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THE GREATEST GLORY IN LIVING LIES NOT IN NEVER FALLING,
BUT IN RISING EVERY TIME WE FALL. - NELSON MANDELA

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尊敬的读者:

感谢您正在阅读本期 CASA 协会的刊物。鉴于本刊并未设定同行评审（peer review）机制，于本刊所投及发表的学术文章可仍于今后发于 Peer review 刊物。已正式发表的文章亦可于本刊物转载。本编辑部鼓励专业同行积极投稿，为我们麻醉事业的发展努力。

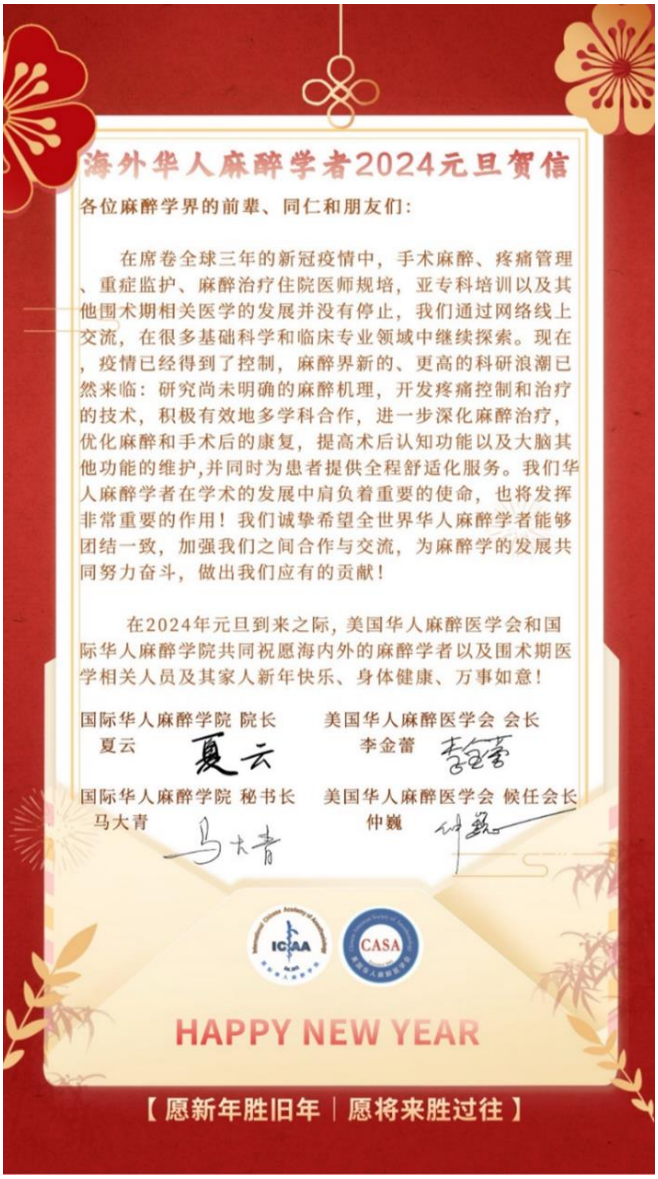
主编之言

微风轻抚，唤醒了大地的沉睡。春天已至，带来了新的希望和生机。让我们怀着感恩的心情，迎接春天的到来，让生命在这片美好的季节里绽放光彩。

CASA 董事会莅临换届，祝愿新的董事会一如既往，蒸蒸日上。

编辑部又添新成员，新的使命，新的征程，祝新的一年更上一层楼。

新年伊始，万象更新。编辑部祝愿新的一年带给各位麻醉医生好运连连，事业蒸蒸日上，身体健康，家庭幸福。龙年吉祥，万事如意！



Review Article

Carcinoid Tumor and Anesthesia

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Carcinoid: The term was first coined in 1907 and described as a multitude of primary locations of neuroendocrine tumors (NETs). Incidence is 6.98 per 100,000 per year in USA [1]

Carcinoid tumors: Originate from neuroendocrine cells and secrete numerous bioactive substances that can reach systemic circulation and produce carcinoid syndrome (CS) if not metabolized by liver or bypass the liver.

Embryonic site of origin of the carcinoid tumor [2]

- Foregut carcinoid tumors: Respiratory tract, thymus, esophagus, stomach, duodenum and pancreas. Foregut lacks the enzyme aromatic L-amino acid decarboxylase, which metabolizes 5-hydroxytryptophan to serotonin. Thus, the neuroendocrine tumors of lungs and foregut do not produce serotonin.
- Midgut carcinoid tumors: Jejunum to mid-transverse colon (classical CS). (jejunum, ileum, cecum, appendix)
- Hindgut carcinoid tumors: Mid-transverse colon to rectum (Usually no CS but GI bleeding). Hindgut neuroendocrine tumors typically do not produce any bioactive hormone.
- Pulmonary NETs: Mainly produce histamine which causes atypical flushing and pruritus.
- 75% of Carcinoid tumors originate in the GI system; 22% of them in lung/bronchial; minors in the GU, thyroid, breast, pancreas, thymus and liver.
- Some researchers refer to midgut tumors as carcinoid tumor only; and other sites are called NETs.
- The site of origin of carcinoid tumors is important because it affects:
    a. The clinical presentation
    b. Secretion of vasoactive substances
    c. Signs and symptoms of CS
    d. Overall survival rate

Symptoms and Signs of Carcinoid tumors (slow growing) [3]

- Non-functional or non-secreting tumors (or with non-systemic release of mediators) are usually asymptomatic, often presenting with only vague abdominal pain, GI bleeding (GIB), intestinal obstruction, hemoptysis, etc.
- While 25% of carcinoid tumors actively secrete vasoactive substances, less than 10% of patients develop CS.

Diagnosis of carcinoid tumors: With the nonspecific presentation and delay in diagnosis, metastases are frequent [2]

- Abdominal pain,
- Functional or bypass clearance by liver: flushing, diarrhea, bronchospasm
- Urine and blood substances level: 24-hour urine for 5-HIAA, serum Chromogranin A (protein existing in the neuroendocrine cells).
- Imaging: capsule endoscopy, ultrasound, CT, MRI, PET, angiogram all can identify the primary tumors
- Radioactive somatostatin analog (SSTR) scintigraphy will localize functional carcinoid tumor
- Carcinoid heart disease: often only found in later stages: CRX, EKG, Echocardiogram for severity of cardiac lesions
- CRX/Bronchoscopy for bronchial carcinoid tumors

Carcinoid syndrome (CS): First described in 1954 [1]. Incidence of CS is heterogeneous among different NET subtypes [4]. Approximately 20% of NETs patients (mainly midgut NETs) experience CS [5]

- Highest rate: Small bowel NETs (32.4%)
- Moderate rate: Pulmonary NETs (7.6-38%)
- Lower rate: Colorectal NETs (11.5%)

CS symptoms and signs (S/S)

Carcinoid S/S occurs only when vasoactive substances are released in active form into the systemic circulation. Primary tumors that do not drain into portal circulation, such as bronchial, ovarian, and testicular tumors are also capable of producing CS [2-4]

- Cutaneous flushing on face, neck and upper trunk (85% patient with CS), lasts 30 sec to 30 min. Bradykinins, tachykinins, prostaglandins, substance P, and/or histamine cause vasodilating and flushing. Furchgott and Zawadski propose that indirect vasodilation is mediated by endothelium-derived relaxing factor or nitric oxide released by 5-HTP during platelet activation as possible cause of flushing [6]. The differential for flushing as includes:
    a. Idiopathic flushes: History of flushing, starting rather early in life and sometimes with a family history without occurrence of a tumor.
    b. Menopausal flushes: whole body and might be related to release of calcitonin gene–related peptide (CGRP) with transient vasodilation, a so-called dry flush.
    c. Menopausal symptom: the wet flush, which includes epinephrine-induced sweating.
    d. Mastocytosis: Urticaria pigmentosa.
- Abdominal pain
- Diarrhea with dehydration and electrolytes abnormalities (80% cases). 30 bowel movements/day
- Bronchospasm (10-20% patients)
- Cardiac involvement: can present in up to 60% to 70% of patients with symptoms of heart failure, valvular heart disease, plaque-like deposits of fibrous tissue on the endometrium, valves, chambers, pulmonary and aortic arteries. Serotonin induces

connective tissue growth factor secretion, stimulating fibroblast growth and fibrogenesis to carcinoid heart disease and mesenteric fibrosis **[7]**.

- Hypoproteinemia: CS can deplete the essential amino acid tryptophan which is needed for the synthesis of serotonin, protein, and nicotine acid (use 99% tryptophan) and a deficit can result in hypo-albuminemia and decreased protein synthesis, and when severe, can lead to pellagra-like symptoms (dermatitis, dementia, and diarrhea) [2].

Carcinoid symptoms and their putative mediators

Organ	Symptom	Frequency (%)	Putative mediator
Skin	Flushing	85	Kinins, histamine, kallikreins, other
	Telangiectasia	25	
	Cyanosis	18	
	Pellagra	7	Excess tryptophan metabolism
Gastrointestinal tract	Diarrhea and cramping	75 to 85	Serotonin
Heart	Valvular lesions		Serotonin
	Right heart	40	
	Left heart	13	
Respiratory tract	Bronchoconstriction	19	Unknown

UpToDate [7]

Pathophysiology: Secretion of > 40 bioactive substances by NETs [4] [1] [6] [3, 7-9]

- Serotonin and urinary metabolite 5-hydroxyindoleacetic acid (5-HIAA. Normal level <10mg/24h). Serotonin does not cause flushing.
- Histamine: Atypical flushing and pruritus
- Bradykinin
- Tachykinin, substance p, neurokinin A and neuropeptide k are also responsible for causing flushing due to their vasodilatory effect and diarrhea.
- Kallikrein: A protein that cleaves kinin from plasma kininogens, vasodilator for flushing, stimulate intestinal motility and increase vascular permeability
- Prostaglandins: Stimulate intestinal motility and fluid secretion
- Dopamine, norepinephrine and epinephrine and their metabolites-normetanephrine and metanephrine

Serotonin overproduction: Adrenergic stimulation release of serotonin into circulation [2]

- Serotonin is synthesized from tryptophan via hydroxylation and decarboxylation. Serotonin will be metabolized by aldehyde dehydrogenase and monoamine oxidase to 5-HIAA, and then excreted in the urine
- Serotonin causes vasoconstriction and vasodilation resulting in either HTN or hypotension

- Serotonin indirect releases norepinephrine which causes cardiac inotropic and chronotropic response
- Serotonin increases gut motility and secretion of water, Na, Cl and K by small intestine
- Serotonin prolongs drowsiness following emergence from general anesthesia
- Bronchospasm
- Hyperglycemia

Histamine overproduction typically in foregut carcinoid tumor [2].

