RESIDENT POSTER ABSTRACTS

NJSSA'S 64TH ANNUAL MEETING

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Medically Challenging Case: Use of home CPAP as adjuvant to TIVA to prevent airway collapse and hypoventilation in a CPAP-dependent patient

Rutgers: Robert Wood Johnson University Hospital

Attending: Jennifer Cowell, MD

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Abstract: TIVA can be used to deliver moderate to deep sedation in CPAP-dependent patients. Combining home CPAP with TIVA allows for minimal airway obstruction and apnea episodes during induction and maintenance. Our patient is a 29-year-old male with a PMH of Duchenne muscular dystrophy, home CPAP dependence, wheelchair bound, congestive heart failure, bilateral kidney stone surgery, spinal fusion surgery, and bilateral renal calculi presented for cystoscopy with retrograde pyelogram, laser lithotripsy, and bilateral ureteral stent placement. The mother of the patient brought patient's home CPAP machine to the hospital on the day of surgery. TIVA was performed with avoidance of inhalation agents, and patient was continuously ventilated using his home CPAP device intraoperatively. Preoperatively, patient received midazolam 2mg IV. Anesthesia induction was successfully achieved with dexmedetomidine 100mcg/mL concentrated 30mcg IV, lidocaine PF 20 mg/mL (2%) 40mg IV, ketamine 20mg IV, and propofol 20mg IV. Patient received titrated continuous infusions of propofol and fentanyl under continuously monitored anesthesia, until discontinued at the end of the procedure. Patient sedation was maintained throughout with minimal airway obstruction. Patient was continued on his home CPAP for the duration of the procedure as well as in the recovery room postoperatively without any apneic episodes or desaturations.

Anesthetic Management of Migrated Venous Stent

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Learning Track:
Cardiac Anesthesia

Case Description:

Venous stent migration is an exceedingly rare occurrence. The vast majority of cases successfully are retrieved by an endovascular approach. We describe an interesting case of an 83 year-old female with a complex medical history including sick sinus syndrome, cardiomyopathy, prior pericardial window, ESRD on dialysis, and history of right arm AV graft dysfunction requiring multiple interventions including balloon angioplasty of the right subclavian vein and right innominate vein stent.

Initial presentation included shortness of breath and dizziness. Pro-BNP was elevated and TTE showed severe biatrial enlargement secondary to an embolized SVC stent in the right atrium traversing the tricuspid valve causing severe regurgitation. Initial endovascular attempt at stent extraction was unsuccessful due to tricuspid valve entrapment. Second attempt was an open procedure with sternotomy. The stent was retrieved through a right atriotomy with total bypass support. Tricuspid valve was repaired after extrication of the distal end of the stent to the anterior leaflet of the valve. The patient was transferred to the ICU after the procedure with mild to moderate tricuspid regurgitation and moderately reduced right ventricular function.

Neurotrophin-3 contributes to paclitaxel-induced neuropathic pain by elevating CCL2 expression in primary sensory neurons

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Abstract: Chemotherapy-induced peripheral neuropathic pain (CIPNP) poses a major challenge, with advancements in oncological treatments using potentially neurotoxic chemotherapy to improve cancer care. Acute CIPNP, occurring during chemotherapy, may require dose adjustments or discontinuation, impacting overall survival outcomes. Additionally, 30% of post-treatment patients experience prolonged CIPNP. Unfortunately, treatment options are still limited due to unclear mechanisms.

It is well-established that the dorsal root ganglion (DRG) plays a role in the development and processing of neuropathic pain. In this study, we demonstrated that systemic administration of the chemotherapeutic drug paclitaxel significantly increased the protein and mRNA levels of neurotrophin-3 (NT3) in the DRG in a time-dependent manner. Conversely, blocking the rise in NT3 levels through DRG microinjection of NT3 siRNA attenuated paclitaxel-induced mechanical, heat, and cold nociceptive hypersensitivities.

To further confirm our observation, we induced a surge in NT3 expression by DRG microinjection of adeno-associated virus 5 expressing full-length NT3 mRNA. This led to enhanced responses to mechanical, heat, and cold stimuli in mice in the absence of paclitaxel treatment, thereby illustrating an increased susceptibility to neuropathic pain.
Furthermore, the paclitaxel-induced elevation of DRG NT3 protein activates the NT3/TrkC pathway within the DRG and contributed to the paclitaxel-induced upregulation of chemokine (C-C motif) ligand 2 (CCL2) protein in the DRG.

We demonstrated that overexpression of NT3 enhanced the expression of CCL2, both in vivo and in vitro, within the DRG of naïve mice, indicating its potential mechanistic involvement. Given that CCL2 serves as an endogenous initiator of CIPNP and that NT3 is co-expressed with TrkC in DRG neurons, it is conceivable that the NT3/TrkC/CCL2 signaling pathway plays a crucial role in paclitaxel-induced neuropathic pain. Therefore, NT3 emerges as a promising new target for the treatment of CIPNP.

Lumbar Sympathetic Nerve Block to Treat Complex Regional Pain Syndrome (CRPS) in Pediatric Patient

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Introduction

Complex regional pain syndrome (CRPS) is a debilitating, multifactorial, chronic pain condition that is characterized by allodynia, hyperalgesia, and cutaneous findings typically in a distal limb. In pediatric patients, CPRS is more often diagnosed in girls and has a predilection for the lower over the upper extremity (1). CRPS is precipitated by a minor trauma or no trauma to a limb which leads to continued pain disproportionate to the inciting event. There is also evidence to suggest psychological factors are at play in pediatric CRPS patients. There is a tendency for higher-stress environments and learning difficulties in children diagnosed with CRPS (2). Thus, a multidisciplinary treatment plan involving physical therapy, occupational therapy, psychological counseling, and conservative medical management is employed to treat pediatric CRPS (3). However, invasive management should be utilized in patients who fail conservative pain management therapies. In the presented case, we demonstrate the use of a lumbar sympathetic nerve block to achieve adequate pain relief in a pediatric CRPS patient who had previously failed conservative pain management.

Methods

Patient was brought to procedure room, and general anesthesia was initiated. Skin of sacral area was prepped with chlorhexidine solution and draped in a sterile manner. The lumbar spine was identified under fluoroscopic guidance. The vertebral body end plates were aligned using cephalad tilt. The C-arm was then brought to an oblique angle to the left until the transverse process of L1 overlapped the vertebral body. Using a 25-gauge 1-1/2 inch syringe, the proposed trajectory was anesthetized with 2 ml of 1% lidocaine. A 22-gauge 5 inch spinal needle was directed to the target point until contact with the bony structure was made. The needle was then advanced through the lateral view until the needle tip reached the anterior third of the same vertebral body, at which point the stylet was removed. After negative aspiration, 1 mL iohexol contrast solution was injected, showing appropriate spread in the paraspinal area. Injection of of 9 mL of 0.25% bupivacaine mixed with 1 mL of (40 mg/ml) triamcinolone was performed. The needle was removed after completion, and pressure was applied to the insertion site until adequate hemostasis was achieved. The same steps were repeated on the left side of L3.

