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YOU MUST NOT LET ANYONE DEFINE YOUR LIMITS BECAUSE OF
WHERE YOU COME FROM. YOUR ONLY LIMIT IS YOUR SOUL. -LINES
FROM CARTOON "RATATOUILLE"

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主编导读

本期刊登了两篇 CASA 会员的麻醉专业文章：肿瘤切除中气道的管理，及锁骨手术后的神经丛病症讨论。第三期 POCUS 讲座涉及 FAST，血管 IVC（下腔静脉）/Aorta（主动脉）Gastric 胃和 Airway 气道的超声诊断。Problem-Based Learning Discussion (PBLD)重点讨论了髋关节手术采用蛛网膜下腔麻醉后心脏骤停的诊断及管理。

CASA 在对年轻麻醉医生的培养尽心尽力。2023 七月举办第一期 Mock Oral 训练以期帮助住院医师了解考试环节，顺利通关。

夏日，酷暑，中西部温度可达 110F°。人燥，心浮，难得能坐下来写文章。本刊发行，得益于会员的积极参与。非常感谢投稿作者对刊物的支持，也祝大家有一个愉快的盛夏。

编辑部成员

主编 陆晓薇

副主编 杨钊

编辑 刘宇燕 张珊 李金蕾

校对 刘宇燕 张珊 蒋天宇 曲歌

封面设计 陆晓薇



麻醉专业文章

Airway Management for Major Airway Tumor Resection

Manxu Zhao, MD¹, Henry Liu, MD²

¹Department of Anesthesiology
Cedar-Sinai Medical Center
8700 Beverly Boulevard
Los Angeles, CA 90048
USA

²Department of Anesthesiology and Critical Care
Perelman School of Medicine
Hospital of the University of Pennsylvania
3400 Spruce Street
Philadelphia, PA 19104
USA

Correspondence to:
Manxu Zhao, MD, MS
Department of Anesthesiology
Cedar-Sinai Medical Center
8700 Beverly Boulevard
Los Angeles, CA 90048
USA
Email: mxtzhao@yahoo.com

Abstract

Surgery for the resection of tumors in major airway can pose significant challenges for the entire perioperative team. Thorough preoperative evaluation and meticulous planning form the foundation for successful surgical operation and perioperative outcomes. Close collaborations and effective communications are vital during intraoperative management and postoperative care. This review encompasses both conventional and newly emerged anesthesia and airway management techniques for major airway tumor resection and reconstruction.

Keywords

Airway management, tumor in major airway, anesthesia, spontaneous tubeless ventilation, tracheal surgery

Tracheal tumors are rare diseases with an incidence of 1 to 4 in a million, including benign and malignant tumors. Benign tracheal tumors include chondroma, granular cell tumor, pleomorphic adenoma, and squamous papilloma. About 80-90% of tracheal tumors are malignant, including primary and metastases due to direct invasion from adjacent tissue or distal spread. Squamous cell carcinoma is the most common primary malignant tracheal tumors occurring 50-60%, followed by adenoid cystic carcinoma (10-20%), small cell carcinoma, and sarcoma.¹

Majority of the patients with tracheal tumor presents with symptoms when tumor occupies more than 50% or even 75% of the tracheal

lumen with nonspecific symptoms including shortness of breath, coughing, wheezing, hemoptysis, stridor, or dyspnea at exertion. It's often misdiagnosed and treated as asthma, bronchitis, common cold and often delayed the diagnosis. These symptoms and their severity depend on tumor location, size, and growth pattern. Tracheal resection and reconstruction (TRR) constitute a wide spectrum of procedures which up to half of tracheal tumors can be safely resected when patient is selected appropriately.² Although the mortality rate remains low 1-2%,³ complication rate can be as high as 15-45% due to surgical complexity secondary to anastomotic complications and patient comorbidity including diabetes, redo surgery, longer resection,

tracheostomy for surgery, and younger than 18 year old.⁴ Contraindications for major airway tumor resection due to anastomotic dehiscence includes chronically or expected postoperative ventilator dependency, radiation, and high-dose long-term steroid usage (>10mg/day prednisone).²

Preoperative Evaluation

Thorough preoperative evaluation is essential, which includes physical exam, pulmonary function test (PFT), advanced imaging studies including computed tomography (CT), magnetic resonance imaging (MRI), positron emission tomography (PET), and direct visualization by flexible bronchoscopy. Symptom severity in relation to supine position and neck extension and flexion during phases of respiration should be assessed, especially when planning to use anesthesia under spontaneous ventilation during TRR. PFT including diffusion capacity of carbon monoxide (DLCO) should be obtained, especially in patients with intrinsic lung disease when oxygenation relies on passive oxygen uptake during apnea or jet ventilation during surgery. Flow-volume loop provides the degree of tracheal stenosis caused by tracheal tumor. Imaging studies should be carefully reviewed in regard to tumor location, extent, and severity of tracheal obstruction as well as lymph node and great vessel involvement in determining candidacy for surgery. Preoperative flexible bronchoscopy under meticulous topicalization can help to evaluate the dynamic character of tracheal tumors (Figure 1).

Surgical considerations

Based on surgical stages of dissection, resection, anastomosis, and extubation, the airway can be classified as closed during dissection and extubation phases, semi-closed while in resecting phase, and open airway during anastomosis phase.

The involved surgical techniques vary not only based on location, but tumor size also plays a vital role when deciding surgical and anesthesia approaches. Tracheal tumors can be classified as extra-thoracic, intra-thoracic, and carina based on tumor locations. The adult trachea is 10-14 cm in length and 1.7-2cm in diameter consisting of 16-20 C-shaped cartilages encircling three quarters of anterior tracheal with trachealis smooth muscle posteriorly. Extra-thoracic tracheal starts with vocal cords behind thyroid cartilage at C6 and ends at the upper rim of sternum notch consisting of 6-7 tracheal rings. Intrathoracic tracheal lies behind the sternum ending above the carina at T5 level before branching to the steep right main bronchus and more horizontal left bronchus. The complex structure of the carina carries the highest risk of any tracheobronchial resection.

The surgical approach for extra-thoracic TRR typically involves end-to-end anastomosis performed through a cervical incision without the need for one-lung ventilation (OLV). Intra-thoracic and carina TRR can be achieved by requiring lung isolation using various techniques, including right Video-assisted thoracoscopic surgery (VATS), robotic VATS, right thoracotomy, mediastinotomy, or clamshell. Intra-thoracic TRR can be performed by end-to-end anastomosis. Carina tracheal resection and reconstruction (TRR) may involve suturing the two divided main bronchi when a limited length of the carina is resected. Alternatively, an end-to-end anastomosis can be performed between the trachea and the longer bronchus, followed by an end-to-side anastomosis of the shorter bronchus to the side-wall of the longer main bronchus. Mediastinotomy is chosen when tracheal tumor is long and bilateral hilar release is needed. The clamshell or two-step approach is utilized for bronchogenic carcinoma located near or involving the carina. It involves a left thoracotomy for left sleeve pneumonectomy, and a subsequent right thoracotomy for carina

resection.⁵

Anesthetic Management

Anesthesia technique should be tailored to individual patient starting with anxiolysis preoperatively. Spectrum of monitoring includes ASA standard monitoring as electrocardiogram, pulse oximetry, capnography, and temperature. Arterial blood pressure monitoring is commonly used. It allows frequent measurement of arterial blood gas, especially providing accurate partial pressure of arterial CO₂ (PaCO₂) in the absence of a reliable end-tidal CO₂ pressure (ETCO₂) monitoring. Bispectral index (BIS) is indicated when the depth of anesthesia can be guided during total intravenous anesthesia (TIVA). Cerebral oximetry can identify potential cerebral hypoxemia during extracorporeal membrane oxygenation (ECMO).

Anesthesia induction can be achieved through inhalational agent or TIVA followed by either controlled or spontaneous ventilation. TIVA can maintain spontaneous ventilation with the infusion of midazolam, propofol, dexmedetomidine, ketamine, remifentanyl or sufentanyl. Neuromuscular blocking agent (NMBA) is usually avoided while maintaining spontaneous breathing; short-acting NMBA is given only when motionless surgical field is necessary. Spontaneous ventilation makes tubeless airway possible, provides ideal surgical visualization and subsequently reduces surgical time. Endotracheal tube related coughing can be eliminated, which may further decrease early anastomotic rupture. Additionally, it promotes earlier recovery by enabling reduced doses of opioids, anesthetics, and paralytics, thereby further decreasing the occurrence of postoperative complications.

Patient selection is fundamental to successfully execute spontaneous ventilation. Inclusion

criteria includes ASA I or II, BMI < 25 kg/m² without GERD due to risk of aspiration, no contraindications to local anesthetics such as allergy or coagulopathy, and normal cardiac and pulmonary function so hypoxemia and hypercarbia can be better tolerated.⁶ Exclusion criteria includes LVEF <40%, forced expiratory volume <60% of expected, and hemodynamic instability.

Spontaneous ventilation under volatile agent or TIVA may benefit from supplemental regional or neuraxial analgesia. Neuraxial anesthesia can be achieved under cervical epidural at C7-T1 or T1-T2 for extra-thoracic TRR⁷ and thoracic epidural at T7-T8 level. Cervical or thoracic epidural anesthesia should not be performed on patients with contraindication to sympathetic blockade such as congestive heart failure, severe aortic stenosis, or mitral stenosis. Parasympatholytic agents, including atropine and glycopyrrolate, should be given to minimize bradycardia.⁸ Intrathoracic vagal nerve block performed by surgeon can suppress cough reflex.⁹ Regional anesthesia including paravertebral block and erector spinae block offers additional options to optimize pain relief during thoracotomy and VATS. Both regional and neuraxial analgesia decrease opioid-related hypoventilation and hypoxemia during spontaneous ventilation, minimize coughing or pain-related movement, promote early extubation, and improve postoperative pain control.

Airway Management

Airway management can be challenging when surgeon and anesthesiologist share the airway with the risk of inadequate oxygenation and ventilation. Preoperative preparations should take a multidisciplinary approach and a consensus should be reached among thoracic surgeon, cardiac surgeon, anesthesiologist,

otolaryngologist, pulmonologist, and perfusionist. The evolving anesthesia airway management makes TRR safely achievable using various techniques. These include endotracheal intubation (ETT) with conventional intubation and cross-field intubation, as well as “tubeless” approach utilizing Laryngeal mask airway (LMA) or patient’s native airway under general, regional anesthesia with controlled ventilation, spontaneous ventilation, or even no ventilation utilizing ECMO support. Difficult intubation should always be expected and prepared with rescue plan. Fire prevention is also crucial with close communication and coordination among surgeon, anesthesiologist, and surgical technician. Systemically suction can decrease oxygen near electrocautery and harmonic endocutter, and avoid smoke injury.

Operating room setup can be extensive and cumbersome with multiple bulky machines. Airway equipment include different sizes of ETT and reinforced ETT including sterile ones to pass onto surgical field, microlaryngeal tube (MLT), LMA, different types of bronchial blockers, video laryngoscope, rigid and flexible bronchoscopy, tracheostomy, airway stents, high-flow nasal cannula (HFNC), jet ventilator (JV) with sterile catheters equipped with blender for oxygen and air, and ECMO equipment. A second ventilator is rarely needed when patient can’t tolerate OLV and differential ventilation for each lung is needed. Most reported cases used endotracheal intubation,⁷ which provides secured airway, allows for positive pressure ventilation and oxygenation, ensures airway leak test around anastomosis, and prevents aspiration. ETT can be advanced distally toward tumor and further down to the main bronchus to achieve OLV using MLT without disrupting the tumor. When tumor causes significant tracheal stenosis, ETT can be pulled back above the proximal tracheal incision while passing jet ventilation (JV) catheter through the narrow part of tracheal caused by tumor. Another

approach is to place a sterile ETT cross-field distal to the tumor by surgeon during resection and anastomosis with semi-open and open airway. Near the end of anastomosis, ETT is re-inserted orally with either controlled or spontaneous ventilation. It eliminates the major disadvantage of ETT with less optimal surgical exposure of the posterior wall. Although cross-field intubation may require a few times of advancing and retracting of ETT and repetitive apnea, it ensures a reliable rescue technique when JV or spontaneous ventilation becomes troublesome.

JV can be used in all locations of supra, trans, and infra-glottic areas. It provides controlled oxygenation but imperfect ventilation due to passive expiration. It has minimal surgical interference with adequate surgical exposure during anastomosis. It is indicated in critical stenosis where jet ventilation catheter offers 2-4mm in diameter and up to 15-30cm in length to pass through the tumor. It can be placed antegrade and retrograde during subglottic tumor resection. Frequent blood gas measurement is indicated to monitor PaCO₂ although permissive hypercarbia is well-tolerated up to 100mmHg briefly without increasing mobility and mortality.¹⁰ Disadvantages of JV include barotrauma, tension pneumothorax, subcutaneous emphysema, and tumor debris spreading distally when the catheter is above the tumor.

Emerging tubeless airway management is increasing. The major advantages are improved surgical visualization during anastomosis and decreased surgical time. It avoids multiple tube manipulation, decreases traumatic mucosal swollen, minimizes friable tumor dislodge, and maintains two lung ventilation. However, patient selection is crucial if choosing tubeless airway. Contraindications include uncontrolled GERD, severe COPD, inability to cooperate and tolerate motionless for prolonged surgery.

LMA can be placed to allow both spontaneous and mechanically low-pressure ventilation. It allows evaluation of the entire trachea for an optimal site of incision and anastomosis through bronchoscopy via LMA. It avoids airway manipulation, anastomosis ischemia due to ETT or cuff pressure, and eliminates risk of ETT cuff puncture during tracheostomy. It also eliminates ETT dislodgement when the tumor involves subglottic area. Laryngeal nerve function can be promptly evaluated immediately post-procedure either via fiberoptic bronchoscopy or patient vocalization while under spontaneous breathing. Either “tubeless” or supplemented with JV to distal of tumor provides an effective airway management strategy.¹¹ Positive pressure ventilation (PPV) through LMA may encounter increased airway pressure, especially in cases of severe tumor blockage. Meticulous patient selection is crucial to avoid complications of aspiration or airway crisis due to “can’t intubate, can’t ventilate”,¹² when rigid bronchoscopy or ECMO are options to rescue. Contraindications of LMA application include limited mouth opening, risk of aspiration, pre-existing tracheostomy, or active airway bleeding.