- Bronchospasm
- Flushing

Bradykinin overproduction: Lysosomal kallikrein produces and releases kinins, triggered mainly by sympathetic stimulation [2]

- Newly produced bradykinin rapidly broken down and cleared from plasma by plasma aminopeptidases and kinases
- Sudden rapid release of bradykinin causes vasomotor relaxation and hypotension
- Flushing effect presumed via NO synthesis
- Bronchospasm

Carcinoid crisis (CC): Life threatening hemodynamic instability but no universal definition for CC [2, 4, 10]: First description of CC was published in 1964 (sudden onset of hypotension refractory to vasopressors). CC is caused by the acute release of an overwhelming number of vasoactive compounds by neuroendocrine (NEN) cells causing a crisis. However, a recent study on 46 patients with carcinoid syndrome having abdominal surgery could not confirm this hypothesis. No massive release or changes in serotonin, histamine, kallikrein, or bradykinin were observed in those patients having a hypotensive episode during surgery [9].

The most commonly reported primary tumor locations that can cause CC are lung and small bowel (ileum), which also represent the most common sites associated with CS, because of the overall major release of vasoactive peptides compared to other regions [11].

Sudden severe hemodynamic instability (HTN, Hypotension arrhythmia)

- Severe flushing
- Diarrhea with dehydration and electrolytes abnormalities
- Bronchospasm
- Mental status change

Triggering factors [2, 4]

- General anesthesia
- Surgical procedures
- Anesthesia
- Chemotherapy
- Peptide Receptor Radionuclide Therapy (PRRT)
- Radiological procedures
- Drug-induced (Catecholamine, sedatives)
- Hypotension/hypertension, hypoxia, hypercarbia, Hypothermia
- Spontaneous cases, exercise, stress

- Certain food high in serotonin: banana, alcohol, cheese, coffee, avocado, plum, tomato, pineapple, kiwis, eggplants, plantain, walnuts etc. [2]

Risk factors which induce CC [4, 5, 8]

- Small bowel primary NETs
- Presence of hepatic metastases
- Overall high tumor burden
- Carcinoid heart disease
- Old age
- Elevate level of 5-HIAA and plasma serotonin level

Treatment of carcinoids [2] [3, 12]

- Most effective treatment: Surgical resection of tumors, reduce bowel obstruction, palliative care.
- Somatostatin analogs/Octreotide: Treats symptoms. Somatostatin is a 42 amino acid peptide synthesized by paracrine cells located throughout the gastrointestinal tract, that acts as a hormone This analog will inhibit the release of most of the gastrointestinal endocrine hormones and will relieve flushing effect by decreasing:
    a. GI motility
    b. Gastric acid production
    c. Pancreatic enzyme secretion
    d. Bile and colonic fluid secretion
    e. Insulin, glucagon, secretin and vasoactive intestinal peptide (VIP) secretion
- Hepatic carcinoid: hepatic artery occlusion by ligation, embolization, trans-arterial chemoembolization (TACE), cryoablation, radiofrequency ablation to reduce the size of tumors
- Non-resectable carcinoid tumors: Peptide receptor radionuclear therapy for tumor regression
- Telotristat: An oral tryptophan hydroxylase inhibitor, recently approved for carcinoid syndrome, dose of 250 mg three times a day with meals [3, 12].
- Interferon: Interferon-alpha can be used in a patient who does not respond to a somatostatin analog. Interferon works by leading to cell cycle arrest of tumor cells, stimulation of T-cells, and inhibition of angiogenesis of tumor cells leading to tumor necrosis.
- Chemotherapy: Decreases tumor bulk and relieves the symptoms. Everolimus, which is a mTOR inhibitor. Everolimus has shown to improve symptoms by increasing excretion of 5-HIAA, but studies have failed to show improvement in disease-free survival.
- Antidiarrheal agents like loperamide, Lomotil (diphenoxylate/atropine), cholestyramine (especially for patients who had previous bowel surgery).

Octreotide effects [4]: Synthetic analog approved by the FDA in 1988 that is resistant to degradation by serum peptidases, long $t_{1/2}$(1.5-2 h)

- Urinary 5-HIAA excretion decreases by 26%
- Reduces intensity of flushing episodes
- In vitro, Octreotide reduces intracellular and extracellular levels of serotonin and 5-HIAA by 44% and 17% respectively

- Prophylactic IV infusion 25-1500 mcg/h and titrated off over the postoperative 24 hours. But no standard peri-procedural protocol has been established but North American Neuroendocrine Tumor Society (NANETS) guideline: refractory hypotension is treated with vasopressors and octreotide IV bolus as needed [13]

Vasopressors:

- Use of B-adrenergic agonists in patient with CS and CC was controversial because of the vasodilation with epinephrine. Subsequent research found that norepinephrine, epinephrine and ephedrine use are not different from phenylephrine and vasopressin in CC incidence rate and duration or postop complication. This supports the theory that there is a different mechanism with CC [1, 4]
- In 2022, Wonn recommended IVF followed by [1]:
    a. Vasopressin-first line agent
    b. Phenylephrine- second line agent
    c. B-adrenergic agonists- third line agents

Corticosteroids: Decrease reaction from non-specific histamine release [5]

Ondansetron/Granisetron: Block serotonin (5-HIAA) receptor [5]

Ioratadine, ranitidine, famotidine: Block histamine H1 and H2 receptors [5]

Telotristat ethyl: Tryptophan hydroxylase inhibitor can reduce urine 5-HIAA level, relieve CS diarrhea and bowel movement [4, 5]

There are recent conflicting arguments for CC treatment [4, 8, 13-16]: Octreotide efficacy in the treatment of carcinoid crisis has been questioned

- Some researchers, based on their prophylactic IV octreotide in pre-, intra- and post-operative period, concluded that Octreotide is beneficial for patient undergoing extensive surgical procedure for midgut and foregut NETs
- In 2017, the North American Neuroendocrine Tumor Society's (NANETS) guideline were changed since pre- and /intra-operative octreotide infusions may not prevent carcinoid crisis [13].
- In 2020, the European Society for Medical Oncology (ESMO) guidelines did not address the use of peri-operative prophylactic octreotide prior to the surgery [14, 15]
- In 2022, it was reported that prophylactic IV bolus or infusion of Octreotide, pre-, intra- and post-operatively, 3.4-35% patients undergoing abdominal surgery were identified as having carcinoid crisis [4, 8]. The use of Octreotide wouldn't change the rate and duration of CC. B-adrenergic agonists are not associated with paradoxical hypertension, prolonged crisis or increase postoperative complications [1] [8]
- Octreotide dosing regimens vary widely and there is no consensus as to IV or SQ dosing.
- Refractory hypotension is treated with vasopressors and octreotide IV bolus per NANETS guideline
- Condron et al 2 years prospective study of 46 patient with small bowel/lung NETs surgeries that received preoperative octreotide found [16]:
    1. No difference in serotonin, bradykinin, histamine or kallikrein level when CC

2. Serotonin might partly contribute to CC, serotonin level elevation can worsen the severity of CC
3. Preoperative Octreotide administration did not prevent intraoperative hypotension

- Relationship between mediator levels with symptoms of CC failed to show any correlation, suggesting octreotide might not address the pathophysiology of CC
- No difference in incidence of hypotension, crisis duration, postop complication rate with β-adrenergic agonists (ephedrine, norepinephrine, epinephrine), compared with non-β adrenergic agonist
- In 2022, 7 retrospective and 1 prospective study found that CC develop in patients without functional tumor, or systemically drained metastatic or primary tumors, or without hepatic metastases. They conclude that CC can occur in all patients with NETs [1] [8]. Thus, all patient with NETs need to be treated as possible CC
- Each of the NETs have a different role in the symptomatology of CS, making every patient experience CS differently [1] [8]
- Since many authors found octreotide ineffectiveness preventing CC, it may be a phenomenon different from CS. They believe CC is most consistent with distributive shock (vasodilatory shock), a medical emergency where the body can't get enough blood to the heart, brain and kidneys (septic shock, anaphylactic shock and neurogenic shock also present as to distributive shock) [1, 4, 8].

Carcinoid heart diseases: >50-60% of patient with CS have carcinoid heart diseases [2]

- Result from the increase serotonin and metabolites 5-HIAA
- Most affect the right side of heart due to ability of the lungs to clear the substances
- Right sided valvular lesion and electrical pathway result from interruption caused by fibrous tissue growth within the endocardium (retraction and fixation of valves and electrical pathway, TS, TR, PS, PR and right heart failure, arrhythmia)
- Bronchial Carcinoid tumor can cause left side heart disease, pulmonary hypertension, and bronchospasm

Anesthesia preoperative management [2, 5]

- Goal: prevent the release of bioactive mediators by avoiding factors known for triggering their release to avoid CC
- History and physical exam: focus on the presence and severity of S/S
- Image studies, radiolabeled octreotide and lab tests should be performed for identifying primary and metastatic tumors
- Low threshold for further pre-operative cardiac workup should be utilized since incidence of cardiac involvement is as high as 50-60%
- Pre-operative treatment is aimed at optimization of the patient for surgery and relieve the symptoms.
- Fluid and electrolytes abnormality need to be corrected, especially in patient with diarrhea.
  a. Antihistamine-H1: diphenhydramine
  b. Antihistamine-H2: ranitidine
  c. Kallikrein inhibitor: aprotinin to treat flush induced by bradykinin
  d. Block 5-HIAA receptors: steroid, ketanserin,

e. Anti-serotonin: octreotide 50-200 mcg IV rapidly reverses hypotension and bronchospasm. Typical intraoperative IV infusion 50-500mcg/h

Premedication [17]

- Goal: relieving symptoms and preparing for a potential CC
- All patient maintenance medications should be continued
- Benzodiazepines and antihistamines are useful in resolving anxiety and stress

Anesthesia intraoperative management [2, 17]

- Monitoring: ASA standard and arterial line placement:
  a. Hypotension common during the surgery
  b. Bleeding risk (carcinoid have a rich vascular supply and metastases involve vessel rich organs
  c. TEE may be helpful for patient with coexisting cardiac dysfunction
  d. Airway pressure monitoring: detect the onset of bronchospasm
  e. Temperature monitoring: hypothermia can trigger tumor mediator release
- Induction: Avoid mediator release: propofol, etomidate, opioid/muscle relaxants (not associated with increased histamine release) should be used. Succinylcholine's effect debated
- Balanced technique that incorporates positive ventilation, inhalational agents, N2O, muscle relaxants, fentanyl for anesthesia maintenance
- Patient with right heart disease: Avoid anesthetic factors that aggregate right ventricle work (hypoxia, hypercarbia, light anesthesia)
- Hypertension treatment: Deep anesthesia, β blockers etc.
- Hypotension treatment: IVF, vasopressin, octreotide, lighter anesthesia
- Epidural and spinal anesthesia successfully for patient with carcinoid
- A rapid increase airway pressure suggestive of a CC should be immediately assessed and treated.