Case Report

In this case, a 12-year-old male with a past medical history of migraines and attention deficit hyperactive disorder initially presented to the office with 3 months of burning, sharp pain and hypersensitivity to touch throughout his entire left leg. The pain worsened with walking and standing. The patient reported a baseline pain of 7/10 daily. There was reported intermittent edema in the leg as well as skin color changes. This began following a left knee injury while he was playing soccer. Imaging on X-ray and MRI did not show any abnormal findings. Following his injury, he began physical therapy as well as medical therapies including gabapentin 900 mg qhs, acetaminophen prn, lidocaine patches, and diclofenac gel which did not adequately treat

his pain. This patient was then identified as a candidate for left lumbar sympathetic nerve block for his CRPS. Fluoroscopic-guided left lumbar sympathetic nerve block was performed at the levels of L1 and L3. The injectate included 0.25% bupivacaine and triamcinolone. Following the procedure, the patient reported significant pain relief for the next 3 months, but the pain did gradually return with the same symptoms as he had before his nerve block. The patient underwent a repeat left lumbar sympathetic nerve block and has since achieved the same adequate pain relief.

Conclusions

Sympathetic nerve blockade is able to provide pediatric patients with appropriate pain relief in those who fail conservative therapies for pediatric CRPS. However, due to the multifaceted nature of pediatric CRPS, invasive pain management should still be supplemented with other rehabilitative treatment therapies. Sympathetic nerve blocks are not the only invasive form of pain management therapies. There have been other cases of successful pain relief from other procedures including spinal cord stimulation, transcutaneous electrical nerve stimulation, and intraspinal analgesic infusions (4-6). There has yet to be established a preferred procedure for the treatment of pediatric CRPS. As seen in this case, the symptoms of this patient's CRPS returned over the course of the next few months after his first lumbar sympathetic nerve block indicating the potential limitations of long-term pain relief. Other therapies with potential long-term effects still need to be explored.

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The Use of Low Dose Naltrexone for Refractory Pelvic Pain

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Introduction

There is an abundance of evidence regarding the use of naltrexone in the management of opioid and alcohol abuse (Varrassi 2023). However, low-dose naltrexone (LDN), daily dosing of 1-5mg, may be utilized in the management of various chronic pain conditions. Many reports have outlined its efficacy in managing chronic pain conditions such as CRPS, fibromyalgia, and interstitial cystitis (Hatfield 2020). There is no data regarding the use of LDN for chronic pelvic pain (CPP). Here we describe a case report of a patient with CPP in which LDN was used for multimodal control of pain.

Materials and methods

This is a retrospective case report describing our experience with LDN in the management of a patient with chronic pelvic pain that was refractory to medical management and injection therapy.

Case report

Patient is a 27 year old female with a past medical history of vulvodynia and dyspareunia for over 10 years. Pain is provoked by intercourse, tampon usage, tight garments, and associated with defecation. Baseline pain is described as 4/10 and 10/10 when provoked, at the 4/6 o' clock of vestibule. Pain is minimally relieved with medical management and numerous interventions including conservative management with PT and yoga. Medications tried included gabapentin, nortriptyline, pregabalin, duloxetine, baclofen, lidocaine + hormonal creams. Interventions include pelvic floor TPI, pudendal nerve blocks, genitofemoral nerve blocks, superior hypogastric injection, ketamine infusions, and L1-L2 nerve blocks. The patient was started on 0.5 mg of naltrexone three times a day for one month and then advised to go up to 1mg three times a day for a month and then increase to 1.5mg three times a day.

Results

Since starting LDN, the patient reported improvement in baseline pain and increased quality of life. She describes an overall 25% improvement with less frequency and severity of pain.

Discussion

Studies have shown promising results regarding the use of LDN in the management of chronic pain conditions (Hatfield 2020). LDN can exert immunomodulatory effects to reduce neuroinflammation and thus dampen the inflammatory cascade responsible for nociception and pain hypersensitivity. This is thought to be due to its inhibition of the toll-like receptor type 4 (TLR-4), which is upregulated on the surface of glial cells. TLR-4 influences pain hypersensitivity by upregulating inflammatory chemokines such as IL-6 and TNF-alpha, promoting excitatory tone in nociception while diminishing nociceptive inhibition (Hatfield 2020). Given its favorable adverse effect profile, LDN may be used as an emerging

off-label medication in the treatment of chronic pelvic pain. Although large-scale, multicenter trials are required to assess LDN's effectiveness is the treatment of CPP, our case may guide providers on the utility of LDN in the management of CPP.

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Anesthetic Management of the Parturient with Peripartum Cardiomyopathy: A Growing Concern in Maternal Health

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Background:
Peripartum cardiomyopathy (PPCM) is a form of heart failure that presents during the last month of pregnancy or in the five months post-delivery and may become life threatening. Left ventricular (LV) ejection fraction (EF) is nearly always <45% (1). PPCM is a diagnosis of exclusion and signs and symptoms are often non-specific and diagnosis can be delayed (4-6).

The incidence of cardiovascular disease in pregnancy is increasing. It is the leading cause of pregnancy-related mortality in higher income countries, including Australia, USA and the UK.

Early mortality can occur as a result of sudden cardiac death secondary to cardiac arrhythmia, acute heart failure and thromboembolic events.

Later mortality is attributable to worsening LV function and chronic heart failure. Although up to 58.7% of patients have recovery of left ventricular function within the first year, 1 in 10 patients with PPCM do not survive worldwide. Predictors of mortality include pre-eclampsia, diminished LVEF, and infrequent prescription of HFrEF treatments (3).

Clinical case:
30-year-old, African American Female, G1P1 presents to OB triage on postpartum day 3 with fatigue and difficulty breathing. She reports feeling similarly throughout the last week of her pregnancy, but

thought it was normal. She feels her symptoms have worsened since delivery. Notably, she feels exhausted after walking 15 feet to use the bathroom.

- Physical exam
    - BP 135/78, HR 95
    - Tachypnea, RR 25
    - SpO2 96%
    - Decreased breath sounds in dependent lung fields
    - 3+ Bilateral lower extremity edema to the knees

- EKG: Normal sinus rhythm
- Labs: Troponin 0.02, BNP 2240 pg/mL, D Dimer 650 pg/mL
    - Cr 0.7
    - LFT wnl
    - Hgb 8.8 g/dL
- TTE: dilated left ventricular chamber with eccentric hypertrophy and severely reduced left ventricular motion with an estimated ejection fraction of 35%. No valvular disease noted.