VV-ECMO is indicated when a safe airway can’t be achieved during induction, when poor oxygenation or ventilation is expected during open-airway stages in intra-thoracic and carina TRR. VA-ECMO is performed when expecting hemodynamic instability during extensive carina dissection or cardiac and great vessels being compressed during surgery. The femoral artery and vein are commonly cannulated during ECMO. Right radial artery line and cerebral oximetry monitor are recommended to accurately identify Harlequin hypoxia when the heart ejects deoxygenated blood during VA-ECMO. Although ECMO offers advantages in maintaining a tubeless surgical field during resection and anastomosis, its use is typically reserved as a rescue measure or for cases of

critical airway stenosis due to potential complications such as excessive bleeding, vascular injury, and stroke.

There are different approaches for critical airway obstruction depending on tumor location. Awake tracheostomy should be considered when a tracheal tumor is high near the vocal cord and ETT can be placed through the tracheostomy site distal to tumor. Adequate topical localization makes it possible to perform awake fiberoptic intubation, rigid bronchoscopy, or awake LMA. Cross-field endotracheal tube or transtracheal JV catheter provides a safe profile of oxygenation and ventilation when tumor in tracheal or carina during stages of semi-open and open airway while OLV can be achieved (fig 1).

Postoperative course

Postoperative airway management constitutes an integral part of the overall strategy. The primary goal of TRR is extubation immediately post-surgery. If unable to achieve it, a smaller uncuffed ETT is recommended to be placed either above or 2cm below anastomosis. Tracheostomy is an option to facilitate weaning from the ventilator while minimizing patient discomfort. Chin-suture secures the neck in a flexion position to prevent tension on anastomosis. Complications post-TRR include granulomas, stenosis, dehiscence, and fistula. Granuloma rarely causes airway obstruction when T-tube can be used to stabilize patient if needed. Stenosis may require serial dilation. Dehiscence should be considered when a patient develops increased secretions, cough, or subcutaneous emphysema. Hyperbaric oxygen therapy with 2 atmospheric pressures may facilitate anastomotic healing. Fiberoptic bronchoscopy is recommended to reintubate when indicated. Emergency distal airway cannulation or immediate surgical exploration should be a rescue plan. Anterior anastomosis

separation can lead to tracheo-innominate fistula, which is often accompanied by herald hemoptysis and carries a high mortality rate. In contrast, posterior separation or direct esophageal surgical injury may result in tracheoesophageal fistula, which generally has a more favorable outcome under conservative treatment.

In conclusion, tracheal and carina tumor resection is a technically challenging procedure. It requires the participation of experienced multidisciplinary specialties and intraoperative closed communication and coordination between surgical and anesthesia teams. Prompt recognition and management of postoperative complications improve overall outcomes.

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Pic 1.
Dynamic tracheal tumor during expiration (left) and inspiration (right).

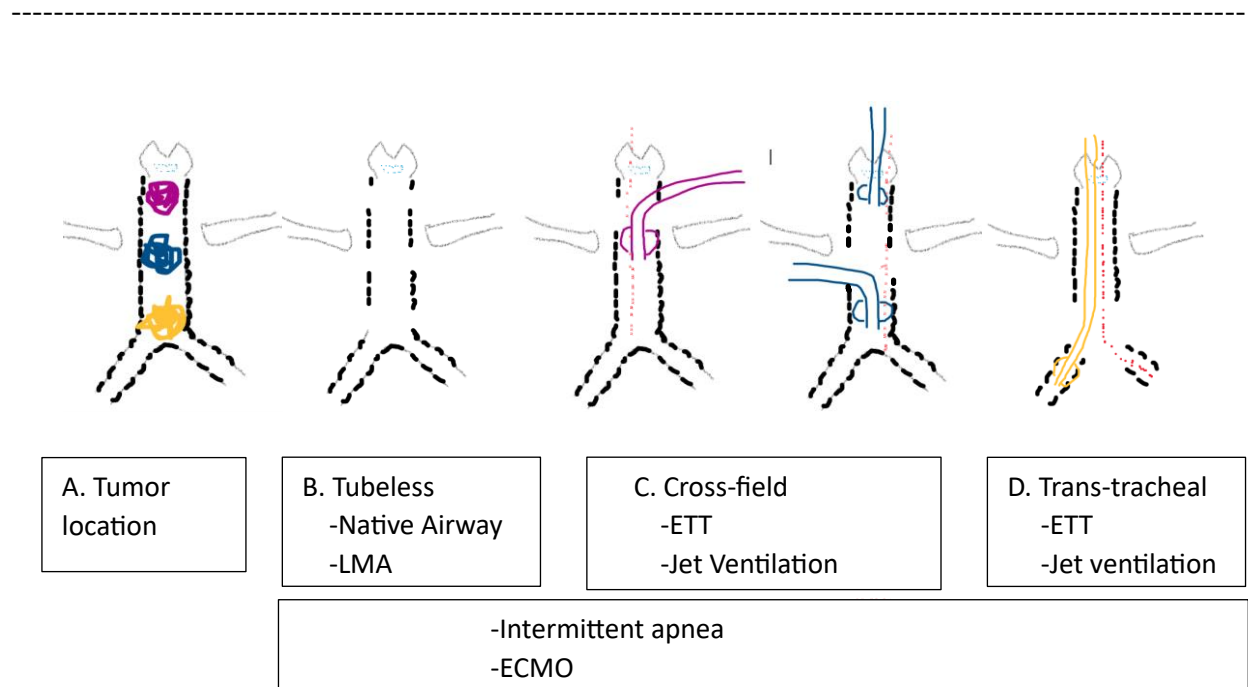


Fig 1. Schematic illustration of various airway management options for tracheal tumor located at different positions during tracheal or carina resection and reconstruction (TRR). A. Extrathoracic tumor in purple, intrathoracic tumor in blue, and carina tumor in orange. B, C, and D review the open airway after the tumor is resected, where B shows spontaneous ventilation under the native airway or LMA (open space indicated resected tracheal rings), purple ETT in C illustrates ETT through a tracheostomy for extrathoracic TRR while two blue-colored ETTs placed orally and cross-field for intrathoracic TRR, and orange ETT in D placed transtracheal for carina TRR. The dotted red line in B, C, and D illustrate jet ventilation. Intermittent apnea and ECMO can be applied at any tumor location during TRR.

Brachial Plexus Plexopathy after Clavicle Fracture Surgery: A Case Report

Xueqin Ding MD, Ph.D.
Department of Anesthesiology
University Hospital Cleveland
Medical Center
Case Western Reserve
University.

Corresponding author:

Name: Xueqin Ding MD, Ph.D
Mailing address: 11100 Euclid Ave,
Cleveland, OH 44106
Phone number: 216-844-8929
E-mail address:
Xueqin.ding@uhhospitals.org
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Abstract: Perioperative Brachial plexus plexopathy is a complex phenomenon and can be caused by multiple clinical factors, including surgical, anesthetic, and patient risk factors. Therefore, it is tough to pinpoint the etiology of brachial plexus nerve injury in clinical cases perioperatively. The neurological symptoms may vary from minor pain to severe sensory or motor loss. It requires a multidiscipline team effort to make diagnoses. The management includes conservative treatment and surgical exploration. We reported a case of brachial plexus plexopathy after clavicle fracture surgery with combined general anesthesia and brachial plexus nerve block.

INTRODUCTION:

Clavicle fractures are most commonly caused by direct trauma. Non-displaced clavicle fractures can be treated by conservative or nonsurgical treatment such as immobilization with a sling, pain control, and physical therapy. However, surgery may be needed for more complicated fractures such as open fractures, displaced fractures with skin tenting, and fractures with concomitant vascular injury and nerve injuries. General anesthesia and regional nerve blocks (cervical plexus and brachial plexus block) are usually preferred in clavicular surgery. The association between clavicle fracture and injury to the brachial plexus is well recognized.¹ Brachial plexus injury could occur at the time of the fracture,² or be caused by the late complications of clavicle fracture (pseudoaneurysms,³ deep vein thrombosis⁴, etc.). Brachial plexus injury is also

a potential complication of clavicle fracture surgery⁵ and brachial plexus block⁶. We presented a brachial plexus injury case after clavicle fracture surgery undergoing general anesthesia and brachial plexus block. The brachial plexus injury was most likely caused by upper extremity deep venous thrombosis secondary to clavicle fracture surgery.

CASE DESCRIPTION

A 56 years old man with a past medical history of hypertension presented for open repair and internal fixation (ORIF) of the right clavicle. One month before the surgery, He suffered multiple injuries, including clavicle fractures, rib fractures, and subdural hematoma after ATV rollover. Orthopedics was consulted for

clavicle fracture, who recommended conservative management and outpatient follow-up because his clavicle fracture originally was minimally displaced. However, he returned to the orthopedic clinic two weeks after being discharged from the hospital. He continued to have pain at the fracture site and obvious deformity shown on the X-ray. So it was decided that patient would need open repair and internal fixation of the right clavicle.

Preoperatively, ultrasound-guided superficial cervical plexus and interscalene brachial plexus blocks were performed without any complications for postoperative pain control. The needle was visualized throughout the procedure. 0.5% ropivacaine 5ml was used for superficial cervical plexus block, and 0.5% ropivacaine 20ml was used for interscalene brachial plexus block. Then the patient was taken to the OR, where he underwent ORIF of the right clavicle with general anesthesia. The surgery went smoothly.

After surgery, the patient was brought to the PACU and discharged home after recovering from general anesthesia. The patient returned to the orthopedic clinic two weeks later for a postoperative visit. It was found that the patient had a significant motor and sensation deficit on the right upper extremity (RUE). The patient was able to shrug a shoulder and fire abduction on the exam but unable to flex/extend the elbow or wrist. The orthopedic surgeon consulted neurosurgery and plastic surgery, who ordered RUE electromyography (EMG) and the right brachial plexus MRI. EMG showed significant RUE nerve dysfunction in multiple nerve/root distributions. MRI of the brachial plexus showed deep venous thrombosis (DVT) of the right subclavian and proximal right axillary vein with surrounding edema. Nonspecific edema is also present around the right brachial plexus. A component of brachial plexus neuropathy is not excluded. Alternatively, this edema may be secondary to adjacent deep venous thrombosis. The patient was referred to a vascular surgeon who started eliquis on the patient and scheduled a venogram and thrombectomy. One week after eliquis started,

the patient had significant improvement in motor function of RUE. Two weeks after eliquis started, the RUE venogram showed DVT of the right subclavian and proximal right axillary vein resolved. Neurosurgery and plastic surgery evaluated the patient and recommended physical therapy. The patient's motor function recovered completely four months postoperatively.

DISCUSSION:

Brachial plexus injury (BPI) is considered one of the most devastating neurological from the patient's point of view. It could cause significant function loss and inability to perform daily, leading to unemployment, economic hardship, and depression. Perioperative brachial plexus injury could be caused by many factors, including patient, anesthesia, and surgery.

Brachial plexus injury is one of the complications of clavicle fracture and clavicle fracture surgery. It could occur through traction, compression, entrapment, or impingement by fracture fragments or callus. Excessive bending or rotation of the head toward the affected shoulder could put too much traction on the brachial plexus and lead to brachial plexus injury. In our case, the head was placed in a neutral position without excessive bending or rotation. There were no fracture fragments or callus present, according to the surgeon. Brachial plexus injury is also associated with the timing of the surgery. Delayed fixation of the clavicle fracture, especially between two and four weeks after injury, has a higher incidence of iatrogenic brachial plexus injury, possibly due to the higher inflammatory reaction associated with the fracture.⁵ In our case, the patient had delayed clavicle fracture fixation (around three weeks after injury). However, it's not clear if the delayed fixation could contribute to brachial plexus injury in this case.

It is well recognized that brachial plexus injury is a potential complication of a brachial plexus

block. It could result from the intrafascicular application of local anesthetics, a high opening injection pressure (>15psi), neurotoxicity of local anesthetics and additives, and hematoma formation.^{7,8, 9} Animal studies indicate that all local anesthetics exhibit concentration-dependent neurotoxicity.⁷ In clinical practice, local anesthetic-induced neurotoxicity is very rare since we rarely use a higher concentration of local anesthetics; in our case, the needle tip and brachial plexus were visualized throughout the block procedure. There was no nerve swelling after the injection. We didn't measure the injection pressure. However, there was not much resistance during the injection. So it's unlikely that brachial plexus injury, in this case, was caused by brachial plexus block.

Brachial plexus injury caused by upper extremity deep venous thrombosis (UEDVT) has been reported.¹⁰ UEDVT usually refers to subclavian and axillary venous thrombosis. It is classified as primary (idiopathic) or secondary based on pathogenesis. Primary UEDVT is rare. Central venous access and malignancy account for most cases of secondary UEDVT. UEDVT is a rare complication of a clavicle fracture. In this case, the patient developed a UEDVT post clavicle fracture, which might compress the brachial plexus and damage the nerve trunks. The patient's sensory and motor function improved significantly after anticoagulation therapy, which indicated that brachial plexus injury, in this case, was most likely caused by UEDVT secondary to clavicle fracture.

Diagnosis of brachial plexus injury starts with a detailed history and physical exam of sensory and motor function. Symptoms, sensory and motor dysfunction vary depending on the brachial plexus injury type, location, and extent. Electromyography may be performed to assist in diagnosis 3-4 weeks after nerve injury because signs of nerve denervation may not be detectable for up to 10-14 days after acute nerve injury.¹¹ CT myelography may be helpful to decide if there is a root avulsion. MRI of the brachial plexus is a very useful and reliable tool for visualizing the plexus and surrounding blood vessels.

Treatment includes conservative management and surgical repair, depending on the type of injury, the severity of the injury, the length of time since the injury, and other existing conditions. Mild brachial plexus injury usually can recover spontaneously with physical therapy over weeks to months. Surgery is indicated when brachial plexus injury is associated with a vascular lesion or any brachial plexus injury which has not shown recovery in 3 months. Depending on the severity and the type of the injury, even surgery may not be able to return the function to normal. Recovery after surgery may occur over months to years, and the outcome is variable.

In summary, we reported a case of brachial plexus injury caused by upper extremity deep venous thrombosis secondary to clavicle fracture surgery, which is a very rare occurrence. Early diagnosis and treatment could make a significant difference to the outcome. In our case, the multidiscipline team effort was the key to making early diagnoses and performing effective treatment so that our patient achieved a complete recovery after four months postoperatively. Our case presentation demonstrates potential diagnosis and management for patients who develop brachial plexus injury caused by upper extremity deep venous thrombosis secondary to clavicle fracture and/or clavicle fracture surgery.

