
Non-CME Webinar Series
designed with the trainee in mind
second Tuesdays of odd-numbered months

Brought to you by ASRA & THE ASSOCIATION OF PAIN PROGRAM DIRECTORS

# Pain Procedures and Anticoagulation

Tuesday, November 10, 2020

7-8:15 pm ET


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# Risk Classification
## Anatomical Considerations and Pain Procedure

**Samer N Narouze, MD, PhD**

**Professor of Surgery and Anesthesiology, NEOMED and OUCOM**

**Chairman, Center for Pain Medicine , Western Reserve Hospital**

**Cuyahoga Falls, OH**

**DISCLOSURE**
I have no financial conflict of interest

**@NarouzeMD**





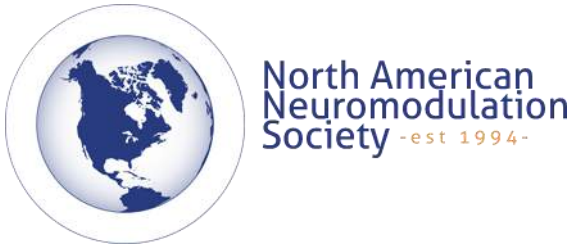
SPECIAL ARTICLE

# Interventional Spine and Pain Procedures in Patients on Antiplatelet and Anticoagulant Medications

## *Guidelines From the American Society of Regional Anesthesia and Pain Medicine, the European Society of Regional Anaesthesia and Pain Therapy, the American Academy of Pain Medicine, the International Neuromodulation Society, the North American Neuromodulation Society, and the World Institute of Pain*

*Samer Narouze, MD, PhD,* Honorio T. Benzon, MD,† David A. Provenzano, MD,‡ Asokumar Buvanendran, MD,§ José De Andres, MD, PhD,|| Timothy R. Deer, MD,# Richard Rauck, MD,** and Marc A. Huntoon, MD††*





# Whey we need separate guidelines?

Too many variables in Chronic pain practice

- Patient variables
- Medications variables
- Procedure variables

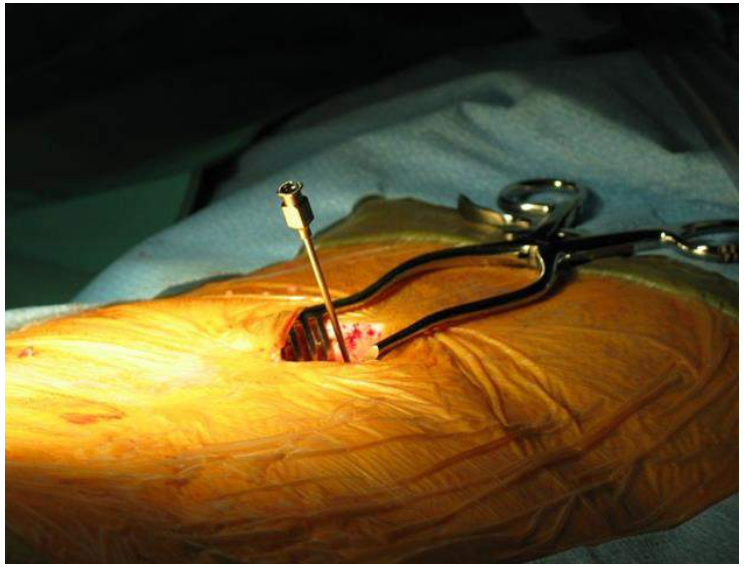
ASRA 2012 meeting Survey results
Scream out loud the need for new recommendations and guidelines for the management of anticoagulants/antiplatelets for interventional pain procedures
Narouze et al. RAPM 2014

# Patient variables?

- Chronic pain patients are usually elderly patients
- Polypharmacy with many antiplatelets and anticoagulant interactions
- Receiving multiple injections/procedures
- Spinal stenosis with vessels compacted in a tighter space.
- S/P back surgeries and scaring

# Procedure Variables??

- Invasive procedures
- Deep procedures
- Large needles
- Multiple attempts at lead placement
- Mobile lead/s left in the epidural space
- = more trauma to the epidural space



- **But**…on the other hand, patients at high risk may need to continue their antiplatelet for CAD or CVA prevention.

- **Moreover**; Chronic pain and stress state is a HYPER-coagulable state

# Pain procedures classification according to the potential risk for serious bleed

| High risk procedures | Intermediate risk procedures* | Low risk procedures* |
|---|---|---|
| **-Spinal cord stimulation trial and implant**<br>**-Intrathecal catheter and pump implant**<br>**-Vertebral augmentation (vertebroplasty and kyphoplasty)**<br>**- Epiduroscopy and epidural decompression**<br>**- Minimally invasive spine procedures** | -Interlaminar ESI (C,T,L, S)<br>-Transforaminal ESI (C,T,L,S)<br>-Cervical Facet MBNB and RFA<br>-Paravertebral block (C,T,L)<br>-Disc procedures (C,T,L)<br>-Sympathetic blocks( stellate, thoracic, celiac, lumbar, hypogastric) | -Peripheral nerve blocks<br>-Peripheral musculoskeletal injections<br>-Trigger point injections including piriformis injection<br>-Sacroiliac joint injection and sacral lateral branch blocks<br>-Thoracic and lumbar facet MBNB and RFA<br>-Peripheral nerve stimulation trial and implant<br>-Pocket revision, IPG/ITP replacement |

Narouze S, Benzon HT, Provenzano D, et al. Interventional Spine and Pain Procedures in Patients on Antiplatelet and Anticoagulant Medications (Second Edition): Guidelines From the American Society of Regional Anesthesia and Pain Medicine, the European Society of Regional Anaesthesia and Pain Therapy, the American Academy of Pain Medicine, the International Neuromodulation Society, the North American Neuromodulation Society, and the World Institute of Pain. *Reg Anesth Pain Med*. 2018;43(3):225-262. doi:10.1097/AAP.0000000000000700

# Pain Procedures Classification

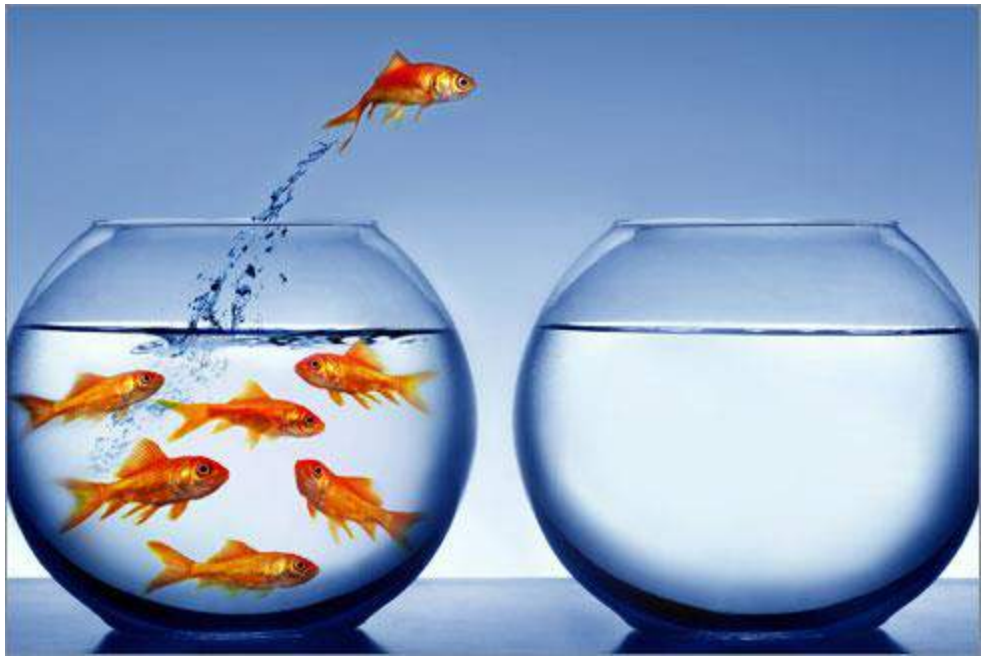
- Patients with high risk for bleeding undergoing low risk procedures = intermediate risk