Hospital Course

The patient was admitted to the ICU for diuresis and close monitoring. Her cardiac function continued to deteriorate despite aggressive diuresis and medical management. She developed right heart failure and required significant inotropic support and pulmonary vasodilator support. Eventually a right ventricular assist device (RVAD) was placed as a bridge to transplant. The patient stayed in the ICU for four months as she developed multiple infections around the RVAD driveline, and ultimately expired before she could receive a lifesaving transplant.

Discussion:

Treatment of acute PPCM is similar to treatment for other types of heart failure, which includes supplemental oxygen therapy (ventilation either invasive or noninvasive) and pharmacologic therapy (such as diuretics, inotropes and vasodilators). When heart failure is refractory to these optimal conventional treatments, mechanical circulatory support and cardiogenic transplantation are required. Mechanical circulatory support, such as Intra-aortic balloon pump (IABP), Extracorporeal membrane oxygenation (ECMO), and Ventricular assist device (VAD), are effective for severe PPCM as a bridge to recovery or cardiogenic transplantation (1), (2). Outcome is dependent on the ejection fraction (<30%), left ventricular end-diastolic volume and right ventricular dysfunction at diagnosis, response to medical therapy, and normalization of left ventricular function within 6 months of pregnancy (3).

Conclusions:

Anesthesiologists, along with other members of a multidisciplinary pregnancy heart team, play a critical role in caring for women with PPCM.

PPCM is a rare but life-threatening condition. Delays in diagnosis and treatment may lead to significant short- and long-term maternal and neonatal morbidity and mortality. Half of those patients diagnosed with PPCM may remain with persistent LV dysfunction and 1/10th may die.

Keywords: Peripartum cardiomyopathy, high-risk pregnancy, anesthesia in PPCM, heart failure.

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Takotsubo Cardiomyopathy Noted on Induction of Anesthesia in a Patient With Known Severe Pulmonary Hypertension

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Abstract
Takotsubo cardiomyopathy is a rare transient regional systolic dysfunction of the left ventricle triggered by intense physical or emotional stress. We report the case of a 51 year old female with past medical history of heart failure with preserved ejection fraction (HFpEF), interstitial lung disease, severe pulmonary hypertension on 2L home oxygen, severe tricuspid regurgitation, recent craniectomy for subdural hemorrhage, prior unprovoked DVT/PE, rheumatoid arthritis, T2DM, depression, and anxiety on multiple anxiolysis medications who presented for cranioplasty six months after a hemicraniectomy. The patient was visibly nervous in the pre-operative area and initially refused the consent for pre-induction placement of arterial line. After thorough discussion of the risks of the procedure and risks of delaying the procedure she eventually agreed. Significant anxiolysis was employed prior to local infiltration for arterial line placement, but the patient remained tachycardic throughout her awake period. Upon induction of anesthesia, the patient became hypotensive and bradycardic, eventually requiring chest compressions. She was intubated and upon discussion with the surgeon, the procedure was cancelled. The patient was transferred to the ICU where she was extubated that evening. A new echo showed a significant drop in her ejection fraction from six months prior, which subsequently returned to normal two weeks later.

This case highlights the difficulty in obtaining a thorough informed consent in patients with significant cardiac pathology and pre-operative anxiety. Appropriate anxiolysis and careful wording must be chosen in order to ensure cardiac stability, but this must be balanced with detailed discussion of risks and benefits and concerns for apnea, hypoxia, and hypercarbia given this patients coexisting pathology.

A Simple Low-Flow Nasal Mask-Face Tent Provided Apneic Oxygenation and Reduced Aerosol/Droplet Spread during RSI, VL ETI and Extubation in a COVID-19 Positive Patient undergoing ORIF of Hip Fracture

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Introduction: Anesthesia providers put themselves at high risk of infection when performing endotracheal intubation (ETI) of the COVID-19 positive patients. These patients, especially those with difficult airway, are also at increased risk of developing hypoxemia during GA induction and intubation requiring positive pressure bag-mask ventilation which may also increase aerosol/droplet spread. Various levels of personal protective equipment (PPE) have been used while taking care of COVID-19 positive patients. These range from N95 mask respirators, eye protection goggles or face shields, and isolation gowns. This equipment helps protect providers exposed to aerosol/droplet spread, however, very few methods have been described to minimize aerosol/droplet spread from the patient. In this case, a novel combined nasal mask-face tent provided continuous oxygenation and reduced aerosol/droplet spread in a COVID-19 positive patient in 2020 (Fig. 1-2).[1-2] It also avoided severe desaturation and reduced aerosol/droplet spread during difficult intubation/extubation in a morbidly obese patient.[1,3]

We used this simple technique in a COVID-19 positive patient amid the ongoing COVID-19 surge.

Case Presentation: A 69 year old female, 5'5", 155 lb, BMI 25.79 kg/m^2 with acute hepatitis, multiple sclerosis, metabolic acidosis and closed fracture of the right femoral neck was tested COVID positive (PCR) on admission. She presented for ORIF 2 days after admission when her liver function improved.

She was transported from her isolation room directly to the OR. It was decided to induce GA in her bed to avoid causing pain. After applying ASA standard monitors, an infant face mask was secured covering the patient's nose with elastic head-straps and her mouth was covered by a face tent. Following pre-oxygenation with 4L O_2/min (Fig. 1), modified RSI of GA with cricoid pressure was induced with fentanyl (100 mcg), lidocaine (60 mg), propofol (150 mg) and rocuronium (60 mg). Her mouth was closed under the face tent and the nasal mask provided apneic oxygenation. A hand-held video-laryngoscopy (VL) was performed and ETT was inserted smoothly under the face tent while the nasal mask continued to deliver apneic oxygenation. The patient maintained 100% SpO_2 throughout RSI and intubation (Fig. 2).

The patient tolerated the procedure well with sevoflurane and 0.6 FiO_2. Prior to extubation, the nasal mask-face tent was re-secured over her nose and covered her mouth. She resumed spontaneous respiration, however, she maintained only 91-94% SpO_2 despite using 1.0 FiO_2 and

assisted ventilation with lung recruitment maneuver (Fig. 3). After the nasal mask-face tent was re-secured over the nose and covered the mouth (Fig.4), five cc of 2% lidocaine was delivered via the ETT to reduce coughing. Copious secretion was suctioned through the ETT. It was done with the face tent wrapped around the ETT connector and the soft suction tubing to avoid spread of secretion (Fig. 5). Her respiration was then improved and her SpO_2 improved to 100% (Fig. 3). She was extubated smoothly after her oral cavity was suctioned clear under the face tent (Fig.4). She maintained 100% SpO_2 with a non-rebreathing facemask. She recovered in the isolation room in PACU without any complication. During Postoperative Day 2 visit, she was doing well and gave her consent for the case report.

