1000 patients undergoing major surgery, BIS-guided anesthesia prevented POD in 83 patients during hospital admission and 23 from POCD at 3 months. (6)

Radtke et al. randomized elder subjects to BIS guided vs. standard care with a 22% reduction in POD. Post-hoc analysis showed average BIS was similar in the groups, the "routine care" patients had more episodes of BIS

<20 and higher average intraoperative EEG suppression. Authors propose reduction in POD may be related to decreasing the time spent at very low BIS >20 with high levels of EEG suppression. EEG slowing has been associated previously with POD. (7)>

Fritz et al. enrolled 727 patients receiving GA with planned intensive care unit stay. Duration of intraoperative EEG suppression recorded from frontal EEG channel (FP1- F7), the same channel used by BIS sensor. POD was observed in 26% of patients. When comparing patients with no EEG suppression with those with suppression based on duration of suppression, patients with > suppression were more likely to experience POD, P < 0.0001. Predictors of EEG suppression included greater end tidal agent concentration and lower intraoperative opioids. EEG suppression is a novel, independent risk factor for POD in surgical patients after anesthesia with inhaled agents. EEG suppression was also correlated with reduced functional independence 1 month after surgery. (8)

2015 pivotal in EEG monitoring history, as 5 societies released EEG practice guidance, including American Geriatric Society with respect to intraoperative measures to prevent POD. Proposing practitioners use processed EEG monitors of anesthetic depth for IV sedation or GA of elders to reduce POD. Processed EEG monitoring has a few studies of adequate quality for recommendations. Providing lighter depth of anesthesia reduces POD vs. deeper sedation. (1)

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Keywords: Postoperative delirium, Bispectral Index, Mortality, Geriatric, MCI

Interprofessional training between specialist students in nurse anesthesia and specialist students in operating room nursing for improving patient safety through collaboration and communication

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Background: Patients with complex health illness and in need of advanced medical and nursing care in high risk organizations, as in operating theatres, will in the future require specialized care of interprofessional teams where the members have the ability, attitudes, skills and knowledge to give medical and nursing care together with common objectives. Each member in the surgical team, have expert knowledge, but some task and skills are common; patient safety, communication and collaboration. To maintain patient safety during surgery, communication and collaboration within the surgical team are crucial. A severe factor to inefficiency and adverse events are insufficient communication and collaboration. Well known barriers in the surgical team are unclear roles, different communication strategies and professional culture among nurses and physicians. Objective: The aim of this study was to see how interprofessional training between specialist students in nurse anesthesia and specialist students in operating room nursing developed the students view of safety climate through collaboration and communication. Setting and participants: A sample of 85 participants including specialist students in nurse anesthesia and specialist students in operating room nursing who did internship in an operating department of two large University hospitals were included. Methods: The training started with a lecture about collaboration and communication. Before the training started and one week after the training the students completed surveys on cooperation and safety climate. The surveys were RIPLS (Rediness of Interprofessional Learning Scale) and SAQ (Safety Attitudes Questionnaire). After the lecture the students trained together in the task "positioning of a patient". They (anesthesia and operating room nurse students) worked together and reported the function of the OR bed, how a patient is positioned in the back position, position with leg support and prone position. Results: The results of the surveys will be reported. Conclusion: A first step towards the development of teambuilding interventions in the operating room is to train different student categories to clarify roles and responsibilities.

Keywords: *Communication and collaboration*

Should we not better talk to each other? And could we improve this with training? Yes, we should! And yes, we could!

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In anesthesia, nurse anesthetists work not only with team members of their own professional group, but very often with numerous people from other disciplines and professions. At these interfaces, misunderstandings, differences of opinion, and even conflicts can arise that can compromise the safe and optimal care of patients. Not always, a common treatment path of all participating disciplines can be found and performed. The causes are that we find it difficult to find consensus between different priorities. We humans tend to favor the views of our own group and devalue others. In psychology, this phenomenon of "in-group favoritism" is a well-known field of research. In order to discuss with other groups and achieve consensus solutions, we need to overcome this in-group bias. Literature shows that this can be achieved by personalization of the individual group members and by sharing of positive experiences. However, the realization and transfer in daily routine is demanding and is influenced by time pressure and other factors. In our department we conduct interdisciplinary simulation trainings in order to know each other in a better way and gain mutual positive experiences. In our trainings, we pay attention to promote positive interdisciplinary interactions. Feedback from the participants in these trainings confirms that mutual appreciation in everyday working life is increased. The participants recognize that unbiased discussion and joint action leads to better results in patient care. The interdisciplinary networking and dependence will increase not only in anesthesia but also in other special fields. To improve interdisciplinary collaboration, we recommend using simulation training frequently as an important tool to reduce in-group bias and promote consensus solutions.

Keywords: *safety, in-group favoritism, simulation training, interdisciplinary decision making*

Quality and Safety in anesthesia – The right to information and cooperation and The right to consent to anesthesia

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Introduction with hypothesis: This article discusses the existing regulation of the protection of patients' rights in the Republic of Slovenia and Member States of the European Union and the ex-post evaluation of the effectiveness of the regulation of patients' rights in Slovenia. We wanted to analyze the existing regulation of patients' rights in Slovenia and the Member States of the European Union, in particular the regulation of rights which related to the right to information and cooperation and the right to consent to anesthesia. The aim of the research is to present, explore and compare the legal framework of the regulation of patients' rights in the 27 Member States of the European Union. Although international initiatives and documents have been

encouraged to develop patient rights, the Member States of the European Union do not have a common patient rights legislation. Patient rights vary from country to country for numerous reasons. Various healthcare systems, procedures, culture and priorities contribute to diverse legislation. Some countries have a single law or act defining patient rights, while in some countries rights are dispersed among many laws or acts. Patient rights have become an important point on the political agenda of most European countries. Individual awareness of their own health rights is constantly increasing.

In Slovenia, on the basis of the Patients Rights Act, all patients have the right to information and cooperation, which also means that all patients have the right to an informed consent to anesthesia. 20. article of the Patients Rights Act states: "The patient has the right to independent decision on treatment and the right to participate in the treatment and information process [1].

The concept of informed consent stems from the fundamental ethical principle of the right of self determination. This principle recognizes that patients are autonomous, independent agents with the right to make decisions regarding their well-being without coercion from others. Anesthesiologists must obtain informed consent for anesthesia care[2].

Method: The methodology of this paper is descriptive. We used a review of Slovenian and non-Slovenian literature related to the topic. The Slovenian regulation of patient rights was compared with the regulation in the EU Member States, for which we use the comparative method.

Results: It has been found that in the Member States of the EU, patients' rights are not regulated by a special law. Patients' rights are scattered across different fields of law. In Slovenia and twelve other countries, patients' rights are regulated by a special law. A research conducted through a retrospective analysis of the effects of regulations showed that, by adopting the Patients Rights Act, Slovenia improved the situation in the field of patients' rights protection. Patients Rights Act provides for fast and efficient handling of the majority of the complaints. Considering the field of patients' rights, Patients Rights Act is entirely comparable to the modern European legislation.

Discussion and conclusion: The laws are written for citizens of the Republic of Slovenia. It is important that we listen to their ideas, suggestions and thoughts. The government's task is to create such a policy which would aim towards those ideas.

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Keywords: *Law, right, patients' rights, Patients Rights Act, Member States of the European Union, legislation*

Finding the right words – Positive suggestion in anesthesia

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Background: Most of the patients awaiting an operation and anaesthesia are suffering from stress. Beside the professionals for whom the medical environment is usual business, they are confronted with unknown rooms, medical items and noises. This can cause stress for patients, which potentially can lead to peri- and postoperative complications. The communication with positive suggestion (ps) constitutes a technique to reduce stress reactions.