- Patients with high risk for bleeding undergoing intermediate risk procedures = high risk

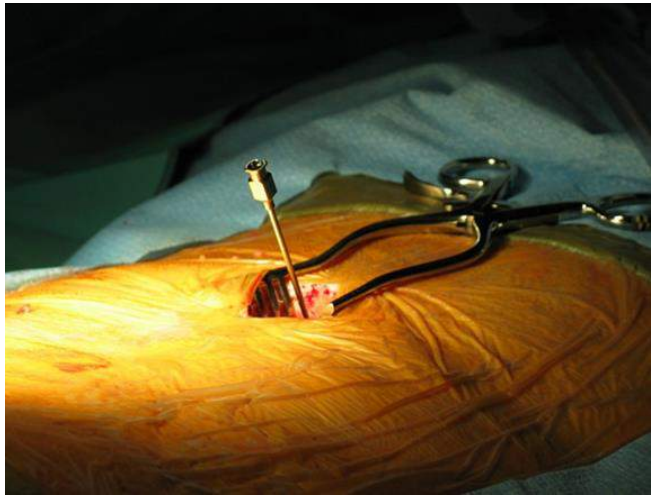
**<u>Patients with high risk for bleeding may include:</u>**

- Old age
- History of bleeding tendency
- Concurrent uses of other anticoagulants/antiplatelets
- Liver cirrhosis or advanced liver disease
- Advanced renal disease.

# High Risk Procedures



# Spinal Cord Stim





## Spinal Epidural Hematoma After Spinal Cord Stimulator Trial Lead Placement in a Patient Taking Aspirin

*Asokumar Buvanendran, MD, and Adam C. Young, MD*

**Objective:** Spinal epidural hematoma is a rare, but potentially devastating, consequence of accessing the epidural space for anesthesia or interventional pain procedures. There is no consensus to stop aspirin therapy before interventional chronic pain procedures.

**Case Report:** A 73-year-old woman with postlaminectomy pain syndrome and lumbar radiculopathy underwent percutaneous spinal cord stimulator lead placement. She had been taking aspirin 81 mg/d for several years. Twenty-four hours later, she developed an epidural hematoma. Prompt recognition and surgical management resulted in no long-term neurological sequelae.

**Conclusions:** The only variable that could have led to our patient's epidural hematoma is aspirin. This is the first reported case of aspirin leading

throughout the perioperative period. It inhibits platelet aggregation by acetylating the serine 530 residue of cyclooxygenase-1 (COX-1), irreversibly blocking the formation of thromboxane $A_2$. This action prevents arachidonic acid from interacting with COX-1 and, therefore, blocks the formation of prostaglandin $G_2$ and prostaglandin $H_2$—the precursors of thromboxane $A_2$.[6] This effect can be seen with doses as low as 30 mg/d. Higher doses (>300 mg) result in acetylation of prothrombin and fibrinogen, facilitating plasminogen activation and altering hemostasis through an entirely different mechanism.[7] Without thromboxane $A_2$, platelets fail to activate and aggregate. Aspirin conveys anti-inflammatory effects (and analgesia) by acetylating the serine

Pain Physician 2010; 13:357-363 • ISSN 1533-3159

**Case Report**

## A Report of Paraparesis Following Spinal Cord Stimulator Trial, Implantation and Revision

Clark C. Smith, MD, John L. Lin, MD, Max Shokat, DO, Sonny S. Dosanjh, MD, and Dionne Casthely, MD

Int J Emerg Med (2010) 3:483–484
DOI 10.1007/s12245-010-0174-z

CLINICAL IMAGES

# Epidural hematoma following spinal cord stimulator implant

Brian T. Kloss · Anne Marie Sullivan · Elliot Rodriguez



Kloss BT, Sullivan AM, Rodriguez E. Epidural hematoma following spinal cord stimulator implant. *Int J Emerg Med*. 2010;3(4):483-484. Published 2010 May 18. doi:10.1007/s12245-010-0174-z

# Spinal cord stimulator and epidural haematoma

BJA

Editor—We present an unusual case of delayed onset epidural haematoma caused by lead migration which developed 72 h after a spinal cord stimulator trial, followed by spontaneous resolution.


Takawira N, Han RJ, Nguyen TQ, Gaines JD, Han TH. Spinal cord stimulator and epidural haematoma. *British Journal of Anaesthesia*. 2012;109(4):649-650. doi: 10.1093/bja/aes335

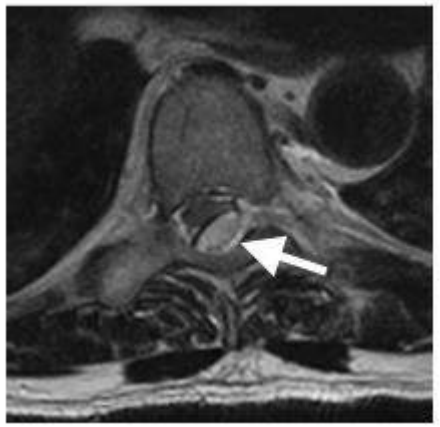
(*Reg Anesth Pain Med* 2014;39: 73–77)

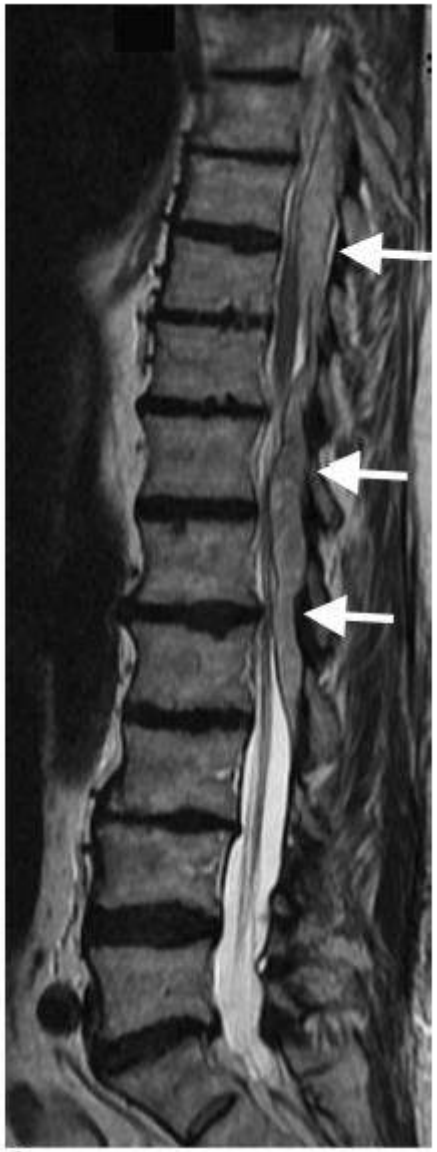
CASE REPORT

# Epidural Hematomas After Removal of Percutaneous Spinal Cord Stimulator Trial Leads

## *Two Case Reports*

*Curren E. Giberson,* Judith Barbosa,* Elizabeth S. Brooks, PhD,**
*Gail L. McGlothlen, APRN-BC, MS, CNS,† Eric J. Grigsby, MD,† James J. Kohut, MD,‡*
*Linda L. Wolbers, MD, MPH,* and Lawrence R. Poree, MD, MPH, PhD*§*





