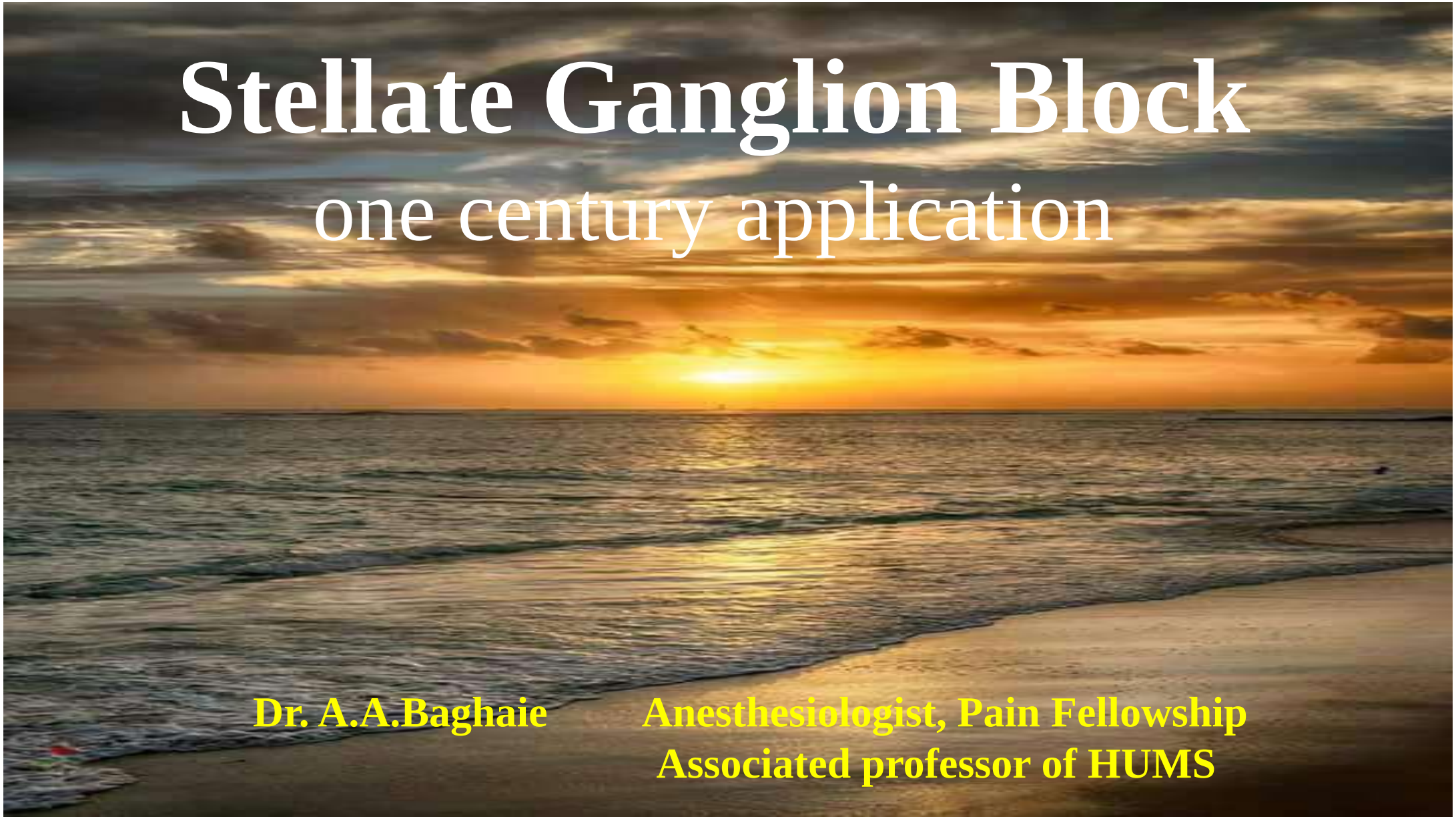


Stellate Ganglion Block

one century application

Dr. A.A.Baghaie

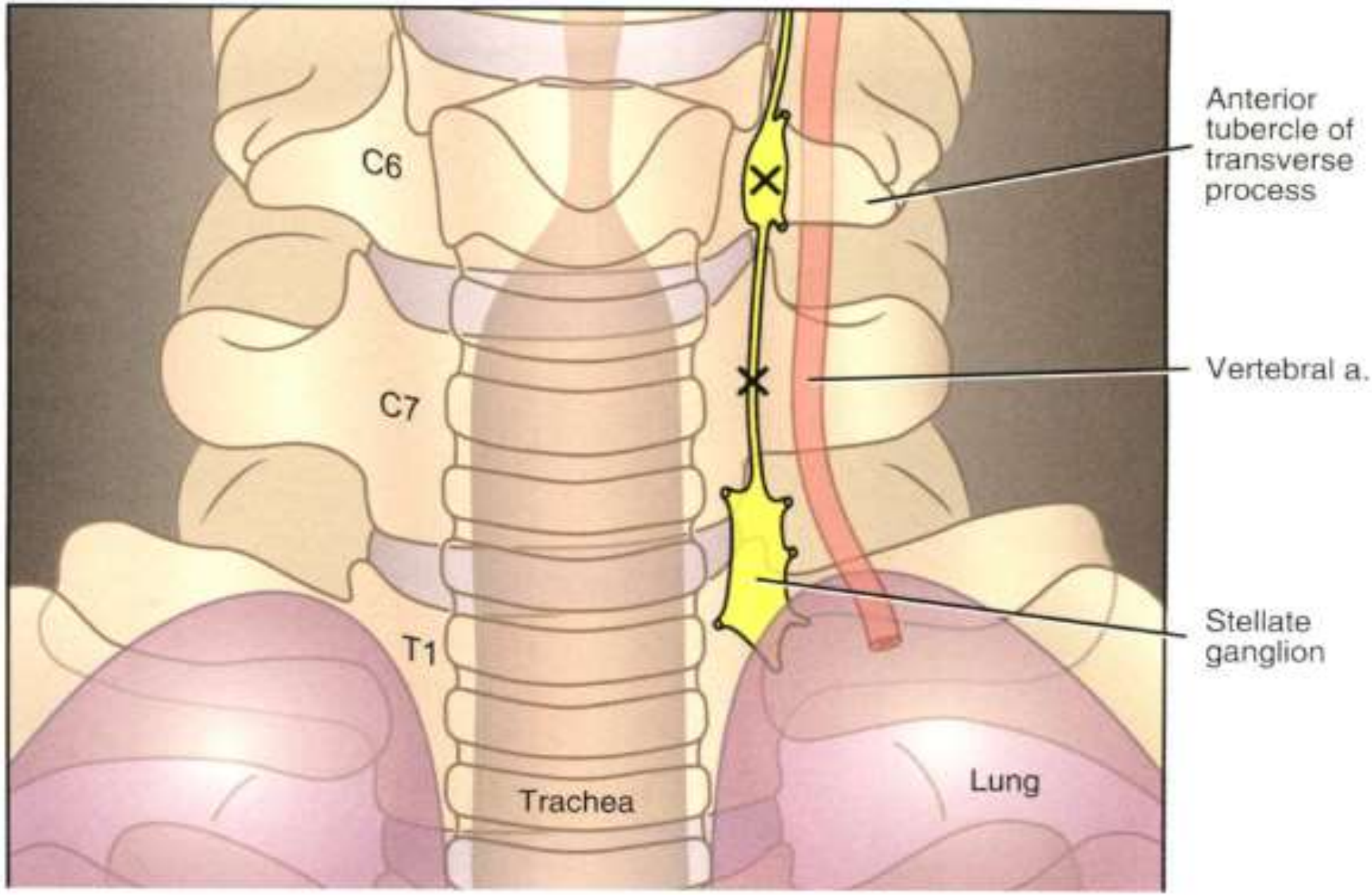
Anesthesiologist, Pain Fellowship
Associated professor of HUMS

Cervicothoracic or Stellate Ganglion

The stellate ganglion is formed at the point

where the inferior cervical ganglion meets the first thoracic ganglion,

at the anterior surface of the 7^{th} cervical vertebral body


C6
C7
T1
Trachea
Lung
Anterior tubercle of transverse process
Vertebral a.
Stellate ganglion