Question: How should we structure communication with patients by using ps during the period of anaesthesia induction, to minimise stressful reactions?

Method: A literature research is conducted. Moreover, an expert among this topic was interviewed. The gathered results are applied retrospectively to reflect a certain patient situation.

Results: PS affects a reduction of postoperative Nausea and vomiting (PONV), fever and the need of postoperative analgesia. Furthermore, it facilitates a quick mobilization and early discharge from hospital. PS allows professionals to perceive and capture the situation of patients and to facilitate a more relaxed "falling asleep" und "waking up" before and after an anesthesia. While using ps the focus of applies is not only on verbal communication, moreover on non-verbal communication. The expert-interview shows, ps is a possibility to lead and guide a patient's mental focus into a positive direction. The retrospective reflection of the certain patient situation shows the frequent use of negative suggestion (ns). E.g.: "the punctuation may hurt now". Those expressions could easily be reformulated in ps. E.g.: "I'll insert an intravenous line now". Furthermore, wearing facemasks during anesthesia induction hinders the development of a relationship to the patient.

Discussion: Based on these results, communication with ps is recommended. To implement ps into clinical practice repetitive training is mandatory. To enhance communications skills of the multiprofessional team, sensitization should be done daily for a long lasting effect. These findings lead the author to design a flyer with important messages to ps. It should support professionals in clinical practice to reformulate ns into ps. This flyer can be part of a concept describing communication with patients among the Institute.

Keywords: *hypnosis, communication, nocebo effect, stress, suggestion, placebo effect*

Parents is also a matter of the heart

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Introduction with hypothesis: Annually approximately 500 children are anesthetized for elective heart surgery in the Department of Cardiothoracic Anesthesiology, Copenhagen University Hospital. Parents and children often witness anxiety and there is currently not a systematic approach for reducing preoperative anxiety. The aim is to investigate which nonpharmacological interventions can effectively reduce anxiety in both parents and children (0-15 years) in the period prior induction of anesthesia in elective heart surgery.

Method: Through a systematic search of literature undertaken in the fall 2017, randomized controlled studies (RCT) have been found in the databases PubMed, Cochrane, Embase and Web of Science. The search has been conducted across wide groups of patients. Nine RCT studies have been selected and examined using Cocranes Risk of Bias tool 2.0. The findings have been discussed and related to clinical practice with the inclusion of qualitative studies to outline the results.

Results: The nine RCT studies represents a population of 1342 parents and children. Effects of interventions were found within 3 categories: *Multicomponent program, the use of clowns in the induction face and web-based interventions and a children's book*. The effect of anxiety reduction in the studies was measured by use of reliable and valid instruments m-YPAS, ICC, APAIS and STAI. Discussion and conclusion: The use of a multicomponent program ($p=0.007$) (1) and web-based program ($p=0.004$) (2) was found to reduce anxiety in both parents and children. Interacting with clowns, watching a educational descriptive video or reading a children's book have shown to have an anxiety reducing effect on either parents or children. In comparison with the qualitative studies, where parents are interviewed about their perioperative needs there is a good consistency between the results (3). Collaboration between the involved departments is further more supported to accomplish the reduction of anxiety by creating a link to the ward to enhance the hospitalization of the congenital family.

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Keywords: *Anxiety reduction, children, parents, perioperative, heart surgery.*

Children, Anxiety and Anesthesia

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Introduction: Anxiety occurring among children in the preoperative period is a well know phenomenon and is associated with an adverse postoperative outcome. Studies have shown that 60 % of all children undergoing anesthesia and surgery experience significant preoperative anxiety (1). Preoperative anxiety can lead to adverse clinical, behavioural and psychological outcomes including delayed recovery, emerge delirium, increased postoperative pain and negative behavioural changes after discharge such as anxiety attacks, nightmares and reduced appetite (2). The purpose of this pilot study was to explore if children in the age of 2-10 undergoing orthopaedic surgery experience anxiety in the preoperative period.

Methods: To assess preoperative anxiety in children an observatory tool, The Modified Yale Preoperative Anxiety Score (m-YPAS) was used, scores ranging from 22,7-100 (3). Children in the age of 2-10 years were observed at three time points, from arrival to the orthopaedic surgery ward and until the induction of anesthesia had finished. A partial weighting of the results was calculated.

Results: Ten children at mean age 5,4 years, 3 being boys and 7 being girls, were included in the study. 7 were induced intravenously and 3 had inhalation induction. 9 of the 10 children showed some level of anxiety or nervousness during the observations; especially when arriving to the operating room. 3 of the 9 children (33,3%) had high level of anxiety during the induction of anesthesia (partial weighting: 77,2, 100, 100), and 2 of the 3 children scored maximum points in m-YPAS, which means maximum level of anxiety. Mask induction of anesthesia was the most anxiety provoking, whereas distracting the children while inserting an intravenous access seemed less challenging.

Discussion: m-YPAS as an observatory tool was considered suitable and satisfactory for this study. Results show that 33,3 % of the children experienced significant anxiety, but the amount of children observed using m-YPAS was 10, and to gain a greater generalizability and reliability of these results, a bigger study with more participants must be made. Analyses lead to other interesting topics for future studies, in order to gain a greater knowledge about children experiencing anxiety in the preoperative period; mask induction versus intravenous induction, premedication, use of parents and interventions to prevent anxiety among children undergoing anesthesia.

Conclusions: Anxiety occurred among the majority of the children in this study but in various levels, and 33,3 % of the children experienced high level of anxiety. The highest level of anxiety was discovered when the children entered the operating room and during mask induction of anesthesia.

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Keywords: *Keywords: Children, anxiety, anesthesia, m-YPAS, mask induction*

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Free Communications X - Drugs in Nurse Anesthesia Practice

Room III.

Pharmacogenomics in anesthesia care

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Background: The practice of anesthesia is changing rapidly. Incorporation of pharmacogenomic data into daily anesthesia care is a burgeoning intervention in nurse anesthesia care. The literature is clear that precision- or personalized medicine-driven care results in improved outcomes, less adverse drug reactions, and better patient satisfaction. Numerous outcomes studies show that using pharmacogenomic data to drive prescriptive decision-making is becoming more and more commonplace in anesthesia practice.

Methods: A literature review was undertaken to identify relevant manuscripts answering the question about outcomes of pharmacogenomic-driven care in anesthesia. Over 400 manuscripts were identified, duplicates removed, and abstracts were read for relevance. A total of 22 manuscripts were included.

Results: Incorporation of pharmacogenomic-driven prescriptive decision-making can lead to three important outcomes:

1. Reduced adverse drug reactions
2. Improved pain control
3. Reduced length of stay

Discussion: Pharmacogenomic-driven prescriptive decision making in nurse anesthesia care has the potential to revolutionize how anesthesia care is delivered. By personalizing the pharmacologic interventions for each patient, the nurse anesthetist will have a large impact in the overall recovery for the patient. Reductions in adverse drug reactions, especially among potent opioid and neuromuscular blocking drugs, has the potential to be life saving. Future directions for pharmacogenomic testing include patient screening for identification of risk factor associated with the need for testing, clinical utility of the results, and the ethical, legal, and social implications of genetic testing in healthcare.