Giberson CE, Barbosa J, Brooks ES, et al. Epidural hematomas after removal of percutaneous spinal cord stimulator trial leads: two case reports. *Reg Anesth Pain Med*. 2014;39(1):73-77. doi:10.1097/AAP.0000000000000026

Anaesthesia
Journal of the Association of Anaesthetists of Great Britain and Ireland
Anaesthesia, 2011, **66**, pages 837–839 doi:10.1111/j.1365-2044.2011.06770.x

CASE REPORT

**Acute epidural haematoma following epidural steroid injection in a patient with spinal stenosis***

H. Shanthanna[1] and J. Park[2]

*1 Anaesthesiologist and Clinical Pain Fellow in Pain Management, McMaster University, Ontario, Canada*
*2 Anaesthesiologist and Pain Fellowship Director, Hamilton Health Sciences, Associate Professor, McMaster University, Hamilton, Ontario, Canada*

Anesthesiology 2005; 102:701–3 

Epidural Hematoma after Epidural Steroid Injection in a Patient Withholding Enoxaparin per Guidelines

*To the Editor:*—We present a case of a patient with renal insufficiency in whom an epidural hematoma developed after an epidural steroid injection while enoxaparin was withheld per guidelines.

An 85-yr-old woman referred to the Anesthesia Pain Clinic for epidural steroid injection (ESI). She reported worsening left-sided lumbar radicular pain with left foot numbness for approximately 1 yr. Conservative therapy had provided minimal relief.

Neurologic examination results were normal, except for a positive straight leg raise test result on the left. No magnetic resonance imaging study of the lumbar spine was available. However, two-view radiography demonstrated a wedge compression deformity of the L1 vertebra, mild to moderate degenerative joint disease, and mild scoliosis.

The patient was taking warfarin for chronic atrial fibrillation and a St. Jude aortic valve. Warfarin was withheld 6 days before the ESI, and the patient received 1 mg/kg subcutaneous enoxaparin every 12 h for 4 days before her appointment. On the day before her appointment, she received only her morning dose. Therefore, at the time of injection, it was more than 24 h since her last dose. Her international normalized ratio on the day of injection was 1.2.

Epidural steroid injection was performed atraumatically with use of an 18-gauge Tuohy needle and the loss-of-resistance technique into the

# Epidural Steroid Injection

Shanthanna H, Park J. Acute epidural haematoma following epidural steroid injection in a patient with spinal stenosis. *Anaesthesia*. 2011;66(9):837-839. doi:10.1111/j.1365-2044.2011.06770.x

Ain RJ, Vance MB. Epidural Hematoma after Epidural Steroid Injection in a Patient Withholding Enoxaparin per Guidelines. Anesthesiology. 2005;102(3):701-703. doi:10.1097/00000542-200503000-00048

Clinical Neurology and Neurosurgery 113 (2011) 575–577

Contents lists available at ScienceDirect

Clinical Neurology and Neurosurgery

journal homepage: www.elsevier.com/locate/clineuro

Case report

## Acute thoracic epidural hematoma following spinal manipulative therapy: Case report and review of the literature

Tsung-Han Lee[a,d], Chih-Feng Chen[b], Tao-Chen Lee[c], Hsiang-Lin Lee[d], Cheng-Hsien Lu[e,*]

[a] Division of Trauma, Department of Surgery, Chang Gung Memorial Hospital - Kaohsiung Medical Center, Chang Gung University College of Medicine, Kaohsiung, Taiwan
[b] Department of Radiology, Chiayi Chang Gung Memorial Hospital, Chang Gung University College of Medicine, Chiayi, Taiwan
[c] Division of Neurosurgery, Department of Surgery, Chang Gung Memorial Hospital - Kaohsiung Medical Center, Chang Gung University College of Medicine, Kaohsiung, Taiwan
[d] Institute of Medicine, Chung Shan Medical University, Taichung, Taiwan
[e] Department of Neurology, Chang Gung Memorial Hospital - Kaohsiung Medical Center, Chang Gung University College of Medicine, Kaohsiung, Taiwan

# Spinal Manipulation Therapy

CASE REPORTS

## SPINAL EPIDURAL HEMATOMA AFTER SPINAL MANIPULATIVE THERAPY IN A PATIENT UNDERGOING ANTICOAGULANT THERAPY: A CASE REPORT

James M. Whedon, DC,[a] Patricia B. Quebada, MD,[b] David W. Roberts, MD,[c] and Tarek A. Radwan, MD[d]

ABSTRACT

**Objective:** We report on the case of a patient with spinal epidural hematoma (SEH) after spinal manipulative therapy and review features of reported cases of a similar nature.

**Clinical Features:** The patient was undergoing Coumadin anticoagulant therapy for atrial fibrillation and presented to the chiropractor complaining of a stiff neck. After cervical manipulation, he developed paresthesia in both feet, progressing to motor deficits in all 4 extremities. He required a laminectomy and evacuation of a clot indenting the spinal cord.

**Results:** Review of the literature revealed 7 reported cases of SEH after manipulation; 5 patients underwent cervical manipulation and 1 patient received Coumadin therapy.

**Conclusion:** Practitioners of spinal manipulative therapy should be aware of SEH as a possible complication of manipulation in patients at risk and should exercise caution in the care of patients undergoing anticoagulant therapy. (J Manipulative Physiol Ther 2006;29:582-585)

**Key Indexing Terms:** *Spinal epidural hematoma; Spinal manipulation; Anticoagulants*

# Special Attention !!
# Cervical Procedures


- Cervical Epidurals
- Cervical Facets
- Cervical Sympathetic blocks (SGB)