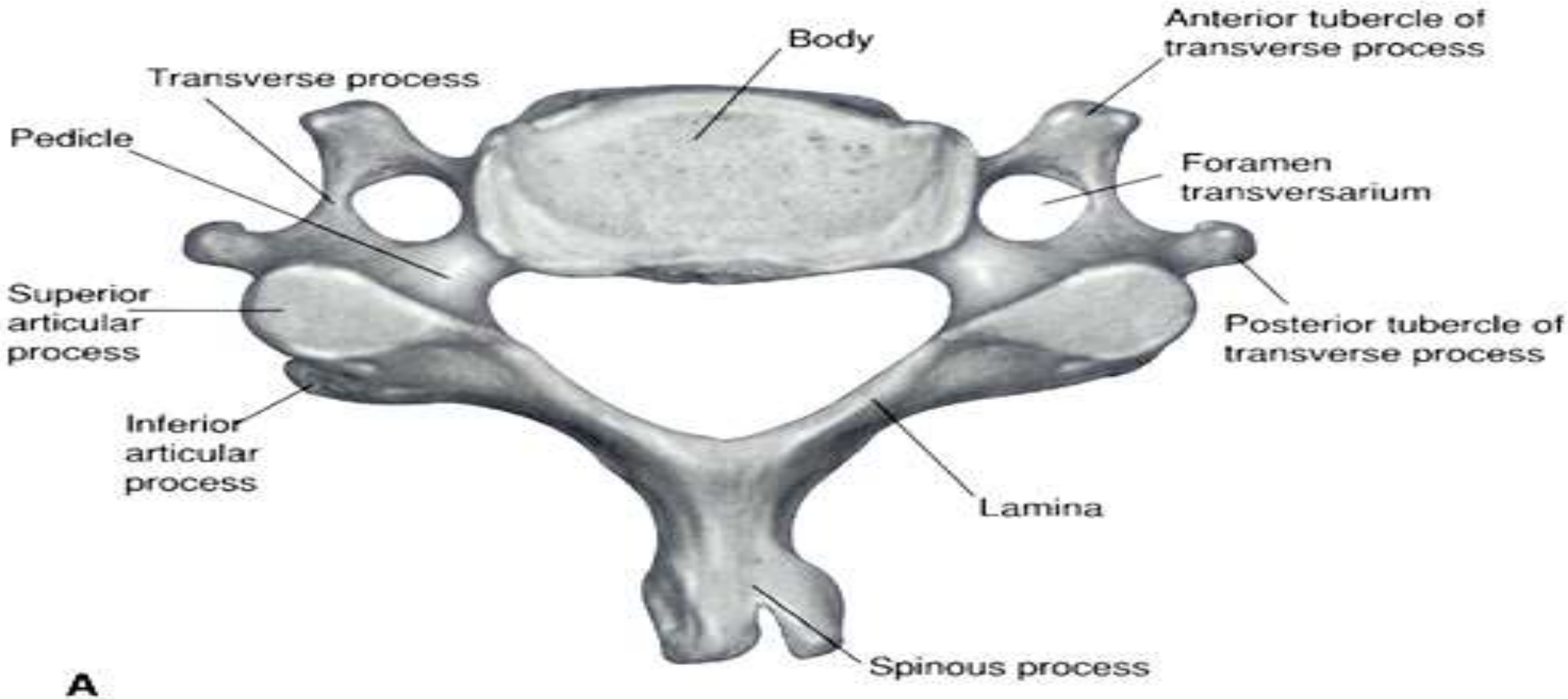
Stellate Ganglion block
History

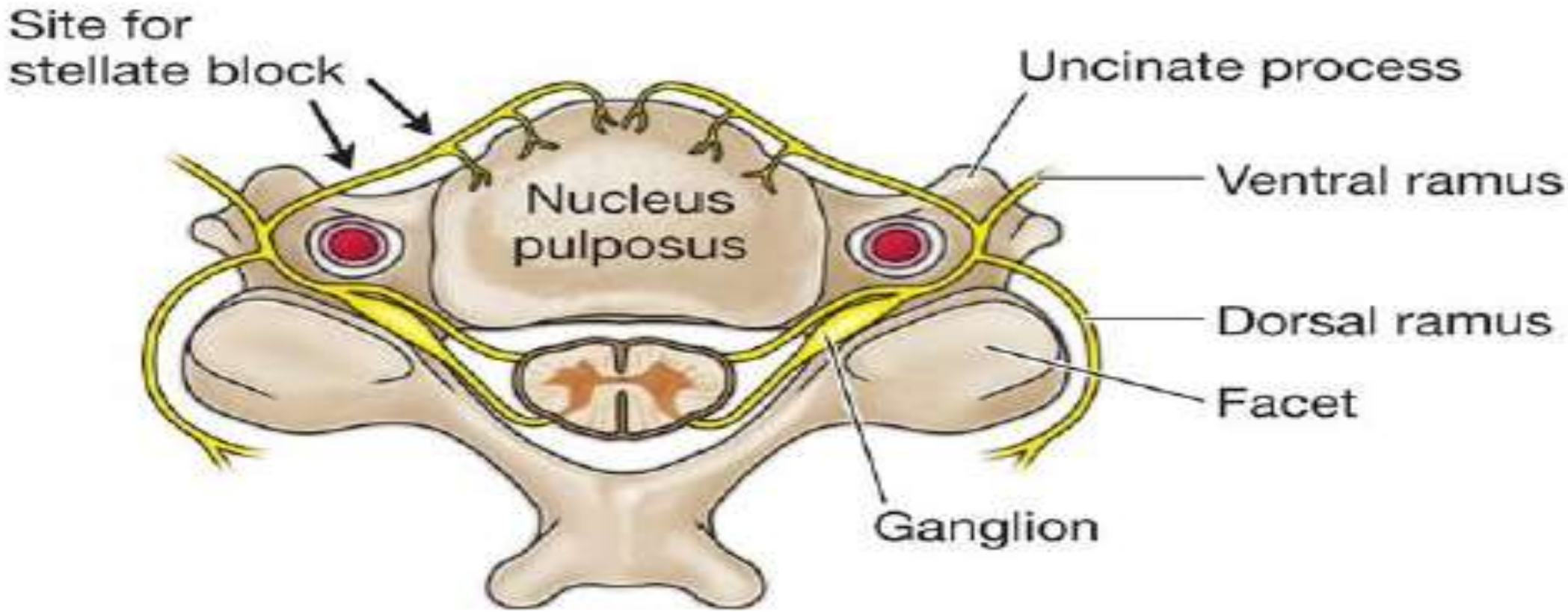
SellHeim, Kappis 1923

Brumm and Mandl 1924

White and Sweet in the USA

Leriche and Fontaine In Europe


Body
Anterior tubercle of transverse process
Transverse process
Pedicle
Foramen transversarium
Superior articular process
Posterior tubercle of transverse process
Inferior articular process
Lamina
Spinous process
A


Site for
stellate block
Uncinate process
Ventral ramus
Nucleus
pulposus
Dorsal ramus
Facet
Ganglion