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POCUS 专题 (3)

汪红医生主讲

张扬医生,陆晓薇医生整理

本期讲课内容包括以下超声检查:

-FAST,

-血管 IVC (下腔静脉) /Aorta (主动脉)

-Gastric 胃

-Airway 气道

❖ FAST

FAST 的全称是 Focused Assessment with Sonography for Trauma, 历史由来已久, 在上世纪 90 年代初在日本和德国首先应用, 1999 年在 International Consensus Conference 上定名为 FAST。该超声包括四个窗口: 剑突下, 右上腹, 左上腹和耻骨上。随后又有 eFAST, 其增加了四个肺部超声窗口 (图 1)。

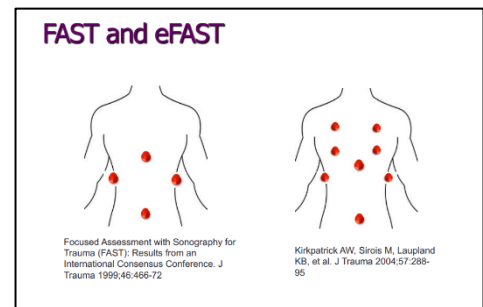


图 1

FAST 超声探头 (图 2) 选择: 推荐凸型 (Convex/Curvilinear) 或者心脏矩阵探头 (Phased Array), 要求 2-6 MHz, 这样可以达到探测深度的要求。Linear 探头探测深度浅, 不适于做 FAST 检查。



图 2

右上腹 超声点选择剑突下水平与腋中线交点, 标记点朝向 11 点钟方向。可以较为容易定位膈肌, 以膈肌分界。左方为肺, 右方为肝脏 (图 3)。**左上腹** 选择剑突下水平与腋中线交点, 标记点朝向 1 点钟方向。类似于右上腹, 以膈肌分界, 左方为肺, 右方为脾脏 (图 4)。

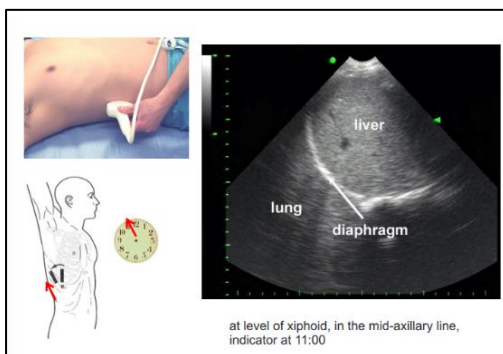


图 3

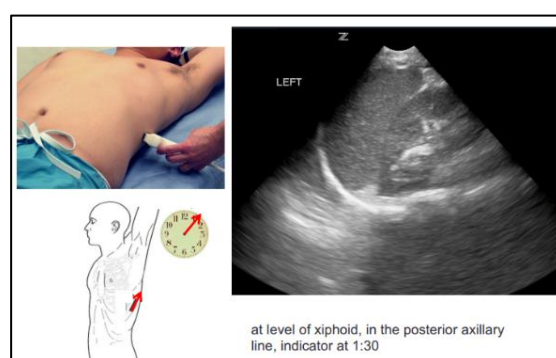


图 4

在看 FAST 的过程中同时也可看胸腔，可发现创伤患者是否有胸腹腔积血，超声图像上如果在胸腔位置看到锥体，一般就是胸腔积液或者肺炎（图 5，黄星标记）。

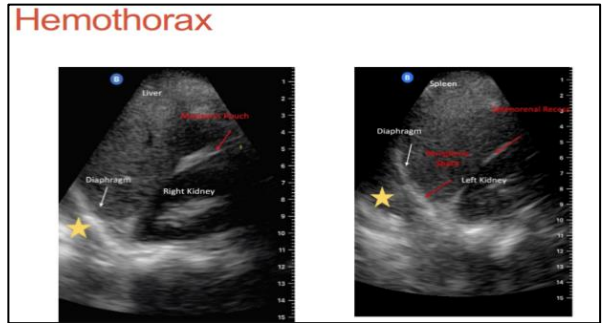


图 5

肝肾间隙称为 Morrison's Pouch，是右上腹最低点，能最敏感地发现右上腹积液的地方。同样，左上腹脾肾间隙为最低点，易于发现积液。FAST 的目的是为了检测腹腔内是否有积液，当排除了患者存在的疾病，比如肝硬化造成的积液，那么对于创伤或者术后的患者，很有可能是腹腔存在出血，出血积液位置可能在肝肾间隙、脾肾间隙，也可以在肝脏或脾脏上方（图 6）。

汪教授分享了 5 年前她的病例（图 6），一名 19 岁男性患者左上腹疼痛，无创伤史，FAST 观测到脾脏周围有积液，追问病史有 ITP、脾增大，怀疑脾破裂，紧急开腹手术行脾切除。FAST 对于闭合型腹部创伤的敏感度为 85%，特异度 96%，贯穿伤的特异度为 94-100%，但有部分研究指出其敏感度数据较差，仅为 28.1%，主要是与出血量有关。需要指出的是，当出血后形成血栓，FAST 可出现假阴性。

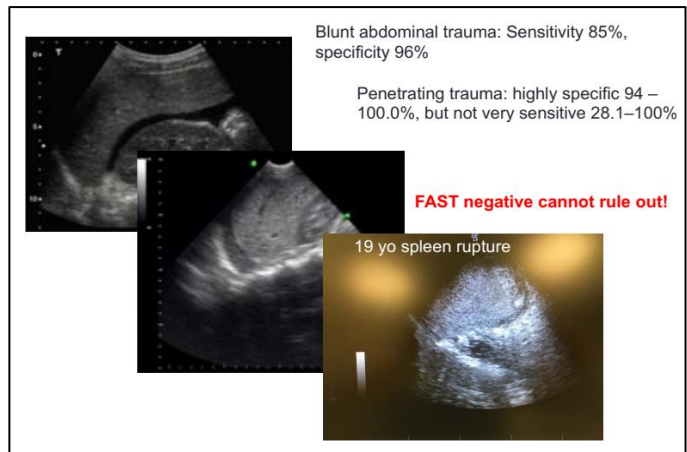


图 6

图 7 为汪教授发表于 2018 年 Anesthesiology 杂志的案例（图 7）。一名腹腔镜结肠部分切除术后的患者，在复苏室心动过速，FAST 显示肝肾间隙有积液，左上腹整个脾脏周围有大量积液形成了“floating sign”，紧急开腹探查发现肝脏有挫裂伤造成腹腔出血。



图 7

耻骨上超声：探头对着盆腔，可横向和矢状位检查（图 8）。男女的解剖结构需要熟知，女性从前往后分别为膀胱、子宫和直肠。子宫和直肠之间称为 Cul de Sac 或者 Pouch of Douglas（图 9a， 10a），是积液最容易观察到的位置。男性从前往后为膀胱、前列腺和直肠。膀胱和前列腺/直肠之间称为 Retrovesical Space（膀胱后间隙）（图 9b， 10b）。该位置最易观察积液。POCUS 认证需要考生能指出前列腺、子宫和直肠（图 11）。耻骨上检查还可以观测术后尿储留（膀胱直径大于 9.7 厘米）和不确定的导尿管置入，通过膀胱内是否可观测到导尿管气囊扩张来确定位置（图 12）。

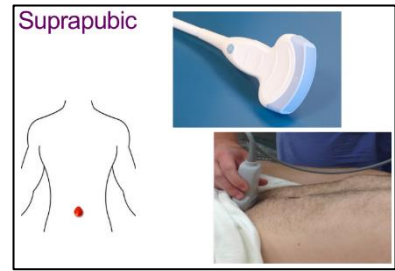


图 8

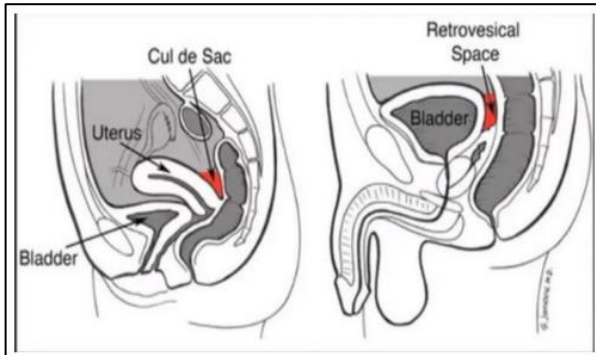


图 9a

图 9b

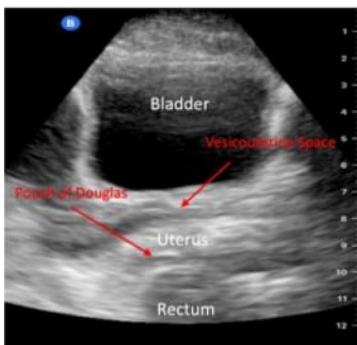


图 10a



图 10b

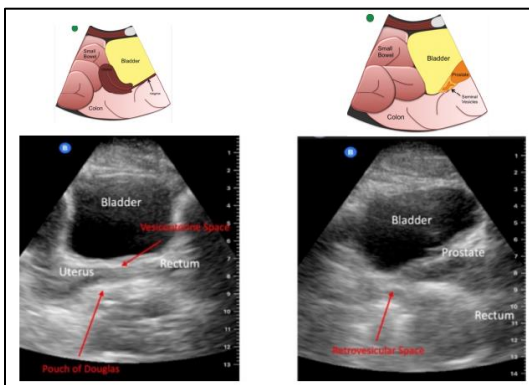


图 11



图 12

增加 FAST 敏感性的方法可以通过改变体位，比如头低脚高侧卧位可看上腹，头高脚低平躺看盆腔。如果观测到腹腔积液(图 13, 14)，是否需要手术探查，取决于患者病史、血液动力学是否稳定和出血量，辅助可用汪教授推荐的 Free Fluid Score 评分 (图 4 来决定。Free Fluid Score 包括最大积液位置的直径 厘米+ 积液位置的数量，如果数字相加大于 3，有 87% 的概率是需要手术探查 (与 15)。

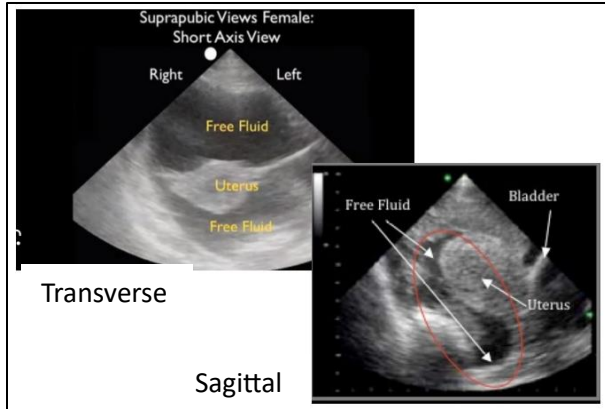


图 13

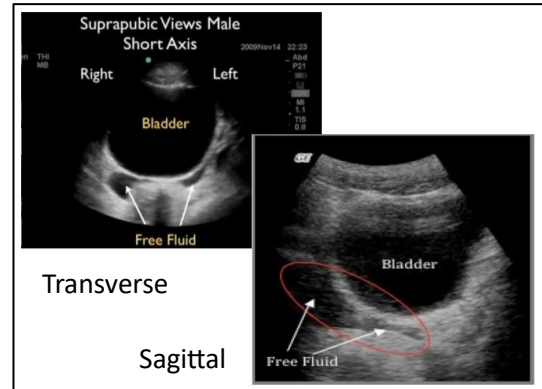


图 14

Sensitivity

- Position
- Time
- Free fluid score
 - Diameter of the largest collection (cm) + sites of the fluid
 - > 3, 87% required surgery
 - J Trauma 2001; 50:650-6
- Limitation (clot)

图 15

❖ 血管 (IVC) 下腔静脉、Aorta 主动脉超声

下腔静脉检查时，患者可呈双膝屈膝，呼气位 (图 16)。超声探头置于腹中部，剑突下，可通过左右摇动超声的位置，来观测和区分下腔静脉和主动脉。在凸型探头矢状面 (sagittal plane) 图像里，下腔静脉通入右心房，可观测静脉侧支 (肝静脉) (图 17, 18)，同时在患者自主呼吸时，吸气后下腔静脉会有塌陷。当探头横向，标记点指向 9 点钟方向，图像里可看到呈椭圆形的下腔静脉在病人右面，搏动的主动脉在病人左面 (图 19)。下腔静脉大小与血容量有相关性，通过其直径和自主呼吸时吸气塌陷比例，可对应中心静脉的压力值范围。在正压通气时，患者如果血容量正常，吸气时下腔静脉直径不会改变，但低容量时，下腔静脉直径会扩张。通过计算下腔静脉的塌陷和扩张指数，可判断患者血压不稳时，是否有容量不足或对静脉补液是否有反应 (图 19, 20, 21)。

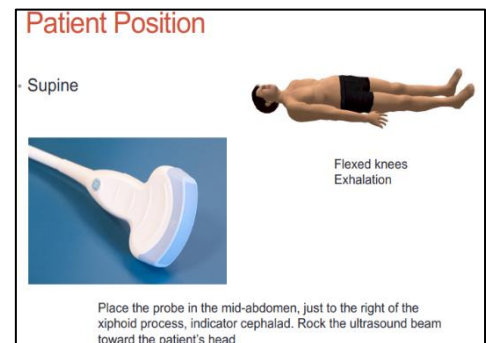


图 16

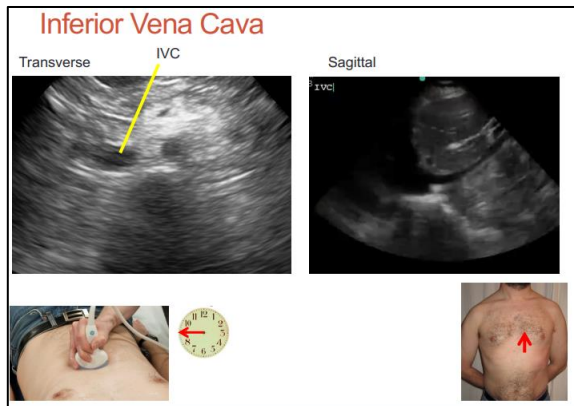


图 17



图 18

Subcostal IVC Assessment

IVC diameter	% collapse on inspiration	CVP (mm Hg)
< 2 cm	> %50	0-5
>2	>50%	5-10
>2	<50 %	10-15
>2	minimal	15-20
>2 cm with dilated hepatic veins	none	>20

Adapted from: Recommendations for Chamber Quantification: A Report from the American Society of Echocardiography's Guidelines and Standards Committee and the Chamber Quantification Writing Group, developed in conjunction with the European Association of Echocardiography, a branch of the European Society of Cardiology, p 1458-9.