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Keywords: *Pharmacogenomics, pharmacogenomic testing, anesthesia*

A systematic literature review: Increased risks of neuronal death in patients with pathophysiologic blood brain barrier permeability in neuromuscular blockade reversal utilizing sugammadex

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Sugammadex is a polar molecule, γ -cyclodextrin, that reverses neuromuscular blockade of rocuronium/vecuronium by forming a 1:1 complex. This prevents the neuromuscular blocking agent from binding to the nicotinic receptor. Important dosing considerations should be noted especially regarding patients that have altered BBB permeability. This consideration is applicable to neurodegenerative diseases and cranial traumas. *The hydrophilic structure of the Sugammadex molecule exposed to increased BBB permeability will translocate and lead to precipitated cellular apoptosis.* Measures were followed to ensure a high-quality literature review. Data bases searched: PubMed, ClinicalKey and ScienceDirect. Six relevant articles were examined. The inclusion criteria of valuable information included the following parameters: peer-reviewed articles, data sources published in a professionally recognized journal (valid ISSN number/SCImago Journal Ranking) and articles published within 5 years. Summary of the primary article involved obtaining cortical neurons from rat fetuses. Neurons were isolated, washed and incubated under controlled conditions with phosphate-buffered saline, antibodies for cellular purity and a temperature of 37C. Western-blot analysis, TUNEL assay (DNA fragmentation), Caspase-3 activity assay (enzymatic activity) and cholesterol quantification were methods utilized within this study to examine the effects of Sugammadex (Palanca et al., 2013). The results demonstrated a significant association between Sugammadex and cholesterol concentrations. According to Palanca et al. (2013) "Sub-cellular fractionation revealed that SUG indeed decreased membrane-associated, cytosolic, and mitochondrial cholesterol levels...cholesterol enrichment prevented the release of different pro-apoptotic molecular signals." In a later study that compared neuronal effects of Sugammadex with its desired drug effect, similar experimental methods were used. These approaches included MTT assay (cellular viability), LDH assay (plasma membrane integrity), optic microscopy, Caspase-3 activity assay and western blots (Aldasoro et al., 2017). A critical finding of this study involved the Caspase-3 assay. According to Aldasoro et al. (2017) "In the culture medium ROC or VEC avoided caspase-3 activity increase produced by SUG which indicated a prevention of apoptosis when either ROC or VEC were present in the culture." There is a high degree of clinical consideration regarding these experimental findings. Many patient populations consist of those with neurodegenerative comorbidities, cranial traumas and importantly, the elderly. According to Gray and Woulfe (2015) "loss

of BBB integrity is normal in the aging brain.” Observing that the use of Sugammadex is a widespread, knowing cautions of its use is vital to prevent undue neuronal effects. Moreover, in reference to Palanca et al. (2013), “The present results indicate potential neuronal toxicity at clinically relevant doses of SUG, harmful effects should be limited to conditions associated with moderate or severe alterations of the BBB integrity. It is in this specific context where our findings may represent a warning, particularly when relatively high doses of this γ -cyclodextrin are required for the rapid reversal of NMB.” Furthermore, when Sugammadex use is required, dosing considerations for this specific patient population must be refined. Aldasoro et al. (2017) emphasizes “It would be desirable to titrate SUG to the minimal effective dose in order to prevent excess of free SUG in plasma that could induce neuronal damage, especially in situations of BBB function impairment.” The subset of populations that have BBB permeability due to vast pathophysiological processes are ever-growing making it of utmost importance that the anesthesia provider be aware of adverse effects of their medication choice. Sugammadex should be dosed according to previous neuromuscular dosing noting that unbound, free drug has the possibility of translocating causing neuronal degradation.

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Keywords: *BBB/ γ -cyclodextrin/ SCImago Journal Rank/ SUG/ ROC/ VEC*

Increased environmental awareness by anesthetic nurses may decrease the leftover volume of intravenous drugs

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Introduction. The Karolinska University Hospital, Stockholm has an ISO14001 certification for environmental management, The management is based on the vision; Patient first and the values; Responsibility, Holistic view and Compassionate, The population's increasing health problems may be prevented with improved environmental management is the idea. The hospital's goals corresponds with UN's global goals for sustainable development(1). Pharmaceutical management is one of the most significant areas for environmental impact. Nurse work for a sustainable environment and are aware of the importance of the environment for health, according to the ethic code for nurses(2). Climate effects from anesthesia gases, have been reduced by low anesthesia metabolic flow technology. Still there are a large volumes of leftover intravenous drugs in operating theaters. Local instructions declares all leftovers to be discarded in a small box near the patient after surgery and anesthesia before destruction. Is it possible to measure and affect the leftover volumes? Hypothesis. Increased environmental awareness by anesthetic nurses may decrease the leftover drug-volumes and environmental impact. Methods. The investigations performed yearly in one operating theater with 23 operating rooms, performing a vast variety of surgery, Left over drugs collected and sorted by name and specialty. Investigation repeated between 2013-2017 an average day. The colleagues and the management was informed of the result and discussed it. Result. The numbers of patients were 48-56 during 5 occasions, both adults and children. Propofol, Remifentanyl and vasopressors were the most common leftover drugs: Propofol 465-572 ml. Remifentanyl 341-468 ml. Fenylephrinhydrochloride 365 ml and Ephedrinhydrochloride 113-204 ml. The total leftover volume of intravenous drugs was 1993-2407 ml. No significant changes in the leftover volumes noticed 2013-2017. Maybe the leftover volume of Remifentanyl and Propofol increased when TCI introduced. Discussion. Hygiene and patient safety in drug handling are regulated by law by the Medical Product Agency(3). High staff turnover and new graduate anesthetic nurses and physicians complicates the environmental awareness. Conclusion. We can't see any decreased volumes of leftover drugs. We need someone to compete with. Still the interest is high from the anesthetic nurses. The investigations will continue.

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Keywords: *Environmental awareness, Anesthetic nursing, Intravenous leftovers*

Pharmacogenetics of opioid use in postoperative pain management

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Opioids are frequently administered for acute postoperative pain. However, up to 86 percent of patients experience moderate to severe pain after major surgery.¹ While several factors influence a patient's response to medications, genetic predisposition has been estimated to account for about 46% pain perception and sensitivity. Like endorphins that modulate pain, exogenous opioids exert most of their analgesic effects by stimulating mu-receptors (coded by the *OPRM1* gene). The phase I metabolism of most opioids is catalyzed by hepatic cytochrome p450 (CYP) enzymes, which are encoded by *CYP* gene. The highly polymorphic nature of the *OPRM1* and *CYP* genes suggests a potential role in interpatient variability in response to opioids. In fact, there are cases of deaths linked to *CYP2D6* polymorphism in children treated with codeine.¹ Pharmacogenetics seeks to predict patient's response to medication based on genetic predisposition to enhance efficacy and minimize adverse effects. However, a study found that Certified Registered Nurse Anesthetists (CRNAs) may not be familiar with the concepts and principles of pharmacogenetics. The

purpose of this review is to provide an overview of the pharmacogenetic principles and summarize pharmacogenetic evidence of relevance to postoperative pain management.

Methods: We reviewed the literature between 2000 and 2017, and references cited therein, using keywords related to postoperative pain management, pharmacology, and pharmacogenetics.

Results: Frequently studied genetic variability result from single nucleotide polymorphisms (SNPs), nucleotide insertion/deletion (Indels) and copy number variations (CNV). These genetic variations alter the structure and function of proteins such as the mu receptor (OPRM1) and CYP enzymes.