Postoperative management [2]

- Goal: Continue to be monitored carefully for signs of tumor mediator release. The effects of carcinoid mediators can continue after tumor removal
- Patient should be transferred to ICU. Mediator release can delay recovery
- Preoperative octreotide should be continued, with a slow dose reduction over the first week
- IVF and electrolytes should be monitored since large fluid shift may occur
- Analgesia to prevent excess sympathetic activity and stress is very important

Perioperative complications [2]

- Complication are associated with intraoperative events: induction, intubation, tumor manipulation at any time and w/o any provoking factor
- Cardiovascular instability is the most frequent complication: BP, HR instability
- Bronchospasm: octreotide and neb ipratropium
- Flushing: Be considered a warning sign of potential cardiovascular instability
- Hyperglycemia from increase in serotonin: should be monitored and treated with insulin

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Clinical Trial

Comparison of Analgesic Efficacy of Continuous Erector Spinae Plane Block and Quadratus Lumborum Block in Open Abdominal Surgeries: A Retrospective Study

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Running head: QLB vs ESPB in Open Abdominal Surgeries

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HIGHLIGHTS

- Managing post-operative pain following surgeries especially open abdominal surgeries remains a persistent challenge.
- Both single shot quadratus lumborum (QL) and erector spinae plane (ESP) blocks have been employed for postoperative analgesia.
- We compare the analgesic effects of continuous Erector Spinae Plane Block (ESPB) and Quadratus Lumborum Block (QLB) in adult open abdominal surgical.
- Both ESPB and QLB provided similar and adequate postoperative analgesia in open abdominal surgery.

ABSTRACT

Study objective
To compare the analgesic effects of continuous Erector Spinae Plane Block (ESPB) and Quadratus Lumborum Block (QLB) in adult open abdominal surgical cases by analyzing retrospective data from a single institution.

Design
Retrospective cohort study.

Setting
A single academic teaching medical center.

Patients
Patients aged 18 to 65 years with ASA scores of I-III scheduled for elective open abdominal surgery with either ESPB and QLB from 2021-2022 were included in the study.

Interventions
Patients received QLB or ESPB catheter under ultrasound guidance.

Measurements
The total analgesic requirements in the first 72 h postoperatively, the time to the first administration of pain medication, and block-related complications.

Main results
Our study included 123 patients undergoing open abdominal procedures. There were no significant differences between the groups in terms of demographic data, intraoperative pain medication consumption and operative time (P>0.05). There was no difference in 72-hour post-op opioid consumption and the time to the first administration of pain medication in patients who received the ESP block compared to the QL block (P>0.05). No block-related complications or side effects were observed preoperatively.

Conclusions
Our study suggests that continuous ESPB and QLB provided similar and adequate postoperative analgesia in open abdominal surgery. Both methods are applicable for pain management following open abdominal surgeries.

KEYWORDS: Erector spinae plane block, Quadratus lumborum block, Postoperative pain management, Open abdominal surgery

ABBREVIATIONS ESPB, Erector spinae plane block. QLB, Quadratus lumborum block. QL, quadratus lumborum. PM, posas muscle. ESP, Erector Spinae Plane

1.

1. Introduction:

Managing post-operative pain following surgeries especially open abdominal surgeries remains a persistent challenge. Given the diverse nature of surgical procedures within the abdominal context and the unique characteristics of patient populations, there exists a broad spectrum of pain management and analgesic strategies [1]. Unfortunately, abdominal pain is frequently undertreated, resulting in adverse physiological consequences such as prolonged recovery times, heightened morbidity, and an increased risk of opioid dependence [1]. These repercussions, in turn, can have negative implications on psychological, economic, and social aspects [2]. Effectively addressing pain is a potent means of modifying surgical stress responses, ultimately contributing to an enhanced overall outcome [1-3].

Postoperative analgesia options for open abdominal surgery encompass various methods, notably opioids and epidurals [1]. While opioids serve as a cornerstone in perioperative drug treatments, their usage is associated with numerous side effects, including nausea, vomiting, and respiratory depression. These side effects may impede optimal analgesic dosing, potentially hindering the recovery process [1-3]. Moreover, given the current opioid epidemic, the administration of high opioid doses raises concerns about an elevated risk of long-term dependence, particularly in patients with substance use or mental health disorders [2]. On the other hand, although epidural anesthesia can effectively manage pain, there are frequent apprehensions regarding potential complications such as hypotension and hypocoagulability [4].

The application of regional anesthetic techniques, such as ultrasound-guided truncal fascial plane blocks, has demonstrated efficacy in reducing postoperative pain and minimizing opioid requirements, thereby contributing to a decrease in complications [3]. Since its introduction in 2007, the utilization of quadratus lumborum blocks (QLB) has become widespread in abdominal surgery [5]. Then in recent years, the erector spinae plane block (ESPB) has gained popularity because of easy placement and very few complications.

While both single-injection quadratus lumborum (QL) and erector spinae plane (ESP) blocks have been employed for postoperative analgesia following open abdominal surgery [4, 6-9], there is a scarcity of studies directly comparing their efficacy especially for continuous QLB and ESPB with catheters. Our research endeavors to assess and compare the analgesic effectiveness of continuous QL and ESP blocks in the context of postoperative pain management after open abdominal surgery.

2. Methods

2.1. Study Design and Participants

Following approval by the University Hospitals Cleveland Medical Center Institutional Review Board (IRB) under the study identifier STUDY20220622, a retrospective chart review was conducted. All patients undergoing elective major abdominal surgical procedures with midline upper abdominal incisions and receiving quadratus lumborum (QL) or erector spinae plane (ESP) blocks preoperatively during the study period were included. These surgeries include liver resection, Whipple's procedure, hemicolectomy, laparotomy, radical cystectomy and nephrectomy, and abdominal aortic aneurysm surgery. Patients undergoing emergency surgery were excluded. The patient's demographics, American Society of Anesthesiologists (ASA) physical status and type of surgery were recorded. This chart review focused on patients who underwent open abdominal surgeries with either quadratus lumborum (QL) or erector spinae plane (ESP) blocks within the timeframe of 2021-2022. The data were extracted from the

electronic medical records (EMR) system of University Hospitals Cleveland Medical Center (The Allscripts Sunrise Clinical Manager). The inclusion criteria comprised patients aged 18 to 65 years with American Society of Anesthesiologists (ASA) scores of I-III. Exclusion criteria encompassed patients on those allergic to local anesthetics, individuals with infections at the insertion site and the patients who refused block. The primary outcome measure was the analgesic requirements in the first 72 hours postoperatively and the time to the first pain medication administration. The secondary outcome is block-related complications.

2.2. Interventions

The patients received either quadratus lumborum block (QLB) or erector spinae plane block (ESPB) preoperatively. The decision on whether QLB or ESPB performed was made by acute pain anesthesiologist based on their experience and references. All the blocks and catheter placement were done preoperatively with ultrasound guidance.

QLB: In our institution, we exclusively conduct lateral QLB procedures. The patient is positioned either supine or laterally. To initiate the process, the ultrasound probe is positioned on the flank, located between the costal margin and the iliac crest in the anterior axillary line. This allows for the identification of the three abdominal muscle layers: external oblique, internal oblique, and transversus abdominis. Subsequently, the ultrasound probe is moved posteriorly to locate the Thoracolumbar Fascia (TLF) and the Quadratus Lumborum (QL) muscles.

A needle is inserted using an in-plane approach, progressing through the anterior abdominal muscles until it reaches the anterolateral edge of the QL. Following the confirmation of needle placement, 0.5% bupivacaine 15ml is injected to ensure the spread of local anesthetic between the QL and the middle layer of the TLF. Subsequently, a catheter is advanced 2-3 cm beyond the needle tip into the fascial plane. Remove the needle over the catheter and secure the catheter to the skin.

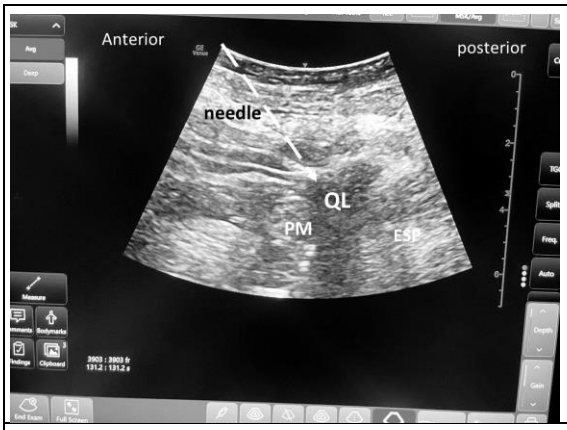

Figure 1. Quadratus Lumborum Block (QLB) under ultrasound guidance. QL: quadratus lumborum, PM: posas muscle, ESP: Erector Spinae Plane

ESP: In our institution, the Erector Spinae Plane (ESP) block is typically conducted at the T5-T7 paraspinal levels with the patient in a sitting position. Depending on the patient's body habitus, either a high-frequency linear transducer or a low-frequency curvilinear transducer is employed. The transducer is positioned over the target spinous process and moved laterally along the lamina to locate the transverse process. With the transducer in a parasagittal orientation, the block needle is inserted in-plane from either end of the transducer at a 45-degree

angle to the skin. The needle is advanced to make contact with the tip of the transverse process, and its tip is visualized throughout the procedure. Following a negative aspiration, 5 mL of saline is injected. This results in the visualization of the erector spinae muscle separating from the transverse process. Subsequently, the local anesthetic, 0.5% bupivacaine 15 mL, is injected in 5 mL increments. Aspiration is performed after every 5 mL to prevent intravascular injection. Following this, a catheter is inserted and advanced 2 to 5 cm into the Erector Spinae Plane, with continuous visualization of the catheter tip. The needle is then removed over the catheter, and the catheter is secured to the skin.

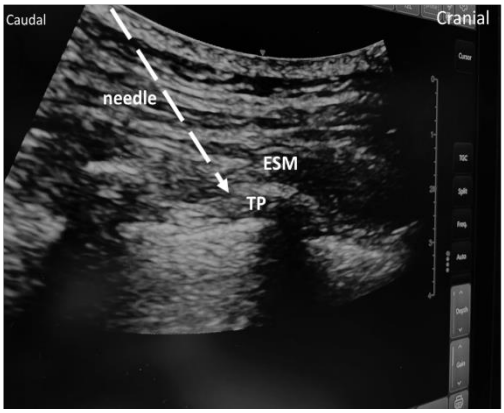

Figure 1. Erector Spinae Plane Block (ESPB) under ultrasound guidance. TP: transverse process, ESM: Erector Spinae muscle

Intraoperative and postoperative pain management: Following nerve blocks, all patients underwent general anesthesia. Intraoperative parameters such as pain medication consumption, operation duration, and any complications were meticulously documented. Post-surgery, patients were transferred to the post-anesthesia care unit (PACU), where the PACU nurse evaluated resting pain severity using an 11-point Numeric Rating Scale (NRS), ranging from 0 (no pain) to 10 (worst pain). A standardized postoperative supplemental analgesic regimen was administered to all patients. For NRS scores of 7-10, intravenous hydromorphone (0.4 mg) was administered every 5 minutes as the first-line therapy. Incidences of postoperative nausea or vomiting were documented and addressed. Upon transitioning to the general ward, patients received multimodal analgesia, including oral acetaminophen, oxycodone, tramadol, IV Toradol and intravenous hydromorphone bolus or PCA.

