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TOPICS IN THIS ISSUE

Post-Discharge Nausea & Vomiting

Diabetic Autonomic Neuropathy

Preeclampsia and HELLP

Glossal Tumor Debulking

Offsite Anesthesia

Down Syndrome

Ludwig's Angina

Total Spinal

Hemophilia



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Front Cover: Graduate students in the Northeastern University Nurse Anesthesia Program practice ultrasound-guided central line placement. Pictured from right to left are Jen Phelan, BSN, Mark Blazey, and Sarah Kuszek, BSN.

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Difficult Airway in the Parturient with Severe Preeclampsia and HELLP

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Keywords: obstetric anesthesia, difficult airway, preeclampsia, HELLP, LMA

The morbidity and mortality associated with general anesthesia for cesarean sections is significantly higher than with regional anesthesia, with 58% of complications resulting from failed endotracheal intubation or respiratory failure.¹⁻³ Regional anesthesia is recommended by obstetric and anesthesiology practitioners as the standard of care for cesarean sections due to the potential of a difficult airway associated with general anesthesia.^{1,4} HELLP is a syndrome characterized by hemolysis, elevated liver enzymes, and low platelets.⁵ In the parturient with severe preeclampsia complicated by HELLP, regional anesthesia may be contraindicated due to thrombocytopenia.⁵ When general anesthesia must be utilized for cesarean section, the anesthesia practitioners must plan for and anticipate a potential difficult airway.

Case Report

A 37 year old female, 154 cm, 67.5 kg, gravida 4 para 1 at 30 weeks gestation presented for an urgent cesarean section secondary to severe preeclampsia and HELLP. Past medical history was significant for idiopathic thrombocytopenic purpura (ITP) managed with intravenous immunoglobulin (IVIG), platelet infusions, and corticosteroids throughout her pregnancy. Upon hospital admission, the patient complained of headaches and blurry vision, with blood pressures ranging 160-180/110 mmHg and heart rate 80-100 beats/min. Laboratory values included 3+

proteinuria, aspartate transaminase 59 U/L, alanine transaminase 77 U/L, lactate dehydrogenase 387 U/L, and platelets 6,000/mm³. The airway and physical examination were significant for Mallampati III classification, submental space 4 cm, mouth opening 4 cm with a large edematous tongue, pendulous breasts, and gravid abdomen. Prior to cesarean section, the patient received a magnesium sulfate bolus (4 grams), followed by an infusion at 2 grams/hour. The patient received 1 unit of platelets (containing 6-8 single donor packs) and IVIG 1 gram/kg. The platelet count prior to proceeding in the operating room was 77,000/mm³.

Sodium citrate 30 ml per os, metoclopramide 10mg intravenous (IV), and a lactated ringers 500 ml bolus were administered 30 minutes prior to the start of surgery. In the operating room, standard monitors were applied, oxygen was delivered via facemask, and the patient was placed in the sniffing position with left uterine displacement. A rapid sequence induction proceeded with cricoid pressure and lidocaine 100 mg, propofol 100 mg, and succinylcholine 80 mg. Glidescope video laryngoscopy (Verathon Inc., Bothell, WA) was unsuccessfully attempted, failed as a result of inability to maneuver the blade in the patient's mouth. A direct laryngoscopy was then attempted twice with a Macintosh 3 blade, resulting in grade 3-4 view and failed intubation attempt. The patient's oxygen saturation (SpO₂) decreased to 85% and two-handed mask ventilation without cricoid pressure returned the oxygen saturation to 99%. A laryngeal mask airway (LMA; The Laryngeal Mask Company, San

Diego, CA) was placed atraumatically with proper seal, appropriate gas exchange, and adequate ventilation noted.

General anesthesia was maintained with desflurane 1 MAC and oxygen. A unit of platelets was infused per surgeon request, secondary to difficulty maintaining hemostasis. Estimated blood loss was 750 ml. Fentanyl 50 mcg was incrementally titrated IV, totaling 250 mcg. An oxytocin (60 units) infusion was initiated immediately after neonate delivery. Upon case completion, the LMA was removed atraumatically when the patient opened her eyes, followed commands, and demonstrated a five second head lift. She was transferred to PACU and subsequently to the postpartum unit in no acute distress.

Discussion

The risks associated with general anesthesia are acknowledged by both the American Society of Anesthesiologists (ASA) and the American Council of Obstetricians and Gynecologists as greater than with regional anesthesia.^{1,4} While overall maternal mortality during cesarean sections is low, parturients receiving general anesthesia are at approximately twice the risk as regional anesthetics.⁴ The increased complications for the parturient receiving general anesthesia are related to a variety of physiologic and anatomical changes to the respiratory and gastrointestinal systems.^{3,6} Anesthetic complications associated with general anesthesia are attributed to difficulty with induction, failed intubation, pulmonary aspiration, and respiratory failure.¹⁻³ The parturient with severe preeclampsia and HELLP may not be a candidate for a regional anesthetic due to thrombocytopenia. This patient presented with an abnormal platelet count of 6,000mm³. At 30 weeks intrauterine

pregnancy, this patient demonstrated symptoms of severe preeclampsia including vision changes, extremity edema, and hypertension.

The sole, definitive treatment for preeclampsia is delivery of the fetus. Severe preeclampsia can warrant preterm cesarean section to prevent fetal and maternal distress.⁵

Airway related deaths are a significant cause of maternal mortality during cesarean section.^{1-3,6} Pregnancy induces several physiologic and anatomic changes which renders intubation more difficult. In the parturient, upper airway edema is common from an increased blood volume, vascular engorgement and fat deposits, resulting in difficult intubation.^{3,6} Preeclampsia can worsen upper airway edema which may precipitate bleeding following minimal trauma.⁵ Breast engorgement and maternal weight gain may make direct laryngoscopy attempts and intubation more difficult.^{3,6} The parturient is predisposed to oxygen desaturation and hypoxia due to enlargement of the gravid uterus, decreased functional residual capacity, and increased oxygen consumption and carbon dioxide production.^{3,6} In this case, impaired airway visualization may be attributed to upper airway edema, pendulous breasts, and the gravid uterus. Since the patient's physical exam revealed an increased potential for airway complications, the glidescope was chosen to facilitate intubation.

Prior to general anesthesia induction, the patient should be positioned to optimize airway visualization. Proper sniffing position is necessary and the patient may require exaggeration of the flexion secondary to the gravid uterus.^{3,6} If possible, 100% oxygen should be administered by face mask before induction for a minimum

of three minutes. In emergency instances, the patient should be instructed to take at least 4-8 vital capacity breaths with 100% oxygen ensuring oxygenation and denitrogenation prior to induction.⁶

An additional risk associated with general anesthesia in the parturient is aspiration. Parturients are at increased aspiration risk due to decreased gastric motility, cephalad displacement of the abdomen, and an incompetent gastroesophageal sphincter.^{1,3,6} All parturients should receive aspiration prophylaxis prior to cesarean section as they are considered to have a full stomach.⁴ Common prophylaxis techniques include administration of a combination of nonparticulate antacids, proton-pump inhibitors, prokinetics, and H₂ receptor antagonists.^{3,4,6} In this case, these factors were considered and a plan for rapid sequence induction (RSI) was initiated to prevent aspiration and to allow for a swift procurement of the airway. The patient was NPO for greater than 8 hours, another recommended prophylaxis against aspiration. Metoclopramide and sodium citrate were administered 30 min prior to the patient's cesarean section as aspiration prophylaxis.

In this case, intubation with an ETT was unsuccessful after multiple attempts. The decision to proceed with the cesarean section stemmed from the urgent nature of the surgery due to severe, symptomatic preeclampsia. Following the ASA difficult airway algorithm, LMA placement was successfully attempted, and adequate oxygenation and ventilation achieved. The cesarean section proceeded and anesthesia maintained with the LMA and assisted ventilation.

The ASA difficult airway algorithm should be utilized with failed endotracheal

intubation. According to the algorithm, if both intubation and mask ventilation attempts are unsuccessful the placement of any type of laryngeal mask airway (LMA) should be considered.⁷ Use of the LMA in the parturient population has been specifically studied because of the increased respiratory and aspiration risks.^{8,9} LMA placement has been successfully completed in non-urgent elective cesarean sections without complications.^{8,9} Han et al reported 99% success of LMA placement on the first attempt in a study of 1097 women presenting for elective cesarean section.⁹ The increased risk of aspiration with the parturient and an unsecured airway should be considered during LMA usage and actions taken to prevent this complication.^{4,6,8} Other options to proceed in the event of a difficult airway which were not utilized during this case include advancing to modified cricoid pressure during induction and additionally maintaining cricoid pressure with the LMA throughout the cesarean section. Another option could be placement of an ETT through the LMA.^{8,9}

Upon conclusion of the procedure, the LMA was removed atraumatically and no complications related to the general anesthetic developed. In this case where regional anesthesia was contraindicated due to thrombocytopenia secondary to HELLP, appropriate preparation was taken prior to the patient's anesthesia induction to prevent for potential aspiration and failed intubation. The patient was NPO for greater than 8 hours and received recommended aspiration prophylaxis. When airway attempts had failed in this patient ventilation and oxygenation were achieved with the LMA.

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Mentor: Michele E. Gold, CRNA, PhD

Anesthetic Management for Glossal Tumor Debulking

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Keywords: awake tracheostomy, tongue debulking, tongue cancer, difficult airway

Anesthesia practitioners typically categorize the ‘difficult airway’ in one of two ways; recognized and pre-identified, or unrecognized and unanticipated. The recognized difficult airway allows for adequate and timely assessments in addition to the development of a plan based on processes that have demonstrated high success rates coupled with low morbidity.^{1,2} The ASA has developed a difficult airway algorithm that recommends considering an awake intubation when the airway is deemed difficult.³ A closed claims analysis study

published in 2005 identified that when practitioners followed the algorithm, poor outcomes were lessened relative to difficult airway management⁴ The purpose of this report is to depict the successful application of the ASA difficult airway algorithm.

Case Report

A 60 year old male, 60 kg, 175.3 cm, presented with glossal cancer and was scheduled for a tracheostomy, resection of tumor and debulking of the tongue, and an esophagogastroduodenoscopy (EGD) with placement of a percutaneous endoscopic gastrostomy (PEG) tube versus open

gastrostomy tube placement. Past medical history was significant for oropharyngeal cancer of the tongue, liver cirrhosis, esophageal varices, and chronic obstructive pulmonary disease. Past surgical history included a radical neck dissection without subsequent chemotherapy or radiation.