图 19

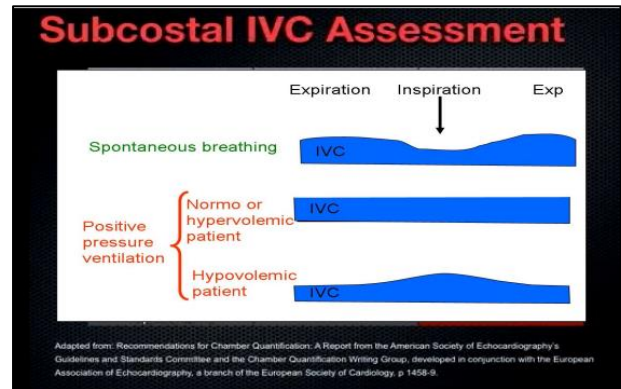


图 20

Beyond the Certification

Spontaneous Breathing Patient
 $cIVC = (D_{max} - D_{min}) / D_{max} \times 100$
 $cIVC > 40\%$ - Fluid responsive
 $cIVC \leq 15\%$ - NOT fluid responsive

Mechanically Ventilated patient, no respiratory effort, TV 8-10 mL/kg
 $dIVC = (D_{max} - D_{min}) / D_{min} \times 100$
 $dIVC > 18\%$ - fluid responsive
 $dIVC < 16\%$ - NOT fluid responsive

$\Delta IVC = (D_{max} - D_{min}) / [(D_{max} + D_{min}) / 2] \times 100$
 $\Delta IVC > 12\%$ - fluid responsive
 $\Delta IVC < 12\%$ - NOT fluid responsive

图 21

汪教授还介绍了在腹卧位时，可以使用矩阵探头，在右上腹位置测量下腔静脉（图 22）。她分享了多年前的一个病例，一名患者妇科手术后，血液动力学不稳，FAST 阴性（出血后形成血块），但下腔静脉塌陷（有 Kissing sign）（图 23），血红蛋白骤减为 3 克，紧急探查发现子宫动脉出血。

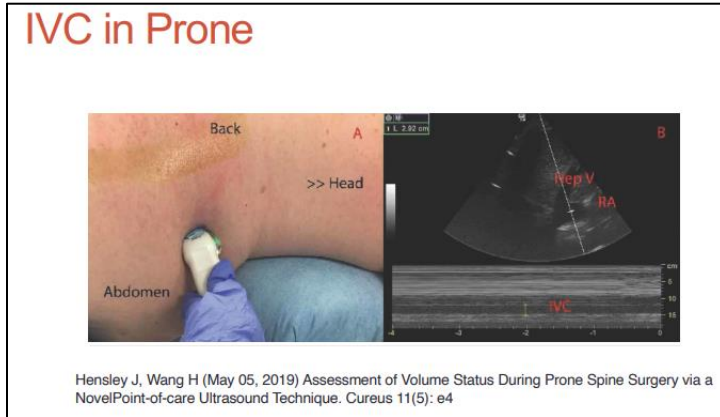


图 22

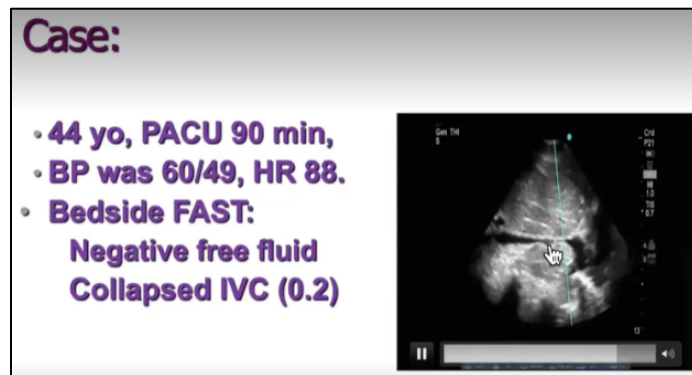


图 23

腹主动脉的超声检查（POCUS 认证未要求），操作容易，将探头置于下腔静脉位置，朝左面可帮助麻醉医师在围手术期观察腹主动脉支架的位置和是否有内漏（图 24，25，26，27）。

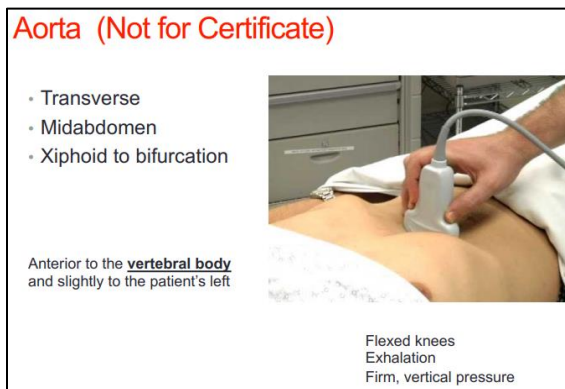


图 24

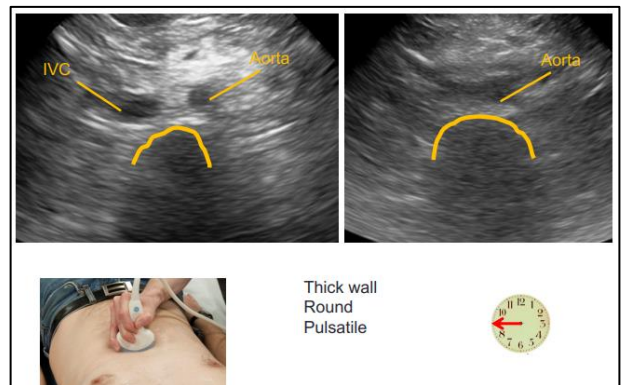


图 25



图 26

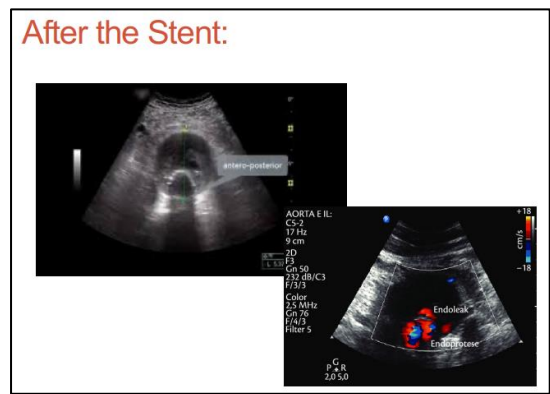


图 27

❖ 胃超声

胃超声的应用日趋流行，将探头放置于下腔静脉偏左的位置，探测的结构准确说是胃窦，要有仰卧位（图 28a）和右侧卧位（图 28b）两个体位的同时评估。先用超声定位肝脏，顺着朝病人左侧移动，可在肝左叶下方找到胃窦。为了保证有足够的探测深度，要求同时观测到主动脉（图 29）。空腹时胃窦有典型特征，黏膜周围有空气附着，形成环状边缘（Ring）（图 30a），而喝水后，环状边缘消失（图 30b）。此方法可用于判断患者的误吸风险。在患者右侧卧位，通过超声测量胃窦面积，若小于 10 平方厘米（小于 1.5 cc/kg），误吸风险小。若超声无法测量面积，结合腹卧位/右侧卧位是否可观测到液体，来区分误吸风险。看到液体则是高风险。具体可参见 gastricultrasound.org 的评分标准(图 31a, 31b)。



图 28a & b

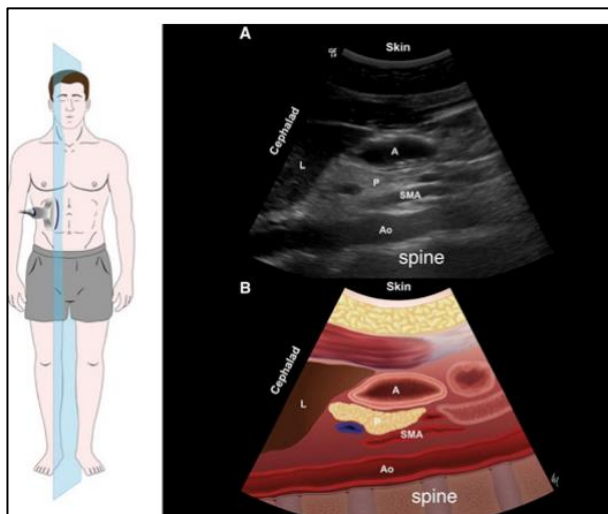


图 29

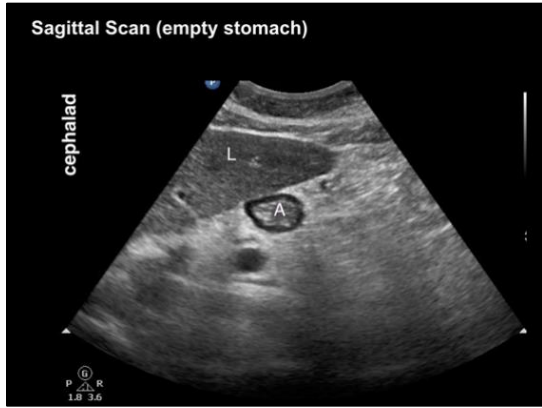


图 30a

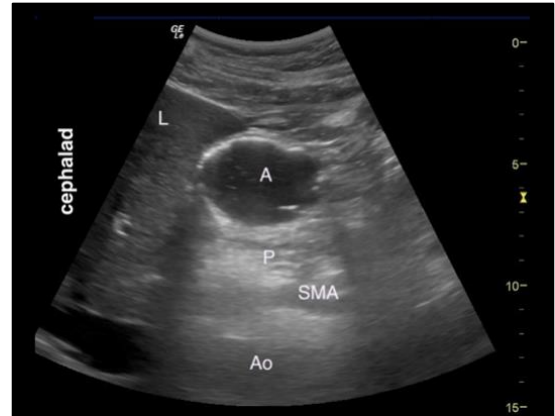


图 30b

Antral Grade	Fluid in supine	Fluid in RLD	Gastric volume
0	NO	NO	Nil
1	NO	YES	Low volume < 1.5 mL/kg in 75% of cases
2	YES	YES	High volume > 1.5 mL/kg in 75% of cases

Empty

Early Solid

Late Solid

< 10 cm² in the RLD

<https://www.gastricultrasound.org/>

图 31a

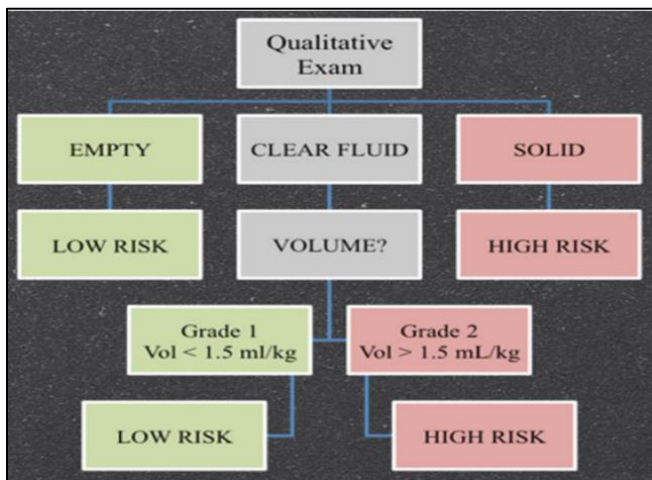


图 31b

❖ 气道超声

气道超声, 虽然 POCUS 认证没有要求, 但对于临床很有帮助。探头选择推荐矩阵探头或者凸型探头, 放置位置在胸骨上 (图 32)。目前主要用于以下几个方面: 确认插管位置 (图 33a & 33b)、环甲膜位置、困难气道的预测和气道神经阻滞。



图 32



图 33a 气囊未打开

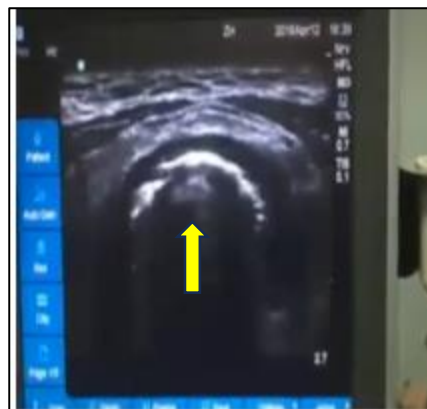


图 3b 气囊打开

在 2016 年《麻醉学》杂志发表关于插管深度 (气管 vs 支气管) 的研究发现, 超声观测插管气囊推动气管软骨扩张, 同时双肺胸膜有滑动征, 证明插管位置准确的敏感度和特异度为 93%和 96%, 而通过听诊器判断气管位置的敏感度和特异度仅为 66%和 59% (图 34)。在插管后无二氧化碳呼出, 超声若显示双气道征, 提示插管入食道内 (图 35)。

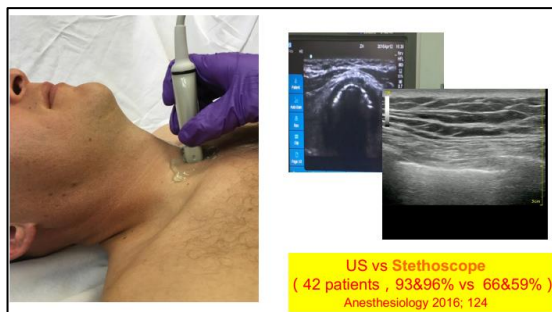


图 34

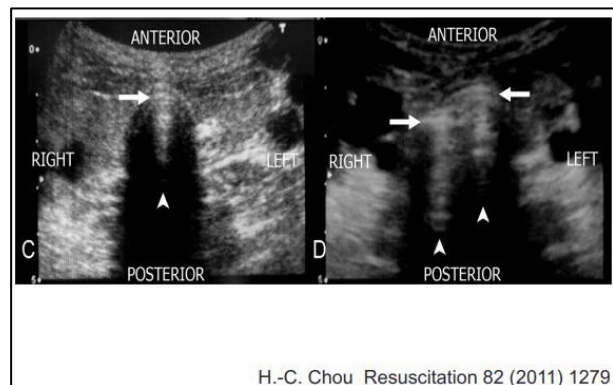


图 35

H.-C. Chou Resuscitation 82 (2011) 1279

环甲膜的定位可以通过横状位和矢状位来观测，ASA 困难气道 Workshop 推荐横状位 TACA Approach，分别为 Thyroid cartilage、Airline（即环甲膜）、Cricoid cartilage、Airline，矢状位从下往上依次确定气管软骨“string of pearls”、凸起的环状软骨、凹陷的环甲膜和再次凸起的甲状软骨（图 36a, 36b）。