2.3. Outcome Measures

The main criterion for evaluating postoperative analgesia quality included two primary outcomes: cumulative opioid consumption at 72 hours postoperatively and the time to the first administration of pain medication. Cumulative opioid consumption was determined by adding up all rescue opioid doses, along with the total intravenous Patient-Controlled Analgesia (PCA) usage, and then converting it into Intravenous Morphine Equivalents (IME). Secondary outcomes encompassed intraoperative pain medication consumption and the occurrence of procedure-related complications (such as hematoma, infection, or needle trauma) during the perioperative period.

2.4. Statistical Analysis:

Continuous variables are reported using either mean and standard deviation or median and 25th and 75th percentiles. Categorical variables are reported using frequencies and percentages. Continuous variables are compared using either t-test or independent Wilcoxon Mann-Whitney test. These statistical analyses were performed using R version 4.3.2 program for statistical computing. A p-value of less than 0.05 was considered significant. Possible outliers were identified by visually inspecting the histograms. Four patients were removed from further analyses due to their magnitude falling beyond 2.5 standard deviations from the mean while minimizing the loss of statistical power.

3. RESULTS

3.1. Participants

Following the application of the inclusion criteria, 188 patients were deemed eligible (refer to Fig. 1). Subsequently, 60 patients were excluded based on the exclusion criteria. Of the remaining cohort, 64 patients were assigned to the ESPB group and 63 patients were assigned to the QL group. Therefore, a total 127 patients were included in the study. Then during the statistical analysis, outliers were removed, resulting in a reduction of the sample size from 127 to 123.

There were no significant differences between groups in terms of age, sex, ASA, and BMI. Intraoperatively, there was also no significant difference in the amount of pain medication (fentanyl, hydromorphone, toradol), overall morphine equivalents given and mean surgery time between the groups. Operation types included Whipple, cystectomy, nephrectomy, hepatectomy, colectomy, ileostomy, gastrectomy, exploratory laparotomy, and abdominal aortic aneurysm repair. The ESP group has more Whipple and colectomy/ileostomy and the QL group has more cystectomy and hepatectomy (**Table 1**).

3.2. Outcome

There was no significant difference in the time to first opioid intake after post operation between the ESP and QL groups ($p>0.05$). Within 72 hours post operation, there was no difference in 72-hour postoperative overall morphine equivalents consumption in patients who received the ESP block compared to the QL block ($p>0.05$). There was no difference in proportion of patients who experienced postoperative nausea and vomiting between the groups ($P>0.05$). No block-related complications, such as hypotension, arrhythmia, allergic reactions, or other side effects were observed during the intra- or postoperative periods in any patient (**Table 2**).

4. DISCUSSION

Effective postoperative pain management after open abdominal surgeries is essential for optimal recovery time and minimizing detrimental physiological effects [2]. Our results showed that both QLB and ESPB provide similar analgesic effects for adult open abdominal surgeries. In our knowledge, this is the first study that compared the analgesic effect of continuous QLB and ESPB for open abdominal surgeries.

Fascial plane blocks (FPBs) focus on the area between two layers of fascia instead of specific peripheral nerves. Despite being widely used, there is ongoing debate about the mechanisms of action, especially concerning ESPB and QLB. QLB involves the administration of a local anesthetic in proximity to the quadratus lumborum muscle, exerting its effects on the thoracolumbar nerves [10]. Over the years, various modifications of QLB have emerged, resulting in the description of four distinct types of the block: anterior/transmuscular QLB, posterior QLB, lateral QLB, and intramuscular QLB [5]. Various QLB exhibit distinct mechanisms of action as indicated by both cadaveric and clinical observations [10]. The anterior QLB may depend on the dispersion of local anesthetics to lumbar nerve roots, branches, and the thoracic paravertebral space [10]. Lateral QLB are linked to the spread of local anesthetics to the plane of the transversus abdominis muscle and subcutaneous tissue [10]. In the case of posterior QLB blocks, their clinical impact is associated with the injection spreading along the intertransverse area of the middle thoracolumbar fascia [10]. Currently, there is insufficient evidence to favor one approach over another in terms of QLB coverage and efficacy. All QLB conducted in our study are anterior QLB, as per the acute pain team's reference. The QLB has been shown to improve postoperative analgesia for abdominal surgery due to a broad distribution of local anesthetic (T7 –L1 in most cases).

While QLB is widely employed, ESPB was introduced as a newer analgesic technique [11, 12]. When performing an ultrasound-guided ESPB, the anesthetic is introduced into the interfascial plane between the erector spinae muscle and the transverse process. Subsequently, the anesthetic diffuses into the paravertebral space, influencing the dorsal and ventral branches of thoracic spinal nerves and the rami communicantes containing sympathetic nerve fibers [9]. ESPB offers several advantages, including easy visualization of the transverse process during ultrasound-guided injection, a considerable distance from major vessels at the injection site, extensive anesthetic diffusion with a single injection, and the flexibility for the patient to assume different postural positions—such as sitting, lateral decubitus, or prone—during administration [9].

Several studies have evaluated the positive effects of ESPB on postoperative pain management. In a study of 82 patients undergoing laparoscopic cholecystectomy, Canıtez et al found that ESPB improved postoperative quality of recovery and reduced pain scores and cumulative consumption compared to a standard multimodal analgesic regimen [11]. In a meta-analysis performed by Viderman et al comparing ESPB versus no block in open and laparoscopic abdominal surgeries, it was concluded that although ESPB administration decreased opioid requirement and time to first analgesic request, there was no difference in pain scores, nausea, and vomiting [4]. However, Gao et al was able to conclude that ESPB reduced pain scores compared to both patients who received a placebo (i.e. no block or sham block) and patients who received transversus abdominal plane block (TAPB) [8]. Similar to QLB, ESPB also comes with low risk of complications, due to its administration being far away from the peritoneum and abdominal wall [8].

There are limited studies comparing the postoperative analgesic efficacy between ESPB and QLB in abdominal surgeries. Abd Ellatif et al showed that in 75 open nephrectomy patients, ESPB is just as effective as QLB in providing analgesia and decreasing perioperative opioid consumption [6]. In pediatric lower abdominal surgical cases, ESPB has also been shown to provide similar postoperative analgesia as QLB [7]. Our study exhibited comparable findings to the ones reported in those studies.

The surgical procedures differed between the QLB and ESPB groups. The ESPB group underwent more Whipple and colectomy/ileostomy surgeries, while the QLB group had a higher

number of cystectomy and hepatectomy. However, we do not anticipate that these variations will impact our outcomes.

The study comes with several limitations. Initially, postoperative pain scores were not reported. Conducted during the COVID-19 period, our hospital faced significant staff shortages, particularly among floor nurses, resulting in inconsistent documentation of pain scores. Consequently, data collection for pain scores proved challenging. Additionally, being a retrospective study, inherent biases are present when compared to randomized controlled studies. There was no standardized protocol for intraoperative and postoperative pain control. However, this study could be used as a pilot study for a future randomized controlled study.

In summary, our study demonstrates that both Quadratus Lumborum Block (QLB) and Erector Spinae Plane Block (ESPB) offer comparable postoperative analgesia for patients undergoing open abdominal surgeries. Both blocks can be employed safely for postoperative pain management following open abdominal procedures.

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CONFLICTS OF INTEREST

None

AUTHOR CONTRIBUTIONS

Emily Peng; Collected the data, analyzed the results, and wrote the first draft of the manuscript

Josh Yuan: Collected the data.

Wana Mathieu: Collected the data and analyzed the result

Nirav Patil: Data analysis and interpretation

Mart Andrew Maravillas: Data analysis and interpretation

Xueqin Ding: designed the study, interprete results, directed the project and supervised the study, and critical review and editing of the manuscript for important intellectual content.

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Table 1: Comparison of demographic and intraoperative data between two groups.

	Level	Overall n = 123	ESP n = 61	QL n = 62	p-value
Age	Mean ± SD	62.56 ± 14.52	61.20 ± 15.37	63.90 ± 13.62	0.304[a]
Sex, n (%)					
Female		55 (44.72%)	30 (49.18%)	25 (40.32%)	0.323[c]
Male		68 (55.28%)	31 (50.82%)	37 (59.68%)	
ASA	Mean ± SD	2.91 ± 0.36	2.95 ± 0.38	2.87 ± 0.34	0.224[a]
BMI	Mean ± SD	28.65 ± 6.80	28.64 ± 6.30	28.66 ± 7.31	0.989[a]
Intraop Meds					
Fentanyl, mg	Mean ± SD	36.71 ± 17.07	38.11 ± 19.23	35.32 ± 14.65	0.368[a]
	Median (25th, 75th percentile)	30 (30, 30)	30 (30, 45)	30 (30, 30)	0.690[b]
Hydromorphone, mg	Mean ± SD	18.99 ± 14.28	19.67 ± 14.50	18.32 ± 14.06	0.603[a]
	Median (25th, 75th percentile)	20 (10, 20)	20 (10, 28)	20 (8.5, 20)	0.614[b]
Toradol, mg	Mean ± SD	0.61 ± 3.54	0.74 ± 4.27	0.48 ± 2.67	0.694[a]
	Median (25th, 75th percentile)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0.980[b]
Overall Intraop Morphine Equivalents (Calculated), mg	Mean ± SD	55.70 ± 22.62	57.79 ± 25.43	53.65 ± 19.47	0.313[a]
	Median (25th, 75th percentile)	50 (42, 69)	50 (42, 70)	50 (42, 60)	0.641[b]
Surgery time, minutes	Mean ± SD	251.48 ± 80.03	240.31 ± 67.81	262.47 ± 89.66	0.125[a]
	Median (25th, 75th percentile)	247 (186, 301)	244 (183, 282)	248.5 (187.75, 333)	0.265[b]
Operation type					
Whipple		19	15	4	
Cystectomy/nephrectomy		35	10	25	
Hepatectomy		23	7	16	
Colectomy/ileostomy		29	23	6	
Gastrectomy, Ex lap		12	5	7	
Abdominal Aortic aneurysm repair		10	4	6	

Continuous variables are reported using either mean and standard deviation or median and 25th and 75th percentiles.
Categorical variables are reported using frequencies and percentage.
[a]t-test; [b]Wilcoxon test; [c]Pearson's chi-squared test.

Table 2: Comparison of Postoperative Pain Medication Consumption between Two Groups.