The pre-operative anesthetic airway evaluation was significant for two 7.5 cm bilateral masses located laterally on both sides of the neck; cervical range of motion was critically limited. The Mallampati classification was rated as 'IV' and upon further assessment a large visible mass was noted at the base of the tongue. A 90 degree upright sitting position was needed to facilitate respirations. Vital signs pre-operatively were as follows: blood pressure 133/72 mm Hg, pulse 98, respiratory rate 26 breaths per minute with a SpO₂ of 92% on room air. Chest radiography depicted pulmonary nodules and the 12-lead electrocardiogram was unremarkable. Hemoglobin and hematocrit values were 10.5 g/dL and 30.6% respectively.

The patient, anesthesia, and surgical teams collaborated regarding the plan for peri-operative care; an agreement was reached and informed consent was obtained for an awake tracheostomy followed by an EGD for assessment of esophageal varices and placement of a gastrostomy tube. After being transported to the operating room and application of standard monitors, the patient remained sitting upright at 90 degrees for completion of the 'awake' tracheostomy. Oxygen was delivered via nasal cannula at 3 liters/min and midazolam 2 mg and fentanyl 50 mcg were slowly titrated to minimal sedation effects. Xylocaine 2%, 10 ml, was injected subcutaneously as well as trans-tracheally to facilitate patient comfort. Upon completion of the tracheostomy and a confirmed EtCO₂ via waveform on

capnography, general anesthesia was instituted with propofol 100 mg, midazolam 2 mg, and rocuronium 40 mg. Anesthesia was maintained with sevoflurane 3%. The tongue debulking was completed with approximately 5 cm of tumor removed. The EGD was performed next followed by the PEG tube placement. An additional fentanyl 100 mcg was titrated to pain responses and dexamethasone 10 mg and ondansetron 4 mg were administered prophylactically for prevention of PONV.

At procedure end, neuromuscular blockade was antagonized with glycopyrrolate 0.4 mg and neostigmine 3 mg. The patient was transported to the post anesthesia care unit on 10 liter/min humidified oxygen via tracheostomy shield.

Discussion

The ability to establish and secure an airway in those diagnosed with oropharyngeal masses can prove to be extremely challenging. Patient safety and utilizing techniques exhibiting minimal risk must be the priority. Tracheotomy is the traditional and safest method to secure an airway in those with oropharyngeal tumors and for tumor debulking--type procedures. An algorithm has been proposed in regards to evaluating which modality is most appropriate in securing an airway. The algorithm serves as a guide for critical decision making, for example, to help determine whether successful intubation seems likely, or if performing a tracheotomy under anesthesia versus an 'awake' tracheotomy appear to be the safest option.⁵ Specific to this case, the algorithm suggests the safest option is an awake tracheotomy.

The initial consultation between the anesthesia and the surgical team included a discussion regarding using a fiberoptic

bronchoscope as an initial option for securing the airway. The discussion concluded with the expression of multiple concerns. Tumors are known to be composed of friable tissue and are extremely vascular; one may bleed quite readily when attempting to visualize vocal cords while manipulating the bronchoscope in close proximity to the tumor. In addition, tissue edema typically caused by the manipulation of the airway can further compromise effective ventilations.³ While airway structures can usually be anesthetized with nebulized local anesthetic, superior laryngeal blocks, transtracheal blocks, or glossopharyngeal blocks in preparation for intubation with a fiberoptic bronchoscope, the large glossal tumor presented here made the option of regional nerve blockade improbable.⁶ Given the distorted anatomy and concern over the inability to adequately anesthetize the airway, the decision was made to proceed with an awake tracheotomy. Understanding that performing a fiberoptic intubation with a spontaneously breathing patient is often considered the 'gold standard of care' in those with airway abnormalities² each situation must be assessed individually to determine the safest route. It therefore was collectively decided that an 'awake' tracheotomy was the best option for this patient.

Choosing an awake tracheostomy has several advantages. It allows for spontaneous respirations while decreasing the risk of aspiration and loss of protective airway reflexes.⁶ Minimizing or avoiding sedation in a patient with an upper airway lesion is critical because sedatives and opioids have direct effects on motor neurons as well as the reticular activating system³ and can contribute to airway obstruction and inability to ventilate the patient. This was a major concern in this situation considering

the size and location of his tumor and the poor Mallampati rating.

If the decision is made to administer sedation for an awake tracheotomy, extreme caution must be taken in both the selection and titration of medications; all efforts are aimed at minimizing airway obstruction. In this case, both midazolam and fentanyl in small titrated doses were utilized and tolerated well by the patient; they have been commonly used in similar situations.⁷ Other appropriate pharmacologic options include the alpha₂ agonist dexmedetomidine as well as low-dose ketamine. Dexmedetomidine has been shown to have effective sedative and analgesic properties without causing respiratory depression; it causes a degree of xerostomia and when used in conjunction with low-dose ketamine, can be very beneficial. The increase in secretions caused by ketamine is minimized by the xerostomia effect of the dexmedetomidine and the dexmedetomidine may minimize the cardiovascular effects of ketamine.⁷

Also for consideration regarding the perioperative care was the open versus percutaneous placement of the gastrostomy tube. The concern with performing percutaneous placement of the gastrostomy tube was related to entering the esophagus which was known to have varices. The risk of variceal rupture could lead to a potentially fatal outcome. The decision was made by the surgical team to very carefully insert the endoscope into the esophagus to assess the varices before proceeding. The rationale for this decision considered that a main treatment for variceal rupture is an EGD to define the site of bleeding and provide therapy such as cauterization or banding.⁸ Upon entering the esophagus it was found that the varices were receded and the decision was made to perform the gastrostomy tube via percutaneous method.

The anesthetic management in this particular case is a perfect example of how important it is for anesthesia and the surgical team to work in partnership. The management of a difficult airway is often the difference between life and death. A thorough pre-operative collaborative evaluation is non negotiable. Open and frank discussion of all the risks and benefits can help to decrease the incidence of a catastrophic result.

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Mentor: Mary Golinski, CRNA, PhD

Anesthetic Management of Hemophilic Child with Inhibitors

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Keywords: Hemophilia A with Inhibitors, Hemophilia and Dental Restorations, Anesthesia Management and Hemophilia

Traumatic injury to the vessels of the vascular system causes a series of intrinsic complex events to occur; the end result is formation of a 'clot' and cessation of

bleeding. Clot formation requires interaction of platelets and up to 20 different proteins circulating in the bloodstream.¹ Hemophilia is the most common inherited blood disorder that prevents the normal progression of clot formation resulting in increased bleeding tendencies, length of time of a bleeding and/or hemorrhagic

event, and even death.² Specific clotting factors are either decreased in quantity, absent, or deformed in those suffering from hemophilia.¹ Providing anesthesia care for individuals diagnosed with ‘hemophilia A with inhibitors’ poses unique challenges for the peri-operative team.

Case Report

A 17 year old African American male weighing 63.8 kg with a history of extensive dental caries and gingivitis presented for dental restorations and extractions. The procedure was scheduled to be performed with general anesthesia. Past medical history was positive for severe hemophilia A with inhibitors and seizure disorder, both diagnosed at 3 months of age. Prior to admission medications included of antihemophilic factor VIII and recombinant coagulation factor VIIa. Preoperative lab values were as follows: hemoglobin 14.2g/dL, hematocrit 42%, platelets 200K/CUMM, PT <9.0 seconds, aPTT 32 seconds, factor VIII activity <1%, factor VIII inhibitor 3.7BU.

Pre-anesthesia assessment was completed in the holding area; vital signs revealed a heart rate of 86 bpm and arterial blood pressure of 95/68 mmHg. A mallampatti class 1 and thyromental distance >4 cms was documented upon airway assessment. Recombinant coagulation factor VIIa was administered in the holding area as a prophylactic measure. The patient was taken to the operating room and after pre-oxygenation, anesthesia was induced through an existing PICC (peripherally inserted central catheter) line with midazolam 2 mg, propofol 200 mg, and fentanyl 125 mcg. Lidocaine 30 mg was administered to assist with insertion of 6.5cm oral endotracheal tube. General anesthesia was maintained with isoflurane.

Recombinant Coagulation Factor VIIa 6mg was re-dosed 4 hours into the procedure; a total of 5 hours after the initial dose given in the holding area. The re-dosing was administered according to guidelines and not related to any significant bleeding noted in the surgical field. The patient remained relatively stable during the intra-operative course; there was a slight decrease in blood pressure to 82/48 mmHg which responded to ephedrine 10 mg. Ondansetron 4 mg was administered before emergence to prevent post operative nausea and vomiting. The patient was transported to the post anesthesia care unit with the endotracheal tube in place. It was removed soon after arrival. Total surgery time was 5 hours with < 50 ml estimated blood loss.

Discussion

Performing surgery on those diagnosed with congenital hemophilia with inhibitors carries with it many risks, hemorrhage the most significant. Documented in the literature are unique surgical considerations to review and no procedure should be taken lightly. Depending on the magnitude of the disease, bleeding episodes can be somewhat predictable during surgery, dental procedures, and injury.¹ With that being said, spontaneous bleeding episodes do occur with no apparent trigger usually into joints, skin, and muscles.³

Patients with Hemophilia A have a deficiency of clotting factor VIII, while those with hemophilia B have diminished quantity of clotting factor IX. Hemophilia A is an X-linked recessive hereditary disorder. It is the most common and most serious hereditary disorder of coagulation.² Hemophilia A is a disease that is usually an X linked recessive disorder with an incidence of 1 in 5000 live male births.⁴ Rayen et al states “Hemophilia A can be

classified as severe (less than 1% of normal factor VIII activity), moderate (1-5% of normal activity), or mild (5-25% of normal activity).⁵ This patient's normal factor VIII activity was <1% putting him in the most severe category.

Of those diagnosed with hemophilia A, one third will develop inhibitors.⁴ Inhibitors develop as an abnormal immune response to replacement therapy⁶; they attack and are resistant to normal treatment regimens (Factor VIII containing blood products and desmopressine acetate (DDAVP)) which are used to halt bleeding episodes. The inhibitor binds itself to the infused clotting factor, which interferes with the normal clotting cascade process, making it difficult, if not impossible, to obtain enough clotting factor to control bleeding.² Diagnosis of hemophilia A with inhibitors is made through a blood test that can measure inhibitor titers. The inhibitor unit of measurement is the Bethesda unit. The higher the units number the more inhibitor that is present. Inhibitors are categorized as being "high responding" or "low responding" based on how a person's immune system reacts or responds to multiple treatments of factor concentrate. When a patient has "high responding" inhibitors receiving factor concentrate increases their number of inhibitors quickly.