# Cervical Symp Block/ SGB

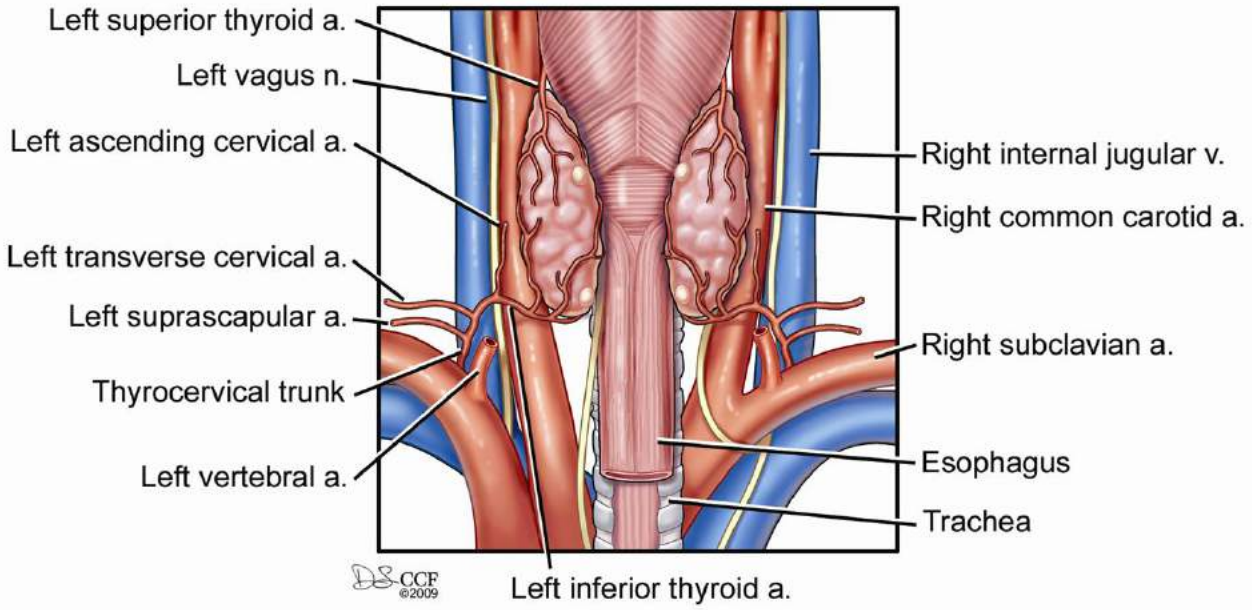
■ PAIN AND REGIONAL ANESTHESIA

Anesthesiology 2006; 105:1238–45 

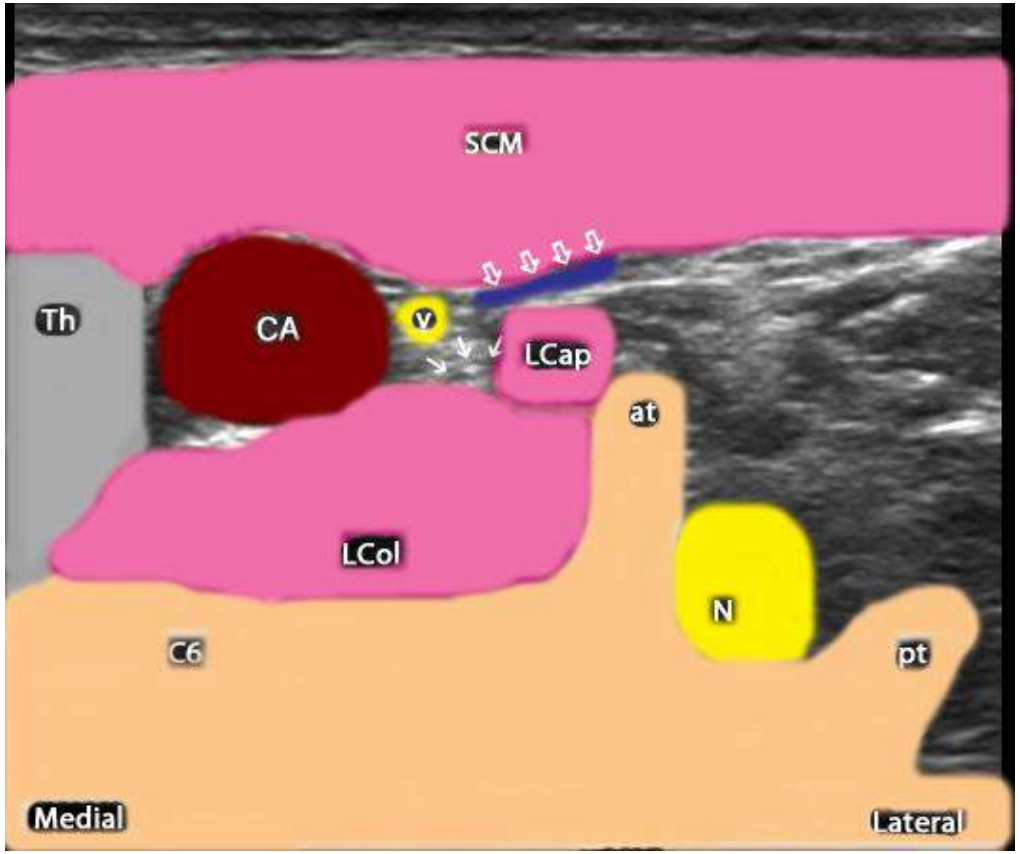
## *Retropharyngeal Hematoma after Stellate Ganglion Block*

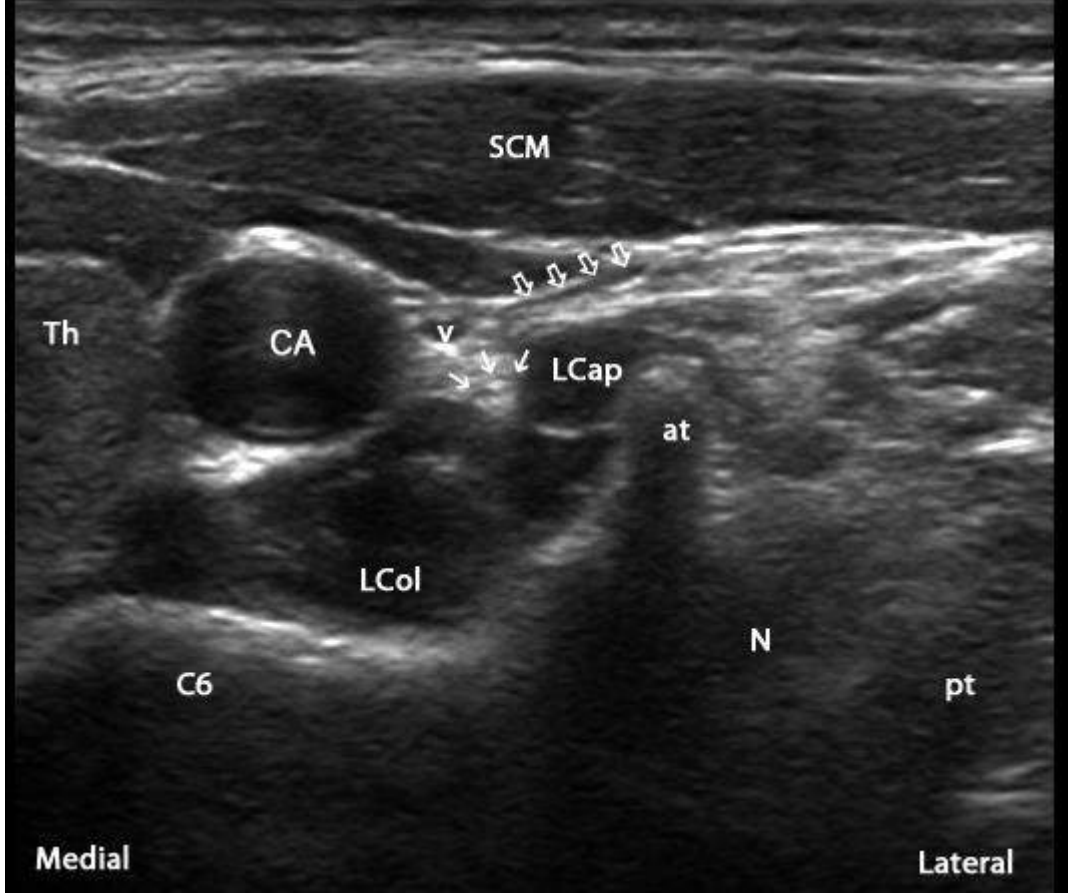
### *Analysis of 27 Patients Reported in the Literature*