CYP polymorphisms may affect pharmacokinetic properties of opioids, which directly or indirectly affect their efficacy and toxicity. Codeine is a prodrug that undergoes O-desmethylation into morphine by enzymes coded by the *CYP2D6* gene. CNV of the *CYP2D6* gene results in CYP2D6 enzymatic activity that differs among patients: poor metabolizers, intermediate metabolizers, extensive metabolizers and ultra-rapid metabolizers.²Inheritance of at least three normal function variants, referred to as CYP2D6 ultra-rapid metabolizers result in the rapid conversion of codeine to morphine. This variant can result in morphine toxicity and was associated with severe respiratory depression and deaths in children treated with codeine.¹

Unlike the CYP2D6 polymorphism that affects pharmacokinetics properties, OPRM1 polymorphism (118 A>G) has been shown to alter the pharmacodynamics properties of morphine. Results from several studies have shown that inheritance of the G-variant of OPRM1 (118 A>G) reduces the efficacy of morphine and increases risk of adverse effects.³

Discussion: Opioids are the standard of care for the management of moderate to severe pain. However, genetic variability can have a profound impact on the efficacy and toxicity of opioids. There is a strong correlation between *CYP2D6* genotype and response to codeine. The US Food and Drug Administration (FDA) has issued a black box warning, against codeine use in children undergoing tonsillectomy for obstructive sleep apnea. The Clinical Pharmacogenetics Implementation Consortium (CPIC) has published *CYP2D6*-guided therapy recommendations for patients treated with codeine.²It recommends avoiding codeine in patients with poor and ultra-rapid *CYP2D6* metabolism. There is moderate evidence linking OPRM1 polymorphism to response to morphine.³However, further studies are needed to generate *OPRM1*-guided therapy and actionable pharmacogenetic evidence on the efficacy and toxicity of other opioids.

Conclusion: Patients respond differently to opioids, and genetic factors play a role in defining this variable response. An understanding of the principles of pharmacogenetics has the potential to improve postoperative pain management. CRNAs should be ready to use this information to improve patient outcomes.

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Keywords: *Postoperative pain, Pharmacogenetics, Opioids*

Applying the "Shendu" developed the quality of anesthetic nursing in China

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Applying "Shendu" concept of the Confucianism into education programs of the anesthetic nursing investigated respectively the validity and administration of narcotic drugs in China. We reiterate constantly the importance of narcotics and anesthetics in the management and administration; above all, Confucian "Shendu" belief is as same as nursing ethics."Shendu", is not only the traditional ethics of the China, but influence of the anesthetic nursing education、clinical anesthetic nursing practice and drug management in the anesthesiology department in china.

Methods:

From 2014to 2017, the Department of anesthesiology in Beijing Tsinghua Hospital affiliated to Tsinghua University, that based on the laws were Regulations on the administration of narcotic drugs and psychotropic drugs、Administration system of narcotic control drug. The thirteen core system medical treatment in China and Standards of anesthetic nursing framework, in order to constitute education courses for administration of narcotic drugs.

We quote the Confucian "Shendu" from the "Book of Rites - Mean" that means "not to despise secret or insignificance , a man of moral integrity is prudent when he is alone."in order to sustain the major principles possessed the concept of nursing ethics with Chinese culture.In the meantime, a number of 89 nurses involved in this training. As a result of theoretical and technical training courses, in addition, they received the examines. Unless the examination is passed, it is necessary to enter the clinical anesthetic nursing practice. They must pass the indicators those were the 100% of the accuracy rate about the usage、discarding and records of narcotics

Results: 2014/12-2017/11, was to obtain the achievement of 89 subjects involved in the assessment. The throughput rate of the theoretical examination for the first time was 89.88% (80/89), and it was passed after supplementary examination. According to the indicators for monitoring the quality of anesthetic nursing,three inspections and seven verifications、records and discarding , aim at the accuracy of the usage of narcotic control drugs. The result of the evaluation, the throughput rate, was 75.28% (67/89) for the correct discarding of the skills, and then via examinations was 100%.

Conclusion: Chinese laws and regulations: personal responsibility, special books, lockers, special prescriptions and special registrations act as a restraining act on anesthesia nurses. However, for addictive non-narcotic psychotropic substances such as Propofol, there is no controlled drug management. Undergraduate room in 1997, Soyka and other scholars confirmed that the study of propofol addiction and narcotic nurses entertaining drug application is the fourth largest drug abuse. In particular, since the 12th of January, 12, he has achieved good results in the education ethics of anesthesia control and non-controlled drugs with the Confucian "prudence and independence" spirit of Chinese culture in the first chapter of pedagogical ethics teaching.The particularity of narcotic medical work has determined that anesthesiologists and nurses have more opportunities to work alone

and operate independently, and these opportunities happen to be in the absence of outside control and supervision. The correct norms of medical behavior, whether the treatment is promptly in place, medication is reasonable, safe and effective, are unilaterally approved by the anesthesiologist nurses, and there are quite a lot of cases in patients with incapacity or perception, therefore, "Shendu" Spirit is especially important. In such a special environment, nurses should transform the law into an inner moral restraint. For the use of narcotics, they should check and use, record and discard the remaining drugs from their recipients and double persons in accordance with standard operation procedures, consciously restrict their behaviors, build a moral defense.

Keywords: *Restraining in Privacy, Narcotics, Ethics*

Is it possible to open two vaporizers at the same time intentionally?

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Introduction: Vaporizers used during induction and maintenance of anesthesia are attached to the anesthesia machines and can only be used single specific agents designed for the special vaporizers. In some anesthesia machines, more than one vaporizers may be mounted to the machine however with a special lock mechanism, only one of the vaporizers can be opened rendering the other one out of use at the same time. In our clinic, sevoflurane and desflurane vaporizers are mounted on the Draeger Primus (R), the lock mechanism making usage of two vaporizers at the same time and when one is opened other is locked.

Case Report: Fifty-seven years old, ASA I, 80 kg body weight male patient had been anesthetized to undergo total hip replacement surgery after all preparations had been done. Preoperatively, the patient who had preoxygenized with 100%, 3 lt/min, had a blood pressure of 135/85 mmHg and pulse oximetry (SpO₂) 100, heart rate 74/min. The induction of anesthesia had been obtained by intravenous (i.v.) thiopental 6mg/kg and muscle relaxation with rocuronium 0,8 mg/kg. The patient had been intubated by (8.0) endotracheal tube and then maintenance of anesthesia had been started with sevoflurane 2% in O₂/N₂O 50:50. Controlled ventilation with a TV: 600ml respiratory rate; 12, i/E 1:2 had been started short after which an alarm and extraordinary thing had been noticed in the gas analyzer. The gas analyzer had alarmed for an more than one anesthetic gas'. The anesthesia machine had alarmed for a 'mixture of gases' alarm. There were more than one gas in the inspiratory gas analysis of the machine. A fracture in the lock and safety mechanism of the vaporizers had been found and because of the fracture and error of the applicator more than vaporizers had been opened accidentally. All of these were recorded and the anesthetic agents had been rearranged so that the operation concluded without any adverse effects or complications to the patient.

Conclusion: The safety and lock mechanisms of every vaporizers mounted on the anesthesia machines locks a vaporizer while the other one had been opened so that only one anesthetic agent could be administered to the patients. However, this mechanism is not included in the checklist of anesthesia machine and not one of the regular routine obligatory tests. Fracture of this safety and lock mechanism of this system may cause opening of two vaporizers at the same time and simultaneous administration of more than one inhalational agents. Although vigilance of the anesthesia team and efficient inspiratory gas monitoring alarms caused safe anesthesia administration in our case, being not in the routine safety checklist, fracture of the lock system of vaporizers may harm patients. We suggest to include checking of this lock and safety systems of vaporizers and inspiratory gas analysis monitoring in the everyday routine checklist of anesthesia machines. It should be mandatory to have efficient working inspiratory gas analyzers as well to administer safe and vigilant anesthesia.