A patient with low responding inhibitors can still receive factor concentrate to try to correct the bleeding episode because their inhibitor titer will raise slowly.² In this particular scenario, the patient exhibited "low responding" inhibitors with a factor VIII inhibitor level of 3.7BU. A value of >5BU will indicate "high responding" inhibitors and <5BU indicates "low responding" inhibitors.² The disease itself will effect erythrocyte and clotting laboratory values; hemoglobin may be low

because of multiple bleeding episodes, aPTT will almost always be elevated, and factor VIII activity level will always be low. Caution should be taken when evaluating laboratory blood values (this patient had an aPTT that was >200 seconds two weeks prior to this operation). Practitioners must check the factor VIII inhibitor level pre operatively and nasal intubation should be avoided in hemophilia patients to prevent any bleeding episodes. This patient had low responding inhibitors (3.7BU) which prevents the normal treatment of Hemophilia A, DDAVP, from being effective.

Treatment regimens for patients with hemophilia A with inhibitors is unique; many can receive high dose clotting factor concentrates if they have low responding titers- otherwise bypassing agents or immune tolerance induction therapy must be administered.⁴ Antihemophilic factor VIII and recombinant coagulation factor VII are bypassing agents which this patient was receiving pre operatively, intra operatively, and post operatively. Antihemophilic factor VIII contains naturally occurring von Willebrand factor and provides a means of temporarily replacing the missing clotting factor in order to correct or prevent bleeding episodes.² Recombinant coagulation factor VIIa is used for treatment of bleeding episodes with hemophilia A or B, prevention of bleeding in surgical interventions in hemophilia A or B, and treatment of bleeding episodes in congenital FVII deficiency.⁷ This patient had a PICC line because he required frequent and multiple administrations of both of these bypassing agents.

It is recommended that in minor surgical procedures recombinant coagulation factor VIIA should be administered immediately prior to surgery and every 2 hours during

surgery at 90mcg/kg.² Due to different dosing recommendations per the institution's hematology department, this child did receive the recommended dose of 6mg prior to surgery but did not receive his second dose until 4 hours after the beginning of surgery. Post operatively, an overnight admission for observation and continuation of recombinant coagulation factor VIIa treatment typically ensues (and did). Patient controlled analgesia is a good choice for management of post operative pain. Intramuscular injections and NSAIDS should be avoided; both can potentiate bleeding.

This case progressed without untoward events. A severe hemorrhagic episode was avoided but one must never assume that every case will go as planned. Always be cognizant of clinical laboratory (blood) values and alter management if a patient has inhibitors. A wise and well prepared practitioner will have adapted multiple and options should a bleeding episode occur.

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Offsite Anesthesia Management for ERCP

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Keywords: off-site, anesthesia, airway obstruction, complications, sedation, ERCP

Advancements in diagnostic and interventional techniques have led to an increase in the number of procedures taking place outside of the boundaries of the traditional operating room setting.^{1,2} Many of these procedures such as an endoscopic retrograde cholangiopancreatography (ERCP) require sedation techniques to be provided by an anesthesia professional. Along with the unique challenges of providing anesthesia in remote locations, management of sedation for an ERCP presents the anesthetist with unique considerations for airway management. Potential concerns include airway obstruction, hypoventilation, and inadequate oxygenation, which may be further complicated with the patient in the prone position and concurrent access of the airway by the endoscopist.

Case Report

A 43 year-old, 170 cm, 63 kg, male presented for an ERCP secondary to a common bile duct stricture and a pancreatic mass. Past medical history included a prolonged hospital admission the previous year, due to epiglottitis with subsequent placement of an endotracheal tube for airway protection. Following this hospitalization the patient required oxygen support via nasal cannula at home and reported shortness of breath after ambulation of approximately 10 steps. In the subsequent months, the patient was evaluated for shortness of breath, dysphagia, weight loss and hoarseness but reported gradual

improvement over time in his exercise tolerance, respiratory function and weight gain. ASA III status was identified due to the excessive weight loss following hospitalization, supplemental oxygen requirements at home, and poor exercise tolerance.

During the preoperative assessment, the patient's lungs were clear to auscultation and he denied difficulty breathing, swallowing or symptoms of a recent upper respiratory infection. Further assessment revealed a Mallampati class I airway with adequate respiratory effort, no accessory muscle use or distress, clear breath sounds and an SpO₂ of 98% on room air.

On arrival to the ERCP suite, standard monitors were applied. Oxygen 3 L/min was administered via nasal cannula and the patient was positioned prone. A propofol infusion was initiated at 75 mcg/kg/min intravenously (IV) and titrated as needed. Prior to the insertion of the gastroscope, ketamine 20 mg IV was administered. The patient's respiratory effort was regular and no distress was noted. Following the insertion and advancement of the gastroscope the patient began to cough. The persistent coughing and airway irritation led to a gradual decrease in the SpO₂ readings from 98% to 88%. At this time the patient's head was repositioned, a chin-lift was applied, and oxygen flow was increased to 15 L/min via facemask.

Despite efforts to improve oxygenation the SpO₂ continued to decrease, and the end tidal carbon dioxide (EtCO₂) waveform was diminished with no value noted. A thoracic

impedance waveform reflecting chest wall motion via the electrocardiogram (ECG) was observed. The gastroscope was removed and the propofol infusion was discontinued. The patient was repositioned supine, the oropharynx suctioned, and ventilation was assisted via facemask with O₂ at 10 L/min. Within three minutes following a few strong coughs from the patient to clear his airway, the SpO₂ increased to 96%.

It was decided to reschedule the procedure for a future date. The patient was transported back to the recovery room with no additional complications and discharged home later that day. The procedure was completed a month later. The patient underwent general anesthesia with an endotracheal tube for airway management inserted with a Glidescope video laryngoscope (Verathon Inc, Bothell, Washington) after multiple unsuccessful direct laryngoscopy attempts.

Discussion

The anesthetic goals for this patient focused on adequate sedation for the procedure, proper management of the airway and early recognition of respiratory complications. Factors that may have contributed to the persistent oxygen desaturation and subsequent termination of the procedure included the patient's prior medical history, airway irritation in response to the gastroscope insertion, and difficulty in airway management due to the prone position. Advanced age and ASA status are risk factors for the occurrence of oxygen desaturation during conscious sedation.³ In patients receiving sedation for an ERCP, ASA status and increased BMI are associated with cardiac and respiratory events.⁴ Of these predictors only an ASA III status was present in this case.

In a closed claim analysis from 1990 and later, anesthesia provided outside of the operating room demonstrated an increase in adverse respiratory events when compared to anesthetics provided in the operating room. Inadequate oxygenation and hypoventilation were the leading causes of complications that may have been prevented by improved monitoring.¹

In this case, the combination and continuous use of monitoring devices such as thoracic impedance monitoring reflecting chest movement, pulse oximetry and capnography provided timely recognition of respiratory compromise and identification of airway obstruction. Direct visual assessment of chest wall movement as a primary modality is not effective in recognition of respiratory abnormalities and is complicated by the dark and crowded environment of the ERCP suite. Pulse oximetry may reflect late symptoms of hypoxia and may not be effective in guiding early interventions.^{5,6} The addition of capnography during procedural sedation increases detection of respiratory depression, however, the diminished ETCO₂ waveform during the episode of desaturation may have resulted due to nasal secretions obstructing the nasal prongs.^{6,7} Evaluation of the thoracic impedance monitoring waveform indicated chest wall motion and respiratory effort, with inadequate oxygen saturation. Airway obstruction was identified, the gastroscope was removed, and additional oxygen and airway support were provided.

Propofol was utilized for the advantages of titration and a rapid recovery in the event of a respiratory complication. The study by Heuss et al. stated the use of propofol during endoscopy was safe in high risk patients but the higher co-morbidity of the ASA III patient led to an increased risk for oxygen desaturation.⁸ The reduction in SpO₂ that

occurred in this patient was likely due to the his co-morbidities and not to the use of propofol, as apnea was not observed. The use of ketamine may have resulted in increased oral secretion and subsequent airway irritation. Concurrent administration of glycopyrrolate may have attenuated the undesirable increase in oral secretions.

Despite efforts aimed at maintaining adequate sedation while minimizing respiratory risks, the introduction of the gastroscope resulted in airway irritation and subsequent coughing. It is possible that the patient was not adequately sedated prior to the gastroscope insertion and would have benefited from the synergistic effect of midazolam in combination with the propofol infusion. Although the presence of airway reflexes is maintained for many sedation techniques, coughing is common during insertion of the gastroscope and achieving an increased depth of anesthesia for insertion may have been beneficial in this case. Although not described in the literature, a discussion point for the case was the size of the gastroscope and possible tracheal compression and subsequent airway obstruction. This patient's history of epiglottitis, prolonged intubation, and subsequent hoarseness possibly reflected some degree of anatomical changes. Ultimately removal of the gastroscope was necessary in order to secure the airway and restore adequate oxygenation.

Airway manipulation was also complicated by the prone position. Although considerations for the prone position include an increase of abdominal pressure by external weight on the abdomen, the patient was not obese, gel pads were properly supporting the thorax and the abdomen did not appear to be compressed.⁹ The main challenge presented by the prone position was the inability to properly implement an

adequate jaw thrust despite the ability to achieve a chin lift. Additionally, it was difficult to obtain an adequate seal during mask ventilation and assistance. In order to gain proper control of the airway, the patient needed to be turned into the supine position. Discontinuing the sedation and managing the airway allowed for the patient to clear his own secretions and achieve adequate oxygen saturations.

It is important to identify strategies that may have prevented the patient's adverse respiratory event. Topical or intravenous lidocaine given preoperatively could have reduced airway irritability and coughing with the gastroscope insertion. The lateral position may have facilitated oral secretion drainage, improved access to the airway and optimized airway maneuvers. It is also possible that administration of glycopyrrolate would have attenuated the increase in oral secretions possibly resulting from the administration of ketamine. Premedication with midazolam may have achieved a more appropriate level of sedation without the effects of respiratory depression. Alternatively, a general anesthetic with endotracheal intubation could have been performed. Identifying the possible challenges in providing sedation in the offsite setting related to airway management, positioning and sedation, will facilitate improved outcomes and delivery of a safe and effective anesthetic course.