Conclusion: This simple nasal mask-face tent provided pre-oxygenation and apneic oxygenation during RSI induction and VL intubation in a patient with COVID-19 infection. It also reduced aerosol/droplet spread during intubation, suctioning of ETT and extubation. It may improve patient safety and provide additional provider protection amid the ongoing COVID-19 surge.

References: 1. www.TSEmask.com; 2. ASA AM: MC1280, 2020; 3. NYSSA 74th PGA: MCC201, 2020

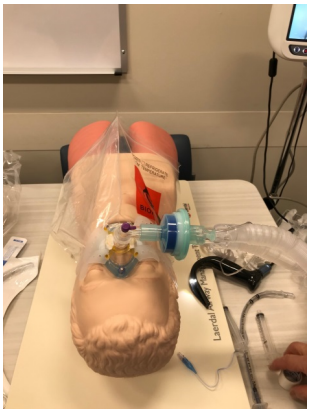

Fig. 1.

Fig. 2.

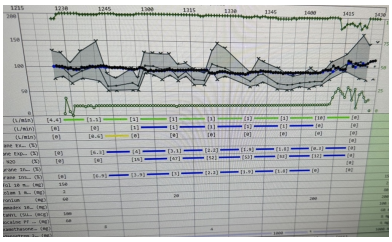

Fig. 3

Fig.4

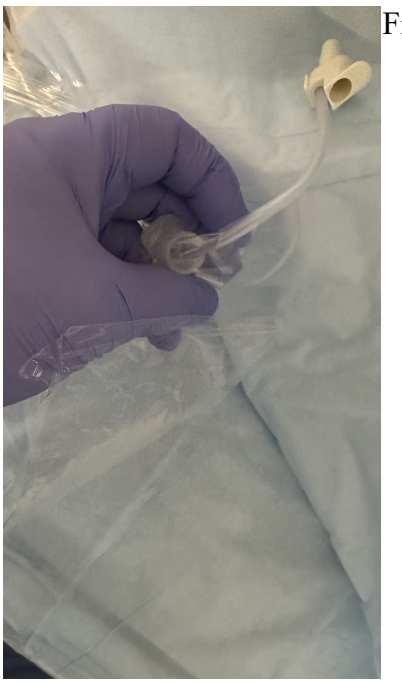
Fig. 5

Financial Disclosure: All authors have no conflict of financial interest.
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A Simple Low-Flow Nasal Mask-Face Tent Provided Immediate Pressure-Controlled Ventilation/Oxygenation and Reduced Aerosol/Droplet Spread in an Obese Patient with OSA during Outpatient TEE under MAC at NORA

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Introduction: It is always very challenging to provide monitored anesthesia care (MAC) for patients at non-OR anesthesia (NORA). Over-sedation and/or airway obstruction may result in severe desaturation, especially in obese patients with obstructive sleep apnea (OSA). A pediatric facemask has been shown to provide nasal continuous positive airway pressure (CPAP) ventilation and improve O_2 delivery in deeply sedated OSA patients (Fig. 1).[1-2]

A simple combined nasal mask-face tent provided pre/apneic nasal oxygenation and reduced aerosol/droplet spread during rapid sequence induction (RSI), video laryngoscopic endotracheal intubation and extubation in a COVID-19 patient [3] and during per-oral endoscopic myotomy (POEM) and extubation in a COVID-19 patient.[4]

We used this simple technique in an obese patient during outpatient TEE amid the ongoing COVID-19 surge.

Case Presentation:
A 70-y/o male 5'9", 255 lbs, BMI 37,7 kg/m^2, with OSA, iron deficiency anemia, abnormal findings of gastrointestinal tract and paroxysmal atrial fibrillation (PAF) presented for outpatient Transesophageal Echocardiogram (TEE) at the Echocardiography Lab. He had a Mallampati Class III airway. An infant facemask for delivering nasal CPAP was shown to the patient and he gave his consent for photography and case report.

The nasal mask-face tent was secured over his nose with elastic head-straps and connected to the anesthesia circuit/machine. Pads were placed over his nasal bridge and under the head-straps. The face tent covered his mouth that was kept open by a bite block.

The adjustable pressure-limiting (APL) valve was adjusted to deliver 8-10 cm H_2O CPAP with fresh O_2 flow of 4 L/min. A nasal cannula with air sampling tubing was taped below his lower lip underneath the face tent to continuously monitor orally exhaled CO_2 and evacuate oral droplet/ aerosol. Following nasal CPAP pre-oxygenation, his SpO_2 increased from 95% to 100%. Deep sedation was slowly titrated with lidocaine (100 mg), propofol boluses (70 mg) and propofol infusion (100 mcg/kg/min). He maintained spontaneous nasal ventilation and 100% SpO_2 (Fig. 2).

During manipulation of the TEE probe, his airway was obstructed and his SpO_2 decreased to 93% (Fig 3). Bilateral jaw thrust was immediately applied and maintained by a medical student throughout the procedure (Fig. 4). His ventilation was supported with assisted nasal ventilation

and subsequently with pressure-controlled nasal ventilation (PIP 20-38 cm H_2O, PEEP 8 cm H_2O and RR 20/min) (Fig. 5). He maintained 98-99% SpO_2 during the remaining procedure (Fig. 3). Upon removal of the TEE probe, he maintained spontaneous nasal CPAP ventilation and 98-100% SpO_2. He was awake and alert soon following TEE and was discharged home without any complications.

Conclusion: This simple low-flow nasal mask-face tent provided immediate pressure-controlled ventilation/oxygenation in an obese patient with OSA during TEE under MAC at NORA. As it is expected that within the next decade 50% of locations where anesthesia is provided will be outside the traditional operating room, it is imperative that the anesthesia community develop improved methodologies for the safe and efficient care of sedated/MAC patients.[5] This simple mask allowed for an appropriate escalation in oxygen delivery when needed. It also reduced aerosol/droplet during the aerosol generating procedure.
Amid the ongoing COVID-19 surge, this technique may improve patient safety and provide additional provider protection at no extra cost.

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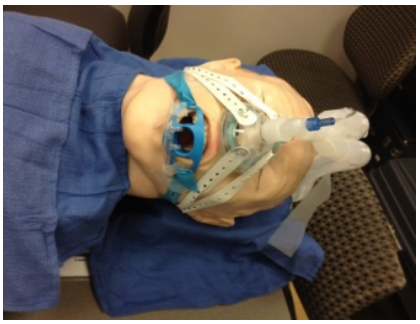

Fig. 1.

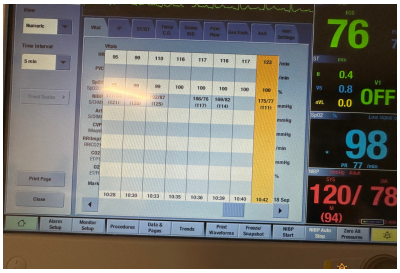

Fig.2..