*Kazuo Higa, M.D.,* Kazuhiko Hirata, M.D.,† Kazunori Hirota, M.D.,† Keiichi Nitahara, M.D.,‡ Shinjiro Shono, M.D.†*




Higa K, Hirata K, Hirota K, Nitahara K, Shono S. Retropharyngeal hematoma after stellate ganglion block: Analysis of 27 patients reported in the literature. *Anesthesiology*. 2006;105(6):1238-6A. doi:10.1097/00000542-200612000-00024



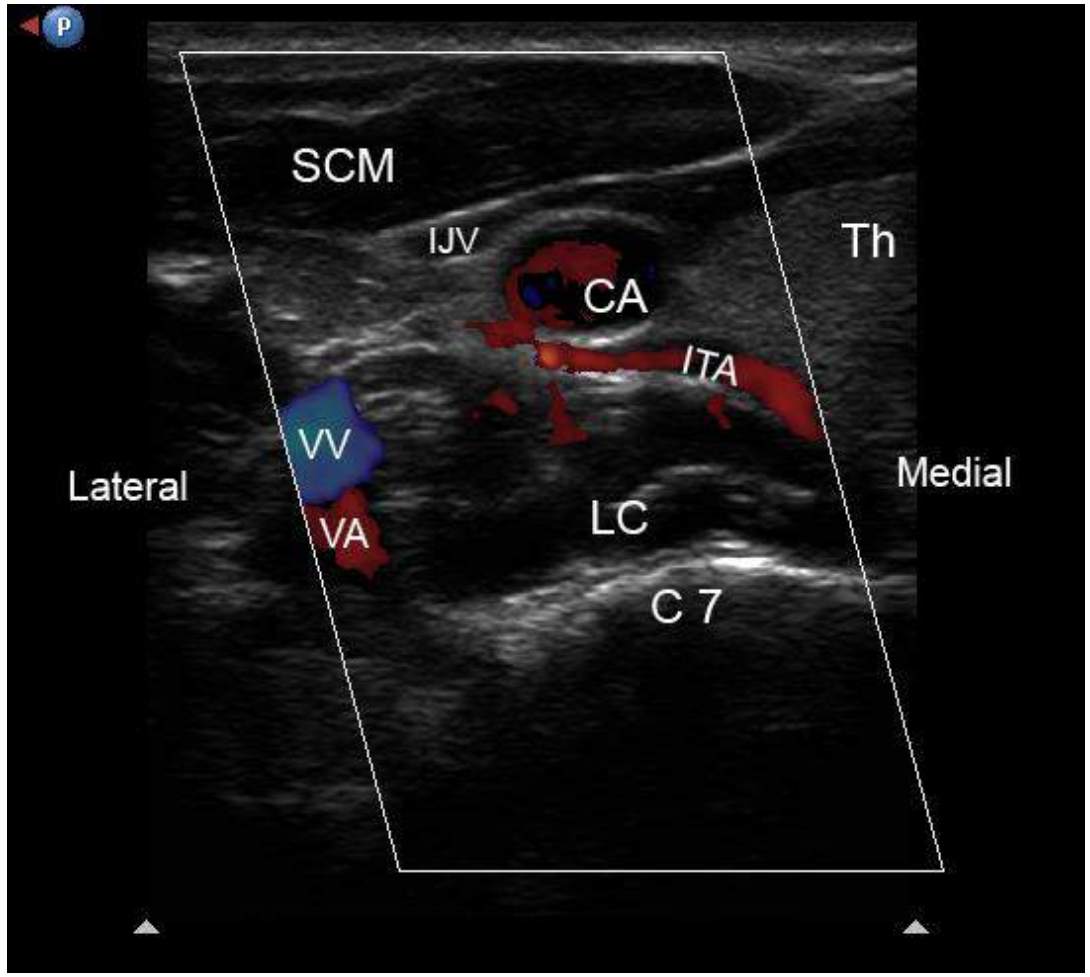



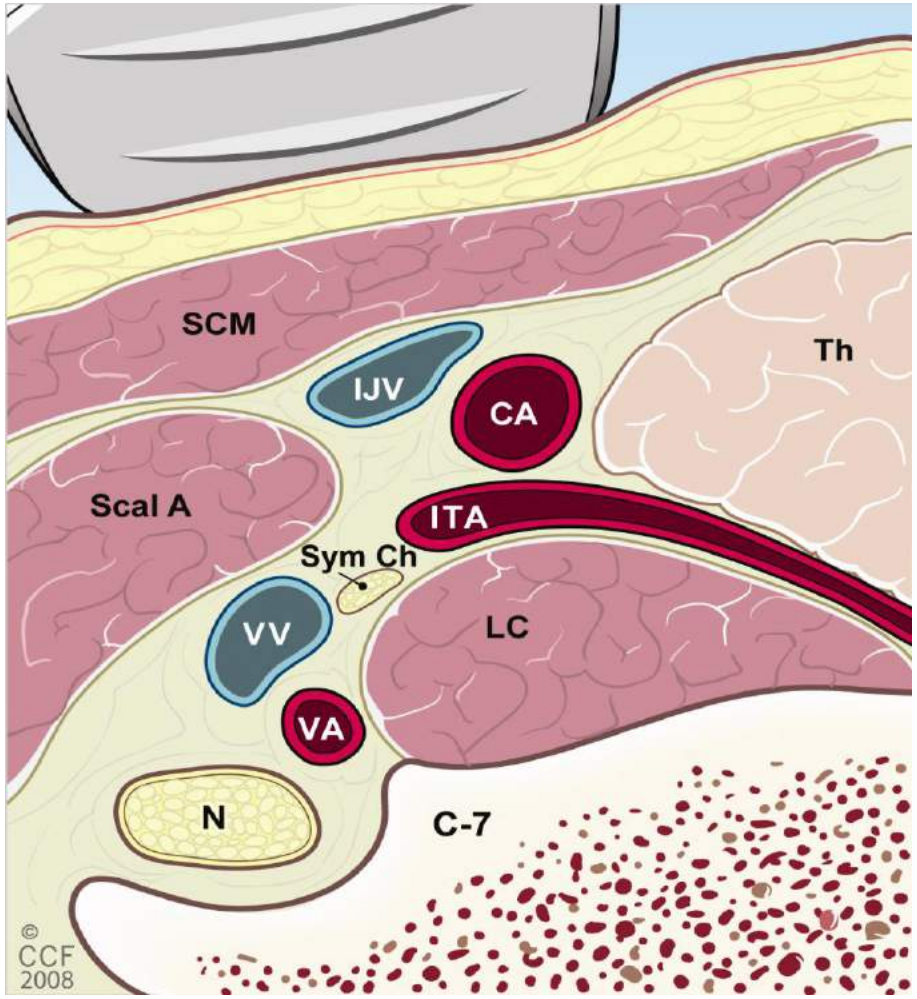

**Narouze S.**
**Curr Pain Headache Rep. 2014**

**@NarouzeMD**

Narouze S. Ultrasound-guided stellate ganglion block: safety and efficacy. *Curr Pain Headache Rep*. 2014;18(6):424. doi:10.1007/s11916-014-0424-5