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Total Spinal after Shoulder Surgery

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Keywords: anesthesia, total spinal anesthetic, interscalene block, shoulder surgery, post-operative pain management

For the past 130 years, peripheral neural blockade has been part of surgical care.¹ It is the responsibility of the anesthetist to recognize the signs and symptoms of inadvertent delivery of a total spinal anesthetic. Ultrasonography advancements, within the past few years, allow anesthetists to administer peripheral neural blockade with a greater rate of success. The following case report describes peripheral neural blockade administered for post-

operative pain control leading to a total spinal anesthetic.

Case Report

A 29 year-old, 183 cm, 70 kg male presented for shoulder arthroscopy. Medical history was significant for tobacco use. The patient had no prior anesthetic or surgical history. The physical exam was unremarkable; he had no known drug allergies and took no prescription medications. A general anesthetic followed by an interscalene block in the post anesthesia care unit (PACU) for post-

operative pain management was the anesthetic plan.

Upon arrival to the operating room, midazolam 2 mg was given intravenously (IV) and non-invasive monitoring was applied; oxygen was administered via facemask. An IV induction consisted of propofol, fentanyl and rocuronium. Mask ventilation was achieved and followed by direct laryngoscopy with successful intubation of the trachea. Placement of the endotracheal tube was confirmed by capnography and auscultation. Respirations were controlled by mechanical ventilation. Dexamethasone and ondansatrom were given IV for post operative nausea and vomiting prophylaxis. An average end tidal sevoflurane concentration of 3% in oxygen at 2 L/min was administered for maintenance of anesthesia. Hydromorphone 0.5 mg IV was given for analgesia. The procedure was uneventful and hemodynamic stability was maintained throughout. Neuromuscular blockade was antagonized with IV neostigmine and glycopyrrolate, and the patient was extubated without incident.

In the PACU, the patient was alert with complaints of shoulder pain. Hydromorphone 0.5 mg IV was administered with resulting relief. Thirty minutes after arrival to PACU an ultrasound guided, nerve stimulated interscalene block was performed with 0.25% bupivacaine 30 mL injection; the block was easily administered without pain or resistance, and negative for blood on needle aspiration. Less than five minutes after the injection, the patient complained of nausea that was unrelieved with promethazine 6.25 mg IV. The complaints progressed from a feeling of a “lump” in his throat, to the statement “I can’t breathe” followed by unresponsiveness. The patient’s trachea was intubated, respirations controlled by

mechanical ventilation, and a propofol infusion rate at 30 mcg/kg/min was initiated for sedation. Two hours and twenty minutes later the patient was extubated. He complained of left arm numbness and pressure, displayed an unsteady gait and exhibited lower extremity weakness. Ninety minutes after extubation he was able to ambulate 100 feet, tolerate oral intake of fluids, and void without difficulty. He denied recall of the event and was pain free at the time of discharge.

Discussion

The ability of the anesthetist to promptly recognize, manage and treat an inadvertent total spinal anesthetic when it occurs is an important component of care when providing regional anesthesia. The term total spinal anesthesia is utilized when sensory and motor blockade become associated with the loss of consciousness.² This case study represents the unintended delivery of a total spinal anesthetic after placement of an interscalene block. The patient lost consciousness and became apneic presumably as a result of medullary ventilator center ischemia that was associated with profound hypotension and a decrease in cerebral blood flow.² A randomized prospective study comparing direct visual ultrasound to nerve stimulation-guided needle placement for interscalene blocks concluded direct visual ultrasound guidance provided better monitoring of spread of the local anesthetic thereby improving the success rate of the block.³ Although there is data to support that the use of ultrasound has improved the visualization of anatomic landmarks and the amount of spread of injectate, this technology is not perfect, as seen in this case report.

The manifestation of a total spinal generally occurs shortly after injection.² Chaudhri,

Macfie and Kirk described a case of a total spinal resulting from an intercostal nerve block during a lung resection procedure.⁴ The procedure was performed utilizing ultrasound without any blood or CSF aspiration, which was similar to the present case. However, the patient was under general anesthesia at the time of the intercostal nerve block, and the inadvertent total spinal was only noted after the pupils were fixed and dilated. The differential diagnosis after surgery consisted of a global stroke, brain stem stroke, or total spinal anesthesia.⁴ It turned out to be the latter, with resolution after 12 hours and a full recovery.

Interscalene block is one of the most common peripheral neural blocks to perform for shoulder, as well as arm and forearm procedures; however, it has potential side effects. These untoward effects can be due to its close proximity to the location of the stellate ganglion, the phrenic nerve and the recurrent laryngeal nerve which can foster an increased rate of incidental block.⁵ Inadvertent total spinal is possible due to the anatomical location to the cervical neural foramina and the presence of dural sleeves on nerve roots.⁵ Loss of respiration can occur as a result of medullary ventilator center ischemia or inadvertent phrenic nerve blockade; this is especially important to consider for patients without preserved pulmonary function. Intra-arterial injection of local anesthetic could induce a seizure due to the proximity to the vertebral artery, whereas venous injection, albeit slower, has more of a central nervous system effect as evidenced by circumoral numbness or ringing in the ears.⁵

Bupivacaine is known for its cardiotoxic effects and the potential requirement for IV lipid emulsion therapy to treat cardiac arrest. Having lipid emulsion available for

immediate infusion prior to the placement of a peripheral neural block when bupivacaine is being administered is recommended. One theory regarding the cellular mechanism of action of bupivacaine suggests that it inhibits the mitochondrial enzyme carnitine-acylcarnitine translocase. This inhibition prevents cellular respiration of a certain type of cardiac myocyte that uses fatty acids as fuel.¹ In the wake of cardiac compromise, a patient should be monitored for at least 12 hours to determine if any further lipid treatment is needed.^{1,2} Although lipid emulsion was not needed in this case, lipid rescue is worth mentioning because bupivacaine was administered.

Retrospectively, post-operative pain management for this case could have been achieved solely with IV opioids during the post-operative period without a peripheral nerve block. Current research is studying the effectiveness of local anesthetics based on the optimal location of injection, hypothesizing it may not be the volume of local anesthetic injected but where the injection is being placed. A randomized, controlled study included 170 patients, comparing the loss of shoulder abduction after injection into the peri-plexus or intra-plexus of the brachial plexus.⁶ The study did not reveal statistical significance between groups based on block onset time or block quality, but the intra-plexus block lasted about 2.5 hours longer.⁶ Although early studies such as this support the notion that technological advances are improving patient care and outcomes, the safety and effectiveness of peripheral neural blockade still remain a concern.

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Cardiovascular Diabetic Autonomic Neuropathy

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Keywords: cardiovascular autonomic neuropathy, diabetic neuropathy, diabetes mellitus, cardiovascular risk, anesthetic risk

Cardiovascular diabetic autonomic neuropathy (CAN) is an often overlooked complication of diabetes. It increases morbidity, mortality, and sudden death in diabetic patients.^{1,2,3} Prevalence ranges from 1-90% of the diabetic population depending on the patient population being tested and differences in methodology.³ Unfortunately, given such a potentially high occurrence rate most diabetic patients are not being tested for CAN preoperatively. With the rate of diabetes on the rise, it is important for the anesthesia provider to be aware of the ways that CAN affects anesthesia outcomes.

Case Report

A 76 year old 83 kg male patient presented for arteriovenous graft placement for hemodialysis access. He was diagnosed with type 2 diabetes mellitus 16 years earlier.

Other medical history included gastroesophageal reflux disorder, hypertension, coronary artery disease, and end stage renal disease. He received dialysis three days a week. He was last dialyzed the day before surgery. All electrolytes were within normal limits on his most recent preoperative lab work including a potassium level of 4.3 mEq/L and a blood glucose level of 116 mg/dl. Unfortunately, a HgbA1C was not performed. His preoperative EKG showed normal sinus rhythm at a rate of 68 beats/min. His daily medications included subcutaneous long-acting insulin, pantoprazole, and carvedilol. He received only his carvedilol the morning of surgery.

Upon arrival to the operating room, the patient was placed on 10 L/min oxygen by mask, and noninvasive monitors were applied. Initial vital signs included a blood pressure of 154/89 mmHg and a heart rate of 65 beats/min. The patient had an 18 gauge intravenous catheter in place in the right arm with a 500 ml bag of 0.45% normal saline

infusing. A rapid sequence induction was performed using 100 mcg fentanyl, 80 mg lidocaine, a 5 mg defasciculating dose of rocuronium, 150 mg propofol, and 140 mg succinylcholine. A MAC 3 blade was used for direct laryngoscopy and a 8.0 mm endotracheal tube was used to intubate the trachea. Placement was confirmed via bilateral breath sounds, positive end-tidal CO₂, tube fog, and equal chest rise. The patient was placed on the ventilator, oxygen flow was decreased to 2 L/min, and sevoflurane 1.3% was used for maintenance of anesthesia prior to incision.

After induction, the patient's blood pressure fell to 87/49. The resulting hypotension was treated with 20 mg ephedrine and a decrease in sevoflurane concentration, with no response. An additional dose of ephedrine 20 mg was given with no major response. Neosynephrine totaling of 500 mcg was then administered, which increased the blood pressure to 140/78 mmHg. A neosynephrine drip was started to maintain the blood pressure at adequate levels. The patient received 0.45% normal saline 350 ml during the case. Throughout the case, the blood pressure showed extreme lability with minimal response to vasopressor treatment.

Discussion

Cardiovascular diabetic autonomic neuropathy affects autonomic innervation of the sympathetic and parasympathetic nervous systems. The parasympathetic nervous system is often the first to show signs of damage from this disease.⁴ Thus, there is usually an unopposed increase in cardiac sympathetic tone initially, followed by eventual sympathetic denervation.⁴ There are several clinical signs that may be observed. The first is impaired heart rate variability with inspiration and expiration. This reflects both parasympathetic and

sympathetic dysfunction. Another sign is resting tachycardia, reflecting increase in sympathetic tone from parasympathetic denervation. Exercise intolerance may also be noted. This may manifest as a decrease in heart rate, blood pressure, and cardiac output with cardiac stress. The patient may experience abnormal blood pressure regulation including nocturnal hypertension. Finally, orthostatic hypotension may be seen, reflecting a late sympathetic denervation.⁴ CAN also has been linked to enhanced intraoperative cardiovascular lability, silent myocardial infarction, decreased rate of survival following myocardial infarction and decreased myocardial perfusion reserve capacity.^{4,5}

The diagnosis of CAN is based on the results of various tests. Cardiovascular reflex tests are most commonly utilized for the diagnosis of CAN. To test for parasympathetic denervation, the heart rate is measured in response to inspiration/expiration, a Valsalva maneuver, and orthostatic changes. Sympathetic function is tested by measuring blood pressure in response to an orthostatic change or a Valsalva maneuver. It is recommended that at least two abnormal test responses be present for the diagnosis of CAN.⁶ In most institutions, CAN is not routinely tested for preoperatively.