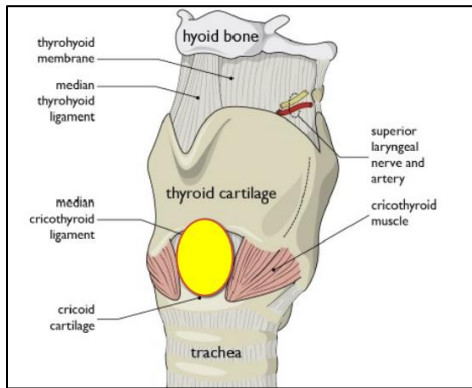


图 36a

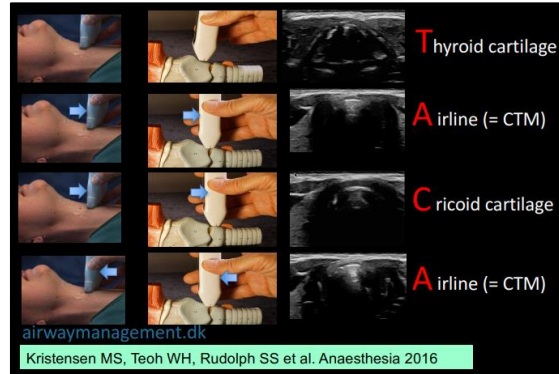


图 36b

汪教授最后介绍了气道超声的研究热点包括测量皮肤到气道各个结构的距离来预测困难气道(图 37)，以及超声引导下的喉上神经的阻滞（图 38a, 38b）。

Difficult airway prediction

Airway Ultrasound as Predictor of Difficult Direct Laryngoscopy: A Systematic Review and Meta-analysis

Andrea Carsetti, MD,*† Massimiliano Sorbello, MD,‡ Erica Adrario, MD,*† Abele Donati, MD, PhD,*† and Stefano Falcoetta, MD†

- Distance from skin to epiglottis,
- Distance from skin to hyoid bone
- Distance from skin to vocal cords

Patients with difficult direct laryngoscopy have higher values than patients with easy laryngoscopy

Anesth Analg 2021;

图 37

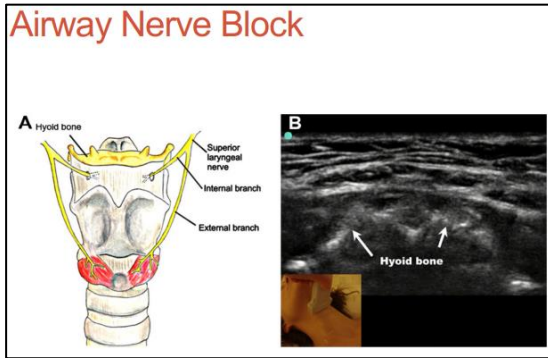


图 38a

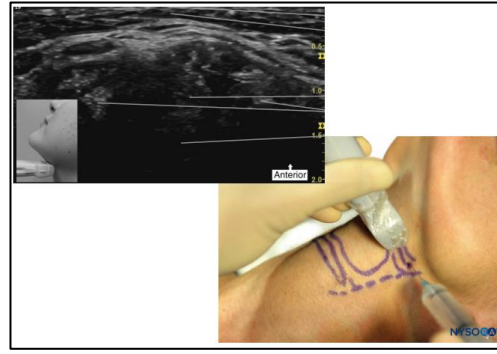


图 38b

在接下来的讲座时间里，汪教授回答了诸多关于 POCUS 的相关问题，包括儿童 FAST 现状，具体解析了主动脉支架的内漏，着重讲解了胃超声的应用和未来的研究方向。大家就误吸的规避和救治也展开了激烈讨论，汪教授还介绍了各类超声仪器的优势。最后她鼓励大家尽早收集自己的超声病例和图像，积极参加 POCUS 的认证。

POCUS 讲座目前已举办三期，深受广大麻醉医生的肯定。CASA Bulletin 将继续以往的努力刊登讲座内容，也鼓励各位麻醉医生将自己实践中的 POCUS 经验成文投稿，分享于同行，以期共同进步。下一期将刊登黄佳鹏医生主讲的肺部及胃部超声，欢迎各位医生参加。-主编注



Problem -Based Learning Discussion (PBLD)

Intraoperative Cardiac Arrest after Spinal Anesthesia for Total Hip Arthroplasty

Juan Li, MD
Narragansett Bay Hospital

Disclosures: This is a hypothetical case. This presenter has no financial relationships with commercial interests.

Objectives:

After the case discussion, the participants should be able:

- 1) Define the pathophysiologic changes after spinal anesthesia
- 2) Review spinal anesthesia-related complications
- 3) Discuss the pathophysiology of perioperative myocardial infarction and prevention.

Case Report:

80-year-old female for right-side total hip arthroplasty. She has a PMH of HTN, HLD, CAD, OSA, CKD, PSH of tonsillectomy and cholecystectomy, and no previously reported problems related to anesthesia. NKDA. She takes HCTZ, atorvastatin, and 81mg ASA at home. Her physical examination shows a weight of 80kg, a height of 165cm, and a sedative lifestyle due to chronic hip pain.

Physical Examination: 80kg, 165cm female, no acute distress, and is pleasant during the examination.

Vitals: BP 145/78mmHg, HR 80, RR 18, SpO2 99%, T 36.6 F

Labs:

CBC: Hemoglobin 11g/dL, Hematocrit 36%, Platelets $110 \times 10^3/uL$, WBC $5.5 \times 10^3/uL$

BMP: Na 135 mmol/L, K 3.7 mmol/L, Cl 108 mmol/L, HCO₃ 23 mmol/L,
Glu 99mg/dL, Cr. 2.8 mg/dL, Bun 15 mg/dL

EKG: Left bundle branch block (LBBB)

Key Questions:

You evaluate the patient for surgery in the preoperative holding area.

1. Are there any clinical concerns for this patient undergoing total hip arthroplasty?

2. Are any additional exams necessary prior to proceeding with the procedure? Is the LBBB a concern to you?
3. What anesthetic technique would be appropriate for this patient? General anesthesia (GA) or regional anesthesia (RA) with sedation? Please explain.
4. Will her age or other comorbidities impact your decision regarding the choice of anesthetic?
5. What are your hemodynamic goals during surgery? Are invasive monitors such as arterial line placement warranted?

The Anesthesia team did spinal anesthesia at L3-L4 level with 1.5cc 0.75% hyperbaric bupivacaine. The patient was placed left lateral decubitus position. The patient was started on 100 mcg/kg/min propofol infusion with a non-breather face mask 8L/min O2. The case was uneventful until 40 min later, the patient's HR dropped from 80s to 50s and then 40s with BP 100/65. The patient has LBBB, so the ST elevation was the same as previously.

6. What do you think is going on at this time? And what would you do in this situation?
7. Is this BP 100/65 concerning with this HR?
8. What would you do at this time?

The anesthesia team administered 1mg atropine, but the patient's HR didn't respond and got even worse to 20s, with a BP of 85/45.

9. What are the explanations for the current clinical status?
10. What other treatment choice do you have other than using atropine at this time?

More anesthesia providers were called to the OR for help. The patient was then found in cardiac arrest and a code was initiated. The patient was started on CRP and meanwhile, ETT was placed. CPR lasted for 5min and 2 rounds of epinephrine in a total of 2mg were administered. The patient had ROSC, surgery was aborted and the patient was transferred to ICU.

11. What mechanisms of action lead to a patient's cardiac arrest? Any differential diagnosis?
12. What is your clinical planning after the patient was transferred to ICU?

POCUS in ICU shows severe hypokinetic of the anterior inferior and lateral wall, LVEF was probably 25-30%, and troponin level 26 ng/mL, the patient was then scheduled for an emergent cardiac catheterization. Cardiac catheterization shows almost complete occluded LAD and an emergent stent was placed

13. What is a logical explanation for this result?
14. Do you think MI is the cause or outcome of cardiac arrest?

Discussion:

It has been reported that two cardiac arrests occurred in 1881 patients and 26 cardiac arrests occurred in 40,640 patients in the two largest prospective studies designed to examine complications during spinal anesthesia. This represents an overall incidence of seven arrests per 10,000 spinal anesthetics (0.07%) (1). In contrast, three arrests from any cause were reported for every 10,000 noncardiac surgery patients (0.03%) (2). According to the results of this study, spinal anesthesia increases the risk of perioperative cardiac arrest. Based on the ASA closed claims database, Pollard noted that 170 claims involved cardiac arrests during spinal or epidural anesthesia. Ninety percent of these cases resulted in brain damage or death (3). Although cardiac arrest is a rare but severe complication of spinal anesthesia, it is important to discuss the cause of the cardiac arrest as well as any preventative measures or treatments that may be effective.

The first differential diagnosis of cardiac arrest during the spinal is a sympathetic blockage and parasympathetic stimulation from spinal anesthesia. While the mechanism by which spinal anesthesia induces bradycardia is not completely understood, it has been established that the final pathway is the blockage of the sympathetic nervous system and the relative or absolute parasympathetic nervous system (4). It has been reported that cardiac arrest can occur within 12 to 72 minutes of spinal anesthesia, while cardiovascular side effects can occur as late as hours after the procedure (1). The patient suffered a cardiac arrest 40 minutes after spinal anesthesia, during the period when cardiac arrest can be caused by increased parasympathetic nervous activity.

What is causing sympathetic blockage and parasympathetic stimulation during spinal anesthesia? During spinal anesthesia, the level of the sympathetic blockade is usually two to six levels higher than the sensory level; therefore, a patient with a T4 sensory block may have completely blocked cardiac accelerator fibers that originate at T1 to T4. The inhibition of sympathetic efferent during spinal or epidural anesthesia has a more significant effect on venous return to the heart. When preload decreases, reflexes may be triggered that cause severe bradycardia. Sudden decreases in preload can trigger reflexes (Bezold-Jarisch's) that can cause severe bradycardia (5). Combined with severe bradycardia, vasal dilation can result in hypotension and cardiac arrest (6). Our case was characterized by bradycardia as the first symptom and a significant drop in blood pressure only after the heart rate dropped to the 20s. Asystole can occur in vagotonic patients when procedures that increase vagal activity are performed. In particular, spinal anesthesia has been associated with the progression of first-degree heart block to second-degree heart block and with the development of sick sinus syndrome after spinal anesthesia (2, 7). Our patient has already had a history of LBBB and if this spinal

anesthesia triggers an RBBB caused by a myocardial ischemia affecting the sinus node, the patient may have encountered a complete

heart block which was not responsive to atropine as shown by the management.

Maintaining adequate preload and afterload during spinal anesthesia is crucial to reducing the risk of bradycardia and cardiac arrest. Based on the results of physiology studies and multiple case reports, it is evident that volume loading is crucial as well as the prompt replacement of lost fluids (1). This was attributed to vigilance and the use of IV atropine, ephedrine, norepinephrine, and epinephrine (8). In the event of a profound bradycardia or a full cardiac arrest after spinal anesthesia, epinephrine must be administered as soon as possible. Cardiopulmonary resuscitation may be rendered ineffective as a result of the vasodilation caused by spinal anesthesia. After spinal anesthesia, epinephrine should be administered earlier and more consistently in order to improve outcomes after cardiac arrest (2). Our patient had been NPO for more than 12 hours when the cardiac arrest occurred and was presumably intravascular volume depleted. Only 500cc of fluid was administered and epinephrine was also not given at the earliest possible phase as recommended, which may have delayed treatment.

The second differential diagnosis is high spinal or total spinal. From the literature review, total spinal anesthesia can happen during spinal anesthesia (9). Hypoxia or hypercarbia caused by high neuraxial blockade can result in profound peripheral vasodilatation, resulting in a significant decrease in venous return and poor atrial filling in severely dehydrated patients. It is also possible for a high spinal or total spinal pressure to cause profound sympathetic blockage and parasympathetic stimulation, which further increases the risk of cardiac arrest. Cardiac arrest may occur due to hypotension and hypoxemia or unopposed vagal dominance (9). According to the literature review, the dose for elderly patients may be reduced in order to reach the same level of sensory stimulation (10). In our patient, we used 1.5cc of 0.75% hyperbaric bupivacaine, which is 11.25 mg, and based on the literature review, this amount of bupivacaine can cause a high spinal level. After 20 minutes of spinal anesthesia, delayed cardiac arrests have been reported (8, 11). For our patient who started to have bradycardia around 40min, this can be a delayed high spinal, though the incident was uncommon.

A combination of reassurance, supplemental oxygen (intubation if necessary to support oxygenation and ventilation or to restore airway reflexes), IV fluid administration, as well as vasopressors, with early epinephrine administration being essential. Early recognition is vital, as block progression may be mitigated by adjusting the patient's position (1, 9).

The third differential diagnosis can be sedation with resultant obstruction and hypoxemia.

A circulatory or respiratory insufficiency may be caused by inducing sedation for the purpose of providing comfort and relieving anxiety related to surgical procedures. In a sedated state, spontaneous verbalization can be lost for a short period of time before cardiac arrest is detected. Several cases of severe hypoxia (SpO₂ below 85% for >30 seconds) have been reported without cyanosis or changes in respiratory pattern. Thus, respiratory insufficiency may have been present but clinically unrecognized (12). Our patient has OSA with possible obstruction under sedation after spinal anesthesia. The dose of propofol was 100 mcg/kg/min and was high enough to cause significant obstruction and hypoxemia which lead to cardiac arrest.

The fourth differential diagnosis is acute intraoperative myocardial infarction. In view of the advancing age and co-morbidity of surgical patients, cardiovascular management of patients undergoing non-cardiac surgery has drawn a great deal of clinical interest (13, 14). From the revised cardiac risk index (RCRI) our patient is 2 which belongs to Class 3 of risk for perioperative cardiac events with a risk percentage of 6.6%. And according to the recommended perioperative evaluation and optimization of patients at risk of cardiac complications for non-cardiac surgery, this patient should have a pharmacologic stress testing or echo exam before this elective surgery (15). And if this cardiac arrest was triggered by perioperative myocardial infarction, the patient with bradycardia may be a second-degree AV block or complete heart block on top of a LBBB, especially when there are a sinus node or AV node coronary artery mal-perfusion issues, for example, an inferior MI. The patient, as we discovered later, had an acute LAD occlusion and received an emergent cardiac stent for LAD occlusion. Though it is difficult to determine whether this MI caused cardiac arrest or whether it was the result of a cardiac arrest during the code period, perioperative myocardial infarction should be one of the differential diagnoses to entertain.

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五子登科

摄影 林熙

Xi Lin (林熙), MD,PhD, an alumnus of Peking Union Medical College (83') and University of Maryland (91'), currently practicing neurology in Gettysburg, PA

我唯一锲而不舍，愿意以自己的生命去努力的，只不过是保守我个人的心懷意念，在我有生之日，做一个真诚的人，不放弃对生活的热爱和执着，在有限的时空里，过无限广大的日子。-三毛

ANESTHESIA NEWS

曲歌整理

June 20, 2023

Updated ASA and APSF Joint Statement on Elective Surgery Procedures and Anesthesia for Patients After COVID-19 Infection

RECOMMENDATIONS

Patients who demonstrate symptoms consistent with COVID-19 should be screened and, if appropriate, tested for SARS-CoV-2 before their elective procedure. Physicians should use a time- and symptom-based strategy to decide when patients with COVID-19 are no longer infectious.