	Level	Overall n = 123	ESP n = 61	QL n = 62	p-value
Time to first opioid intake after post operation	Mean ± SD	140.13 ± 425.55	169.66 ± 588.94	111.08 ± 230.55	0.451[a]
	Median (25th, 75th percentile)	48 (25.5, 91)	55 (34, 89)	36 (24.25, 95.5)	0.091[b]
Postop Meds					
Acetaminophen, mg	Mean ± SD	4,501.50 ± 3,381.16	4,661.89 ± 3,704.57	4,343.71 ± 3,051.99	0.605[a]
	Median (25th, 75th percentile)	4,550 (1,300, 6,662.5)	3,900 (1,300, 7,800)	4,550 (1,950, 6,500)	0.786[b]
Hydromorphone, mg	Mean ± SD	114.60 ± 148.08	123.74 ± 137.57	105.61 ± 158.34	0.499[a]
	Median (25th, 75th percentile)	44 (20, 145)	68 (28, 172)	33 (16, 77)	0.031[b]
Oxycodone, mg	Mean ± SD	36.43 ± 49.56	35.10 ± 49.68	37.74 ± 49.80	0.769[a]
	Median (25th, 75th percentile)	15 (0, 61.88)	15 (0, 45)	11.25 (0, 73.13)	0.996[b]
Toradol, mg	Mean ± SD	22.80 ± 46.82	13.28 ± 34.00	32.18 ± 55.39	0.024[a]
	Median (25th, 75th percentile)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0.030[b]
Tramadol, mg	Mean ± SD	1.07 ± 3.22	1.42 ± 3.77	0.73 ± 2.54	0.236[a]
	Median (25th, 75th percentile)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0.185[b]
Overall Postop Morphine Equivalents (Calculated), mg	Mean ± SD	152.10 ± 147.32	160.26 ± 134.57	144.08 ± 159.56	0.544[a]
	Median (25th, 75th percentile)	98 (41.5, 224.75)	122 (61.5, 231.5)	74.5 (32, 174)	0.112[b]
PONV, n (%)	Yes (%)	46 (37.40%)	23 (37.70%)	23 (37.10%)	0.944[c]

[a]t-test; [b]Wilcoxon test; [c]Pearson's chi-squared test. Continuous variables are reported using either mean and standard deviation or median and 25th and 75th percentiles. Categorical variables are reported using frequencies and percentages.

Problem Based Learning Discussion（PBLD）

Anesthesia for Endovascular Embolization of Unruptured Intracranial Aneurysm

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Learning objectives:
After discussion, participants should be able to:

1) Develop the best anesthesia plan for endovascular embolization of unruptured intracranial aneurysms (UIA).
2) Utilize neurophysiological monitoring during embolization of intracranial aneurysms to detect and prevent brain ischemia.
3) Apply best practice to manage intraprocedural aneurysm rupture (IAR) to improve patient outcome.

Stem Case and Key Questions:
Case presentation:
60-year-old female patient presents to IR suite for endovascular WEB (Woven EndoBridge) embolization of basilar artery aneurysm. Her PMH is significant for breast cancer, metastasis to brain, COPD, NIDDM, and paroxysmal SVT. Patient was found to have basilar artery aneurysm during her brain tumor work-up 6 months ago. Her past surgical history includes mastectomy, posterior cervical spine fusion and instrumentation, and recent craniotomy. Her current medications are Levetiracetam, albuterol, metformin, metoprolol, and abemaciclib.

1. What is the rationale for the intervention of UIA? Endovascular treatment versus microsurgical clipping?
2. What are your anesthetic concerns for endovascular repair of UIA? What type of anesthesia do you choose for this patient? General anesthesia (GA) or monitoring anesthesia care (MAC)? Why? Does the type of anesthesia chosen affect patient outcome?

Patient's airway exam reveals Mallampati class 3 and limited neck range of motion.

3. How do you secure the airway in this patient? What measures can be taken to minimize aneurysm rupture during intubation? What medications can be used to control blood pressure?
4. How do you monitor this patient? do you monitor brain for ischemia during the embolization procedure? Why? Neurophysiological monitoring (NPM) (EEG vs SSEP vs MEP vs BAEP)? Regional cerebral oximeter? Transcranial Doppler? How does NPM affect

your anesthesia technique? Total intravenous anesthesia (TIVA) or inhalational anesthesia?

5. What is periprocedural blood pressure goal during embolization of UIA?

Cerebral angiography shows basilar aneurysm 8.3mmx6.8mmx10 mm with neck 6.8 mm in width. The procedure is changed to stent assisted coil embolization due to aneurysm growth and morphology changes.

6. Heparin is used to reduce thromboembolic events during procedure, what is the ACT target? If a patient has a history of heparin-induced thrombocytopenia (HIT), what other anticoagulation medications do you use to reduce prevent thromboembolic events? What is the role of antiplatelet medications in EVT procedures?

Procedure continues. On the 4th coil placement, the aneurysm dome is ruptured.

7. What are clinical manifestations of intraprocedural aneurysm rupture (IAR)? NPM changes? How is IAR managed? What can be done to reduce bleeding? Lowering blood pressure? Burst suppression?

Aneurysm is secured after additional coils, NPM changes due to IAR resolves.

8. Do you allow patient emergence after basilar artery aneurysm rupture? What considerations do prevail?
9. Is this patient susceptible to cerebral vasospasm and delayed cerebral ischemia (DCI)? How are they related? Can cerebral vasospasm and DCI be prevented? How?

Case Discussion:

Unruptured intracranial aneurysm (UIA) has a prevalence of 3.2% and are increasingly diagnosed with modern imaging tools. [1] The major risk of UIA is aneurysm rupture leading to intracranial bleeding, most likely subarachnoid hemorrhage (SAH) which is associated with high mortality and morbidity. [2,3] 5-year cumulative rupture rates can be calculated based on size and location of UIA. [2] However, PHASES score and UIATS score considering several factors related to the patient and aneurysm are popular tool used to evaluate risk of UIA rupture in individual patient. [4,5] The decision to treat UIA depends on the risk of rupture and intervention risks. [6]

Endovascular treatment (EVT) is still first line treatment in most UIAs, though surgical clipping is an effective modality in treating UIAs in selective cases. [7] Comparing to surgical clipping, EVT has lower mortality and morbidity rate. [6,7] EVT continues to evolve and current techniques include embolization, intravascular flow diversion, and intrasaccular flow disruption, which can be chosen based aneurysm location, size, and morphology. [8]

Anesthesia care of patients with UIA for EVT is challenging due to its high complexity of the procedure, remote site anesthesia, radiation exposure, and requirement of anticoagulation to prevent thromboembolic events. General anesthesia (GA) is generally required for patient comfort and motionless to obtain high-quality images. GA also provides the ability for physiological manipulation of patients' blood pressure, ventilation, and intracranial pressure as needed. [9, 10] There is insufficient evidence to favor total intravenous anesthesia (TIVA) or inhalation anesthesia during EVT. However, TIVA is preferred if NPM is planned during procedure. Monitoring anesthesia care (MAC) has an advantage of monitoring neurological function in an awake patient and has been shown to be safe and feasible in selected patients. [11,12,13]

EVT carries the risk of thromboembolic and hemorrhagic events that lead to brain ischemia. [14] Multiple modalities such as NPM and near-infrared spectroscopy (NIRS) can be used to monitor brain function when a patient is under general anesthesia. NPM has been advocated to monitor brain ischemia during EVT.[15,16,17,18,19,20]

Electroencephalography (EEG) waveform slowing occurs when cerebral blood flow is less than 20-25/100g/min, thus EEG detects cortical ischemia early enough to allow corrective intervention and to improve patient outcome. Evoked potentials monitoring such as somatosensory evoked potentials (SSEP) is an effective tool in detecting brain ischemia with sensitivity of 100% and specificity of 98% during EVT. [19] Reduced duration and reversal of SSEP changes are associated with fewer incidence of postoperative infarction and favorable outcome. [19] Motor evoked potential monitoring (MEP) causes patient movement but can be used in selected cases. Brainstem auditory evoked responses (BAER) is often used in conjunction to SSEP to monitor brainstem ischemia in posterior circulation aneurysms. Multi-modal NPM is generally employed to improve diagnostic accuracy.

Patient for EVT of brain aneurysm presents with difficulty airway is particularly challenging to anesthesiologists. ASA difficulty airway algorithm [21] should be followed to safely secure the airway with close monitoring and controlling of blood pressures. Measures should be taken to avoid severe hypertension and coughing during airway management to avoid brain aneurysm rupture. If the airway is anticipated or known to be difficult, fiberoptic intubation is often the method of choice. An arterial line must be placed before induction. Intravenous fentanyl and midazolam may be carefully administered to facilitate awake intubation. Other techniques include remifentanil infusion and dexmedetomidine infusion. Once the glottis is viewed, a dose of lidocaine may be given via the fiberoptic scope to prevent coughing and "bucking" with intubation. Alternative techniques for failed sedation or topicalization should not produce excessive hemodynamic responses. The concomitant administration of beta-blockers or vasodilators may be necessary for blood pressure control. Once the airway is secured, the patient can be induced with propofol, and anesthesia is maintained with TIVA or inhalational anesthesia. Anesthesia management principle for EVT of UIA is avoidance of hypertension while maintaining cerebral perfusion. What is optimal blood pressure during EVT is unclear. In practice, we usually aim for systolic blood pressure less or equal to patient's normal systolic blood pressure with maximum 140 mmHg and

mean arterial blood pressure between 70-90 mmHg.

Anticoagulation management is essential in EVT. Heparin is often required to be administered intravenously to minimize thromboembolic complications and prevent vessel occlusion. A baseline activated clotting time (ACT) is obtained and then a dose of 70–100 units per kg of heparin is given, followed by measurement of the ACT, aiming for a target of 2–3 times baseline. [9] For patients with UIA undergoing EVT stent assisted embolization and pipeline embolization, an antiplatelet preparation with aspirin and clopidogrel bisulfate is a standard therapy because its effect and safety have been demonstrated. [22] In patients with resistance to clopidogrel, modified antiplatelet preparation may need to be adjusted to reduce the thromboembolic events rate in coiling for an UIA without increasing bleeding. [23] Cangrelor bolus followed by infusion (30 mcg/Kg bolus then 4 mcg/Kg/min for 2 hours or duration of the procedure) is alternative for intraprocedural use in case stent is unexpectedly required during EVT. If thromboembolism occurs during coiling, glycoprotein IIb/IIIa inhibitors (abciximab, eptifibatide, tirofiban) may be administered. [24]

Intraprocedural aneurysm rupture (IAR) is not common but devastating to patients. The role of general anesthesia in IAR is still not clear, but evidence suggests general anesthesia does not contribute to IAR. [25] The incidence of IAR is 2-5% during endovascular embolization of intracranial aneurysms. [26] Following IAR, patients may have severe hypertension and bradycardia indicating increased intracranial pressure (ICP) due to intracranial bleeding. Once IAR occurs, radiological imaging shows contrast-dye extravasation and prolongation of dye transit time. NPM changes following IAR include suppression of electric activity of EEG, reduction in amplitude and increase in latency of SSEP, and BAER wave V latency increase. Management of IAR includes stabilization of the patient, immediate reversal of heparin, reduction of increased ICP, emergency neurosurgery consults for possible EVD placement and craniotomy in OR. Burst suppression may be used to protect the brain from ischemia. Blood pressure is kept near the baseline levels until bleeding is controlled. Once hemostasis is achieved, blood pressure is elevated with vasopressors to maintain cerebral perfusion pressure in context of increased ICP. [27] IAR in UIA is usually associated with better neurological outcome than IAR in already ruptured aneurysms. [28,29]

Decision to extubate or not after IAR depends on the severity of bleeding, ICP, NPM changes, neurological exam. Patient is routinely kept intubated for immediate postprocedural CT imaging to evaluate intracranial bleeding. Patients should be allowed to wake up in case of small bleed and reversal of NPM changes at the end of procedure for neurological examination. Postprocedural management of subarachnoid hemorrhage (SAH) due to IAR follows the same guideline as aneurysmal SAH (aSAH). [30]