CAN is associated with an increased need for vasopressor support intraoperatively. There is an inability to compensate for the vasodilating effects of anesthesia with the normal autonomic response of vasoconstriction and tachycardia.⁷ It would be beneficial for anesthesia professionals to know which diabetic patients have autonomic dysfunction in order to plan for a safe anesthetic.

It is often difficult to determine who will be affected by CAN because there seems to be no consistent link to duration of diabetes, type of diabetes, or age.⁷ However, there is some evidence to suggest that disease duration and poor glycemic control may be associated with increased risk of CAN.⁸ The occurrence of CAN in type 2 diabetic patients was found to be higher if insulin was used for treatment as opposed to oral hypoglycemic agents.⁸ A study by Boyson, et al reported that even pediatric, type 1 diabetic patients, who had no overt symptoms of autonomic dysfunction, were actually found to have pathologic changes upon cardiovascular reflex testing.⁹ This article suggests that even children with a short duration of diabetes can be affected by CAN. Neither age nor duration of diabetes can be consistently relied upon to predict the presence of CAN. All surgical patients with diabetes should be considered at risk for CAN.

This patient showed classic signs of CAN. Upon induction, the patient was unable to compensate for the vasodilating effects of anesthetic agents by autonomic compensation and his blood pressure decreased dramatically. The need for hemodynamic support and resistance to vasoactive medications that was observed in this patient is typical of patients with CAN. It is important to note that this patient had also been recently dialyzed and most likely had a contracted vascular space. This may have also contributed to his hemodynamic instability making him at greater risk for intraoperative complications. Again, this patient showed extreme lability throughout the entire anesthetic with extremes of high and low blood pressure ranges, another classic manifestation of CAN. In anticipation of CAN, it might have been beneficial to have administered a smaller dose of propofol or changed to an induction

agent with less myocardial depression, such as etomidate. Even though this patient had no obvious major cardiac history that would suggest the need for etomidate, the CAN patient does not compensate for vasodilation the way a healthy patient can by utilizing autonomic reflexes. It would have also been beneficial for the patient to have had preoperative testing for CAN. Because most of the cardiovascular reflex tests are noninvasive and inexpensive it would be easy to conduct at the bedside prior to surgery.

In conclusion, it is suggested that anesthesia providers be aware of the potential complications of anesthesia with all diabetic patients. The anesthesia practitioner should be prepared for wide blood pressure and heart rate changes with a wide variety of vasoactive medications ready for administration. Dosages of anesthetic agents should be modified to minimize wide swings in hemodynamics. Because these patients are at a higher risk of cardiac events and sudden death, heightened vigilance should also be used when monitoring these patients.

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Ludwig's Angina

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Keywords: Ludwig's angina, LA, emergency airway, fiberoptic airway, tracheostomy

Ludwig's angina (LA) is a rapidly progressive bilateral cellulitis of the submandibular space associated with elevation and posterior displacement of the tongue usually occurring in adults with concomitant dental infections.¹ Airway edema, distortion and obstruction are potential lethal entities associated with LA and deep neck infections.² In early stages of LA, patients may be treated with observation and antibiotics. More advanced stages require a secured airway.

Case Report

A 42 year-old, 195 cm, 150 kg male presented to the emergency room (ER) with extensive swelling of the face and neck. Past medical history was negative except for obesity. Patient was not taking any

medications and had no history of prior surgical procedures. The patient's tongue was protruding out of his mouth with excessive salivation. The patient stated that he had a toothache and had planned to see a dentist the following week.

On physical examination, there was no respiratory distress noted but he indicated he was uncomfortable due to excessive swelling, and salivation. The patient's temperature was 38.5°C with a pulse rate of 115 beats/min, blood pressure 155/90 mmHg, and a respiratory rate of 22 breaths/min. The airway assessment was limited due to the tongue protruding from the mouth, and swelling. He had a thyromental distance of less than 1 fingerbreadth. The otolaryngology surgeon assessed the patient and a decision was made to do an emergency tracheostomy and surgical drainage of the abscess.

The patient was given glycopyrrolate 0.2 mg intravenously (IV) followed by a nebulizer treatment containing xylocaine 4% and phenylephrine 100mcg. The patient was transferred to the operating room (OR) on oxygen 6 L/min via face mask.

In the OR midazolam 0.5 mg was administered. Preoxygenation was performed for 5 min with 10 L/min oxygen via the anesthesia circuit. A 30 Fr nasal airway lubricated with xylocaine jelly was inserted into the right nare for 3 min. Larger nasal airways, up to 34 Fr, were inserted to dilate the nasal passage. After assuring the surgeon was prepared to perform an emergency tracheostomy, a fiberoptic scope was inserted and advanced into the right nare. Once able to visualize the vocal cords, the patient was given glycopyrrolate 0.2mg and midazolam 1mg IV. A 7.5cm oral endotracheal tube was passed through the vocal cords and secured. Bilateral breath sounds were auscultated and end tidal carbon dioxide was present to confirm proper placement. Following confirmation of the endotracheal tube placement, propofol 200mg and fentanyl 100 mcg were administered. General anesthesia was maintained with sevoflurane 2% inspired concentration in oxygen at 3 L/min. The surgeon performed a tracheostomy procedure and then drained the abscess. The patient tolerated the procedure well and he was transferred to the intensive care unit where he remained ventilated through his tracheostomy site.

Discussion

Ludwig's angina is a rare surgical emergency that is potentially life threatening unless recognized early and treated aggressively.¹ There are no specific guidelines for management so treatment is largely dependent on clinical judgment and

experience. It was first described by a German physician named Karl Friedrich Wilhelm von Ludwig in 1836.¹⁻³ He described LA as a rapidly progressive gangrenous cellulitis that begins around the submandibular gland and spreads via the lymphatic system.⁴

Ludwig's angina typically affects 20 to 60 year old males with ontogenic infections accounting for 70% of cases.³ Due to communicating spaces, once an infection is present, it spreads through tissue planes.³ The infection causes inflammation to include swelling under the tongue, a wood-like swelling of the neck, difficulty with speech, deglutition, and, occasionally respiration.⁴

Aggressive IV antibiotic therapy is crucial in LA treatment.⁴ Radiographs, ultrasound studies, computed tomography, and magnetic resonance images can confirm the extent of soft tissue swelling and presence of airway edema. In patients with excessive airway edema, the airway must be secured. Blind nasal intubation is not recommended, and orotracheal intubation is typically not feasible due to the edema and swelling related to the disease process.⁴ Fiberoptic nasotracheal intubation is considered acceptable with the surgeon in attendance and a tracheostomy tray available.⁴

If left untreated, LA and deep neck infections lead to airway obstruction and death.⁵ Control of the airway, antibiotic therapy, and drainage of the abscess are the main focus for dealing with LA. Early intubation or tracheostomy are of utmost importance due to the continued airway compromise to help avoid an emergency airway in an uncontrolled setting.⁴

Anesthesia professionals may be faced with this emergent case on an infrequent basis.

To promote safety and strive for an optimal clinical outcome, professionals should become familiar with and follow current evidence based guidelines when developing a plan of care for these patients.

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Mentor: Kevin C. Buettner, MS, CRNA

Airway Assessment in Down Syndrome Patients

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University of Pennsylvania

Key words: Down Syndrome; Trisomy 21; airway assessment; atlantoaxial instability; macroglossia

Down Syndrome (DS), also known as Trisomy 21 is a genetic disorder caused by an additional chromosome 21.¹ The incidence of DS is estimated to be 1:700 live births.¹ DS affects all races.⁴ Those with DS commonly present with physical features such as microcephaly and macroglossia.^{1,4} According to Yang et al., the life expectancy of DS patients has increased significantly from 25 years in 1983 to 49 years in 1997.² Thus, we can anticipate more patients with DS presenting for surgical procedures. A thorough understanding of their unique airway anatomy is vital for successful airway management.

Case Report

A 23-year old 42 kg, 130 cm female with an American Society of Anesthesiologists

(ASA) physical status classification of 3 presented to the hospital for implantation of a Vagus Nerve Stimulator (Cyberonics, Inc., Houston, TX) for the treatment of epilepsy. The patient's past medical history included severe cognitive impairment related to DS. Current medications included clorazepate, levetiracetam, valproic acid, felbamate, memantine. The patient had no known drug allergies.

A 20 gauge peripheral intravenous (IV) catheter was placed and an infusion of lactated ringers was initiated in the pre-operative area. A standard airway assessment, such as mouth opening, chin protrusion, and neck range of motion could not be assessed due to the patient's impaired cognition. A Glide Scope Video Laryngoscope (Verathon Inc., Bothell, WA) was made available prior to induction, as well as laryngeal mask airways (LMAs), and gum bougie. Premedication included midazolam 2 mg. The patient was pre-

oxygenated with 100% oxygen at 10 L/m for five minutes. Induction was initiated with fentanyl 100 mcg and propofol 100 mg. Rocuronium 40 mg was administered after successful positive pressure mask ventilation. The patient's head and neck were placed in neutral position. Direct laryngoscopy was performed using the Glide Scope Video Laryngoscope (Verathon Inc., Bothell, WA) to minimize cervical spine movement. A grade 1 view was noted. The trachea was intubated with a 6.0 cuffed endotracheal tube (ETT). Proper placement was confirmed with bilateral breath sounds and visualization of end tidal CO₂ capnography. Controlled ventilation was initiated.