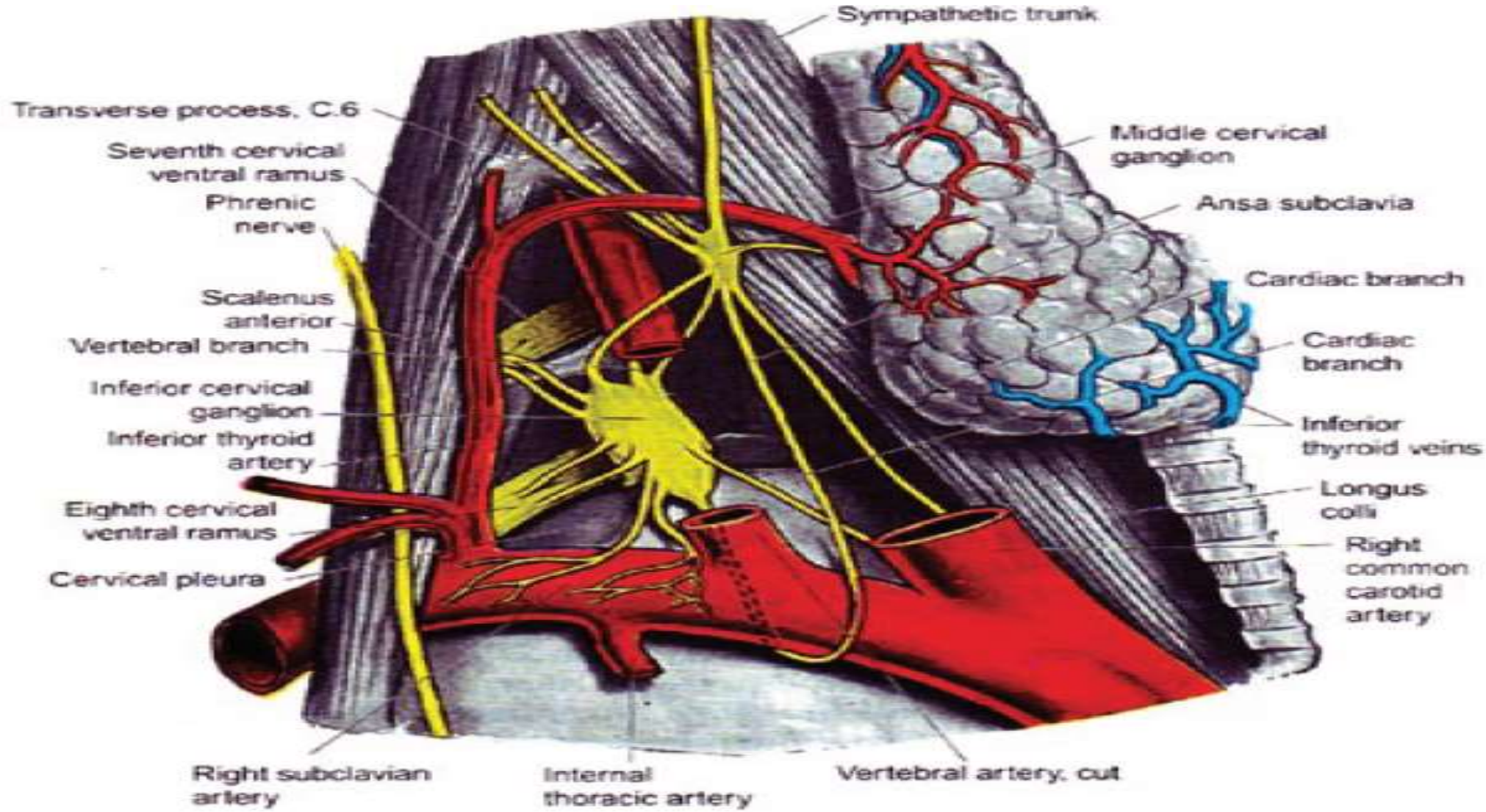
It is usually located in front of the neck of the first rib and extends to the interspace between the seventh cervical (C7) and first thoracic (T1) vertebral bodies

commonly measures 2.5 cm long, 1 cm wide, and 0.5 cm thick

The stellate ganglion lies

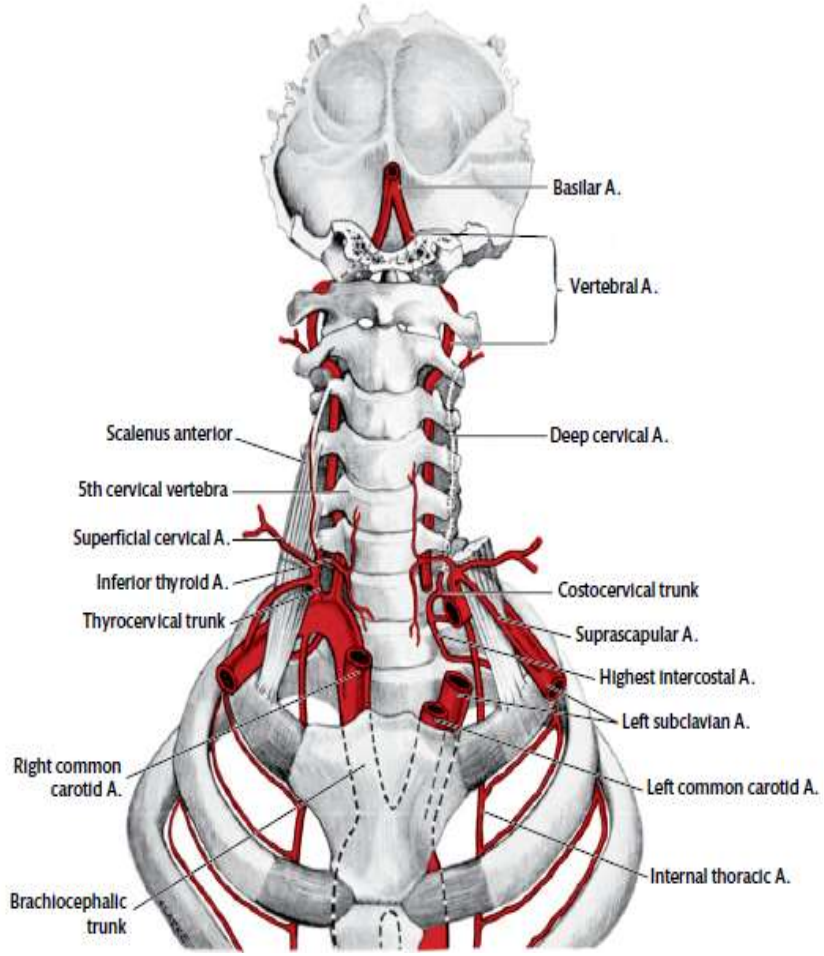
Medial to the scalene muscles
lateral to the longus colli muscle