Cerebral vasospasm is a devastating complication of aSHA. Fisher scale is useful predictor of vasospasm risk after aSAH, although it does not necessarily correlate with clinical outcome. [31] Angiographic vasospasm happens in up to 70% to 90% of patients. However, symptomatic vasospasm affects one third of patients. [31] Vasospasm leads to delayed cerebral ischemia (DCI)

which is a major predictor of poor outcome after aSAH. DCI is defined as "the occurrence of focal neurological impairment (such as hemiparesis, aphasia, apraxia, hemianopia, or neglect), or a decrease of at least 2 points on the Glasgow Coma Scale (either on the total score or on one of its individual components [eye, motor on either side, verbal]) lasts for at least 1 hour, is not apparent immediately after aneurysm occlusion, and cannot be attributed to other causes by means of clinical assessment, CT or MRI scanning of the brain, and appropriate laboratory studies." [32] Vascular dysfunction, inflammation, and spreading depolarizations all contribute to pathophysiology of DCI. [33] Prophylactic therapy with nimodipine and euvolemia prevents cerebral vasospasm and improves patient outcome. [31,34] Treatment of symptomatic cerebral vasospasm includes induction of euvolemic hypertension and cerebral angioplasty and intra-arterial vasodilators. More recently, milrinone has been identified as a promising therapeutic agent for DCI. [34]

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Dr. Hong Wang (汪红)
(2023 CASA Photo Competition)

Dr. Mi Wang （王谧）
(2023 CASA Photo Competition)

Anesthesiology News

曲歌医生整理

July 17, 2023

Innovative infection prevention program reduces surgical site infections, results in reduced hospital stays and cost

An innovative anesthesiologist-led infection prevention program helped reduce the number of surgical site infections (SSIs) in colorectal patients by 50%, the number of days in the hospital by 46%, and led to significant cost savings over a two-year period by $540,000, according to research presented at the virtual American Society of Anesthesiologists' Anesthesia Quality and Patient Safety Meeting.

SSIs are related to additional antibiotic treatments, interventional procedures or even re-operation. SSIs can lead to major complications, including death, as well as significantly increase the cost of care. The SSI incidence rate in colorectal surgery is higher than many other procedures.

Under the umbrella of the ERAS program, UT Southwestern's infection prevention initiative implemented a number of interventions, each targeted at evidence-based causes of SSIs, including:

- Giving oral antibiotics with the patient's mechanical bowel preparation
- Identifying the best antibiotic to use, as well as optimal timing and redosing for colorectal surgery
- Using chlorhexidine baths prior to the surgery and wipes to the abdomen immediately prior to the operating room to decrease bacteria on the skin
- Improving access to critical medications by storing the antibiotics directly in each operating room's "pyxis" machines
- Requiring the surgical team and their assistants to change their gowns and gloves when the surgery was completed, and they were about to close the wound
- Actively warming patients both prior to and during the surgery
- Increasing patient mobility as soon as possible after surgery, for example sitting up in a chair the day of surgery and walking in the hallways up to three times as soon as possible.

This program may serve as a useful model for other academic or major medical centers seeking to improve their SSI outcomes.

October 2, 2023

Hard Times: Watchbands Harbor Bacteria

According to a new study (Adv Infect Dis 2023;13[2]:193-209), Leather, plastic and other band materials were more likely to be contaminated with bacteria than metal bands.

Bacteria found in the study typically were Staphylococcus (85%), Pseudomonas (30%), and E. Coli, which were prevalent on 85%, 30% and 60% of the wristband.

Researchers from Florida Atlantic University's Charles E. Schmidt College of Science, in Boca Raton, tested wristbands made of various materials to determine their risk for harboring potentially harmful pathogenic bacteria.

Using standard microbiological assays, the researchers looked at bacterial counts, type of bacteria and their distribution on the wristband surfaces. They also conducted a bacteria susceptibility assay study screening the effectiveness of three different disinfectant solutions: Lysol Disinfectant Spray (Reckitt Benckiser); 70% ethanol, commonly used in hospitals and alcohol wipes; and a more natural solution, apple cider vinegar.

The results suggest people might want to wear metal bands, particularly in a hospital or medical setting. Nearly all wristbands (95%) were contaminated. However, rubber and plastic wristbands had higher bacterial counts than metal ones, which had little or no bacteria. The most important predictor of wristband bacteria load was the texture of wristband material and activity of the person when the bands were sampled. Gym-goers showed the highest staphylococcal counts.

Findings from the study showed that Lysol Disinfectant Spray and 70% ethanol were highly effective regardless of the wristband material, with a 99.99% kill rate within 30 seconds. Apple cider vinegar was not as potent and required a full two-minute exposure to reduce bacterial counts.

CASA NEWS

申建成医生 陆晓薇医生整理

CASA 董事会及编辑部 2024 换届及变动

彭勇刚医生圆满完成 2023 年 CASA 会长任期

李金蕾医生新任 2024 年 CASA 会长, 离任 CASA Bulletin 编辑部编辑

仲巍医生任 2024 CASA 候任会长, 加入 CASA Bulletin 编辑部任编辑

麻浩波医生新任 CASA 理事

许连君医生新任 CASA 理事

申建成医生加入 CASA Bulletin 编辑部任编辑

CASA 基金会新成员

孙蕾, MD- 南开大学医学院毕业

University of Florida 麻醉住院医，

UF regional anesthesia and acute pain fellowship

目前在 UF 麻醉科 acute pain division 工作

周星光（Gary Zhou），MD-湘雅医学院毕业

Yale University Hospital

专攻于肝移植，创伤，气道管理

目前致力于门诊手术中心的管理

2024 CASA 活动通知

- 中国麻醉协会（CSA ）2024 年会将于 9 月中国上海举行
- CASA 与恒瑞公司合作的线上讲课活动重新启动，征集讲者和题目，有意参与者请和 CASA 候任会长仲巍医生联系
- CASA 前会长汪红医生和彭勇刚医生为 CASA 会员准备 POCUS Certification

CASA 2023 年第四季度 2024 年第一季度活动

- CASA 在 PGA2023 设立了展台，扩大了 CASA 的影响，加强了 CASA 与 PGA 和纽约州麻醉医生协会的交流合作。
- CASA 多位前任会长和会员参加了 2023 年 PGA 年会, 并出席了午餐会讲座。前会长长征医生组织了联谊晚宴。
- 十一月十八日 CASA 组织了针对中国医学院毕业生住院医申请的模拟面试，王景平和张扬医生主持了面试，七位申请者参加了活动。
- 美国华人麻醉医学会(CASA)会长李金蕾医生和国际华人麻醉学院(ICAA)院长夏云医生联合致信华人麻醉同仁，祝贺二零二四年新年快乐!
- 十一月十一日在 CASA 副会长仲巍医生的主持下，四位前会长，刘恒意，李韵平，黄佳鹏，曹锡清医生，通过 Zoom 和大家分享了 Academic Success and Society Engagement.

- 为新冠做贡献的一线医生-林永健


電子報首頁 刊期 目錄
B4 | 社區新聞(一)
世界日報
華醫打新冠第4針 抗體增加
林永健分享自己接種疫苗數據 效果顯著 建議老人、基礎病患仍需注射

- CASA on X: "The Anesthesia Without Boundaries international cloud exchange conference was organized by the China Medical Education Association and CASA Regional Block Anesthesia and Acute Pain (RAAPM). The meeting was hosted by Dr.Tao Zhu and Dr.Jinlei Li. 46 doctors attended the meeting.

-

- CAA 于 2/29-3/3 在上海举行，是新冠后首次完全线下会议，冯鸿辉，Henry Liu and 李金蕾代表 CASA 出席. 李金蕾在会上被推选为世界麻醉医师协会副主席。

CASA Bulletin 推荐评选出了 2023 年度发表的优秀文章

1st Place:

- Perioperative Management of Patients with Heart Failure with Reduced Ejection Fraction (HFrEF), Wei-Dong Gao,MD

2nd Place:

- Cardiovascular Implantable Electronic Devices: Perioperative Management for Anesthesiologists. Juan Li,MD and Yong G. Peng,MD
- Airway Management for Major Airway Tumor Resection. Manxu Zhao, MD. Henry Liu, MD

3rd Place:

- Brachial Plexus Plexopathy after Clavicle Fracture Surgery: A Case Report. Xueqin Ding,MD.
- Cytoreductive Surgery with Hyperthermic Intraperitoneal Chemotherapy and Anesthesia. Ning Miao, MD, Xiaowei Lu, MD. Andrew Mannes, MD.
- 从体重的角度认知疾病的实质。 文志向，刘继红, 张必翔, 张波, 丁则阳, 陈孝平。

Achievement

Louisville Anesthesiologist Jiapeng Huang, M.D. Nominated for KMA President-Elect 2024-2025

Louisville Anesthesiologist Jiapeng Huang, M.D. has been nominated for the role of KMA President-Elect for the 2024-2025 Association year by the Greater Louisville Medical Society (GLMS).

Dr. Huang currently serves as Vice President of the KMA and is a member of the KMA Legislative Quick Action Committee and Budget Committee. He previously served as KMA Secretary-Treasurer and is a 2018 graduate of the Kentucky Physicians Leadership Institute. Dr. Huang is an academic advisory dean, professor and vice chairman in the Department of Anesthesiology & Perioperative Medicine at University of Louisville. He also serves as Editor of the *British Journal of Anaesthesia Education, Associate Editors of British Journal of Anaesthesia, Journal of Cardiothoracic and Vascular Anesthesia and Seminars in Cardiothoracic and Vascular Anesthesia.*

AI, cardiac surgery, and renal function

A diverse team of researchers from medicine, engineering, and public health backgrounds is studying machine-learning AI models that may help develop a personalized risk prediction and decision-making process for managing kidney injury in heart surgery patients. Louisville professor and anesthesiologist Jiapeng Huang is principal investigator for the project. Read more from UofL News →

Publications-Articles and Books

Articles

- 麻浩波 (Haobo Ma) : article in Anesthesiology:

  Intraoperative Use of Phenylephrine versus Ephedrine and Postoperative Delirium: A Multicenter Retrospective Cohort Study

Perioperative Medicine | November 2023

Intraoperative Use of Phenylephrine *versus* Ephedrine and Postoperative Delirium: A Multicenter Retrospective Cohort Study

Haobo Ma, M.D., M.Sc.; Elena Ahrens, cand. med.; Luca J. Wachtendorf, cand. med.; Aiman Suleiman, M.D., M.Sc.; Denys Shay, M.D.; Ricardo Munoz-Acuna, M.D.; Tim M. Tartler, M.D.; Bijan Teja, M.D., M.B.A.; Soeren Wagner, M.D.; Balachundhar Subramaniam, M.D., M.P.H.; ... Show more

+ Author and Article Information

Anesthesiology Newly Published on November 2023. doi:

https://doi.org/10.1097/ALN.0000000000004774

- Jiabin Liu: article in Anesthesiology

  Evidence -based perioperative practice utilization among various racial populations- a retrospective cohort trending analysis of lower extremity total joint arthroplasty patients

Perioperative Medicine | December 2023

Evidence-based Perioperative Practice Utilization among Various Racial Populations—A Retrospective Cohort Trending Analysis of Lower Extremity Total Joint Arthroplasty Patients FREE

Jiabin Liu, M.D., Ph.D., F.A.S.A.; Haoyan Zhong, M.P.A.; Michael Reynolds, M.D.; Alex Illescas, M.P.H.; Crispiana Cozowicz, M.D.; Christopher L. Wu, M.D.; Jashvant Poeran, M.D., Ph.D.; Stavros Memtsoudis, M.D., Ph.D., M.B.A.