Fig. 3.

Fig. 4.


Fig. 5.

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Is Remimazolam Changing Fiberoptic Intubation?

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Conflict of Interest: Alex Y. Bekker, MD, PhD is a member of the Speakers Bureau for Eagle Pharmaceuticals, a remimazolam manufacturer.

Abstract

Introduction

Fiberoptic intubation is an effective technique for managing difficult airways before induction of anesthesia. It is most commonly performed in an awake state, however, it can also be done asleep. A significant challenge in awake fiberoptic intubation is selecting an appropriate sedative agent that carefully balances patient comfort with successful intubating conditions. The ideal sedative should provide anxiolysis, amnesia, and analgesia; suppress the cough and gag reflex; be easily titratable and reversible; and have minimal respiratory and cardiovascular side effects. Commonly used sedatives have limitations in achieving these aims. Remimazolam is an ultrashort-acting benzodiazepine that offers various pharmacological advantages such as weightindependent clearance, reversibility with flumazenil, cardiovascular stability, and minimal respiratory depression. We looked at whether remimazolam is a suitable sedative agent for fiberoptic intubation.

Case Description

We present five patients who received remimazolam as the primary sedative agent for fiberoptic intubation. The patients were classified as having a Mallampati class 3 or 4 airway. Upon arrival to the operating room, routine monitors were placed on the patients. The patients were given supplemental oxygen using nasal cannula. Glycopyrrolate 0.2 mg was given intravenously to minimize secretions. Fentanyl citrate was given for analgesia. Remimazolam 4 mg was given at induction followed by incremental doses of remimazolam. Our goal was to achieve a Modified Observer's Assessment of Alertness and Sedation (MOAA/S) scale score of 2 ("responds only

after mild prodding or shaking"). The oropharynx was topicalized with cetacaine spray and the tonsillar pillars were anesthetized with topical lidocaine. A flexible bronchoscope was inserted orally. The epiglottis and vocal cords were identified and the scope was passed through the cords. A 7 or 7.5 mm endotracheal tube was then advanced over the bronchoscope and through the cords. Successful intubation was confirmed by end-tidal CO2 and direct bronchoscope visualization.

Results

Our study confirms remimazolam's superior safety and efficacy profile as well as its association with greater hemodynamic stability. We demonstrate minimal respiratory and cardiovascular variations in our patients undergoing fiberoptic intubation under deep sedation (Table 1). A MOAA/S scale score of 2 was achieved with remimazolam. Our patients tolerated intubation without apparent discomfort and was breathing spontaneously throughout the procedure.

Table 1: Patients' Vital Signs

Case	Initial BP (MAP) mmHg	Lowest BP (MAP) mmHg	Reduction in MAP	Initial HR (bpm)	Lowest HR (bpm)	Reduction in HR	Lowest O_2 before securing airway
1	159/86 (110)	81/60 (67)	39%	83	52	37%	96%
2	162/102 (119)	78/47 (57)	52%	99	67	32%	97%
3	141/90 (107)	105/56 (72)	32%	100	78	22%	94%
4	171/98 (113)	148/88 (101)	10%	60	60	0%	98%
5	161/96 (111)	91/60 (67)	40%	108	95	12%	97%

Conclusion

This study documents successful awake fiberoptic intubation with deep sedation using remimazolam, an ultra-short-acting benzodiazepine, in five patients with anticipated difficult airways. Remimazolam provided adequate sedation in terms of both patient satisfaction and optimal intubating conditions. It effectively produced anxiolysis and amnesia while preserving spontaneous ventilation with minimal respiratory depression and cardiovascular instability. Additional studies are needed to further solidify the role of remimazolam in managing difficult airways.

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Multimodal Pain Management in the Peripartum Period for Mothers on Buprenorphine

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Abstract:

A 27 year old woman with a past medical history of opioid use disorder presented at 39 weeks to the labor and delivery unit for an elective C-section. She had been on buprenorphine 8mg total daily dosing for the past 6 months and denied any relapse. Her perioperative course was insignificant. The OB team consulted the acute pain service for post-operative pain management recommendations, and during the initial encounter, the patient confirmed her prenatal buprenorphine usage. A member of the OB team had advised her to 'pump and dump' due to her buprenorphine use and to utilize other medications for analgesia. After discussion with the acute pain service, the team advised the patient to continue her buprenorphine usage and encouraged direct lactation efforts with the infant due to low transfer of medication to breastmilk.

Maternal addiction rates are on the rise nationwide as are efforts to curb opioid use disorder. Medications for opioid use disorder include methadone, buprenorphine and naltrexone. There are many social stigmas associated with these treatments, especially with maternal patients. Buprenorphine use is safe to use in pre- and postnatal periods and does not pose a threat to breastfed infants, thus making 'pumping and dumping' unnecessary. Furthermore, these medications are key to preventing relapse in this particularly vulnerable population. Multidisciplinary efforts by acute pain and OB services can help dispel misinformation and destigmatize proper and safe treatments for patients. With a stronger appreciation for chronic treatments of opioid use disorders, better postpartum pain control can be established early and quickly, thereby minimizing patient discomfort and letting the patient feel heard by the medical teams. Multimodal pain management includes implementation of acetaminophen, NSAIDs, and lidocaine patches, but may also include regional anesthetic techniques including transversus abdominus plane, quadratus lumborum, or erector spinae blocks. Leaving in lumbar epidurals for a few days postpartum can also be considered in patients at risk for higher opioid requirements with the understanding that there may be limited mobility. Other neuropathic adjuncts, such as ketamine and gabapentinoids, can also be considered. By implementing a comprehensive pain treatment plan and supporting these patients early in their pregnancy journey to prevent relapse, stronger doctor-patient bonds can be the foundation of a support network for vulnerable patients.

An unusual perioperative complication in a healthy 26 year old female undergoing elective total thyroidectomy

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Introduction:

In this case report, we describe a severe complication in an otherwise healthy patient who presented for elective thyroidectomy. After an uneventful case, the patient had a severe hemorrhagic stroke, which was later attributed to undiagnosed Moyamoya disease. Moyamoya disease is a rare progressive occlusion of the distal internal carotid artery (ICA) that leads to a compensatory growth of collateral small vessels at the base of the brain.[1] These new small vessels are fundamental in the pathogenesis of Moyamoya disease as they tend to be friable, leading to shearing.[2] As a result, patients with unknown Moyamoya disease may present with ischemic and/or hemorrhagic stroke. Although the exact pathophysiology of Moyamoya remains largely unknown, there seems to be some association with other disease states, including hyperthyroidism, which may warrant further screening in these patient populations.[2] This case report will examine the relationship between Moyamoya disease and thyroid disease, detail the events leading up to the discovery of Moyamoya in our young patient, and discuss potential preoperative screening measures to prevent devastating outcomes.