Elective surgery should not occur within two weeks of a SARS-CoV-2 infection. Such a delay allows anesthesiologists and surgeons to assess the severity of a patient's COVID-19 symptoms and to mitigate the risk of transmitting COVID-19 from patient to clinical staff.

Between two and seven weeks after SARS-CoV-2 infection, anesthesiologists with surgeons or proceduralists should conduct a risk assessment on their patient. Such risk assessments should ideally use a validated tool and consider these patient factors:

Age, comorbidities, and functional or frailty status of the patient, severity of the patient's recent SARS-CoV-2 infection, ongoing symptoms, and vaccination status, complexity of surgery or surgical risk, potential deleterious effect of delayed surgery upon the patient's health.

If the patient and surgery are determined to be low risk, anesthesiologists and surgeons may, with the informed consent of, and shared decision-making with the patient, schedule the procedure between two and seven weeks after SARS-CoV-2 infection. Such a decision should consider whether the risk of proceeding exceeds the risk of delay.

Further delaying surgery after seven weeks should be considered if the patient has continued COVID-19 symptomatology or other factors that may result in the risk of proceeding exceeding the risk of delay.

Facilities, surgeons, and anesthesiologists should track patient outcomes, including complications and mortality, on elective surgery cases after SARS-CoV-2 infection.

June 29, 2023

American Society of Anesthesiologists Consensus-Based Guidance on Preoperative Management of Patients (Adults and Children) on Glucagon-Like Peptide-1 (GLP-1) Receptor Agonists

-By American Society of Anesthesiologists (ASA) Task Force on Preoperative Fasting

Glucagon-like peptide-1 (GLP-1) receptor agonists are approved by the FDA for treatment of type 2 diabetes, cardiac risk reduction in this cohort, weight loss in adults and pediatrics. The GLP-1 agonists are associated with adverse gastrointestinal effects such as nausea, vomiting and delayed gastric emptying. There are concerns that delayed gastric emptying from GLP-1

agonists can increase the risk of regurgitation and pulmonary aspiration of gastric contents during general anesthesia and deep sedation.

The American Society of Anesthesiologists (ASA) Task Force on Preoperative Fasting reviewed the available literature and provide the following recommendations.

For patients requiring urgent or emergent procedures, proceed and treat the patient as 'full stomach' and manage accordingly.

For patients scheduled for elective procedures consider the following:

Day(s) Prior to the Procedure:

For patients on daily dosing consider holding GLP-1 agonists on the day of the procedure/surgery.

For patients on weekly dosing consider holding GLP-1 agonists a week prior to the procedure/surgery.

If GLP-1 agonists prescribed for diabetes management are held for longer than the dosing schedule, consider consulting an endocrinologist for bridging the antidiabetic therapy to avoid hyperglycemia.

Day of the Procedure:

If gastrointestinal (GI) symptoms such as severe nausea/vomiting/retching, abdominal bloating, or abdominal pain are present, consider delaying elective procedure, and discuss the concerns of potential risk of regurgitation and pulmonary aspiration of gastric contents with the proceduralist/surgeon and the patient.

If the patient has no GI symptoms, and the GLP-1 agonists have been held as advised, proceed as usual.

If the patient has no GI symptoms, but the GLP-1 agonists were not held as advised, proceed with 'full stomach' precautions or consider evaluating gastric volume by ultrasound, if possible and if proficient with the technique. If the stomach is empty, proceed as usual. If the stomach is full or if gastric ultrasound inconclusive or not possible, consider delaying the procedure or treat the patient as 'full stomach' and manage accordingly. Discuss the concerns of potential risk of regurgitation and pulmonary aspiration of gastric contents with the proceduralist/surgeon and the patient.

There is no evidence to suggest the optimal duration of fasting for patients on GLP-1 agonists. Therefore, until we have adequate evidence, we suggest following the current ASA fasting guidelines.



CASA NEWS

黄佳鹏教授

获得 环境科学研究中心 (Center for Integrative Environmental Health Sciences CIEHS) 奖励, 用于研究重金属锑 (Antimony) 对肺动脉高压病人中的影响



李娟医生

祝贺李娟医生作为我们 CASA 学会开展床旁超声培训系列讲座以来第一名获得 ASA 资质认证的会员



王天龙教授当选中华医学会麻醉学分会第十四届专业委员会候任主任委员



ARTICLES AND BOOK PUBLISHING

Dr. Jeffrey Huang published Summary of "Safety and efficacy of an automated anesthesia delivery system for total intravenous anesthesia with propofol, remifentanyl, and rocuronium: a non-inferiority randomized controlled trial versus manually controlled anesthesia" in Anesthesia Patient Safety Foundation.

Summary of "Safety and efficacy of an automated anesthesia delivery system for total intravenous anesthesia with propofol, remifentanyl, and rocuronium: a non-inferiority randomized controlled trial versus manually controlled anesthesia"

Summary published May 31, 2023

Summary by Jeff Huang, MD

Share

Journal of Anesthesia | November 2021

Nagata O, Matsuki Y, Ogino Y, Shigemitsu K. Safety and efficacy of an automated anesthesia delivery system for total intravenous anesthesia with propofol, remifentanyl, and rocuronium: a non-inferiority randomized controlled trial versus manually controlled anesthesia. *J Anesth.* 2022 Feb;36(1):96-106. doi: 10.1007/s00540-021-03015-6. Epub 2021 Nov 5. PMID: 34739584.

doi: <https://doi.org/10.1007/s00540-021-03015-6>

Dr. John Zhong published Patient and process outcomes among pediatric patients undergoing appendectomy during the COVID-19 Pandemic: An international retrospective cohort study.

ANESTHESIOLOGY

Patient and Process Outcomes among Pediatric Patients Undergoing Appendectomy during the COVID-19 Pandemic: An International Retrospective Cohort Study

Clyde T. Matava, M.B.Ch.B., M.Med., M.H.S.C.,
Nathaniel T. G. Tighe, M.D., M.M., Reto Baertschiger, M.D., Ph.D.,
Robert T. Wilder, M.D., Ph.D., Lynnie Correll, M.D., Ph.D.,
Steven J. Staffa, M.S., David Zurawski, M.S., Ph.D.,
Meredithe A. Kato, M.D., Petra M. Meier, M.D.,
Vidya Raman, M.D., M.B.A., Sriyaya K. Reddy, M.D., M.B.A.,
Remigio A. Roque, M.D., Melissa Brooks Peterson, M.D.,
John Zhong, M.D., Thejovathi Edala, M.D.,
Timothy J. Greer, M.B.B.S.,
Britta S. von Ungem-Sternberg, M.D., Ph.D.,
Joseph Cravero, M.D., Allan F. Simpao, M.D., M.B.I., for the
PEACOC Collaborators*

ANESTHESIOLOGY 2023; 139:35–48

刘进教授（四川成都华西医院）文章三连发：



Efficacy of prolonged intravenous lidocaine infusion for postoperative movement-evoked pain following hepatectomy: a double-blinded, randomised, placebo-controlled trial

Yan Xu [†] • Mao Ye [†] • Fei Liu • ... Mengmeng Zhou • Li Zhou [✉] • Chunling Jiang [✉] •

Show all authors • Show footnotes

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Original Contribution

The effect of driving pressure-guided versus conventional mechanical ventilation strategy on pulmonary complications following on-pump cardiac surgery: A randomized clinical trialXue-Fei Li ^{a,1}, Rong-Juan Jiang ^{b,1}, Wen-Jie Mao ^c, Hong Yu ^a, Juan Xin ^a, Hai Yu ^{a,2}^a Department of Anesthesiology, West China Hospital, Sichuan University, Chengdu 610041, China^b Department of Anesthesiology, Chengdu Second People's Hospital, Chengdu 610041, China^c Department of Anesthesiology, Jiayang People's Hospital, Jiayang 641400, China

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Original Contribution

Airway nerve blocks for awake tracheal intubation: A meta-analysis of randomized control trials and trial sequential analysisJianqiao Zheng, MD, PhD ^a, Li Du, MD ^b, Bin Du, MD ^a, Weiyi Zhang, MD, PhD ^a, Lu Zhang, MD, PhD ^a, Guo Chen, MD, PhD ^{a,c}^a Department of Anesthesiology, West China Hospital, Sichuan University, No. 37th, Guoxue Alley, Wuhou District, Chengdu 610041, Sichuan, China^b Department of Anesthesiology, Sichuan Cancer Hospital & Institute, Sichuan Cancer Center, School of Medicine, University of Electronic Science and Technology of China, No.55th, People's South Road, Chengdu 610041, Sichuan, China

HIGHLIGHTS

- Airway nerve blocks may reduce the intubation time during ATL.
- Airway nerve blocks appear to improve intubating conditions during ATL.
- Airway nerve blocks may reduce the incidence of complications of ATL.
- The impact of Airway nerve blocks does not appear to differ for oral vs nasal ATL.

黄建宏教授：手术室应急手册国际实施的经验和结果**黄建宏教授：手术室应急手册国际实施的经验和结果**

Original | 黄建宏教授 | 新青年麻醉论坛 | 2023-07-06 18:31

手术室应急手册国际实施的经验和结果

Dylan Irvine, BS, Jeffrey Huang, MD

手术室应急手册作为一种围手术期医学工具的实施在提高麻醉管理中的患者安全方面至关重要。手术室应急手册引用了许多医学资料，以提供一个麻醉处理计划，帮助麻醉护理团队的成员和其他手术室人员一起协作处理危机^[1-4]。手术室应急手册的目标不是为了消除不断学习获取知识的重要性，而是作为罕见事件患者护理中的记忆辅助工具，以最小化错误并最佳优化患者护理^[1,3-4]。

手术室应急手册作为患者安全工具的可靠性已经进行了广泛的研究。哈佛大学的基于模拟的研究表明，当使用应急手册时，急救护理过程的重要步骤完成可能性增加了4到6倍^[5]。在美国大多数医疗机构里，手术室应急手册已经广泛应用到实践和培训中。

CASA 活动纪实-Mock Oral Training

张扬医生报道

美东时间 7 月 29 日周六晚 7 点, CASA 举办了首次针对高年级住院医的线上(Zoom)麻醉口试模拟会议 (Mock Oral)。会议共有 7 名住院医师和 14 位考官 (7 位 Junior 和 7 位 Senior) 的积极参与, 同时还荣幸地邀请到了 ABA oral board 考官黄佳鹏教授为考生们答疑解惑。

本次会议由王景平老师主持。按照 Oral Board 的考试安排, 考生们提前 15 分钟阅读题干, 准备参加考试。随后每名考生和两位考官组成小组, 分别进行了 10 分钟手术中、15 分钟术后的提问及答题环节, 此外还有总共 10 分钟的 3 个独立病例问答。在紧锣密鼓的问答结束后, 考官们立即给予考生建设性的反馈, 与考生一起总结分析了此次口试演练 (mock oral) 的突出表现和不足。

在各组短暂独立讨论后, 所有参会人回到大会议室。彭勇刚老师首先代表 CASA 感谢了参与此次活动的考生和考官, 并期待未来更多相关的教学会议。周少风、李汝鹏和仲巍老师随后参与讨论, 首先肯定了各个考生的优异表现, 并提出了自己针对考试的建议。他们强调, 回答问题要点主要包括 what 和 why, 并要熟记术中的 emergency (hypotension、cardiac arrest/ACLS、anaphylaxis)、difficult airway、transfusion 等常见的必考内容。同时赵辰老师在线上分享了许多学习资料的链接。。

最后, 黄佳鹏老师分享了其作为考官的经历和对考试经验分析, 给大家答疑解惑。他指出, oral board 的考试评分具有客观性, 由复杂的算法决定考试的成绩。考试会从知识的应用和病例分析 (Application)、随机应变处理突发情况的能力 (Adaptability)、针对患者情况的处理判断 (Judgement) 和语言表达的逻辑和组织能力 (Organization) 四个维度来给考生打分。他强调考试的选题范围是在 community hospital 所常遇见到的患者, 每次考试都会涵盖 general、pediatrics、cardiac、OB、pain 和 ICU 的病例, 所以考生的知识要准备全面。其次考试的 professionalism 也会被评估, 考生要自信但不能傲慢, 他还通过幽默的例子强调, 一个考生表现过于自信和傲慢, 会引发考官问出更加困难的问题。很多考试准备的技巧会让学生 assume 病人的状况, 作出对应的解答, 但黄老师强调应该减少 assumption 的使用, 而是要记住题干病人的基本情况。随着问题的深入, 考生可以

利用之前所问问题出现的信息，来辅助回答后续的问题。考官对考题知识也需要查缺补漏，所以遇到不会回答的问题偶尔（1-2次）表述自己不知道答案，并不一定会真的造成考试失败，反之，胡编乱说既浪费了时间也没有评分价值。黄教授还提出，在回答问题时，考生要回答 what 和 why，保证问题回答的深度和广度。如果考官判断你在这个问题时是知道答案的，就会打断你，立刻进入下一个问题，确保在有限时间内问完所有问题，会议最后，考生们纷纷表示在此次教学会议中收获颇丰，考官们也认为自己从中学到了很多，提高了自己平时教学工作的能力，大家共同期待下一次活动的举办。

特此感谢参与活动的各位考官（按分组排序）：李娟、周少风、梁小民、李汝鹏、张扬、彭勇刚、赵辰、王景平、陈伟、仲巍、张凯颖、苗宁、钱铖、李金蕾和黄佳鹏老师。



青年医生园地

Fresh off the Boat-An IMG's Journey

HN.Luk

Once, I aspired to become an anesthesiologist, following in the footsteps of my family members. However, fate took an unexpected turn when the match results were unveiled in March. A whirlwind of emotions consumed me, ranging from disappointment and anxiety to an overwhelming sense of uncertainty. It brought back memories of the dreadful days when numerous interview rejections piled up in my mailbox. Despite the intense competition for positions this year, the realization that the specialty had rejected me felt like a door slamming shut—the most devastating blow of all.

While many people extended their congratulations for my successful match in the first round, I couldn't help but bear the weight of self-blame for what I perceived as my own inadequacies during the application process. Additionally, I felt overwhelmed by the thought of adapting to my newly assigned specialty. However, as time passed, I gradually began to accept my current circumstances and feel a sense of gratitude for what I have achieved thus far. Throughout the past year of hospital rotations, I discovered that the most invaluable treasures I acquired were not merely for obtaining medical licensing, but for embarking on a profound journey of self-growth.