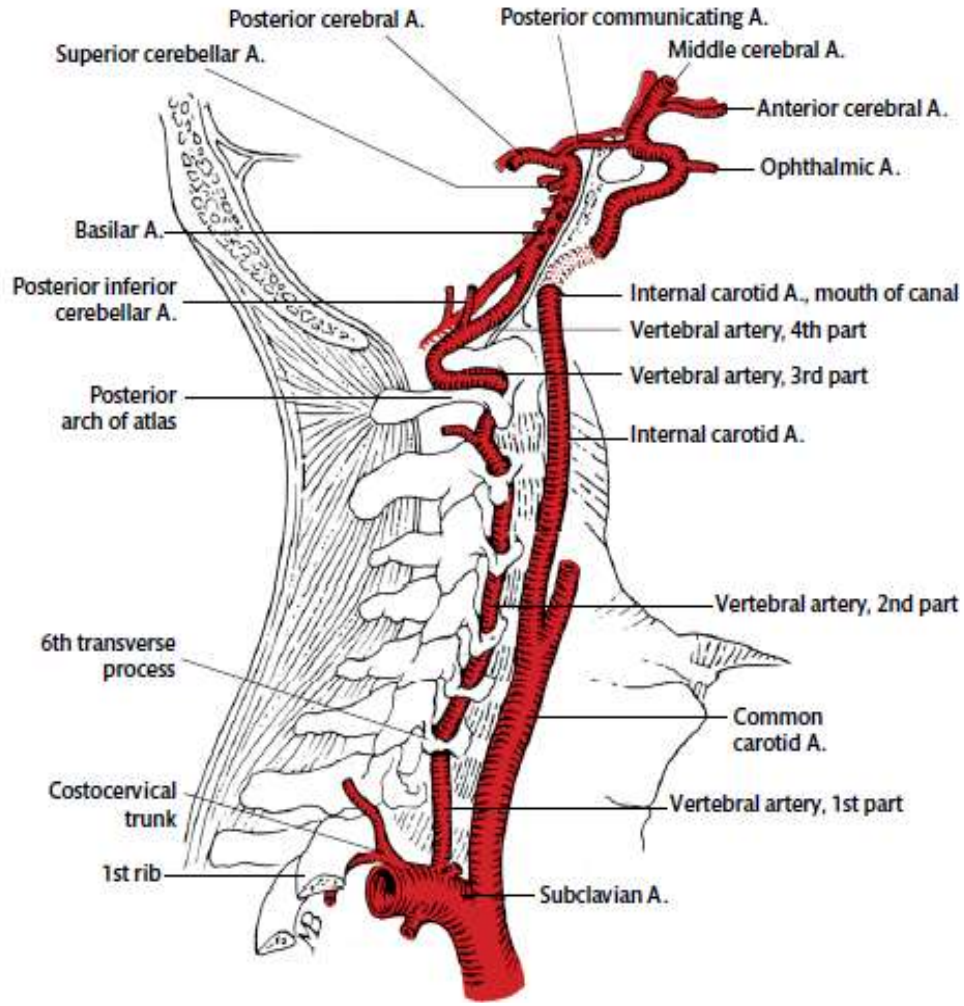
Anterior to the transverse processes and prevertebral fascia and posterior to the subclavian artery
Superior to the posterior aspect of the pleura