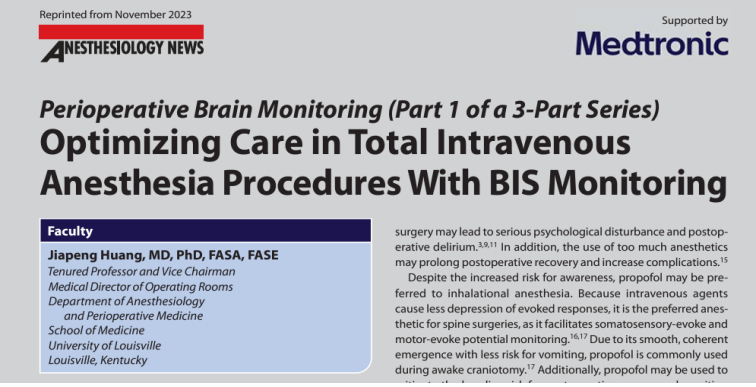
+ Author and Article Information

Anesthesiology December 2023, Vol. 139, 769–781.

https://doi.org/10.1097/ALN.0000000000004755

- 黄佳鹏(黄佳鹏): article in Anesthesiology News

  Optimizing Care in Total Intravenous Anesthesia Procedures with BIS Monitoring



Reprinted from November 2023
ANESTHESIOLOGY NEWS
Supported by
Medtronic

Perioperative Brain Monitoring (Part 1 of a 3-Part Series)

Optimizing Care in Total Intravenous Anesthesia Procedures With BIS Monitoring

Faculty

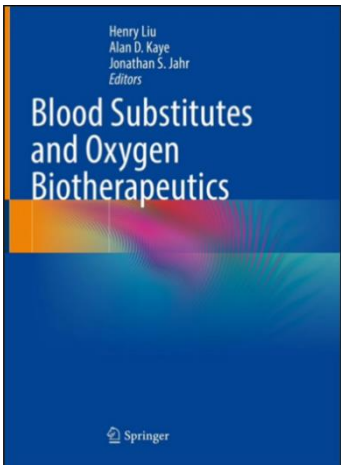
Jiapeng Huang, MD, PhD, FASA, FASE
Tenured Professor and Vice Chairman
Medical Director of Operating Rooms
Department of Anesthesiology and Perioperative Medicine
School of Medicine
University of Louisville
Louisville, Kentucky

surgery may lead to serious psychological disturbance and postoperative delirium.[3,9,11] In addition, the use of too much anesthetics may prolong postoperative recovery and increase complications.[15]

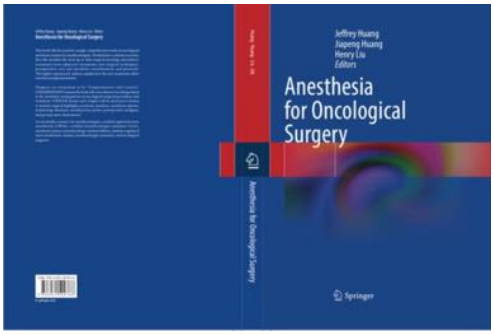
Despite the increased risk for awareness, propofol may be preferred to inhalational anesthesia. Because intravenous agents cause less depression of evoked responses, it is the preferred anesthetic for spine surgeries, as it facilitates somatosensory-evoke and motor-evoke potential monitoring.[16,17] Due to its smooth, coherent emergence with less risk for vomiting, propofol is commonly used during awake craniotomy.[17] Additionally, propofol may be used to

Books

- 刘恒意 (Henry Liu) 发表专著 “Blood Substitutes and Oxygen Biotherapeutics”



- 黄建宏 (Jeffrey Huang) , 黄佳鹏 (Jiapeng Huang), 刘恒意 (Henry Liu) 发表专著 “Anesthesia for Oncological Surgery”



纽约 PDA 会议纪实

晓薇

繁灯初上，纽约街头人群熙熙攘攘，不时会撞到对面的路人。上一次我在纽约参加 PDA 已是八年前的事了，纽约的热闹也已经又恢复到了疫情之前。一直觉得纽约很乱，但也乱得让人感到亲切。因为是快过圣诞节了，路上尽是游人， 本地的，外地的， 加之国际的，人人却也是面带笑容与惊喜，注视着这世界的大都市。

CASA 的董事会同行们为了大家能够尽兴与新朋老友汇聚一堂，特意在晚上举行了聚餐。曾经的我在纽约呆过七年，纽约相识好友终于在多年之后又见面了。虽然年龄多已过半百，但容貌依旧。这次难得的机会，让我们能够放下工作的繁忙，摆脱生活的琐事，专注于新老朋友间的交流与沟通。大家进餐后仍意犹未尽，在纽约的细雨下漫步续谈。

和浓浓家宴式的晚宴相比， 会议中间的午餐就更加融入了专业的形式。 藉着 PGA 会议的中间休息，新朋老友相见是一番后续曾经的工作经历和新的生活，无论是自己的创业亦或是工作的经历，包括家庭及爱好。王长征前会长为 CASA 做一年的工作总结，也为大家送上了美好的祝福。其后会长们纷纷发言，包括前任会长刘仁玉，黄建宏，及 CASA 杂志目前总编。之后，公司药物代表对目前最新的抗术后噁心心呕吐的新药做了讲座。大家欢快共进午餐。

感恩我们能够欢聚一堂，共同品尝美味佳肴，重温往日的友谊和情谊。在欢声笑语中，我们分享着彼此的喜悦与忧愁，回忆着曾经的点滴与故事。仿佛时间在这一刻停滞，我们又重新感受到了彼此之间那份珍贵的情谊。让我们珍惜眼前的生活，感恩曾经的相知相惜，期待着未来的再次相聚。


Chinese American Society of Anesthesiology (CASA)
CHINESE AMERICAN SOCIETY OF ANESTHESIOLOGISTS (CASA)


69°CBA
SBA

Dr. Xiqing Cao (曹锡清)
(2023 CASA Photo Competition)

Dr. TieBo Fu (符铁波)
(2023 CASA Photo Competition
手机拍摄)

医生生活

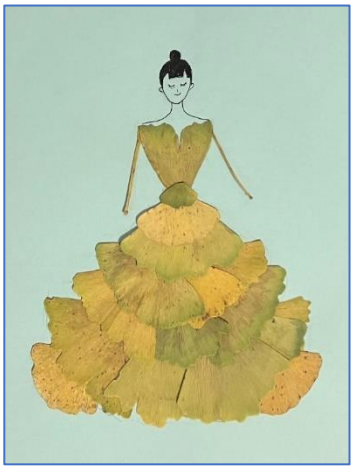
秋 思

李冰

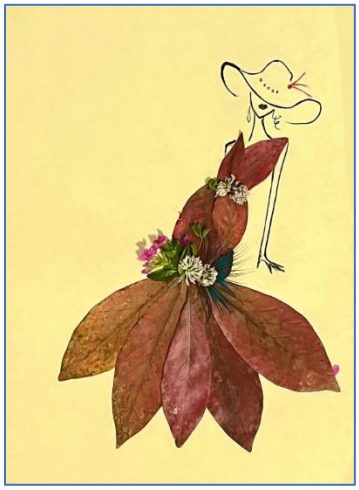
秋色斑斓，秋叶如画。

落叶，在秋风的喧哗中，在秋阳的寂静里，在有声与无声的世界，轻轻地飘来飘去。五彩缤纷，千姿百态 —— 红的浪漫，橙的热烈，黄的高贵，绿的执着……

漫步秋光里，拾起片片落叶——以秋叶着色，借秋思作笔。镶出生命的色彩和流沙般的岁月，化作张张画页，致意青春芳华，装点人生绚丽！



李冰：麻醉医生， 在美行医二十余载。 目前在 Southern California Kaiser Permanente Downey Medical Center 工作



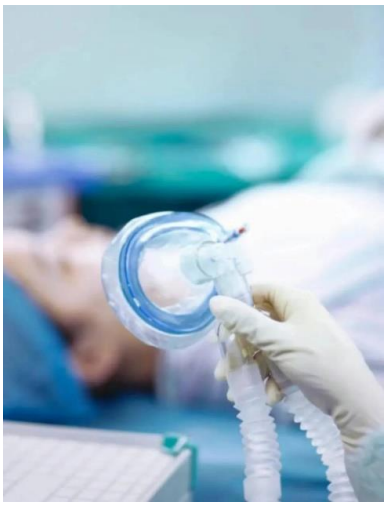
李冰是我高中同学，有幸的是，又做了六年的医学院同窗。到了美国还做了同一专业。印象中李冰善艺术，会舞蹈，文雅安静，直到几年前才知道她开始钻研画画，从速描而油画到电子笔画。约稿是很痛快的，只是没想到作品带来的惊喜。点点几片让人遗忘的落叶子，在她的想象中竟成了帖帖时尚的大片，赏心悦目。-主编语

麻醉科医生的一天

张珊

早上 5:00，铃声响起，和往常一样匆匆地起床洗澡喝咖啡。出门时月牙高挂，繁星点点。6:30 到医院，医生停车场上只有两盏昏暗的路灯，天边泛出些许微光。

今天排班轻松，没有大手术。



第一台是一个智障患者需要放镇静去做核磁共振。推着小车去放射科之前，我先去术前区 Eyeball 了（看一眼）病人，主要是看看病人的个头大小，问一下是否空腹，别的信息病历上都有。然后我去准备药物。没几分钟听到头顶呼叫，让我赶紧回术前区，我飞快地取了一只 Ketamine, 快步跑到术前区。原来病人跟着我出了他的房间，带着围嘴举着氧气管到处乱跑，两个护士跟在后面追，hold 不住了。我赶快把病人牵到就近的一个房间，里面没有病床，只有沙发，让病人坐下，请护士小姐姐们关上房门，给我取来针管和针头，一针 ketamine 肌肉注射下去，几分钟以后病人安静了，这才从容不迫的扎静脉点滴。正好这个沙发底下有轮子，我们就用沙发直接把病人推到了核磁共振，找来几位身强力壮的小伙子把病人搬到机器上面，剩下来的就是行云流水，顺理成章了。
接下来的四个小手术，波澜不惊，掠过不表。