The first hurdle I faced was securing a rotation spot during the challenging time of the Covid-19 pandemic. The landscape had changed significantly due to various ECFMG policy alterations, including the cancellation of Clinical Skills examinations and the modifications to the passing and failing criteria for Step 1. Hospitals across all states became more stringent in accepting international medical graduates (IMGs). Nevertheless, abandoning ship was not an option. With limited options available, I embarked on my first anesthesia externship at a community hospital in southern Chicago. In stark contrast to the picturesque images of Chicago as 'The Windy City,' renowned for its jazz music and deep-dish pizzas, this hospital was situated 40 minutes away from downtown, in an area notorious for gun violence and high crime rates.

During this time, I met my first anesthesia attending on this transformative journey, Dr. A. Dr. A defied the conventional image of a doctor, sporting a tattoo around one of his arms,

with a gleaming gold chain peeking out from under his scrubs. He stood out as the few Caucasian American physicians working in this hospital. In his own words, he endured a daily commute of nearly two hours because he believed that someone needed to provide anesthesia for the individuals in this community. With a predominantly African American patient population, major surgeries were infrequent, apart from orthopedic procedures. Most cases involved cataract surgeries, biopsies, or wound debridement. Consequently, the prevailing form of anesthesia employed here was monitored anesthetic care. Dr. A's expertise ensured precise control over the administration of sedatives and analgesics, striking a delicate balance between sedation levels that would keep patients comfortably sedated without compromising their ability to breathe or perceive pain.

Every day, as part of my daily routine, I joined my rotation colleagues to make a positive impression on the attending physician, hoping to earn a valuable letter of recommendation by showcasing our limited knowledge. Alongside this goal, I also aimed to familiarize myself with the hospital systems and undergo a personal transformation: from a timid introvert to a more sociable extrovert. This task was not without its challenges, as every migrant doctor encountered barriers such as language, work culture, and... the food in the hospital cafeteria. Fortunately, in this hospital, many individuals like us shared similar backgrounds. Our initial conversations often followed a familiar pattern, with introductions centered around our recent completion of certain steps in our medical journey: 'I just finished XXX step, how about you?'

宇宙是一个大的生命，江流入海，落叶归根，我们是宇宙中的一息，我们是大生命中的一分子。不是每一道江流都能流入大海，不是每一粒种子都能成熟发芽，生命中不是永远快乐，也不是永远痛苦，快乐与痛苦总是相辅相成的，在快乐中，我们要感谢生命，在痛苦中，我们也要感谢生命，因为快乐、兴奋、痛苦又何尝不是美丽呢？-冰心

医生生活

因着爱(续)

2023 年 3 月海地义医日记

黄黎光医生编辑

(参与人员: 刘欣, Jeri 毛, 于丰, 汪玲, 陈朱莉, 赵敏, 何成师, 刘霞, 吕刚, 吕杰克, 许安娜)

2023 年 3 月 24 日, 星期五, 新希望医院, 晴。

今天是我们工作的最后一天, 手术会比较忙。走到楼顶上等日出, 看到医院门口有一辆车, 旁边一个女人又喊又唱的, 不知道她在表达什么。不一会, 汪玲也上楼顶来了, 脸上带着倦意。怎么回事? “你没听到半夜的叫声吗?” 汪玲问。“早上是有一些响声, 是今天的病人来了吧?” 我说。“半夜三更楼下就有人大声说话, 不知道为了什么事又哭又叫。我就被惊醒过来。后来我们发现是一位病人夜里死了。这位病人不是我们义诊的病人。”汪玲说。医院有一个急诊室, 虽然简陋, 也 24 小时为当地的居民提供急诊服务。这里的人大多数非常贫穷, 没有钱看医生, 往往是疾病到晚期才来就医。

原来是这样。门口的这个女人可能是已故病人的家属了。

海地人表达悲哀的方式和我们中国人好像有些不同。他们没有嚎啕大哭或顿足捶胸的剧烈, 也没有悄悄抹泪的收敛, 而是在这两者之间。这个女人一会唱, 一会说。唱歌的节奏还蛮好的。一会赵敏也上来了, 说起了今早把大家全都从床上叫起的事, 我们都大笑起来。汪玲说, “嘘, 小声点! 下面的人正在悲哀呢。我们要与欢乐的人同乐, 与悲哀的人同哀。”我们都把声音放低了 8 度。赵敏看上去也是倦容满面。“你也没睡好吗?” 我问。“没有呢。”她老实地回答。“何止是她一人没睡好, 她让我们每人都没睡好。”汪玲说。

“怎么回事?” 我好奇心大发。原来赵敏、汪玲、朱莉和安娜四个女生住一个房间。晚上聊天时汪玲讲故事, 说到海地人的治安混乱和前段时间 17 个传教士被绑架的事。这可把她吓着了。晚上做梦都是劫匪, 一夜都睡得不安稳。到了大概凌晨 5 点的时候, 楼有人大声喊叫, 她们听不懂海地语, 也不知道发生什么情况。赵敏就以为是劫匪来了, 要绑架她们, 于是从床上跳起, 把她的室友们一个个叫醒。“起来, 起来! 有情况!” 有些人还在睡梦里, 一听有情况, 赶紧跳起来, 穿上衣服, 拿起装有护照的小包包, 准备夺门而逃。心里还怦怦跳, 紧张得不得了。是劫匪来了? 带着枪吗? 锁上门会安全一点吗? 还是先逃出去, 找个地方躲起来? 要是劫匪来了, 一锅端怎么办?

再听一会儿又没动静。安娜就小心翼翼地偷偷开了一条门缝, 探头往外看一看, 还是没动静。嗨, 没事。大家又回到床上。突然楼下又有大喊声, 吓得各位女士又跳起来, 惊慌地坐在床上。脑子里比高级计算机运算还要快: 如果真有劫匪, 从哪里逃呢? 跳窗吗? 这是三楼耶。各位可以脑补一下当时的情形, 后面省略 3 千字。结果是这一屋子人第一次全体到楼上看到日出。



昨天我听说有一位护士带领就诊的人唱赞美诗。我刚刚从二楼的临时疼痛治疗室出来，就听到楼下的众人开始唱赞美诗。海地语我还不懂，但是旋律是熟悉的，是“神啊，你何等伟大”。

是的，神啊，你真伟大。你的大爱遍及全地。你的爱祝福着我们，使得我们有饭吃，有衣穿，有屋住，有健康的体质，有工作可以养家糊口，生活在平安中……我们接受到的祝福无可数算。你的大爱感动着我们的每一位队友，因着爱，我们冒着危险来到这个最贫穷的地方，来祝福他人。当我们身处危险的时候，家里的平安就越显珍贵。当看见别人生活贫困时，我们的生活就越显富足。当我们付出一点点的时候，才更觉得原来我们已经接受了更多，这便是施比受更有福了。我们因此感恩。

手术室和门诊都有序地进行了。我走到门诊分流的地方。吕刚医生是门诊分流的把关人，几乎所有的病人都预先问诊分流，一天里经过他问诊的人达到 60 多人，够繁忙的。可这几天他和儿子手上都被咬了好多个包包。今早起来就觉得身体不太对劲，发冷，乏力。不会是得了疟疾吧？或者是什么流行病？在海地，这些病不是空穴来风。幸亏下午门诊人不多。我让他赶紧休息，三次都被他拒绝了，“干事要有始有终，就让我做完最后一天的门诊分流吧”。面对这样认真勤奋负责的队友，我能说什么呢？只觉得眼睛有点发热。朋友啊，能认识你们，是我的福气。能与你们一起义医，我何等幸运！



最后一个病人竟然“爆”了！这是个 81 岁的老头，有巨大的“蛋蛋”鞘膜积液，看上去比一个篮球还大。没有钱去做手术。两周前因为巨大的积液，合并感染，即使开始用抗生素，蛋蛋皮肤也开始溃烂。在手术室，给他做麻醉很不容易。当地的护士麻醉师给他扎了好几针，



腰麻都不成功。这病人腰椎强直，加上耳聋，听不清我们的指令，加上这个“水球”过于大，他无法弯着腰让我们做腰麻。Julius 医生穿上高鞋套，穿好隔离衣，扶着病人。一不小心，他的手碰到这个大“水球”，一霎那，“水球”就砰地“爆”了。真的是爆发了，那脓血一涌而出喷了一墙一地，一门相隔的另一手术室也漫进了脓血，弥漫着浓臭味。等麻醉做好，手术开始的时候，还吸出了 2 升的脓血液。可见这些病人真是没办法，没钱看病，等得命都要没了。

去年义医时也有类似的一个病例，病人都已经得了败血症，都以为这病人没啥希望了。给他引流清创后，又做了几次手术。今天 Julius 医生告诉我，病人最后还出院了，现在康复良好。我很高兴，看到义医的一点意义。

有朋友常对我说，海地就那样了，豆腐扶不上墙。多少年来，多少国家帮助他们，他们还是那样贫穷落后，还是那样乱和不稳定。你们去，能改变得了海地吗？说实话，每当我看到海地政府的腐败，官员的贪婪无能，匪帮泛滥，民不聊生，空气污染，环境污染，这四年来每年去海地义医，所见都是触目惊心，垃圾满地，情景一点都没变，心里就很烦。可是，每当看到病人求助的眼神，无奈的身影，心就软下来了。作为一名医生，我们的天职是救死扶伤，而

不是搞政治改革，不是帮助经济腾飞。有哪位医者看见病人得医治而不高兴的呢？有哪位医者，心里没有与病人同乐同哀的心呢？

手术终于结束了，我们的义医也画上一个句号。在短短 4 天里，我们和海地分队一起为 40 病人做了 80 例手术。大部分手术病人有双侧的睾丸鞘膜积液，6 位病人有腹股沟疝气。最小年龄 19 岁，最大年龄 85 岁。积液最大量超过 3000 毫升，大于 1000 毫升者有 10 人。

我们为大约 250 位病人做了门诊诊疗，门诊手术大约 15 例。最小年龄 3 个月。常见的病种有高血压，糖尿病，胃酸反流，皮肤囊肿，皮肤脂肪瘤，甲状腺肿瘤，乳房肿瘤，镰刀状贫血等。

这次义医终于圆满完成了。



2023 年 3 月 25 日，星期六，新希望医院，晴

今天我们要回家了，就聊一些花絮吧。

经过几天一起生活和工作，我们都成了好朋友。开玩笑中，我们每个人都有了一个外号。

吕刚：大帅哥。血液科医生。吕刚是我们中个子最高的。其实他的“大”，并不是他的身高，而是他性格坚韧的魅力。他主要负责门诊分流。几乎所有的病人都要经过他的初步诊断，很有一夫当关、万夫莫开的气势。最后一天他身体开始不适，发冷，疲惫，可能还低烧。我们都怀疑是不是感染了什么疾病。可是他坚持要完成这最后一天的工作，再三劝阻，也打动不了他钢铁般的意志。“有始有终嘛，让我完成这项工作好不好？”他说。

杰克：小帅哥。杰克是吕刚的儿子，才 16 岁，高中二年级，长得差不多何爸爸一样高了。两人走在一起，都有点像哥俩好。杰克话不多，很聪明，很勤快，很快就掌握了检查血压、血糖的技巧。这次的义医经历对杰克来说，是一个眼界大开的机会，也是一个终身难忘的经历，他得以看到海地人的贫穷，义医的帮助，和这几天他工作的意义。



安娜：晨星。安娜已经大学毕业，现在休士顿的一个实验室工作，正在申请入学医学院。她非常聪明，而且非常勤快，不管学什么一学就会，成了我们的有力帮手。她就像一颗冉冉升起的晨星一样灿烂。我们祝愿她的前途光明，能顺利入学医学院。

赵敏：福娃。赵敏是在圣地亚哥工作的一位内科医生。她的脸圆圆的，笑起来嘎嘎响，清脆爽朗，真是非常可爱，一看就是有福气的人。她有个疼爱她的丈夫和两个聪明伶俐的女儿。她丈夫非常支持她到海地义医，连机票都是他订的。所以我们说她是福娃。

何成师：何半仙。何医生是广州医学院 77 级的，文革以后第一届医学生。年资最长，而且热爱运动，几乎大部分户外运动都很棒，滑雪潜水是小儿科啦，跑个三项铁人，马拉松比赛什么的，都是不在话下。几乎全球主要的高峰都留有他的足迹。他是运动达人，又是医学达人。这一次他给我们手术病人高血压提供了一个很有效的治疗方法，解决了这些病人术中极高血压的问题。这样的人，技术全面，身体素质良好，心灵更美，理应叫他全仙才对。可是全仙的名字好像有点那个什么的，干脆叫半仙，蛮好。

刘霞：酒仙女。这是她的老外号。在大学时因为酒量大，因而得此名。这次义医她没喝多少酒，使得我们都低估了她的酒量。刘霞医生在 Fort Lauderdale 做急诊，有着丰富的临床经验。她到美国后先做护士十几年，有一年下定决心考医学考试，居然在一年内把第一步、第二步和第三部份都全考过了，如愿以偿地成为医生。她心灵手巧，很多比较难的疾病诊疗、门诊手术在她都不是难事。

朱莉：老树开花。陈医生的阅历非常丰富，在完成了麻醉医训练后，又做了疼痛专科，是华人医生中少数比较早就成为疼痛专科医生之一。原来信佛，但是觉得没有找到人生的根本，认识主耶稣成为基督徒以后，心才得到平安。前些年刚刚退休，热心于参加义医，足迹遍布亚洲，非洲，南美洲。今年早些时候得了新冠肺炎，很长时间身体还没有得到恢复，并发生了心脏衰竭。在心衰还没有完全康复的时候，就义无反顾地参加我们的海地义医。她的祷告有力量，甚至非基督徒都受到感染了。她的生命绽放，如花一样美丽。

毛毛：天使。毛毛在国内是眼科医生，现在加州工作，是一位内科医生。她面容姣好，身材苗条，能歌善舞，性格开朗，是我们的开心果。她跳起舞来可能比专业的舞蹈演员还好。她的歌声美妙，使我们的团队本来就有的喜乐更加锦上添花。她在门诊有极好的交流沟通技巧，在手术台上甘心当助手，密切配合。看她缝合时手中的针线，如同下凡的织女缝补渔网那样，富有艺术和音乐的节奏感。她富有同情心，所以我们管她叫天使。

毛毛说：“我非常荣幸和感恩，这次义医有缘与这么多有爱心的大小伙伴们相识，让我学到很多…从专业上第一次为睾丸鞘膜积液根除术当手术助手，更感爱到手术的意义所在。这不只是让男人微笑，而且帮助男人及家庭恢复生命的活力！谢谢刘欣医生。我们合作了不少复杂的手术，圆满成功地完成手术，让我感到我们辛苦结晶的所在。我做过五年半眼科。来美之后是内科医生。平时只看十七岁以上的病人。在南美洲义医看过五岁以上儿童。这次与赵敏一样，看了六个月、七个月、一岁半的小病人。这也创了自己的纪录。我们这群人有着各种的信仰和信念，是大爱把我们联系在一起。无论有无信仰，每个灵魂都有灵性。我深深地感受到这一点。我们的祈祷与大自然的联结，不仅增长了我们的阅历，更使心灵得到升华…受益无穷，感恩天地，感恩上帝佛菩萨，感恩大家，感恩一切！”