# US can prevent hematoma formation from injury to the ITA




Be aware of the SERPENTINE ITA
Narouze. Anesth Analg 2009

Narouze S. Beware of the "serpentine" inferior thyroid artery while performing stellate ganglion block. *Anesth Analg*. 2009;109(1):289-290. doi:10.1213/ane.0b013e3181a20197

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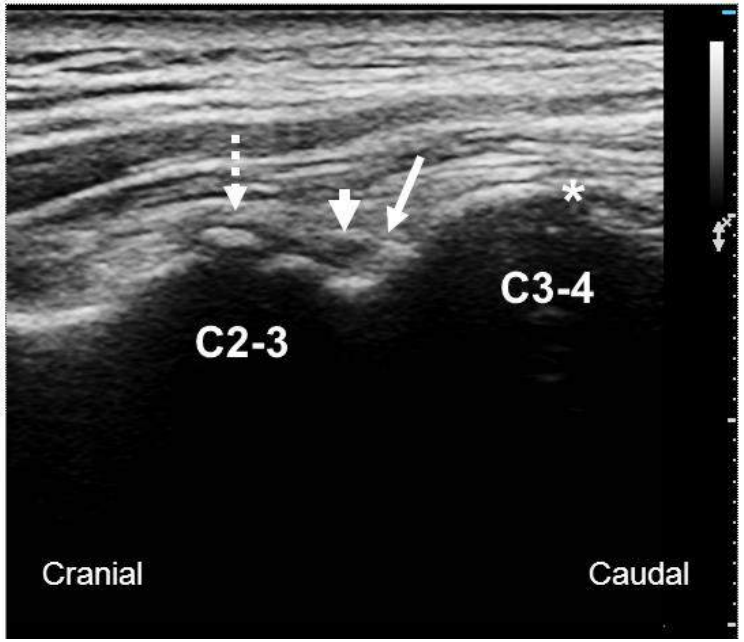
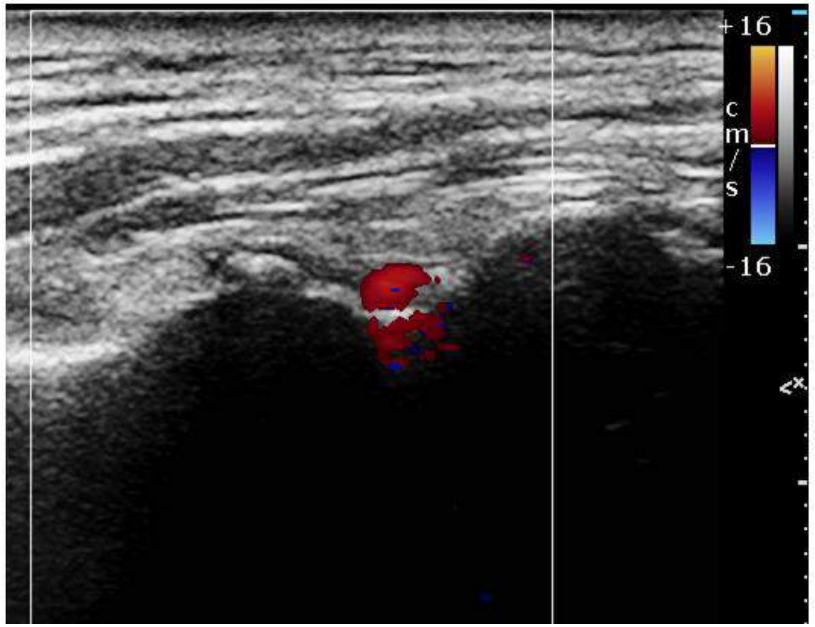
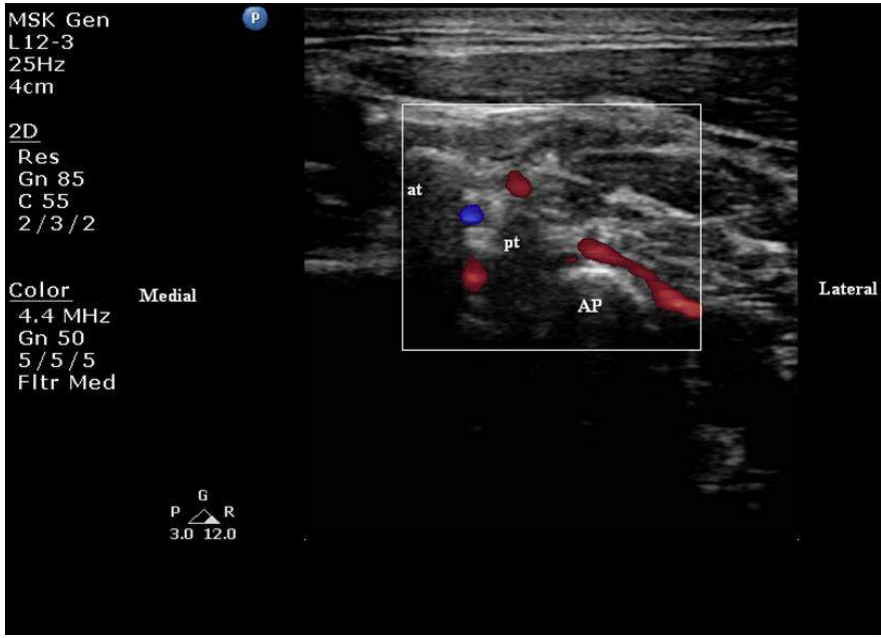
# Cervical Facet MBNB