General anesthesia was maintained with desflurane 6% and intermittent boluses of fentanyl 25 mcg totaling 150 mcg. Intra-operative heart rate ranged from 65-80 beats per minute. Systolic blood pressure (BP) ranged from 100-120 millimeters of mercury (mmHg). Diastolic BP ranged between 50-70 mmHg. Pulse oximetry was steady at 100%. At the conclusion of the case, train of four testing demonstrated four twitches on peripheral nerve monitoring. No fade was observed with post-sustained tetanic stimulation. Neuromuscular blockade was antagonized with neostigmine 3 mg and glycopyrolate 0.4 mg. The ETT was removed after visualizing 6-8 ml/kg tidal volume, positive gag reflex, and purposeful movement as evidenced by the patient attempting to grab the endotracheal tube. Response to verbal commands was not assessed in this patient due to her impaired cognition. Oxygen was administered via nasal cannula at 4 L/min. The patient was transferred to the post anesthesia care unit and was later discharged to her long-term care facility without complication.

Discussion

Proper airway assessment is critical in the preoperative phase for all patients receiving anesthesia. Usually, when a patient is being assessed in the preoperative setting, the anesthesia practitioner will gather information to help determine whether the patient is considered to be a difficult airway. The standard methods of gathering this information are accomplished by having the patient perform simple tasks. For example, the patient is instructed to open their mouth as wide as they can while simultaneously sticking out their tongue as far as they can. This allows the anesthesia practitioner the opportunity to assess the distance between the upper and lower incisors while also assessing the patient's Mallampati classification, which indirectly measures visibility of pharyngeal structures. Another simple exercise is the Upper Lip Bite Test (ULBT). In this exercise, the patient is instructed to prognathate their lower incisors above their upper lip as far above the vermilion line as possible. In 2003, Khan et al., determined that the ULBT was more accurate when compared to the Mallampati classification and could more easily predict a patient with a difficult airway.³ Unfortunately, the DS patient population suffers from a broad spectrum of delayed development, which can hinder the airway assessment process, as was the case with this patient.^{1,4} None of these methods could be utilized to assess the patient's airway due to her inability to follow simple commands.

Since standard airway assessment techniques could not be performed, familiarity of anatomic airway anomalies is particularly important in DS patient population and was key in this case. The anesthesia practitioner must be familiar with the numerous physical anomalies that are characteristic of DS patients. These

anomalies place the DS patient at a greater risk for potential problems regarding airway management. According to Fleisher and Roisen, DS patients are at a higher risk of obstructing their upper airway during induction of general anesthesia because of their short necks, macroglossia, and micrognathia.⁴ In addition, Stoelting and Dierdorf also contribute respiratory difficulties to oversized tonsils and flaccid soft palate.¹ Another consideration for possible difficult airway is that 20-25% of the DS population suffer from subglottic stenosis.^{1,4} Multiple airway devices such as oral and nasal airways, smaller sized endotracheal tubes, laryngeal mask airways, video laryngoscopes, light wands, and gum bougies should be made available when anesthetizing DS patients, as was mentioned in this case report.

In a normal healthy patient, cervical spinal instability, also known as atlantoaxial instability, is usually not an issue. Once general anesthesia has been induced, many anesthesia practitioners will extend the head and place the patient in a sniffing position in order to achieve alignment of the oral, pharyngeal, and laryngeal axes to facilitate trachea intubation. Normally, the transverse ligament prevents subluxation between the first and second cervical (C₁-C₂) vertebrae when the head is extended.⁵ However, in the DS populations, extension of the head can lead to devastating outcomes such as quadriplegia secondary to spinal cord compression from c-spine instability of C₁-C₂.⁵ In addition, joint instability also increases the risk of temporomandibular joint (TMJ) dislocation when performing jaw thrust in the DS population.^{1,4}

Therefore, the anesthesia practitioner must be cognizant of these risks when performing

laryngoscopy and jaw thrusts in order to prevent subluxation of C₁-C₂ and the TMJ.

A thorough understanding of the anatomical differences in those presenting with DS is essential in providing safe and proper anesthetic management. It is the responsibility of the anesthesia practitioner to anticipate and prepare for all possible outcomes related to airway management in all patients but especially so in the DS patient. Preparation and anticipation is of utmost importance in creating a successful anesthetic outcome.

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Mentor: Kelly Wiltse Nicely, CRNA, PhD

A Comparison of the Prophylactic Combination of Transdermal Scopolamine and Dexamethasone versus Aprepitant and Dexamethasone in the Incidence and Severity of Post-Discharge Nausea and Vomiting in a Group of High Risk Patients

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Keywords: PONV, PDNV, Scopolamine, Aprepitant, Antiemetics

Introduction

Multimodal treatment strategies utilizing different classes of antiemetics are effective in the prevention of post-operative nausea and vomiting (PONV). However, there is limited research on strategies to prevent post-discharge nausea and vomiting (PDNV) in high risk patients. PDNV is nausea and vomiting that occurs 24-72 hours postoperatively. The purpose of this investigation was to compare two multimodal approaches in reducing the incidence and severity of PDNV in patients determined to be high-risk.

Methods

Forty subjects were enrolled in this prospective, randomized, double-blind investigation. Subjects received 6 mg dexamethasone IV, and were randomized to receive either 1.5 mg transdermal scopolamine or 40 mg oral aprepitant. Subjects were followed for 48 hours to evaluate the incidence and severity of PDNV.

Results

Data was collected on 36 subjects; four were excluded for protocol violations. The incidence of post-discharge nausea was 5.3% in the aprepitant group and 17.6% in the scopolamine group ($P > 0.05$). No patient experienced post-discharge vomiting. The cumulative incidence of vomiting between 0 - 48 hours was 5.3% in aprepitant group and 11.8% in the scopolamine group ($P > 0.05$). Nausea incidence was highest post-PACU to 24 hours (aprepitant = 68.4% vs. scopolamine = 64.7%, $P > 0.05$). The incidence of significant nausea (VNRS $> 3/10$) was 5.3% in aprepitant group and 11.8% in the scopolamine group ($P > 0.05$). Time to first nausea complaint or need for rescue antiemetics were similar ($P > 0.05$). Post hoc power analysis indicated 216 subjects would be needed to find a 12.3% difference in the incidence of PDNV.

Discussion

The highest incidence of PDNV was within the first 24 hours. Results suggest no differences in the incidence or severity of PDNV between groups. However, given the small sample size no definitive conclusions can be drawn. Future studies may need over 200 subjects when evaluating multimodal approaches to decrease the incidence of PDNV.

Mentor: Lt Col Valerie T. Belle, NC, USAF, CRNA, MSN

Editorial

I'd like to extend my warmest wishes to everyone for a Happy New Year during this holiday season. The ISJNA family is growing! I'd like to announce the addition of four new Section Editors: Laura Ardizzone, CRNA, DNP, Marjorie Giesz-Everson, CRNA, PhD, Sarah Perez, CRNA, MSN, and Kelly Wiltse Nicely, CRNA, PhD. We also have three new nurse anesthesia programs publishing for the first time in this issue: Albany Medical College, Samford University, and Wayne State University. I am so pleased to welcome all of you! I'd also like to say a special thank you to Ed Waters, CRNA, MN, who after many years of serving on the Editorial Board is stepping down (but has agreed to continue as a reviewer☺).

Something I've noticed over the years is the trend of placing a quote at the end of one's email signature – words to live by, so to speak. Here are a few examples:

“manifest healing and well being intentionally”

“The happiest people don't have the best of everything. They just make the best of everything that they have.” (author unknown)

“Excellence can be attained if YOU...
...CARE more than others think is wise.
...RISK more than others think is safe.
...DREAM more than others think is practical.
...EXPECT more than others think is possible.” (author unknown)



Do you really need to print this e-mail? (thinkbeforeprinting.org)

I don't use one, but I think I may add one of my favorites, a quote by Abraham Lincoln, which is “Whatever you are, be a good one”. I like it because it reminds me that no matter what you are doing at the time, you should always strive to do your best. It applies to all of our roles in life – husband, wife, parent, son, daughter, friend, nurse, learner, teacher, mentor . . . just something to think about during this busy, distracting time!

A handwritten signature in black ink that reads "Vicki C. Coopmans".

Vicki C. Coopmans, CRNA, PhD
Editor

“The International Student Journal of Nurse Anesthesia is produced exclusively for publishing the work of nurse anesthesia students. It is intended to be basic and introductory in its content. Its goal is to introduce the student to the world of writing for publication; to improve the practice of nurse anesthesia and the safety of the patients entrusted to our care.”

INTERNATIONAL STUDENT JOURNAL OF NURSE ANESTHESIA GUIDE FOR AUTHORS

MISSION STATEMENT

The International Student Journal of Nurse Anesthesia *is produced exclusively for publishing the work of nurse anesthesia students*. It is intended to be basic and introductory in its content. Its goal is to introduce the student to the world of writing for publication; to improve the practice of nurse anesthesia and the safety of the patients entrusted to our care.

ITEMS ACCEPTED FOR PUBLICATION

Case reports, research abstracts, evidence-based practice (EBP) analysis reports, and letters to the editor may be submitted. These items must be authored by a student under the guidance of an anesthesia practitioner mentor (CRNA or physician). The mentor must submit the item for the student and serve as the contact person during the review process. Items submitted to this journal should not be under consideration with another journal. We encourage authors and mentors to critically evaluate the topic and the quality of the writing. If the topic and the written presentation are beyond the introductory publication level we strongly suggest that the article be submitted to a more prestigious publication such as the *AANA Journal*.

ITEM PREPARATION & SUBMISSION

Student authors prepare case reports, abstracts, EBP analysis reports, and letters to the editor with the guidance of a mentor. Only students may be authors. Case and EBP analysis reports must be single-authored. Abstracts may have multiple authors. **Mentors should take an active role** in reviewing the item to ensure appropriate content, writing style, and format prior to submission.

The original intent of this journal was to publish items while the author is still a student. In order to consistently meet this goal, all submissions must be received by the editor at least **3 months prior** to the author's date of graduation.

PEER REVIEW

Items submitted for publication are initially reviewed by the editor. Items may be rejected, or returned to the mentor with instructions for the author to revise and resubmit prior to initiation of the formal review process. All accepted submissions undergo a formal process of blind review by at least two ISJNA reviewers. After review, items may be accepted without revision, accepted with revision, or rejected with comments.