毛毛能说会道，一串绕口令跟随而来：

酒仙女何半仙，好友佳医全能才；
老树开花智慧果，经历丰富创人生；
大小帅哥齐上阵，父子送爱海地角；
甜娃富娃显潜力，男女老少皆能治；
舞仙天使艺术家，手到病除效果佳；
晨星天牛星光灿，跑前跑后勤劳快；
晶莹剔透麻醉师，心灵升华心光闪；
八方相聚于海地，友情爱心遍四方；
活出大爱显真我，群星璀璨天地赞。

汪玲：晶莹剔透。汪玲医生从华西毕业，在 Cleveland clinic 完成住院医，是新泽西的一位麻醉医生。个子不很高，和我大约相似。皮肤白嫩剔透，喜欢开怀大笑。美女麻醉医生不仅人美，心灵更美。她的麻醉技术可是一流的！她那么可爱，像极了一件晶莹剔透的艺术品。

刘欣：舞仙。刘欣医生是华西医科大学的高材生。毕业后做了好几年胸外科。来美后也和许多人一样，经过一番搏斗，终于成了心脏麻醉医生和重病室主治，在新泽西工作。他手巧细致，做手术，那不是匠人活，而是艺术家的作品。手术刀在他手下好像有灵性那样进退有度，左右逢源。他在泌尿外科专家 Kevin Lee 的指导下，已经掌握了睾丸鞘膜积液跟根除术。这一次他作为手术主刀之一。刘欣医生还喜欢跳舞，这次在毛毛医生的鼓励下，跳起了民族舞，加上太极拳。看他一抬手一抬脚的样子，就让人捧腹大笑，笑得肚子都痛了。可是他还特认真。他说，回家后一定要好好练舞，明年再会时再跳，不许我们笑。

于丰：纯娃。于丰医生是东北人，纯正的北方口音，听起来就顺耳，而且说话细声慢语，甜甜的。她初中才毕业后就考上了医学院，是他们那一届年龄最小的医学生。毕业后到日本读博，后来美。现在新泽西州做家庭全科。她生长在农村，也喜欢干农活。手巧是没话说的，上得了手术台，也能种一院子的好菜。我们这次义医所有人的手术衣都是她亲手缝制，而且很合身，使得我们的团队有了自己的队服。为 12 个人亲手缝制手术衣不是一件容易的事。离出发到海地的时间近了，她不得不请假两天来专心缝纫，终于在上飞机前完工。

黄黎光：天牛，牛妈。在马里兰一家医院做麻醉。与众队友相比，我乏善可陈，只是辅助他们，打打杂。所以他们给我起名“老黄牛”。本来这个名字也蛮好，可是毛毛说这样不好，因为每个人都是天上的星星，把我一个人撂在地上不好，于是管我叫“天牛”吧。汪玲管我叫“牛妈”，的确，我的年龄快可以和她妈妈相当了。

团队的每一个人在这次的义医中都起了极为重要的作用，我们相互配合，好像一台良好的电脑内的精细部件，圆满地完成了义医的任务。他们带着爱心和善良，到西半球最贫穷最危险的地方，帮助那些素不相识的人。他们的品格，人性的光辉，就像天上一颗颗星星那样明亮。能认识他们，和他们一起共度这一个星期的美好时光，是我的福气。

何半仙还写了一首诗歌，真情实意，顿时秒杀 Chat GPT 写的文字堆砌：

《海地义医》

何成师

海地义医献爱心，不畏艰难险中行。
排忧解难显身手，团队合作治百病。
十二精英医疗队，每人各有外号名。
吕刚名号大帅哥，高大威猛前台令。
儿子杰克比父帅，小小帅哥工作勤。
打父必须亲兄弟，上阵尤要父子兵。
安娜是颗亮晨星，前后帮忙上下行。
甜美福娃是赵敏，内科儿科她最行。
于丰天真为纯娃，外科内科统治病。
毛毛其实是天使，飞下凡间解百病。
刘霞本为酒仙女，能解忧患大爱心。

晶莹剔透是汪玲，手术室里她统领。
巧手主刀是刘欣，深藏舞功成舞仙。
朱丽老树开了花，专治各种疼痛病。
半仙之名给成师，上知天文下治病。
贡献最大天牛星，黎明之光传大名。

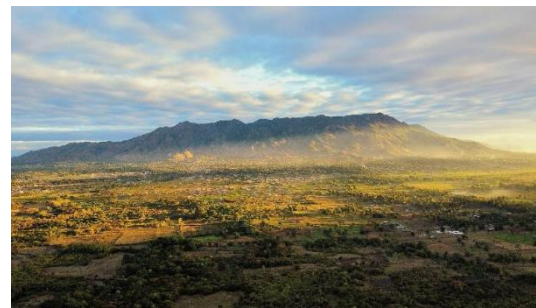
这一次的义医，每个人工作特努力，没有任何抱怨，我们相处融洽。虽然我们的信仰不一样，背景不一样，专业也不一样，但是爱把我们连在一起。在简陋的条件中，做出不寻常的工作。手术室内设备陈旧，有一台 bovie 还是借来的。门诊手术条件更加简单，就一张检查床，多次使用过消毒过的手术刀像锯子那样钝，皮肤缝线不足等等...可是我们的医生凭着自己丰富的经验和高超的技术，为病人解决了痛苦。我们的口号是“有条件，上！没有条件，我们创造条件，也要上！”



我们也看到医院存在许多问题，有待完善加强。希望将来的 2-3 年内能帮助医院建立、巩固、规范内科家庭科的服务，更多地造福于海地人，使海地人微笑。

有朋友询问有关到海地义医的事。首先是安全性。海地不是一个平和的国家，因为贫穷和政府腐败，匪帮泛滥，劫持人质索取赎金的事常发生。外国人是他们劫持的重点对象，连本国的医生也不放过。他们认为医生是高收入人群。三年前和我们合作的两位在太子港附近工作的医生，在上班的路上被绑架，殴打，打得半死后扔在路边。幸好有人路过得以抢救。所以建议不要一个人或几个人到海地去，除非有很强的理由。

劫持人质主要发生在太子港，海地的首都，那里基本上被凶帮控制。我们去的城市是海地角，这是海地第二大的城市，相对安全一些。我们义医的新希望医院还离城市 2 小时的车程，那里人员密度稍微少一点，增加了安全系数。医院有围墙包围，24 小时有持枪的保安看守，更加安全了。我们都不托运行李，一出海关后出门，就上了医院派来的车，直往医院奔去，途中不停顿。义医期间，我们也取消了游玩的计划，所有人都在医院内，减少和周围人群的接触机会。所以到这里义医还是可行的。



刘欣医生航拍的照片，远处山下是海地角

我们吃住都在医院三楼，伙食还可以。水电供应还好。有两个大水箱储水。医院楼顶上装有太阳能板，手术中有几次停电，但是很快就恢复了，装有备用的发电机。我们的项目曾经为他们资助过。



医院外貌。

为这次义医的圆满结束，我首先感谢神。从第一天开始，朱莉姐妹，于丰姐妹和我三人就手拉手地祷告，天天如此，到后来连汪玲和毛毛医生也加入队伍，按她们的方式祈祷。我深感到神的信实。没有神的开路保守，我们不会那么顺利平安。

其次我要感谢队里的每一位队友。我们大多数人此前相互并不认识，仅仅是一个星期的时间，就相亲相爱，配合融洽，如同相知几十年的老友一般，共同完成这次义医任务。我们留下的不仅仅是海地人的微笑，也在心里留下了我们欢乐，笑声，幽默和相互的爱。当我们散去的时候，我们依依不舍。可是，明年我们会再次聚在一起，一起到海地义医。我们也欢迎更多的朋友关注、支持、赞助、加入我们的队伍，让爱，传播出去。



后记：当我们到达 Fort Lauderdale 机场，一位乘客知道我们刚刚从海地回来，眼睛睁得大大的，说，这几天有两个海地美国人在海地被劫持了，每人要给几十万美金做人质赎金，你不知道吗？感谢主，我们都平安归来。以往有关“使海地人微笑”的故事，可以在我们的网站上查到：www.makemensmile.org



王海明回忆录（续 2）

3. 负籍远方学友邦 志把中华去弘扬

去美国留学有三个目标：1. 掌握英语（听说读写，运用自如）；2. 了解世界领先的美国医学教育、科研和临床；3. 广交朋友。将来我要送学生赴美学习，还可请世界一流的学者来北京讲学。我和我的团队将每年去参加世界顶级学术交流。

原计划，待我跟随王大玫教授完成博士后赴美。可发生在北京的一件事，促我提前了留学。

1985 年初，北京大学（北大）6 位教授联名上书教育部：看到文革后高考入学的毕业生中，优秀者公派（数目很少），而自费（数目渐多）纷纷联系留学，估计自费者回国的几率很小。建议设卡！教育部为此专门开会研究。会一散，北京高校集中区，如海淀区，尤其是学院路上的八大学院（北大、清华、北医、北航、北钢、地质、石油、语言学院）暗流涌动，仿佛可闻优秀的师生们齐声喊：快走！我有幸得学长们指引，加速办理留学。我到北医外文图书馆，打开过去两年原版的《美国整形外科》月刊杂志，找到自己感兴趣的文章作者，每篇写一卡片。选出 60 个。我写一英文自荐信，每个航空信封上贴一 8 角邮票投入了信箱。那时，北京到美国寄信 10 天左右可达。三周后，每日上午 10:30 左右，邮差送信来北医三院大门口传达室。我准时接手先查我的信！麻省总医院 James May (MGH 整形外科主任，著名教授) 回信最快说：“对你很感兴趣。希望明年来。”我说，留着它，可我今年应该去，越快越好！很快：麻省州立大学医学院整形外科，罗伯特教授聘请我，去从事显微外科和整形外科研究，给我每年一万五千美元。我立即到北医三院研究生办公室申请，马上批准了；到北医大研究生院申请自费赴美留学，保留学籍两年，也是立即批准。到北京市公安局顺利拿到护照，去美国大使馆顺利获得 J-1 签证（二年后可续）。我又返回北医校长办公室，申请特批结婚，曲绵域校长（骨科教授，运动医学专家）立即批准了。从三院、研究生院、校长办公室一路绿灯。那时，谁能去美国留学谁光荣！我听到许多师生们的赞许和羡慕，又光荣一次。以前，大三时，我曾在北医办讲座，早已成了名人。

我与恋爱 4 年的女同学，张丽（北医口腔 79 级，1984 年像我一样毕业前考取本校研究生，正畸专业，导师：许瑞芳教授），一起到海淀区政府领了结婚证（我 25 岁、丽 21 岁）。正是：春风得意马蹄疾，青春作伴好回家！宴请好两方同学们（水果糖、葵花子、北冰洋汽水、酸奶和西瓜），同学们赠我们相册、高档笔、词典等。然后，我们回家省亲。1985 年 8 月 25 日，告别亲友们，在首都机场，我登上波音 747 飞向美利坚合众国！

办好留学手续后，我曾咨询北医研究生院招生分配处处长沃唯礼教授：可否批准我携张丽一起赴美留学。沃老师说：政策不允许。我反问：为何我常见美国教授携夫人一起来访华，来我校讲学。沃老师笑答：那是外国人。况且，张丽还是在校（研究）生。

在飞机上，我想起，一个周日，我和丽一起骑自行车到天安门，偶遇北医正畸科进修老师田乃学（今日，他已是浙江宁波地产大亨了）。他深情地看着我们说：你们会有金色的前程！还记得，刚进北大医院不久，骨科冯传汉教授的研究生，孙德清老师（他在人民医院读研，却住在草岚子胡同我宿舍隔壁），曾问我：海明你的年龄？我答：22岁。他端详我片刻后深情地说：海明你将有一个金色前程！

我想起导师王大玫教授，已66高龄，仍每日做高难手术：及时将颅骨缝隙早闭的婴儿颅骨打开，好让大脑充分发育，力避傻痴。王老师为献身外科，终身未嫁。多年来，一直是北医和北京市劳动模范！

一次我去王大玫教授家，那是北医三院教授公寓（二卧、一卫、一厅）汇报学习。在客厅，我认识了程耀祖教授，他刚从德国考察回来。他是兰州大学化学系教授和系主任。生长于教授家，在长沙，某冬日，他淘气竟将火炉上的开水洒在头颈。紧急送至湘雅医学院，保住了性命，可严重毁了容。脸面丑陋还失掉了耳朵。自此，尽管他天资聪颖，可仍屡次被学校婉拒。中学毕业后，各名牌大学均因“容貌恐怖”而拒收。所幸，其父是湖南大学教授，许多老师极表同情，湖南大学校长开明，录取了他。年年他的成绩名列前茅，毕业后，留学德国，获化学博士。学成回国，迎娶一南京金陵女子大学毕业生。他告诉我，王大玫教授已多次为他整容，十分感激！我听王教授说：程耀祖教授是中国著名化学家。

在北大医院实习时，我曾负责北医解剖教授许鹿希老师住院。她刚从美国圣地亚哥索克研究所回来。索克发明了脊髓灰质炎疫苗，那里是世界级神经研究中心之一。正巧，许教授先生，邓稼先，来探望。他膀大腰宽，一脸福相：头圆方有致，天庭饱满，浓眉大眼，鼻正口宽。腰挺伟岸，双目炯炯有神。头戴蓝单帽，身着中山装，足踏一双黑色三接头皮鞋，满面笑容。许教授对我介绍说：“这是我爱人老邓（稼先）”。我点头说：邓老师好。“你好，小王大夫”。许老师继续说：在圣地亚哥索克研究所与同事 Carpenter 教授合作了一篇论文，下个月会刊出。邓老师右手从衣兜里取出《英汉词典》，轻轻翻查后说：是的，Carpenter 本意是木匠。（后来，我读英文版《北京周报》方知：许鹿希教授的爱人邓稼先，中国原子弹理论设计者。西南联大毕业，二战结束时，他与杨振宁同年留学美国。二人既是同学，又是好友。邓稼先父亲邓以蜚与许鹿希父亲许德珩又是好友.....

不久，我的思绪转到邻座两位同学：清华材料系的研究生和一位北大生物系研究生的谈话，他们均是去麻省理工读博士。

（未完待续）



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摄影 林熙

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