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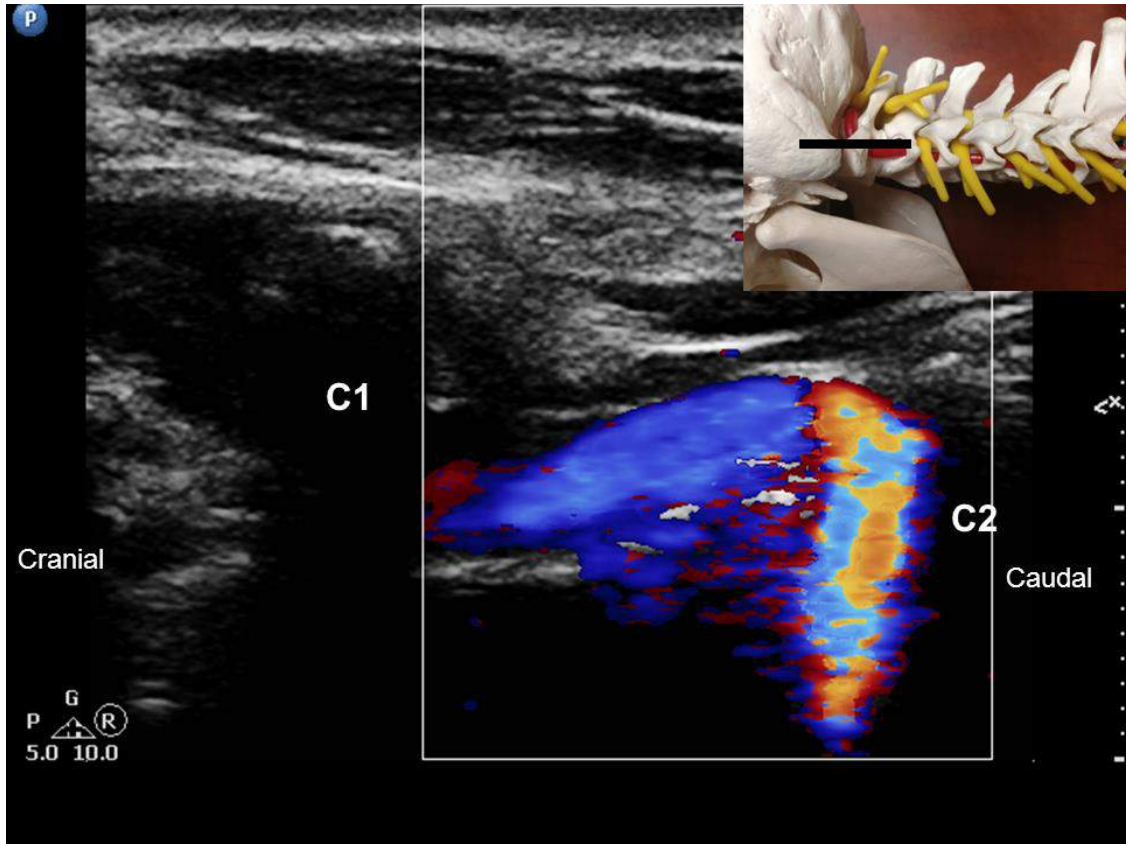


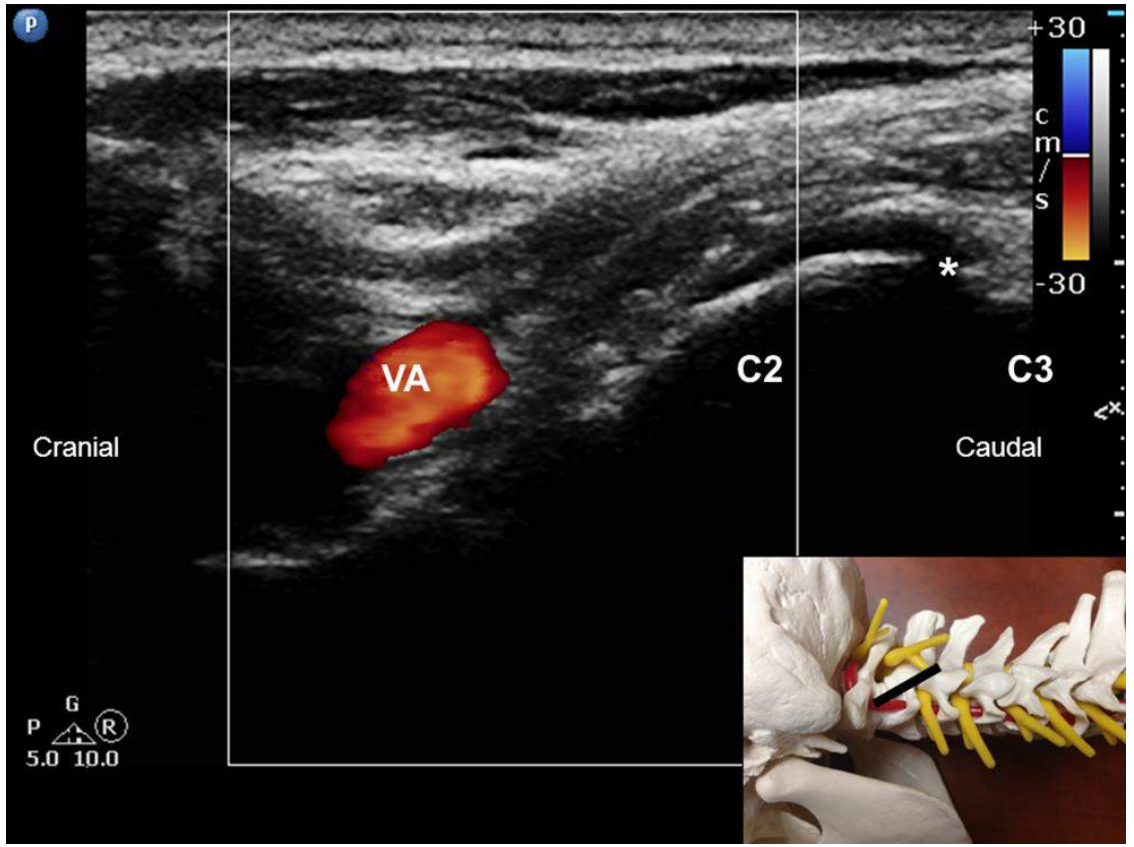


# Craniocervical Junction

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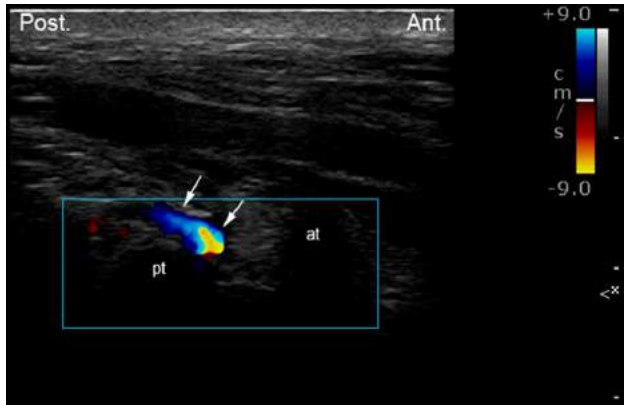