Methods:

A 26-year-old female with a history of Graves disease and two prior uncomplicated vaginal deliveries underwent an elective thyroidectomy. The patient would undergo general endotracheal anesthesia, tolerating the procedure without major hemodynamic changes or intraoperative complications. She was extubated fully awake, noted to be following commands at that time, and then transferred to the post-operative anesthesia care unit (PACU). For two hours, the patient was noted to be drowsy but responding appropriately to nursing staff. However, at the three hour mark, nursing staff noted that the patient remained drowsy and called anesthesia staff to the bedside. Upon rapid assessment, the patient's physical exam was significant for complete right-sided hemiplegia, global aphasia, and inability to follow commands. Stroke alert was called; STAT Computed tomography of the head showed that the patient had spontaneous intracerebral hemorrhage of left external capsule with concomitant evidence of prior right hemispheric infarcts. She urgently underwent a cerebral angiogram followed by evacuation of her cerebral hematoma. 12 days later she would successfully undergo a left extracranial-intracranial bypass followed by the same procedure on the right 2 days later. Ultimately, she was admitted to the hospital for 24 days and discharged with both significant aphasia, and continued right sided weakness.

Conclusions:

Patients with Moyamoya disease are often asymptomatic until stroke symptoms appear. Although research is limited on the correlation between thyroid disease and Moyamoya disease, preoperative assessment by anesthesiologists and surgeons should include a rule out of Moyamoya disease if neurological symptoms are present. In our case specifically, the patient had an episode of left sided facial numbness 5 years prior, with a workup at the time being equivocal. As a result, her neurological symptoms were mistakenly attributed to her poorly controlled thyroid disease. Perhaps if preoperative workup had included a cerebral angiography, her Moyamoya disease may have been discovered and managed prior to her elective thyroidectomy; thus decreasing her risk of postoperative hemorrhagic stroke. In addition, this case reiterated the importance of continued assessment by multidisciplinary teams while patients recover from anesthesia; as the rapid assessment of this patient in PACU resulted in emergent intervention.

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Not Resuscitate and the perioperative period: a practical guide for the anesthesiologist

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Abstract:

Case presentation

87 year old woman, advanced dementia, Atrial Fibrillation, hypertension, presents with signs and symptoms of an acute abdomen. Workup consistent with perforated sigmoid volvulus. T101.4 WBC 20.3 HCT 30 K 3.1 Cr 0.9 HCO_3 29.

Plan is for exploratory laparotomy, possible bowel resection. Patient is Do Not Resuscitate (DNR), and lacks capacity. Situation discussed with daughter (surrogate decision maker). She agrees to all resuscitative measures and suspension of DNR perioperatively.

Key issues

A patient who is DNR requires surgery and anesthesia.

- Is the DNR order automatically suspended perioperatively?
- Required reconsideration- what is it and how do we go about it?
- What is the reasonable thing to do?

Discussion

A DNR order is not automatically suspended perioperatively.
The AMA[1], ACS[2], ASA[3] and the AORN[4] all concur. It violates the patient's autonomy- the right to make their own care choices[5].

'Required reconsideration' is the need for informed discussion with a DNR patient who is scheduled to undergo an invasive procedure or anesthetic[6,7].

That discussion includes the team primarily responsible for the patient, the surgeon, anesthesiologist, patient and their surrogate decision maker (even if the patient has capacity) to explain the issues particular to the procedure and anesthesia, and to ascertain the patient's (or surrogate's) wishes regarding any change of the DNR order perioperatively[8].
All parties may not be available at the same time. The surgeon and anesthesiologist should each meet with the patient and surrogate decision maker to obtain informed consent and discuss the perioperative DNR status, and then contact the primary care team.
The primary team should enter all pre- and post-procedure changes to the DNR order. This avoids confusion as to whose role it is. Verbal/telephone orders for this are not permitted.

a) The potential for perioperative cardiac arrest

- The patient (or surrogate) may not agree to suspend the DNR perioperatively after discussion with the surgeon and anesthesiologist. Two approaches to this are recognized[9]:

1. *Procedure directed*- describes a checklist of resuscitation measures that are or aren't permitted by the patient. However, certain issues may arise. For example, sudden blood loss or arrhythmias can be life-threatening, but quickly remedied with no lasting harm. If the patient limits care to only certain measures, it could be deemed medically inappropriate. The goals of surgery are cure, amelioration, maintenance, or palliation. The patient may succumb to an otherwise easily remedied acute problem.

2. *Goal directed*- requires the team to understand the patient's goals of care. The patient's goals should match the surgery goals. However, this may shift the role of intraoperative surrogate decision maker to the doctors, setting up a scenario of an intraoperative life-threatening event fraught with complex decision making along with the ambiguity of making judgments regarding resuscitation.

b) CPR has a narrower meaning in the perioperative context. Routine intraoperative interventions which mimic certain aspects of CPR may be misunderstood or found to be objectionable.

- Intubation may be planned. Pressor drugs are commonly administered. The patient may be taken aback to learn that those events are considered routine. Once it is explained, the patient may decide that some or all are acceptable intraoperatively.

What is the reasonable thing to do?

The doctors should recommend that DNR be suspended during the perioperative period[10].

1) If instability occurs, and if resuscitation would likely permit the patient to achieve their treatment goals, it is appropriate to suspend the DNR perioperatively.
2) If arrest occurs, CPR/ACLS should be done until it offers no reasonable chance of allowing the patient to reach their goals (i.e. surviving after resuscitation, but now with greatly diminished quality of life). CPR must then be stopped.
3) Without proper ventilation and circulation, any requested restrictions (e.g. give drugs only, but don't intubate or do compressions) will not be beneficial. Such requests are medically inappropriate.

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Bupivacaine Monotherapy via Intrathecal Pump as an Effective Alternative for Chronic Cancer-Related Pain

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Abstract:
In the realm of cancer-related pain management, the use of intrathecal pumps for targeted drug delivery has gained traction due to its enhanced analgesic efficacy and minimal side effects. While morphine and ziconotide are FDA-approved for this purpose, alternative agents like bupivacaine are explored for patients unresponsive to primary options. This presentation details a case of a 67-year-old female with metastatic breast cancer experiencing chronic back pain refractory to conventional treatments. Following an intrathecal fentanyl trial that yielded significant relief, she underwent implantation of an intrathecal pump delivering bupivacaine monotherapy. Post-implantation assessments revealed a remarkable >85% pain relief without adverse effects typically associated with opioids. Subsequent adjustments, including the incorporation of patient-controlled medication delivery, further optimized pain control. This case underscores the potential of bupivacaine monotherapy as an effective alternative for cancer-related pain, preserving patient functionality and mitigating the cognitive and respiratory side effects commonly associated with opioids. The successful application suggests that early consideration and utilization of bupivacaine via intrathecal pumps can potentially enhance the quality of life for cancer patients grappling with chronic pain.