Keywords: *Anesthesia machine; alarms, anesthesia machine; vaporizers, safety systems*

Practical advice for developing and implementing an Interprofessional Student Research Conference

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Introduction: As part of an initiative to advance interprofessional education (IPE) in health science programs, a multidisciplinary faculty team from a public university in the United States collaborated to develop and implement an interprofessional student research conference. This presentation shares practical advice from the faculty experiences of developing and implementing an interprofessional student research conference. Consistent with the literature, we found that educators in our institution value interprofessional education and collaboration but struggle to incorporate IPE learning activities into the curricula of demanding health science programs. Because educators perceive IPE activities to be inefficient, IPE learning opportunities are still very limited in health science education [1]. To increase IPE learning opportunities, faculty recommend a more deliberate and intentional approach that integrates IPE into existing curricula [2,3,4].

Methods: Practical advice for developing and implementing an interprofessional research conference.

Results/Discussion: For our project, we designed an efficient IPE learning experience that simultaneously addressed required curricular content while promoting attainment of core competencies for interprofessional collaborative practice. Addressing both IPE and discipline specific content was our practical approach to meet expected program outcomes in health science majors with limited time and resources for implementation. Existing course assignments were modified to require students to work together as part of interprofessional teams to address current challenges in health care and improve community based population health through evidence-based practices. The interprofessional student research projects were presented at a college-wide student research presentation conference. The conference created an opportunity for students across disciplines to collaborate, interact, and engage with each other in health science research.

Conclusion: The interprofessional student research presentation conference is a sustainable model resulting in an annual forum for students to showcase their research. An overview of the activity with implementation strategies, program outcomes and lessons learned will assist other faculty in developing similar IPE learning activities in their own institutions.

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Keywords: *Interprofessional Education, Interprofessional Collaboration, IPEC Competencies, Health Promotion Teams*

Nurse Anesthesia Student Academic Educational Program Success Antecedents: A Scoping Review

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Introduction: Nurse anesthesia education is considered a demanding, stressful and high risk academic program. Admission criteria primarily focus on grade point average, years of critical care experience, graduate record examination scores and personal statements or interviews to predict student success in nurse anesthesia academic programs. The Doctor of Nursing Practice degree requirements as entry into practice propose challenges in the prediction of nurse anesthesia student academic success. The purpose of this scoping review is to identify the antecedents associated with nurse anesthesia student academic program success and propose educational recommendations.

Methods: A scoping review is a methodological process of mapping existing literature or evidence base to identify literature gaps and summarize research findings. A scoping review is being conducted to identify academic program success antecedents.

Results: The scoping review is in progress. An analysis of several research studies have identified antecedents associated with nurse anesthesia student academic program success such as emotional intelligence, coping mechanisms, working relationships, self-efficacy, and social support.

Discussion: A scoping review provides a process to map existing research based findings to generate a compilation of antecedents associated with academic program success, generate future research questions, and identify evidence from which to generate educational program recommendations. The findings of this scoping review is limited as the findings are primarily associated with masters level educational programs but provide common antecedents and variables that remain a concern with student success in academic programs.

Conclusion: This scoping review is identifying cognitive and non-cognitive antecedents associated with academic program success and provide an evidence based framework from which to develop evidence based students success programs.

Keywords: *Nurse Anesthesia Student; progression; scoping review*

The focused childcare course for nurse anesthetists

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Introduction: In 2015, the Anesthesia and Operation's Department, Rigshospitalet, Center of Head and Orthopaedics (HOC), launched the focused childcare course for nurse anesthetists (NA), to ensure that pediatric anesthetic skills were uniform and updated [1,2]. The department provides anesthesia for to approx. 3000 children annually from 4 different surgical specialties, ranging from neonates to teenagers. These specialties are orthopedics, plastic/burn, ophthalmic, ear nose and throat (ENT). Due to the great diversity of these procedures and co-morbidities of the patients, there is a need for specific competences for nurse anaesthetists. Therefore, we have developed a course, which aims to improve the practical and theoretical skills of the nurse anesthetists, to become more confident in anesthetizing children in HOC. Hypothesis: The hypothesis is that after this course, all participants will evaluate that they are more confident in anesthetizing children at HOC.

Methods: The number of NA participating in the focused childcare course is 6 at the time. The course takes 3 months and is conducted once a year. NA must write a motivated application to be accepted. Participants are expected to share new knowledge with their colleagues. Every participant must complete a logbook, with at least 40 paediatric anaesthesia procedures. Participants are assigned to different operating rooms (OR) and anesthetize children, supervised by an anesthesiologist or an experienced NA. In addition the participants attend lectures 3 hours in each of the following topics: trauma care and fluid resuscitation, management of the difficult airway, neonatal anesthesia, the mentally difficult child and premedication, children with cardiac disease, burn and spinal surgery [3]. At the end of the course there is an examination (card of competency) and an MCQ test. In addition, an evaluation form is provided, in which all participants rate the course.

Results: A total of 18 NA have participated in the course, 16 have passed the examination (card of competency) and an MCQ. The evaluation forms revealed that 15 out of 18 considered that the focused children's course gave them more confidence in anesthetizing children. The evaluation forms revealed that 14 out of 18 considered that the theoretical teaching throughout the course was very relevant. Overall rating of the focused childcare course for NA 11 very satisfied, 6 satisfied and ()neither nor 1.

Discussion: The majority of participants, with the exception of one, who has extensive experience of child anesthesia, evaluated that they were more confident anesthetizing children and that they all have improved their theoretical skills. The overall assessment of the focused children's course, 11 assessed that the course was very satisfactory, 6 satisfied. The positive overall evaluation of the focused childcare course is a clear indication that it will be a part of the HOC education program in the future.

Conclusion: The focused childcare course has strengthened the nurse anesthetist's self-confidence, moreover they have improved their practical and theoretical skills in pediatric anesthesia.

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Keywords: *Nurse anesthetists (NA) - Education - Children - Card of competency*

Developing skilled anesthetists takes a team: The role of the academic partner in resource constrained settings

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Introduction: Training skilled nurse anesthetists to meet international practice standards demands a long term commitment from a variety of sources. Northeastern University (NEU) joined an academic/clinical partnership that included Phebe Hospital School of Nurse Anesthesia (Phebe), Seed Global Health (Seed), and Global Health Service Partnership (GHSP) aimed at supporting sustainable high quality anesthesia education and care in Liberia. Following a full year of in country engagement of a GHSP sponsored nurse anesthesia educator, with Seed support and NEU consults, progress toward goals was assessed. Faculty development was identified as an important unmet need. The partners agreed that Liberian faculty could benefit from and intense immersion experience focused on nurse anesthesia education and best clinical practices. The Beth Israel Deaconess Medical Center (BIDMC) joined the partnership. The team implemented a 4 week immersion at NEU and BIDMC.

Quality Improvement/ Methods: We organized the course around the International Federation of Nurse Anesthetists (IFNA) practice standards [1] and World Health Organization Nurse Educator Competencies [2]. Context appropriate objectives were established during consultation among Seed, NEU and GHSP faculty, and BIDMC anesthesia department. Phebe leadership identified participants for the international immersion. A Seed nurse educator conducted pre planning orientation and directed logistics in Liberia. The partners agreed the primary objective of the academic immersion was to strengthen anesthesia care in Liberia through capacity building. Structured activities included mentored participation in classroom, simulation and clinical experiences designed to reinforce didactic and experiential pedagogy.