下午 1:00，消化科大夫加了两个胃镜，容易嘛，这不是闭着眼都能做的吗？第二位病人术中发生了喉痉挛(laryngospasm) , 常见啊，口腔里抽吸干净，再 jaw thrust 下颌按压一下就缓解了。可是这个病人比我还要固执，喉头就是紧闭着，短短 2 分钟，血氧饱和度从 97%一下跌到 4%（做麻醉 20 多年从来没有见到这么低的血氧饱和度）眼看着病人变成灰色，我耳朵里听着病人的心率正在逐渐变慢，如果这个缺氧不立刻解除，病人马上就会心跳骤停，full code。我回过身飞快地拿出 succinylcholine 琥珀酸胆碱，抽出 2 毫升，推进去，用手使劲挤了几下静脉点滴，二十多秒以后喉痉挛解除，面罩通气成功，1 分钟以后血氧恢复到 99%，心率回升到 100，病人面色红润，危机解除了。幸亏我提前检查了药箱里有没有琥珀酸胆碱，放在什么位置，幸亏我总是准备了一只干净的针管和针头，而且贴上琥珀酸胆碱的标签，在这种危机时刻抓起来就可以用，省下珍贵的十几秒钟… 麻醉科医师从不打无准备之仗。

原来以为我可以回家了，可是到了年底每个手术室都是忙得脚底朝天。 值班大夫说你能不

能再帮我做一台胆囊切除？我说，好。

胆囊病人是个大胖子，术中倒是一切顺利。只是术后病人苏醒偏慢，通气不够。送到术后恢复室，提前让他们准备好那个无创性的呼吸机 BiPAP, 接上，一切平稳。这个无创性的呼吸机这些年在术后恢复室和普通病房真是发挥了很大的作用，减少了很多重症监护室的使用和国家的医疗开销。20 分钟以后胆囊病人醒来，拿掉无创呼吸机，正常呼吸，血氧正常。

下午 5:00，我换了衣服离开医院，迎着耀眼的落日，我开车回家了。

到家以后照例去我的小菜园转了转，看看我的萝卜白菜、花花草草，依旧是春华秋实，岁月静好。其实，相信每一个麻醉医师都有很多类似的故事。麻醉是一个危机四伏的职业，遇事要当机立断，没有什么过多考虑的时间。如果没有危机，那就不是麻醉了。每个麻醉医师都要学会与压力 stress 共处，如果你喜欢重症医学 critical care medicine, 那么你就会喜欢麻醉。从另外一个角度来说，麻醉也是一门单纯而充满魅力的学科，每一台麻醉都应该是一个精美的艺术品, 准确而优美。

我很幸运，做麻醉 20 多年，一直很享受这种 intensive work style ，我喜欢自己这份工作。那天有个护士跟我说，你知道吗？你和我在一起工作的时间远远超过了好多人结婚做夫妻的时间哦，我大笑，说，对呀！难怪咱俩吵起来像结婚多年的老夫老妻!

我知道有一天我会非常想念这种日子。
（文中照片来自网络）

作者简介
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王海明回忆录 （续 4）

5. 波士顿乃大学城 造就精英千万万

两年普外科将要结束时，我被告知继续普外无望。于是，到内科拿到内科第二年的聘书。那天，我很悲伤：自己的基础太差，尽管已十分努力，仍难超众。当晚，昔日普外的上级住院医师，瑟志（祖籍：南斯拉夫）来电话说，已知我的困境，力劝我切勿去内科，而应进波士顿（他在波士顿圣伊丽莎白医院）学习麻醉。起初，我考虑麻醉较凶险。儿时（我父亲是内科医师，母亲是药剂师。我在医院家属院长大），时常听闻手术意外时，外科总是指责麻醉差。瑟志说有三点应选进麻醉：1. 近年麻醉科学已现代化，麻醉规培已由三年制升改为四年制，人员素质提高了、规培加强了。麻醉机正计算机化、麻醉新药辈出.... 2. 他所在医院，麻醉规培除轮转本院，还到波士顿儿童医院（哈佛的附属医院）、雷黑医院（此院临床很有名）、麻省大学医学院等去轮转，很长见识 ... 3. 麻醉住院医规培尚待完成时，就有医院来聘请！ 麻醉专业已开始热了！我心动了。想进波士顿，不仅为我自己，张丽已通过美国口腔医学的基础医学考试，她需要入牙科学院重读第三和第四年方可当牙科医生。伍斯特无牙科学院。

1990 年 5 月 1 日，我和丽商议决定迁去波士顿。瑟志通过主任保罗教授（Paul Levesque MD) 帮我锁定圣伊丽莎白医学中心麻醉科住院医师位置。该科本已于当年三月全美各科普招时满员。四月底获知：一未来住院医师因病需休学一年，突然空出一个位置，我普外的学长将我领入麻醉医学领域！ 瑟志麻醉毕业后去了哈佛附属 Brigham and Women’s 医学中心学习诊治疼痛。我将永远感谢罗伯特教授、Paul Levesque 教授和瑟志学长!

波士顿圣伊丽莎白医学中心是一中大型医院，位于 Brighton, 科室全，接受塔夫滋医学院学生实习。麻醉科很关心住院医师的身心健康。希望不要手术中麻醉医师困睡误事！

三年麻醉科规培后，我一次通过麻醉毕业笔试（规培期间，每年夏天，各年级住院医师参加全国统考。每人的成绩要与同年级相比，毕业年统考作为毕业考试。通过笔试后，可以报名参加口试。口试三次若失败， 则需要回炉。）

学习麻醉约近一年后，我渐渐喜欢上麻醉工作了。一边兢兢业业地工作，一边认真研读麻醉学教科书和参考书，其中一本好书编者名： Fun Sun Yao MD （纽约市康奈尔医学院麻醉科）……接近麻醉规培毕业前，发现自己仍不很杰出。于是到哈佛神经科和麻醉科学习诊治疼痛。那年，四周假期用于考麻醉口试。其余 11 个月内，我轮转了七所医院：麻省总医院（Daniel Carr 教授挂帅）、Brigham and Women’s 医院 （Michael Ferrante 教授负责）、

Beth Israel Deaconess 医院（Carol Warfield 教授担纲）、波士顿儿童医院 （Charles Berde 教授领导）、Spaulding 康复医院 （Raymond Maciewicz 教授主政）、还去了 Massachusetts Eye and Ear Infirmary (哈佛耳鼻喉医院, Martin Acquadro 教授研习疼痛）和 Faulkner 医院头痛中心轮转。拓广了见识。练习了许多次麻醉模拟口试，哈佛有许多真正的麻醉口试考官。

6. 考生一跃升考官 教学波城和纽约

1994 年 3 月，奥兰多，佛罗里达。为了备考麻醉专科执照的口试，考前一周我来到考场，参加辅导班。考试是周四。周一、二我很努力。每日观摩老师和同学们的练习，一有机会，我就志愿登台与老师多练。周三中午，我在一小桌刚坐下准备进餐，一位中年白人男子，端着午饭，微笑地请求与我同桌。我爽快地欢迎他。见他两鬓斑白，我关切地问：您也备考麻醉口试。他笑答：非也，我是病理科医师。我好奇地又问：近日病理也在口试？ 他说：我是该辅导班公司的 CEO，Joseph Selliken MD, 说着递给我一张他的名片，Osler Institute 。我询问该公司怎样创立的？ 经营多久了？ 他说：当年，他备考病理笔试和口试时获得灵感，已经营许多年了。为所有医学专业提供笔试和口试辅导。我称赞：Osler Institute 大名鼎鼎，1993 年，住院医毕业前，我特休一周到西雅图参加辅导班，结果笔试顺利通过。Dr. Selliken 微笑地告诉我：此辅导班麻醉老师们给海明医师高度评价，估计一定会顺利通过口试！我感谢说：托您吉言，我一定要通过口试！ 通不过口试，没有 Board，找工作和任何地方工作均会受歧视，太重要了！ Dr. Selliken 又说：口试通过后，你是否愿意来当辅导老师，加入 Osler Institute faculty？ 我立即表态： 将不胜荣幸！ 他叮嘱：见到通过 Board 信，尽快电话于他。我说：好（Deal ）！

住院医师规培结束后，升至 Fellow。我的重点集中在准备麻醉口试。每日下班后，我到儿童医院隔壁的公寓与儿科麻醉 Fellow：Frank Wang(王凯平医师，现在佛罗里达一儿科医院工作）一起互相口头测试，将麻醉口试可能测试的内容反复梳理，练到听到考题就立即有条理的回答。他美丽秀颖的妻子：Yvonne (翁维瑛，她父亲曾任台北警察付局长）总是轻轻递茶和水果。

临考前，我已明白：麻醉专科口试的目的不是测量知识多少，而是如何理论联系实际，随机应变的临床工作能力。

口试，就像是一段小品样的表演。面对几种临床问题，要有符合逻辑的、合理的解决办法（Common Sense)。

我经常辅导其他备考的医师们： The key is, within limited time, through case discussions, you must convince two examiners that you are reasonably good. They are willing to let you take care of themselves!

若要顺利通过，一定的口头练习和训练是必要的。有人临床工作均可胜任, 可就是怯场。一见考官，魂飞天外，不能理智地思考。这应该是一种可治之症。如临考前，可试服适量贝它受体阻断剂。切记：笔试或口试前禁饱餐（饱餐后会令人昏昏欲睡）。

周四上午，我坦然入考场，从容面对两位考官。他们是：佛罗里达大学麻醉科主任 Kirk 教授和华盛顿州立大学医学院麻醉科主任 Steven Wendell 教授。我脱下西服上衣，挂在我的椅背上，拿一支笔，迅速阅过考题，喝一口冰水后说：我准备好了！两位考官轮番向我提问，我一一回答。当中，Kirk 教授问我可否那样，我头一扬正言道：那是陷阱！ 休蒙我！ 他俩情不自禁地一起笑出声来！ 抓到一个机会，我口若悬河..... 叮叮铃声响起，此番考试结束了！ 时间过的好快！ Wendell 教授和蔼地起身，轻提我的西服上衣帮我穿好，并说：祝王医生回波士顿一路愉快！ 我紧握他的手，以示感谢。哈，我知道：考试通过了！ 出考场后，大家纷纷互相询问，我禁不住告知周围友人：我肯定是通过了！ 我又飞跃一次！ 青春作伴好回家！ 我立即将喜悦传给远在波士顿的张丽！

回到波士顿几周后，我收到美国麻醉医师专科考试委员会寄来的贺信：恭祝王海明医师获得专科执照。又一个里程碑！

我电话感谢曾帮助过我的师生们、感谢家人、满怀喜悦地电话 Dr. Joseph Selliken ， 他说：果不出所料，欢迎加入 Osler Institute faculty。很快， Ms. Suny (Dr. Selliken’s wife , Osler 当家者 ）给我电话、寄用品，请我负责波士顿地区和纽约麻醉口试辅导班活动 。那时，我感到自己是多么幸运！

美国华人麻醉医学会

國際華人麻醉學院

尊敬的海内外华人麻醉同道们：

龙年的钟声即将敲响， 在举国龙腾喜迎中华民族最具传统特色的新春佳节之际，国际华人麻醉学院（ICAA) 和美国华人麻醉医学会（CASA)向所有尊敬的华人麻醉学工作者拜年啦，恭祝大家在新的一年学术上百尺竿头更进一步，手术中为患者麻醉安全保驾护航，手术后引领早康潮流新时尚，家庭合睦身体健康。在这特殊的日子里，回首往年来大家的密切合作和共同努力，倍加期待新的一年携手并肩共创新的辉煌。

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