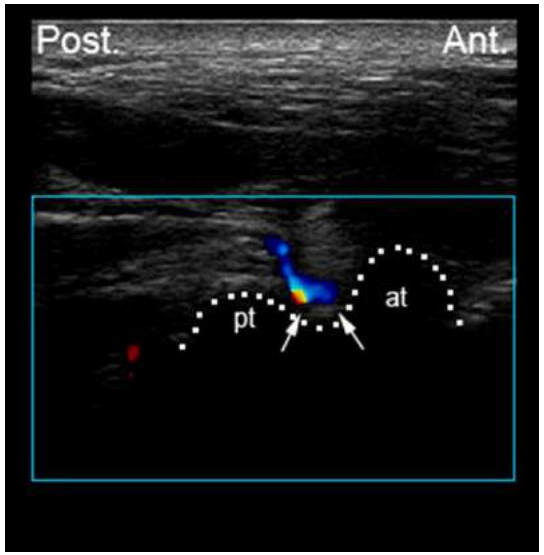


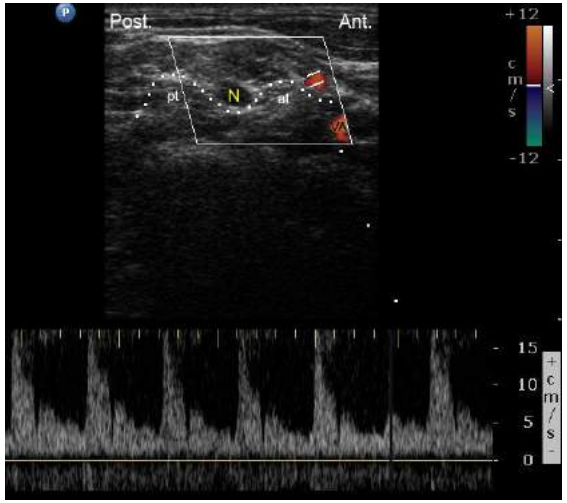


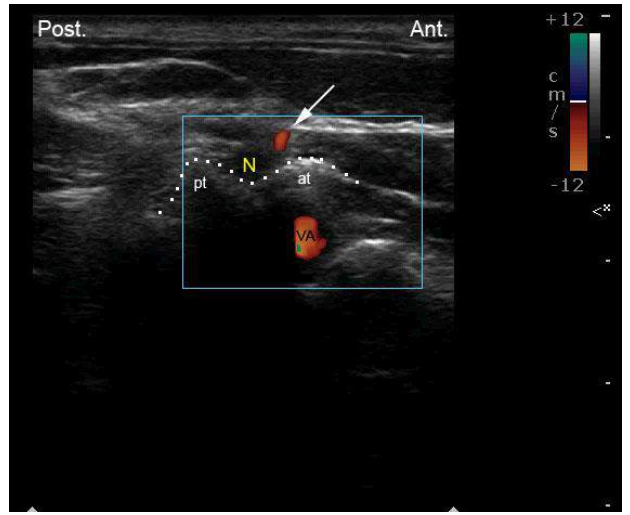


# Cervical Nerve Root

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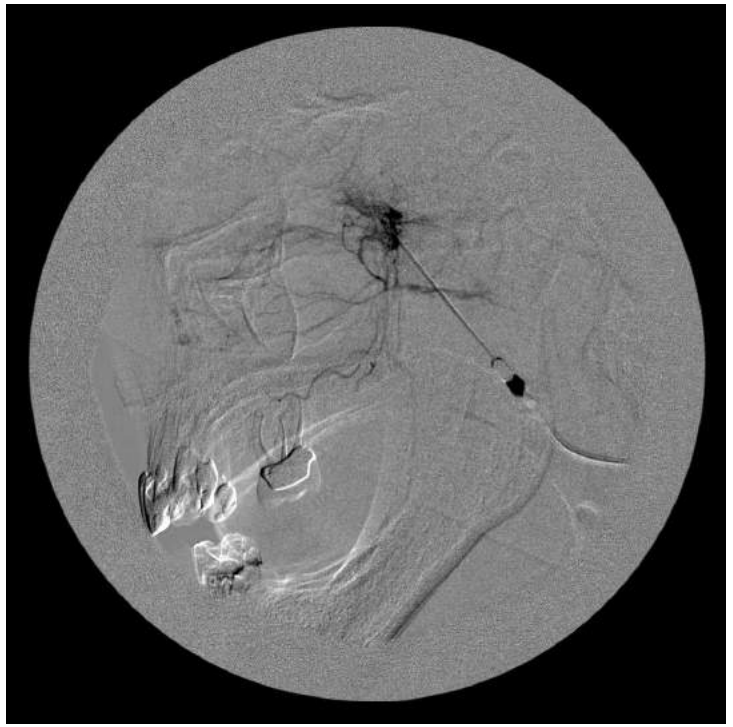


# Head and Neck Blocks

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# Incidence of Intravascular Penetration in Cervical Transforaminal ESI

SPINE Volume 28, Number 1, pp 21–25


## Incidence of Intravascular Penetration in Transforaminal Cervical Epidural Steroid Injections

Michael B. Furman, MD, MS,* Michael T. Giovanniello, MD,† and Erin M. O'Brien, MD‡

**% INTRAVASCULAR SPREAD**

**19.4%**

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ORIGINAL ARTICLE

## Risk of intravascular injection in transforaminal epidural injections

F. S. Nahm,[1] C. J. Lee,[2] S. H. Lee,[3] T. H. Kim,[4] W. S. Sim,[5] H. S. Cho,[6] S. Y. Park,[7] Y. C. Kim[8] and S. C. Lee[8]

**20.4%**

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SPINE Volume 34, Number 21, pp E751–E755


## Incidence of Simultaneous Epidural and Vascular Injection During Cervical Transforaminal Epidural Injections

Matthew Smuck, MD,* Chi-Tsai Tang, MD,† and Brian J. Fuller, MD†

**34.8%**

**Table 1.** *Reported cases of convulsions caused by cervical procedures*

| Study | Procedure | Agent | Conc * Volume | Amount (mg) | Response | Duration | Treatment | Recovery |
|---|---|---|---|---|---|---|---|---|
| Current case | CTFESI | Lid | 1% * 1.5 mL | 15 | Sz, LOC | 30 s | $O_2$ by face mask | 10 min |
| Peng et al (7) | SGB | Lid | 1.5% * 6 mL | 90 | Sz LOC | 2 min | Face mask | n-c |
| Korevaar et al (8) | SGB | Bup | 0.5% * 1.5 mL | 7.5 | Sz, LOC | — | $O_2$ by face mask | 5 min |
| Kazody et al (5) (2 cases) | SGB | Bup | 0.5% * 0.5 mL | 2.5 | Sz, U incont | 15 s | — | 5 min |
| | SGB | Lid+Bup | 1% * 0.25 mL + 0.5% * 0.25 mL | 2.5 + 1.25 | Sz, blindness | 60 s | $O_2$ by face mask | 3 min |
| Ellis et al (9) | SGB | Bup | 0.5% * 3 mL | 15 | Sz, LOC, U incont | 90 s | Face mask and bag | Within 2 h |
| Hsu et al (10) | SLNB | Lid | 2% * 2 mL | 40 | Sz, LOC | 5 min | To general anesthesia | — |
| Mahli et al (6) (2 cases) | SGB | Lid | 1% * 1 mL | 10 | Sz, cyanosis, nystagmus | 30 s | Maintained airway | 2 min |
| | SGB | Lid | 1% * 1 mL | 10 | Sz, mild cyanosis | — | Diazepam 10 mg IV | 2 min |


Vol. 3, 674-677, July 2011
DOI: 10.1016/j.pmrj.2011.02.005

Chung SG. Convulsion caused by a lidocaine test in cervical transforaminal epidural steroid injection. *PM R*. 2011;3(7):674-677. doi:10.1016/j.pmrj.2011.02.005

# Summary

- The spectrum of interventional spine and pain procedures is far broader than that for regional anesthesia, with diverse targets, patient health conditions, and care goals
- After considering the published complications reports and available studies, the panel tried to stratify the major procedures into groups.
- The language "shared assessment, risk stratification and management decisions" was employed to recognize the interdependence of our patients and our physician partners in care.
- A procedural anticoagulation management checklist is strongly recommended for clinicians
- The reasoning behind the guideline recommendations: "five half-lives", and possible patient and situational confounders

# Thank YOU

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