Introduction:

Intrathecal infusion for targeted drug delivery has been a viable option for cancer patients for over three decades, and the prevalence of patients utilizing intrathecal pumps is steadily increasing (1). The administration of drugs directly into the intrathecal space not only yields superior analgesic effects but also allows for the use of smaller doses, thereby minimizing undesirable side effects. This method has demonstrated efficacy in managing cancer-related pain that proves refractory to oral, transdermal, or rectal opioid administration (2). Currently, the Food and Drug Administration has approved two agents for intrathecal use: morphine and ziconotide. However, instances exist where alternative agents are employed following the failure of these primary options (3). Bupivacaine, an amide local anesthetic characterized by high lipid solubility, has been previously recommended in conjunction with intrathecal opioids (4). Notably, the literature includes only one case report detailing the use of bupivacaine monotherapy via intrathecal pump for chronic regional pain syndrome (5). Our case explores the successful application of local anesthetic monotherapy via intrathecal pump for management of cancer-associated chronic pain.

Case Presentation:

This is a 67-year-old female with a past medical history of hypertension, hypothyroidism, metastatic breast cancer status post mastectomy presented for evaluation of low back pain that has been present for many years with recent worsening of symptoms. Her pain radiates down the right lower extremity to the ankle, worse with walking and prolonged sitting/standing, and alleviated with bending forward. PET CT imaging was noted with signs of metastatic spread to her spine. Patient had undergone epidural steroid injection and MILD procedure, which did not provide relief. She had also failed conservative efforts including physical therapy.
Her prescribed tizanidine and oxycodone 10 mg provide only mild relief. The pain interferes with her overall function, ADLs and quality of life.

Patient agreed to undergo an intrathecal trial of fentanyl injection on 6/20/23. This intrathecal injection provided about 65-70% relief. The decision was then made to pursue the intrathecal pump. On 9/18/23, AP fluoroscopic guidance was used to locate a pocket site for the intrathecal pump at the right flank between the iliac crest and the 12th rib. Once the pump

was installed and deemed to be functioning, bupivacaine PF 0.25% was placed in the reservoir. Initial settings as follows:

Infusion rate: 0.4002 mg /day
Reservoir: 20 mL
Prime bolus: 0.302 mL over 19 minutes

Patient tolerated the procedure well with no complications and was discharged home the same day. On post- operative day #4 on 9/22/23 at follow-up visit, patient reports that her low back pain is improved with >85% pain relief; patient denied any weakness or sensory changes in the legs bilaterally. She reports improved mobility and better sleep hygiene. At subsequent bimonthly follow-ups, the patient's pain steadily increases. To capture the patient's residual pain, on 11/15/23 the pump settings are modified to include a Patient Therapy Manager (PTM):

Reservoir volume 7.5 mL Bupivacaine
2.5 mg/mL
Current infusion 0.4394 mg/day. (Infusion rate was not changed)
"My PTM" Set Up with Bolus: 0.0200 mg Q6H. Maximum 4 activations per day. Updated infusion with maximum PTM use is 0.1583 mg/day.

On 12/11/23 at her next follow-up and refilling of intrathecal pump, patient again reports satisfactory pain relief. Each time she activates the PTM, she has 4-5 hours of pain relief.

Conclusions:

The exclusive use of bupivacaine as monotherapy in our patient proved allowed us to effectively manage her pain while maintaining as much physical and mental capacity as possible while avoiding the brain fog, drowsiness or respiratory depression that are typical of narcotic use. The patient's minimal medication requirements enabled us to maintain a treatment concentration at a conservative level of bupivacaine 0.25%. This low concentration leaves ample possibility to up titrate to higher concentrations, higher patient controlled and/or daily doses (up to a maximum 2 mg/day of 0.25%) or an eventual mixture of bupivacaine and narcotic as clinically warranted.

Early installation of an intrathecal pump can make up titrating and transitioning to stronger agents an easier process should chronic pain worsen. Further consideration of intrathecal bupivacaine monotherapy is warranted given its effectiveness in this case and the potential improvements in overall quality of life for others suffering from cancer-related chronic pain.

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Buprenorphine and Breastfeeding: The Safety of MOUD Treatment During Lactation

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Overview/Abstract (including all relevant data):

The case is a 34-year-old female with a history of opioid use disorder taking buprenorphine 4mg twice daily who presented status-post normal spontaneous vaginal delivery. The acute pain management team was consulted by the obstetrician for help with buprenorphine management in this post-partum mother who wished to breastfeed. Upon bedside evaluation, the patient reported being instructed by her obstetric team that she should discard any breastmilk while taking buprenorphine. The acute pain team educated her regarding the safety of buprenorphine while lactating and advised both the patient and obstetric team to allow her to continue breastfeeding while maintaining her 8mg total daily dose of buprenorphine.

Unfortunately, this scenario is not uncommon. Out of what appears to be an *over*-abundance of caution, practitioners involved in perinatal care historically advised patients to "pump and dump" around exposures to various anesthetic and chronic pain medication (1). However, such concern for the transfer of drugs to infants via breastmilk requires additional scrutiny beyond a blanket ban of lactation. In fact, a large majority of anesthetic medications, including buprenorphine for opioid use disorder, remain safe for most lactating patients. Women exposed to general anesthesia may even start breastfeeding immediately after the procedure, once they are alert enough to stay awake (2).

Specifically, studies on buprenorphine have demonstrated that negligible amounts of the drug are actually transferred to babies via breastmilk. Approximately 1% of buprenorphine and buprenorphine-naloxone originally ingested by the patient are detected in breastmilk, including byproducts such as norbuprenorphine and glucuronide metabolites (3, 4). As buprenorphine is hepatically metabolized by CYP3A4, the drug must undergo first-pass metabolism before reaching breast tissue approximately 2 hours after ingestion, leading to low transfer of drug to baby. Furthermore, neonates have low activity of n-dealkylation mediated by CYP3A4 to convert buprenorphine to norbuprenorphine (5). Such biochemistry hypotheses have been corroborated clinically by urine studies which detected minimal amounts of buprenorphine and norbuprenorphine in neonates and infants at nine months of life (5).

Another frequently used medication for medication assisted treatment (MAT) is methadone, of which breastfed babies get exposed to 1.2-7% (6) of the maternal dose; much larger than that of buprenorphine. Overall, for infants exposed to MAT with either methadone or buprenorphine in-utero, those who are breastfed after birth have shortened hospital stays and

decreased need for treatment of neonatal opioid withdrawal syndrome compared to bottle-fed babies (7).