Outcomes: The Phebe anesthesia program director and assistant were immersed in a structured 4 week program during January 2018. They held university resource access as visiting scholars. They participated in nurse anesthesia classes, meetings, projects such as simulation, life support and skills lab training, and observed best practices in the clinical setting. At the conclusion of the program the participants were awarded Certificates in Advanced Nurse Anesthesia Education issued jointly by Seed, NEU and

BIDMC. Summative evaluation included a capstone and a class presentation, IFNA competency log recording, self assessment and program feedback.

Discussion: As many as 5 billion people lack access to safe essential surgery.[3] Anesthesia, performed by skilled clinicians, is recognized as a core component of safe surgery. To meet the G4 Alliance goal of 80% access to safe surgery by 2030, long term strategies to increase the quantity and quality of the anesthesia workforce are needed.[3] In Liberia the shortage of skilled anesthesia clinicians is urgent, but sustainably addressing that need must also include focus on nurse anesthesia educators. A partnership that engages an academic member, host country, NGO and clinical support in a train the trainer model can leverage expertise and resources to create educator development programs. Immersion in a well functioning academic program of nurse anesthesia is integral to this process.

Conclusion: This project demonstrates that it is feasible that a transnational academic/clinical partnership can conduct an immersion anesthesia education course aimed at sustainable anesthesia education improvement. Academic institutions have a responsibility to contribute.

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Keywords: *Liberia, nurse anesthesia education, academic partners, resource constrained setting, anesthesia education pedagogy*

A unique approach to high fidelity simulation curricula in nurse anesthesia education –bringing the practicing CRNA into the HFS experience

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Introduction: High fidelity simulation (HFS) has become an integral part of nurse anesthesia curricula. Doctoral nurse anesthesia students benefit by being exposed to high-risk, low-exposure scenarios during the clinical phase of education, but it requires more than just academic faculty to conduct this curricular experience (Epstein & Hundert, 2002; Flin, Patey, Glavin & Marin, 2010). It is hypothesized that bringing the local/regional community of practicing nurse anesthetists into the academic simulated environment as actors, and offering free continuing educational credits, will improve perceived student learning and satisfaction related to this advanced HFS simulated curriculum (Kassab, et al, 2010).

Methods: A 5-hour HFS curriculum was conducted monthly and studied for one year, incorporating academic faculty (n = 3), doctoral nurse anesthesia students (n = 48), and local certified registered nurse anesthetists (CRNAs) (n = 32). Each HFS session included 4 different high-risk low-exposure anesthesia scenarios where different CRNAs embodied various intraoperative roles (eg, CRNA to be relieved, circulating nurse, surgeon, and scrub technician). Four doctoral nurse anesthesia students each participated as the primary CRNA, and as a helper CRNA. Each scenario lasted approximately 10 minutes. A debriefing session then followed (30 minutes) where all participants convened and participated (students, actors, and faculty). At the conclusion of this half-day of HFS curriculum both actors and students were asked to complete a post-course evaluation. Evaluations from both students and CRNA actors were compiled over 10 months from January to October of 2017.

Results: Forty-eight student evaluations of the simulated experience were reviewed. 100% of students cited that the simulated scenarios increased knowledge and were an effective learning method. 90% of students believed that the debriefing sessions were helpful and 10% not helpful. Students who rated the debriefing sessions not helpful had comments such as “felt I was on the spot”, “did not like reliving such a poor performance”. Only 50% of students felt more confident in handling these same scenarios more effectively in the future. Written comments supporting this lack of confidence included “the scenario was overwhelming”, “I did not follow through”, “difficult to tell what is real”, “breath sounds hard to hear”. Comments from the CRNAs post-stimulation were overwhelmingly positive as well. Negative comments were not observed any written post-course evaluations. CRNAs expressed an interest to experience more HFS curricula for continuing education that has also been supported by other published evidence (Cannon-Diehl, Rugari, & Jones, 2012).

Discussion: Mixing nurse anesthesia students and practicing CRNAs in shared HFS scenarios offers a rich learning environment for all. Clinical relevance is embedded in the simulated experience and debriefing session as students merge didactic knowledge, clinical experience and the simulated experience along with the clinical expertise of the CRNAs. Several curricular improvements could enhance this HFS experience even more: 1) ensuring a safer debriefing environment to enhance student concerns, 2) increasing scenario library to minimize scenario repetition and 3) providing a second HFS experience. Student confidence and performance improvement have been documented with repeated HFS exposure (Arora, et al, 2011; Yee, et al, 2005).

Conclusion: High fidelity simulation curriculum incorporating practicing nurse anesthetists provides a rich learning environment for both students and CRNA actors that was not fully anticipated when this curriculum was initially developed. In addition, the CRNA community has provided a much needed resource for this multi-dimensional curriculum. Faculty could not conduct HFS curricula for a large cohort of students without engaging the CRNA community.

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Keywords: *high fidelity simulation, formative assessment, nurse anesthesia, actors*

Nurses anesthetists and statistics - Love, not war! Or why do nurses anesthetists need to research?

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Anaesthesia nursing is dynamic field of nursing which is developing very fast with implementation of new technologies and new techniques. Statistics is the science of classifying, organizing and analyzing data. Without the application of statistics, data and best research will have low significance. Statistics is a way of thinking - a special approach to what we are studying and researching, a method developed to work with numerical data in order to discover their legitimacy [1]. Quality selection, storage, and search enable numerous data to become important information relevant to health care planning and the organization of anaesthesia nursing practice itself. Quality and sufficient health care information is needed not only for nurses but also for other health care professionals as well as the patient and the community. Nursing as a profession facing many challenges and whose core activity health care supposes a group of specialized knowledge whose achievement requires intensive academic training as well as acquiring special skills especially for nurse anaesthetists. Anaesthesia nursing faces even greater demands in continuing education and implementation of evidence based medicine. The modern age of computerization has, in various ways, touched all healthcare structures, nursing as well. The field of science, methods, techniques, special education system, classification of knowledge, defined field of work and responsibility defines nursing as a profession through status in society, international relations and terminology [2]. The biggest challenge faced by healthcare providers and institutions is to provide evidence-based, effective / cost-effective, quality health care that will enhance practice and improve patient outcomes, for it is well known that providing the best care results in the best outcome for the patient. Development of new technology, new practices and science commits the nurse to continually improve and raise their profession to a higher level. This part of science, its knowledge about statistics methods and understanding of anaesthesia nursing allows implementation of the best quality nursing care. Improvement of the health system and the further development of anaesthesia nursing in the scientific direction using statistically relevant information and practices leads to anaesthesia nursing of tomorrow.

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Keywords: *nurse anaesthetists, statistic, nursing*

Nurse Anesthesia Education Partnership in Liberia

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Introduction: The Nurse Anesthetist (NA) is a vital contributor to the Liberian Health Care System, a system recovering from years of civil strife and the ravages of an Ebola epidemic. The Ministry of Health (MOH) has ambitiously undertaken a rebuilding initiative to address the shortage of trained healthcare workers including NAs (<100 for 4.5 million Liberians) [1-3]. Improving NA education is critical to scaling up safe surgery and reducing surgical, maternal and infant mortality. This necessitates a strong NA training program aligned with national priorities. In 2016, a partnership was established between Liberia's Phebe Paramedical Training Program, NA Program (Phebe) and representatives of the United States was established to enhance the nation's only NA education program to meet international safety standards.