General guidelines

1. Items for publication must adhere to the *American Medical Association Manual of Style* (AMA, the same guide utilized by the *AANA Journal* and such prominent textbooks as *Nurse Anesthesia* by Nagelhout and Plaus). The review process will not be initiated on reports submitted with incorrect formatting and will be returned to the mentor for revision. Please note the following:
 - a. Use of abbreviations is detailed in Section 14. Spell out acronyms/initialisms when first used. If you are using the phrase once, do not list the acronym/initialism at all.
 - b. Instructions regarding units of measure can be found in Section 18. In most cases The International System of Units (SI) is used. Abbreviations for units of measure do not need to be spelled out with first use. Some examples: height/length should be reported in cm, weight in kg, temperature in °C, pressure in mm Hg or cm H₂O.
 - c. In general, first use of pulmonary/respiratory abbreviations should be expanded, with the following exceptions: O₂, CO₂, PCO₂, PaCO₂, PO₂, PaO₂. Please use SpO₂ for oxygen saturation as measured by pulse oximetry.
 - d. Use the nonproprietary (generic) name of drugs - avoid proprietary (brand) names. Type generic names in lowercase. When discussing dosages state the name of the drug, *then* the dosage (midazolam 2 mg).
 - e. Use of descriptive terms for equipment and devices is preferred. If the use of a proprietary name is necessary (for clarity, or if more than one type is being discussed), give the name followed by the manufacturer and location in parenthesis:

“A GlideScope (Verathon Inc., Bothell, WA) was used to”

Please note, TM and ® symbols are not used per the AMA manual.
 - f. Examples of referencing are included later in this guide.

2. Report appropriate infusion rates and gas flow rates:
 - a. When reporting infusion rates report them as mcg/kg/min or mg/kg/min. In some cases it may be appropriate to report dose or quantity/hr (i.e. insulin, hyperalimentation). If a mixture of drugs is being infused give the concentration of each drug and *report the infusion rate in ml/min*.
 - b. Keep the gas laws in mind when reporting flow rates. Report the liter flows of oxygen and nitrous oxide and the percent of the volatile agent added to the gas mixture. Statements such as “40% oxygen, 60% nitrous oxide and 3% sevoflurane” do not = 100% and are thus incorrect. For example, “General anesthesia was maintained with sevoflurane 3% inspired concentration in a mixture of oxygen 1 L/min and air 1 L/min”.
3. Only Microsoft Word file formats will be accepted with the following criteria:
 - a. Font - 12 point, Times New Roman
 - b. Single-spacing (except where indicated), paragraphs separated with a double space (do not indent)
 - c. One-inch margins
 - d. Place one space after the last punctuation of sentences. End the sentence with the period before placing the superscript number for the reference.
 - e. Do not use columns, bolds (except where indicated), or unconventional lettering styles or fonts.
 - f. Do not use endnote/footnote formats.
4. Do not use Endnotes or similar referencing software. Please remove all hyperlinks within the text.
5. Avoid jargon.
 - a. *‘The patient was reversed’* - Did you physically turn the patient around and point him in the opposite direction? “Neuromuscular blockade was antagonized.”
 - b. *The patient was put on oxygen.* "Oxygen was administered by face mask."
 - c. *The patient was intubated and put on a ventilator.* “The trachea was intubated and respiration was controlled by a mechanical ventilator.
 - d. *The patient had been on Motrin for three days.* “The patient had taken ibuprofen for three days.”
 - e. Avoid the term “MAC” when referring to a sedation technique - the term sedation (light, moderate, heavy, unconscious) sedation may be used. Since all anesthesia administration is monitored, the editors prefer to use specific pharmacology terminology rather than reimbursement terminology.
6. Use the words “anesthesia professionals” or “anesthesia practitioners” when discussing all persons who administer anesthesia (avoid the reimbursement term “anesthesia providers”)
7. References
 - a. Again, the **AMA Manual of Style** must be adhered to for reference formatting.
 - b. All should be within the past 8 years, except for seminal works essential to the topic being presented.
 - c. Primary sources are preferred.
 - d. All items cited must be from peer-reviewed sources – use of internet sources must be carefully considered in this regard.
 - e. Numbering should be positioned at the one-inch margin – text should begin at 1.25”.
8. See each item for additional information.
9. **Heading** for each item (Case Report, Abstract, EBPA Report) must adhere to the following format:

Title (bold, centered, 70 characters or less)

[space]

Author Name (centered, include academic credentials only)

Name of Nurse Anesthesia Program (centered)

[space]

Anticipated date of graduation (italics, centered, will be removed prior to publication)

E-mail address (italics, centered, will be removed prior to publication)

[space, left-justify from this point forward]

Keywords: (‘Keywords:’ in bold, followed by keywords (normal font) that can be used to identify the report in an internet search.)

Case Reports

The student author must have had a significant role in the conduct of the case. The total word count should be between 1200 – 1400 words. References do not count against the word count. Case reports with greater than 1400

words will be returned to the mentor for revision prior to initiation of the review process. The following template demonstrates the required format for case report submission.

Heading (see #9 above in General Guidelines)

[space]

A brief introductory paragraph of less than 100 words to focus the reader's attention. This may include historical background, demographics or epidemiology (with appropriate references) of the problem about to be discussed. It is written in the *present tense*. Although it is introductory, the heading word '**Introduction**' is not used. Be certain to cite references in this section, especially statistics and demographics pertaining to your topic.

[space]

Case Report (bold, 400-500 words)

[space]

This portion discusses the case performed in *400 words or less*, and is written in the *past tense*. Do not justify actions or behaviors in this section; simply report the events as they unfolded. Present the case in an orderly sequence. Some aspects need considerable elaboration and others only a cursory mention.

Patient description: height, weight, age, gender.

History of present illness

Statement of co-existing conditions/diseases

Mention the current medications, generic names only. (Give dosage and schedule only if that information is pertinent to the consequences of the case.)

Significant laboratory values, x-rays or other diagnostic testing pertinent to the case. Give the units after the values (eg. Mmol/L or mg/dL).

Physical examination/Pre-anesthesia evaluation - **significant** findings only. Include the ASA Physical Status and Mallampati Classification only if pertinent to the case.

Anesthetic management (patient preparation, induction, maintenance, emergence, post-operative recovery).

Despite the detail presented here it is only to help the author organize the structure of the report. Under most circumstances if findings/actions are normal or not contributory to the case then they should not be described.

Events significant to the focus of the report should be discussed in greater detail. The purpose of the case report is to set the stage (and 'hook' the reader) for the real point of your paper which is the discussion and teaching/learning derived from the case.

[space]

Discussion (bold, 600-800 words)

[space]

Describe the *anesthesia* implications of the focus of the case report citing current literature. Describe the rationale for your actions and risk/benefits of any options you may have had. This section is not merely a pathophysiology review that can be found in textbooks. *Relate the anesthesia literature with the conduct of your case noting how and why your case was the same or different from what is known in the literature.* Photographs are discouraged unless they are essential to the article. Photos with identifiable persons must have a signed consent by the person photographed forwarded to the editor via first class mail. Diagrams must have permission from original author. This is the most important part of the article. In terms of space and word count this should be longer than the case presentation. End the discussion with a summary lesson you learned from the case, perhaps what you would do differently if you had it to do over again.

[space]

References (bold)

[space]

A minimum of 5 references is recommended, with a maximum of 8 allowed. No more than 2 textbooks may be included in the reference list, and all references should be no older than 8 years, except for seminal works essential to the topic. This is also an exercise in evaluating and using current literature.

[space]

Mentor: (bold, followed by mentor name and credentials in normal text)

E-mail address (italics, will be removed prior to publication)

Research Abstracts

Research abstracts are limited to 500 words. References are not desired but may be included if considered essential. Note that this abstract is different from a research proposal. This abstract reports the *outcome* of your study. Use the same format described for the case report with the exception of the section headings:

Heading (see #9 above in General Guidelines)

[space]

Introduction (bold)

[space]

A brief introductory paragraph including purpose and hypotheses.

[space]

Methods (bold)

[space]

Include research design and statistical analyses used

[space]

Results (bold)

[space]

Present results – do not justify or discuss here.

[space]

Discussion (bold)

[space]

Discuss results

[space]

References (bold)

[space]

Not required, but a maximum of 5 references is allowed.

[space]

Mentor: (bold, followed by mentor name and credentials in normal text)

E-mail address (italics, will be removed prior to publication)

EBP Analysis Reports

Evidence-based practice analysis reports are limited to 3000 words. Please do not include an abstract. The report should provide a critical evaluation of a practice pattern in the form of a clinical question about a specific intervention and population. The manuscript should:

1. Articulate the practice issue and generate a concise question for evidence-based analysis. A focused foreground question following either the PICO or SPICE format should be used.
2. Describe the methods of inquiry used in compiling the data.
3. Critically analyze the quality of research reviewed and applicability to different practice settings.
4. Draw logical conclusions regarding appropriate translation of research into practice.

The same general format guidelines apply with the exception of the section headings as below. Please note that text books and non-peer reviewed internet sources should be avoided, and sources of reference should be less than 8 years old unless they are seminal works specifically related to your topic of inquiry:

Heading (see #9 above in General Guidelines)

[space]

Introduction (bold)

[space]

Briefly introduce the reader to the practice issue or controversy, describe the scope or significance or problem, and identify the purpose of your analysis. Describe the theoretical, conceptual, or scientific framework that supports your inquiry.

[space]

Methodology (bold)

[space]

Include the format used for formulating the specific question you seek to answer, search terms and methods used, and levels of evidence.

[space]

Literature Analysis (bold)

[space]

Review and critique the pertinent and current literature, determining scientific credibility and limitations of studies reviewed. Your synthesis table would be included in this section. Your review and discussion of the literature should logically lead to support a practice recommendation. Subheadings may be used if desired.

[space]

Conclusions (bold)

[space]

Summarize the salient points that support the practice recommendation and make research-supported recommendations that should improve the practice issue, while also acknowledging any limitations or weaknesses

[space]

References [bold]

[space]

A minimum of 8 references is recommended, with a maximum of 12 allowed.

Letters to the Editor

Students may write letters to the editor topics of interest to other students. Topics may include comments on previously published articles in this journal. Personally offensive, degrading or insulting letters will not be accepted. Suggested alternative approaches to anesthesia management and constructive criticisms are welcome.

The length of the letters should not exceed 100 words and must identify the student author and anesthesia program.

AMA MANUAL OF STYLE

The following is brief introduction to the *AMA Manual of Style* reference format along with some links to basic, helpful guides on the internet. The website for the text is <http://www.amamanualofstyle.com/oso/public/index.html>. It is likely your institution's library has a copy on reserve.