Other commonly used medications in pain management include morphine, tramadol, and over-the-counter drugs like acetaminophen and ibuprofen. For comparison, 0.8-12% of morphine may be transferred through breastmilk (8), and infants can be exposed to 9.1% maternal dose tramadol and 2.8% of its metabolite o-desmethyltramadol by day 20 of life (9). Acetaminophen and ibuprofen exposures are negligible due to their short half-life of approximately 1.8 hours, especially if there is a delay between medication ingestion and lactation (8).

Overall, the research underlying ACOG guidelines for postpartum pain management (8) recommends avoiding codeine and meperidine in lactating mothers and states that all other medications including low-dose morphine may be considered in treatment plans. Given the importance of maintenance on MAT for opioid use disorder and the health benefits of breastfeeding for infants, providers should feel comfortable recommending that most lactating patients continue buprenorphine at their prescribed dose.

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Manubrial-Sternal Joint Injection for the Management of Refractory Tietze Syndrome

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Abstract:

Tietze Syndrome is a rare, benign, and self-limiting joint disease with unknown prevalence and incidence that affects both men and women under the age of 35 years equally (1,2,3). Diagnosis is clinical, and patients primarily present with point tenderness at the sternocostal, sternoclavicular or costochondral joints, with most cases involving the articulations between the second and third ribs to the sternum. Treatment is conservative, involving nonsteroidal anti-inflammatory medication and analgesics with refractory cases requiring injections of lignocaine and steroids (1,2,3). In this case, we describe Tietze Syndrome managed with a manubrial-sternal joint corticosteroid injection in a 45-year-old female who presented to our pain clinic.

The patient is a 45-year-old female, with no significant past medical history, who presented with ongoing chest pain for several years without an inciting event. Her pain was constant, midline manubrial, non-radiating, and gradually worsening. She had been seen in the emergency department for chest pain, where cardiac and autoimmune workups and imaging studies, including chest x-ray and MRI, were all negative. To this point, she had failed conservative therapies, including more than 6 weeks of physical therapy, physician-directed exercise programs, heating pads, NSAIDs, lidocaine patch, diclofenac cream, TENS unit, duloxetine, pregabalin, and a trial of metaxalone. Her physical exam was positive for tenderness to palpation at the sternal clavicular joint, and a thoracic MRI was done to rule out radicular components of her pain, leading to the diagnosis of Tietze Syndrome. Given the lack of improvement with conservative therapy, a manubrial-sternal joint injection with dexamethasone and bupivacaine was performed utilizing fluoroscopy and ultrasound guidance. The patient tolerated the procedure well and reported complete resolution of her pain at subsequent visits.

Tietze Syndrome is a rare joint disease typically managed with conservative treatments. Corticosteroid joint injections, however, are a viable alternative in refractory cases. As evidenced by the treatment of this 45-year-old woman, these injections are capable of providing significant pain relief and should be considered in the management of Tietze Syndrome.

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Management of One-Lung Ventilation for Video-Assisted Thoracic Surgery (VATS) in a Difficult Airway Patient: A Case of Awake Double Lumen Tube (DLT) Placement

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Introduction:

- Understanding the nuances of video-assisted thoracic surgery (VATS) airway management is imperative for anesthesiologists, as it plays a pivotal role in ensuring patient safety and optimal surgical conditions.
- Traditional VATS airway management includes a standard intravenous induction for general anesthesia followed by laryngoscopy for DLT insertion[2]. Anesthesiologists must then confirm accurate tube placement via combination of auscultation, fiberoptic bronchoscopy, and/or capnography to ensure optimal ventilation and oxygenation.[2]
- Following successful DLT insertion, the next steps for a safe anesthetic induction in VATS involves monitoring vital signs, with particular attention to oxygen saturation and end-tidal carbon dioxide levels to ensure continued proper tube positioning.
- Subsequent maintenance of appropriate depth of anesthesia and neuromuscular blockade should facilitate surgical access without compromising patient safety.[2]

Case Description:

- 66-year-old male with past medical and surgical history of squamous cell carcinoma of the oral cavity with metastases to the lung, bilateral neck dissection s/p chemotherapy and radiation (2019), right mandible fistula tract debridement (2022), tracheostomy (2022), hypertension, obstructive hypertrophic cardiomyopathy, obstructive sleep apnea, and obesity presented for right VATS with lung wedge resection.
- Physical examination revealed Mallampati IV, poor mouth opening limited to 4cm, previous tracheostomy scar, and lower dentures.
- Awake intubation was performed with mild sedation using dexmedetomidine, midazolam, and fentanyl. Patient received glycopyrrolate 0.2mg intravenously and topicalization was achieved with the following local anesthetics: 4% lidocaine-soaked gauze inserted into oral cavity in preop, nebulized 4% lidocaine inhaled enroute to the OR.
- Due to incomplete anesthesia 2% lidocaine gel and butamben-tetracaine-benzocaine spray were applied to the oropharynx. 2% lidocaine spray applied to vocal cords with atomizer. The first attempt at intubation with a left 35F DLT was unsuccessful with a Glidescope 3 blade, but the second attempt with a McGrath video laryngoscope 2 blade allowed insertion of intubating bougie and DLT over it. Placement was verified with fiberoptic bronchoscopy and capnometry. The patient then underwent general anesthesia with neuromuscular blockade.

Discussion:

- The patient reported a history of failed oral intubations, secondary to restricted oral access, but successful nasal intubations. Nasal intubation was not an option given the necessitation for either a DLT or bronchial blocker. A DLT was preferred over a bronchial blocker due to improved right lung isolation and optimization of surgical conditions[1]. Therefore, an awake intubation with a DLT was deemed the most appropriate, and safest option, given the patient's history and procedure type.
- A key lesson from this case is that thorough preoperative physical examination and review of relevant imaging are critical for creating a successful anesthetic plan[2]. Patient cooperation is also imperative in any awake intubation which was facilitated with mild sedation: to keep the patient cooperative and spontaneously breathing. With the appropriate planning, topicalization, and patient cooperation, an awake intubation with a DLT is achievable.

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Clinical Report: Maximizing Recovery in Whipple Procedure: Non-Opioid Anesthetic Approach Integrating Epidural Anesthesia and Non-Opioid Adjuncts

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Abstract:

"This study explores the anesthetic approach employed during a Whipple Procedure, combining general anesthesia with thoracic epidural anesthesia. Traditionally, perioperative pain management involves a multimodal approach integrating narcotics like fentanyl, morphine, and hydromorphone. However, our case diverges from this standard practice as the patient underwent the procedure without intraoperative narcotic administration. Relying solely on epidural analgesia and non-opioid adjuncts notably minimized epidural narcotic usage. Consequently, the patient reported markedly reduced postoperative pain levels, showcasing promising outcomes in post-anesthesia care and recovery. This departure from traditional opioid use potentially mitigates their detrimental effects in the Peru-operative settings, offering prospects for enhanced long-term recovery."