Methods: Improvement methods were used to implement a rigorous Liberian NA curriculum over the program's existing 2-year configuration. Phebe Clinical and Didactic Faculty, collaborating with the Global Health Services Partnership (GHSP), Seed Global Health and Northeastern University meticulously reviewed the International Federation of Nurse Anesthetists (IFNA) practice and monitoring standards to define the essential knowledge and skills necessary to train a competent Liberian NA. The program's existing curriculum, considered in the context of Liberia's current health system and Phebe resources, was cross-matched with the IFNA program accreditation standards. Each course was then individually examined ensuring that its subject matter reflected IFNA standards and content presentation began in semester 1 at an introductory and ended in semester 4 at near mastery level. The classroom space was transformed for didactic and tactical training with the addition of simulation models. Monitoring equipment expanded at the primary clinical affiliation site to IFNA standards. Computer resource tablets were distributed to improved student/Faculty access to daily and in the moment teaching opportunities. Phebe Faculty were trained ensuring competency with all equipment. Measurable, progressive competencies were integrated as outcome benchmarks for students achievement. Faculty coordinated their efforts with MOH, national licensing bodies and the Liberian Association of Nurse Anesthetists (LANA) representatives to promote program buy in and future support.

Results: The 4, 16-week semesters program has been revised to meet IFNA competency based standards. The former curriculum consolidated its course numbers from 22 to 18 (taught in semesters 1-3) with the final semester reconfigured entirely for clinical immersion done to maximally expose students to the variety of clinical experiences Liberia can offer where terminal competency is to be assessed. Simulation experiences were formally integrated into course competency requirements. The revised curriculum has been submitted to the professional accrediting body for endorsement as the national curriculum for Nurse Anesthesia education.

Discussion/Conclusion: It was imperative that the Phebe curriculum was adapted to meet the needs of Liberia's resource constrained setting and aligned with national priorities when adopting international standards in order to be successful and self-sustainable. Strengthening NA training is necessary to fit within the Liberia's strategic plan for health workforce strengthening. This was a collaborative effort of Phebe, the MOH, LANA, and other partners.

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Keywords: *Liberia, nurse anesthesia education, anesthesia curriculum*

Developing the First IFNA Approved Anaesthesia Nurse Education Program in Mainland China

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Introduction: Numerous nurses work in operating rooms and recovery rooms or participate in the performance of anaesthesia in China. However, the scope of practice and the education for Chinese Anaesthesia Nurses is not standardized, varying from one geographic location to another. Furthermore, most nurses are not trained sufficiently to provide anaesthesia care [1]. This study aimed to develop the first Anaesthesia Nurse Education Program in Mainland China based on the Educational Standards of the International Federation of Nurse Anaesthetists (IFNA).

Methods: Two frameworks of developing advanced-practice nurses guided this study. The stakeholders (e.g., decision makers, experts and educators) and the environment (e.g., society, local health care conditions and professional nursing) constitute the

multiple contexts of advanced-practice nursing development. This study included three stages: identifying the scope of practice for CANs, establishing the competencies and developing the education program. The Delphi technique was applied in the study [2].

Results: The four-category, 50-item practice scope, and the three-domain, 45-item competency list were identified for Chinese Anaesthesia Nurses. The education program, which was established based on the IFNA educational standards and Chinese context, included nine curriculum modules. In March 2015, 13 candidates received and passed the 21-month education program. The Anaesthesia Nurse Education Program became the first program approved by the IFNA in Mainland China.

Discussion: The IFNA educational standards are the cornerstone of the education program in China. However, the national context also needs to be considered. Therefore, the framework of APN was applied to engage all stakeholders in the development of the anaesthesia nursing curriculum in China, and to encourage thought about the scope of practice, the competencies in the education program using the Delphi method. In this way, the first ANEP in Mainland China can not only meet the IFNA educational standards but can also fit the national context. Before the Chinese ANEP in this study, 18 education programs in the world were IFNA recognition including the United States, France, Iceland, Indonesia, Philippines, Sweden, Switzerland, the Netherlands, Tunisia and Denmark [3]. The ANEP in this study is the only hospital-conducted program in China, with similarity to Switzerland's program. China is still in the developmental phase for APN roles. The minimum education level for APN has not universally reached the masters or doctoral degree level. The ANEP does provide APN seminars for candidates to learn the APN-relevant competencies, which could help CANs provide qualified anaesthesia care and improve the anaesthesia care system in China. The length of the education program is 21 months, which includes 18 months of training and three months of evaluation. This program length meets the minimum training length strongly endorsed by the IFNA Education Committee.

Conclusions: Policy makers and hospital leaders can be confident that anaesthesia nurses graduating from this Chinese program will be prepared to demonstrate high level patient care as reflected in the recognition by IFNA of their adoption of international nurse anaesthesia education standards.

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Keywords: *Anaesthesia, Education, Accreditation, International, China, Nurse, Standards*

Anaesthesia nursing competence assessment in Finland

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Introduction: It is fundamental to assess nurse competence as educational outcomes in order to provide high quality and safe anaesthesia care [1]. Competence in anaesthesia nursing care can be defined as integrated ability based on not only theoretical knowledge in nursing and medicine but also practical skills for anaesthesia patient care including ethics, medical technology, and regulations [2]. This study aimed to assess the anaesthesia nursing competence to provide information about anaesthesia nursing education needs. The research question was: what is the level of anaesthesia nursing competence of anaesthesia nurses?

Method: For this study, the self-assessment of Anaesthesia Nursing Competence Scale (AnestComp) was developed. The AnestComp instrument has eight competence domains (35 items): 1) working with patient's beliefs and values, 2) patient risk management, 3) patient engagement with technology, 4) sharing decision-making, 5) medication competence, 6) supporting a monitored anaesthesia care patient, 7) providing for patient's needs in general anaesthesia, and 8) knowledge for anaesthesia patient care. The data (n=222) were collected through anaesthesia nurses working in two university hospitals in Finland (May-October, 2017).

Results: The anaesthesia nurses self-assessed their overall competence as 88 by using Visual Analogue Scale (0=not at all, 100=excellent). The highest level of competence domain was 'sharing decision-making' (93 scores) and the lowest competence domain was 'knowledge for anaesthesia patient care' (79 scores).

Discussion: Among the competence domains, 'sharing decision-making' emphasised as a core element to prevent critical errors and to promote quality of care in OR [3] was the strongest competence domain by anaesthesia nurse in this study. It represented that anaesthesia nurses might seek consults when being in uncertain situation for patient care. It could be also considered that Finland had so patient safety culture that anaesthesia nurses spoke up easily to the other team members. While, 'knowledge for anaesthesia patient care' was the lowest competence domain. In Finland, local hospitals have provided registered nurses' training to achieve sufficient knowledge and skills for anaesthesia care. The relatively weak competence level of the knowledge domain pointed out that the hospital-based training should pay more attention in developing training program for theoretical knowledge of anaesthesia patient care.

Conclusion: The competence levels of anaesthesia nurses in overall and most competence domains were higher when compared with the level of the knowledge domain. The results were based on subjective self-assessment. Therefore, a knowledge test or other objective evaluating method is recommended to use together with the self-evaluation to provide wider picture of anaesthesia nursing competence.