<http://www.docstyles.com/amastat.htm#Top>

<http://healthlinks.washington.edu/hsl/styleguides/ama.html>

Journal names should be in *italics* and abbreviated according to the listing in the PubMed Journals Database. The first URL below provides a tutorial on looking up correct abbreviations for journal titles; the second is a link to the PubMed where you can perform a search.

<http://www.nlm.nih.gov/bsd/viewlet/search/journal/journal.html>

<http://www.ncbi.nlm.nih.gov/pubmed>

The International Student Journal of Nurse Anesthesia (ISJNA) is not listed in the PubMed Database. For the purpose of citing the ISJNA *in this Journal* use “**Int Student J Nurse Anesth**” as the abbreviation. The titles of text books are also printed in *italics*. Please pay close attention to ensure correct punctuation.

Journals

Note there is a comma after the first initials until the last author, which has a period. If there are six or less authors **cite all six**. If there are more than six authors **cite only the first three** followed by “et al.” Only the first word of the title of the article is capitalized. The first letters of the major words of the journal title are capitalized. There is no space between the year, volume number, issue number, and page numbers. If there is no volume or issue number, use the month. If there is an issue number but no volume number use only the issue number (in parentheses). The pages are inclusive - **do not omit digits**.

Some journals (and books) may be available both as hard copies and online. When referencing a journal that has been accessed online, the DOI (digital object identifier) or PMID (PubMed identification number) should be included (see example below).

Journal, 6 or fewer authors:

Hamdan A, Sibai A, Rameh C, Kanazeh G. Short-term effects of endotracheal intubation on voice. *J Voice*. 2007;21(6):762-768.

Journal, more than 6 authors:

Chen C, Nguyen MD, Bar-Meir E, et al. Effects of vasopressor administration on the outcomes of microsurgical breast reconstruction. *Ann Plast Surg*. 2010;65(1):28-31. PMID: 20548236.

Texts

There is a difference in citing a text with one or more *authors* from a text with one or more *editors*. Texts that are *edited* give credit to the authors of the chapters. They must be annotated and the **inclusive** pages of the chapter are noted. Texts that are *authored* do not have different chapter authors, the chapter is not cited by heading **but the inclusive pages where the information was found are cited**, unless the entire book is cited.

Text:

Stoelting R, Dierdorf S. *Anesthesia and Co-Existing Disease*. 3rd ed. Philadelphia: Churchill Livingstone; 1993:351-354.

Chapter from a text:

Burkard J, Olson RL, Vacchiano CA. *Regional anesthesia*. In Nagelhout JJ, Plaus KL, eds. *Nurse Anesthesia*. 4th ed. St. Louis:Elsevier; 2010:977-1030

Each chapter was written by a different author. Note the chapter's author gets the prominent location. The chapter title is cited; "editor" is abbreviated in a lowercase. The word "edition" is also abbreviated and in lower case. The inclusive pages of the chapter are cited.

Electronic references

Only established, peer-reviewed sources may be referenced. Please do not reference brochures or informational websites where a peer-review process cannot be confirmed. Authors are cautioned to not copy and paste from these without full credit and quotation marks where appropriate. Electronic references are cited using the following format:

Author (or if no author, the name of the organization responsible for the site). Title. *Name of journal or website*. Year;vol(issue no.):inclusive pages. doi: or URL. Published [date]. Updated [date]. Accessed [date].

For online journals, the accessed date may be the only date available, and in some cases no page numbers.

Examples:

Kamangar N, McDonnell MS. Pulmonary embolism. *eMedicine*. <http://www.emedicine.com/med/topic1958.htm>. Updated August 25, 2009. Accessed September 9, 2009.

Gupta A, Aggarwal N, Sharma D. Ultrasound guided ilioinguinal block. *The Internet Journal of Anesthesiology*. 2011;29(1).
http://www.ispub.com/journal/the_internet_journal_of_anesthesiology/volume_29_number_1/article/ultrasound-guided-ilioinguinal-block.html. Accessed August 1, 2011.

ACADEMIC INTEGRITY

Issues of academic integrity are the primary responsibility of the author and mentor. Accurate and appropriate acknowledgement of sources is expected. **Any violation will be cause for rejection of the article.**

"Plagiarism is defined as the act of passing off as one's own the ideas, writings, or statements of another. Any act of plagiarism is a serious breach of academic standards, and is considered an offense against the University subject to disciplinary action. Any quotation from another source, whether written, spoken, or electronic, must be bound by quotation marks and properly cited. Any paraphrase (a recapitulation of another source's statement or idea in one's own words) or summary (a more concise restatement of another's ideas) must be properly cited."

http://grad.georgetown.edu/pages/reg_7.cfm

HOW TO SUBMIT AN ITEM

Manuscripts must be submitted by the mentor of the student author via e-mail to **INTSJNA@aol.com** as an attachment. The subject line of the e-mail should be "Submission to Student Journal". The item should be saved in the following format – two-three word descriptor of the article_author's last name_school abbreviation_mentor's last name_date (e.g. PedsPain_Smyth_GU_Pearson_5.19.09)

REVIEW AND PUBLICATION

If the editor does not acknowledge receipt of the item within one week, assume that it was not received and please inquire. Upon receipt, the Editor will review the submission for compliance with the Guide to Authors. If proper format has not been following the item will be returned to the mentor for correction. This is very important as all reviewers serve on a volunteer basis. Their time should be spent ensuring appropriate content, not making format corrections. It is the mentor's responsibility to ensure formatting guidelines have been followed prior to submission.

Once the item has been accepted for review the Editor will send a blinded copy to a Section Editor, who will then coordinate a blinded review by two reviewers who are not affiliated with the originating program. The reviewers recommend publication to the Section Editor or make recommendations for changes to be addressed by the author. The Section Editor will return the item to the Editor, who will return it to the mentor for appropriate action (revision, approval to print). If the article is returned to the author for repair it is usually to answer a specific question related to the case that was not clear in the narrative or it asks the author to provide a reference for a statement. Every effort is made to place the returned article in the earliest next issue.

The goal is for all articles submitted by students to be published while the author is still a student. Therefore, deadlines must be met and the entire process must be efficient. If an item is not ready for publication within 3 months after the student author has graduated it will no longer be eligible for publication. For this reason it is recommended that case reports be submitted at least 4-6 months prior to the student author's anticipated graduation date.

Mentors of the papers may be asked to serve as reviewers of case reports by student authors from other programs and will be listed as contributing editors for the issue in which the item is published.

PHOTOS

Photos of students for the front cover of the Journal are welcome. Include a legend describing the activity and who is in the photo and identify the photographer. Only digital photos of high quality will be accepted via email to INTSJNA@aol.com. There must be a follow up hard copy signed by all present in the photo, as well as the photographer/ owner of the original photo, giving consent to publish the photo. Mail that consent to:

Vicki C. Coopmans, CRNA, PhD
Goldfarb School of Nursing at Barnes-Jewish College
4483 Duncan Ave., Mailstop 90-36-697
St. Louis, MO 63110

SUBMISSION CHECK LIST

<p><input type="checkbox"/> AMA Manual of Style and other format instructions are adhered to.</p> <p><input type="checkbox"/> Total word count not exceeded (1400 for case report, 500 for abstract, 3000 for EBPA).</p> <p><input type="checkbox"/> The item is one continuous Word document without artificially created page breaks.</p> <p><input type="checkbox"/> Verbatim phrases and sentences are quoted and referenced.</p> <p><input type="checkbox"/> All matters that are not common knowledge to the author are referenced.</p> <p><input type="checkbox"/> Generic names for drugs and products are used throughout and spelled correctly in lower-case.</p> <p><input type="checkbox"/> Units are designated for all dosages, physical findings, and laboratory results.</p> <p><input type="checkbox"/> Endnotes, footnotes not used.</p> <p><input type="checkbox"/> Jargon is absent.</p> <p>Heading</p> <p><input type="checkbox"/> Concise title less than 70 characters long</p> <p><input type="checkbox"/> Author name, credentials, nurse anesthesia program, graduation date and email are included.</p> <p><input type="checkbox"/> Five Keywords are provided</p> <p>Case Report</p> <p><input type="checkbox"/> Introduction is less than 100 words.</p> <p><input type="checkbox"/> Case Report section states only those facts vital to the account (no opinions or rationale)</p> <p><input type="checkbox"/> Case report section is 400-500 words and not longer than the discussion.</p> <p><input type="checkbox"/> Discussion section is 600-800 words.</p> <p><input type="checkbox"/> Discussion of the case management is based on a review of current literature</p> <p><input type="checkbox"/> Discussion concludes with lessons learned and how the case might be better managed in the future.</p> <p>Abstract</p> <p><input type="checkbox"/> The 500 word count maximum is not exceeded.</p> <p><input type="checkbox"/> Abstract reports the <i>outcome</i> of your study.</p> <p><input type="checkbox"/> Includes Introduction, Methods, Results, and Conclusion sections.</p> <p>EBPA Report</p> <p><input type="checkbox"/> The 3000 word count maximum is not exceeded.</p> <p><input type="checkbox"/> A critical evaluation of a practice pattern in the form of a precise clinical question about a specific intervention and population is presented.</p> <p><input type="checkbox"/> A focused foreground question following either the PICO or SPICE format is used.</p> <p><input type="checkbox"/> Includes Introduction, Methodology, Literature Analysis, and Conclusion sections.</p> <p>References</p> <p><input type="checkbox"/> AMA Style for referencing is used correctly.</p> <p><input type="checkbox"/> Reference numbers are sequenced beginning with one and superscripted.</p> <p><input type="checkbox"/> References are from anesthesia and other current <u>primary</u> source literature.</p> <p><input type="checkbox"/> All inclusive pages are cited, texts as well as journals.</p> <p><input type="checkbox"/> Journal titles are abbreviated as they appear in the PubMed Journals Database.</p> <p><input type="checkbox"/> Number of references adheres to specific item guidelines.</p> <p><input type="checkbox"/> Internet sources are currently accessible, reputable, and peer reviewed.</p> <p>Transmission</p> <p><input type="checkbox"/> The article is sent as a attachment to INTSJNA@AOL.COM</p> <p><input type="checkbox"/> The file name is correctly formatted (e.g. PedsPain_Smyth_GU_Pearson_5.19.09)</p> <p><input type="checkbox"/> It is submitted by the mentor with cc to the student author</p> <p><input type="checkbox"/> The words "Submission to Student Journal" are in the subject heading.</p>
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