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Keywords: *competence assessment, anaesthesia nursing care, self-assessment*

Building an International China/USA Partnership to Develop Advanced Practice Nursing in Chinese Anesthesia Setting: Using a Theory-Driven Approach

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Introduction: As professionals, anesthesia nurse providers are recognized for their significant contributions to global health care. The International Federation of Nurse Anesthetists (IFNA) was established in 1989 and aims to develop and promote both educational and practice standards in the field of Anesthesia Nursing [1]. In China, more recently dramatic increases in anesthesiologist workloads associated with the rapidly increasing rate of surgical procedures have increased the need for anesthesia nurses in departments of anesthesiology. Nurse anesthesia in the USA America is the most developed. This study aimed to build an international China/USA partnership to develop advanced practice nursing in Chinese anesthesia setting.

Methods: A theory-driven approach was applied in this study to develop the international partnership [2]. This theoretical framework included two parts: first part was the Process of Engagement for Partnership model and the second is the model of Sustainability of Interventions. There are six concepts in Process of Engagement for Partnership model: partners, resources, mutual goal setting, cultural bridging, collaboration, capacity building. The model of Sustainability of Interventions includes two concepts: program factor inputs and outcomes.

Results: Anesthesia Nurse Education Program, Ninth People's Hospital, Shanghai and Department of Nurse Anesthesia, Virginia Commonwealth University, USA have sustained the partnership for seven years. Under the collaboration, we developed the research projects on the Development of Chinese Anesthesia Nurses, IFNA approved Anesthesia Nurses Education Program, and Pre-anesthesia assessment and education, and education projects on two-way exchanges and online courses.

Discussion: Global nursing partnerships between countries with progressive health-care systems and developing countries are vitally important to advancing nursing science, education and practice. A recent review reports only 15 publications addressing such partnerships, with most focused on educational partnerships [3]. This study used a theory-driven to develop a comprehensive International China/USA partnership in nurse anesthesia, involving education, research and capacity development. A few lessons we learned from this collaboration process, including: mutual goal setting, cultural bridging, communication.

Conclusion: In 2017, the role of Anesthesia Nurses has been approved officially in Mainland China. We will keep the international collaboration to develop and advance nurse anesthesia in China. In the future, we will add more collaborators worldwide into this partnership, disseminate the standards of IFNA in China and also have more collaboration on patient safety in anesthesia setting.

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Keywords: *International Collaboration, Partnership, Advanced Practice Nursing, Nurse Anesthesia, Theory*

Applying training system of nursing division to standardized development of anesthetic nurse in China

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Objective Learning from nursing training system of Taiwan established classification of ability of anesthetic nurses in order to provide the reference direction of the standardized training、 assessment and certification mechanism in China.

Methods: In 2009 to 2017, formulate the classroom training courses not only classification of professional theory、 clinical expertise and skills but also Clinical skills and techniques for anesthetic nursing. We collected monitoring integrity, skin integrity, drug delivery accuracy, safety transfer completion rate **Results** Based on the professional quality and competence that anesthesiologists should be for training and evaluation that results to classification of nursing division grade ; By the standardized the anesthetic nurses training mode : training completion rate of 100% ; We surveys the 16298 patients , January to December in 2017, just like the nursing quality control indicators、 patient safe transfer、 the incidence of falls and complaints, the integrity is about 98.80%, remaining projects are up to 100%; integrity of peri-operative anesthesia monitoring management completed the rate of 95% threshold.

Conclusion: To promote and adjust the training system of Taiwan anesthetic nurses achieve WHO patient safety goals, In addition, it is adapted to the cultivation of the education system accord with the culture and policy of China for anesthetic nursing. Nursing and anesthesiology cooperation, can present a dual-track management of the advantages of resources. Applying nursing training system by Taiwan , in the rapid expansion of anesthetic case, not only standardized training but also providing high-quality of anesthetic care, compose manpower gap and improve the quality of service around the anesthesia.

Keywords: *Anesthesia, Inservice Training, Ability Classification*

Descriptive study of the characteristics of master's thesis submitted by students nurses anaesthetist from a French school from 2014 to 2017

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Introduction: In 2012, the education of nurse anaesthetists (NA) was reformed in France based on a national competency framework which now includes a competence exclusively dedicated to research. A master's degree is now awarded to the students at the completion of their study. In this context of upgrading the academic level of new NA graduates, it seemed necessary to explore what impact this evolution had had on the master's thesis submitted by students.

Aim: To identify characteristics of research projects carried out by the NA student of a French school as part of their master's thesis from 2014 to 2017.

Methods: A descriptive retrospective study exploring the characteristics master's thesis written by NA students of a French school between 2014 and 2017 was performed.

The data were collected in fall 2017 using an instrument developed based on the literature review. Ethical approval was obtained from the Board of the school.

Results: 78 out of 92 master's thesis were reviewed. The results show that most studies explored clinical nursing practice in anaesthesia (50%) and other clinical fields open to this nursing specialty (post anaesthesia care, pain management, prehospital emergency care). Research was mostly supervised by NA working in management (59%) or education (33.3%). Some essential components of a research study are missing or not enough developed in a substantial proportion of examined thesis such as the method used to perform literature search (91%), clear identification of the theoretical framework (98%), data analysis method selected (73%) as well as ethical considerations (89%). References used by students were mostly published in French, international papers were scarcely used. In terms of research design, quantitative (51.3%) and qualitative approaches were used. Quantitative designs were mostly descriptive. No experimental design was used. Only one thesis used a mixed methods approach. Sample was sometime too small especially for quantitative studies. Data collection methods were mostly declarative: questionnaires (70.1%) and semi structured interviews (39.7%). The discussion part of the thesis was frequently poorly referenced. Implications for practice, education or management were identified.

Discussion: The findings illustrate the phase of transition nursing education is experiencing now in France leaving a vocational model to adopt the academic culture. These results are coherent with a recent study performed in France on nursing research proposals submitted to a national dedicated funding programme [1]. Some insufficiencies identified in this study are similar to those deplored by Richards about the state of nursing research in Europe [2].

Conclusion: There are areas of improvement in the way the master thesis is conducted by NA students. Change in the research preparation/supervision of future NA is needed.

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Keywords: *student nurse anaesthetist, master's thesis, research competency, research design, education*

The approval process of an anesthesia program in Norway

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Western Norway University of Applied Sciences (HVL) received an IFNA grant and started the work of the APAP in May 2015. Following the IFNA / APAP guidelines for the process, brought us into a busy but interesting process, preparing the documents needed, the "On-site Visit" and the "On-site visit" team coming. At the "On-site Visit" of September 2016, we discussed and evaluated our NA education program, and it was of great interest to be a part of this process.

In May 2017 our NA program received the IFNA Accreditation - Level 3, and this was a great honor. There has been a merging process at HVL, and our work will continue with applying for Deemed Accreditation for the entire NA education programs at all HVL campuses.

In addition to this, there is an ongoing process for the other NA education programs of Norway. We have a national curriculum, and the IFNA / APAP program of Deemed Accreditation give us the possibility to apply for accreditation for all the NA programs in Norway. The Norwegian Association of Nurse Anesthetists (ALNSF) have received a grant from the Norwegian Nurse Organization (NSF) to support the start of this further work.

The Norwegian NA education program is a model for educational discussions in both European and international context, and it will be of great importance for the rest of the NA programs in Norway to have this accreditation. ALNSF runs a national network for faculty members of the NA programs. This gives us the possibility to share experiences concerning the APAP process, and hopefully the other NA programs will apply for, and achieve the same accreditation. As an end of our common work - IFNA accreditation for the entire NA education programs in Norway might be a possible "dream come true"

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