Sympathetic trunk
Transverse process, C.6
Seventh cervical ventral ramus
Phrenic nerve
Scalenus anterior
Vertebral branch
Inferior cervical ganglion
Inferior thyroid artery
Eighth cervical ventral ramus
Cervical pleura
Middle cervical ganglion
Ansa subclavia
Cardiac branch
Cardiac branch
Inferior thyroid veins
Longus colli
Right common carotid artery
Right subclavian artery
Internal thoracic artery
Vertebral artery, cut

Its alar fascial plane may communicate with the brachial plexus and the vertebral artery and it is in close proximity to the carotid sheath, phrenic nerve, and recurrent laryngeal nerve.

These anatomic relationships may explain potential side effects of stellate ganglion block.


Basilar A.
Vertebral A.
Scalenus anterior
Deep cervical A.
5th cervical vertebra
Superficial cervical A.
Inferior thyroid A.
Costocervical trunk
Thyrocervical trunk
Suprascapular A.
Highest intercostal A.
Left subclavian A.
Right common carotid A.
Left common carotid A.
Internal thoracic A.
Brachiocephalic trunk


Posterior cerebral A.
Posterior communicating A.
Superior cerebellar A.
Middle cerebral A.
Anterior cerebral A.
Ophthalmic A.
Basilar A.
Posterior inferior cerebellar A.
Internal carotid A., mouth of canal
Vertebral artery, 4th part
Vertebral artery, 3rd part
Posterior arch of atlas
Internal carotid A.
Vertebral artery, 2nd part
6th transverse process
Common carotid A.
Costocervical trunk
Vertebral artery, 1st part
1st rib
Subclavian A.

- The vertebral artery and the cervical sympathetic chain are found
  in the immediate vicinity of the uncovertebral region
  in the lower cervical vertebral motor segments

Via the stellate ganglion and indirectly via the superior cervical ganglion, there are connections to the

cranial nerves, the vagus nerve, glossopharyngeal nerve, hypoglossal nerve, and the phrenic nerve of the spinal nerves.

The indications for injection to the stellate

ganglion therefore primarily concern disorders of the

head, neck, the upper extremities, and the chest area.

Block Indication

- Disorders of the Head and Its Organs
- Disorders of the Neck and Its Organs
- Disorders of the Shoulder Girdle and Upper Extremity
- Disorders ofthe Thorax and Its Organs

Contraindications

- Patient refusal
- Local infection
- A reaction to local anesthetics
- Primary and secondary coagulopathy
- Pneumothorax or Pneumonectomy on the contralateral side
- Recent cardiac infarction
- Glaucoma
- Bradycardia or a severe cardiac conduction block
- Pregnancy (fluoroscopy)
- Previous anterior lower cervical surgery

PREOPERATIVE CONSIDERATIONS

- Appropriate indications have been determined
- Evaluation and treatment of bleeding diathesis, contrast, or medication allergy
- Physical examination should identify previous neck or thyroid surgery, infection at the site of needle insertion, or decreased range of neck extension
- A detailed informed consent including the potential benefits and risks as well as realistic expectations of sympathetic blockade
- Possible postprocedural effects should be explained to the patient including ptosis; miosis; blurred vision; enophthalmos; anhidrosis; facial and conjunctival flushing; upper extremity numbness or weakness; contralateral blockade; and sense of dyspnea, dysphagia, or a lump in the throat
- Intravenous access for administration of fluid or medications to treat rare hypotension, seizure, or other complication
- Preprocedural sedation for anxiety depending on the individual

Medications

- Preservative-free 0.25% bupivacaine or 0.2% ropivacaine or 1% lidocaine
- Iohexol 240 (nonionic water-soluble contrast)
- Triamcinolone or methylprednisolone (optional)

- 5 cm , 22 G B bevel Needle

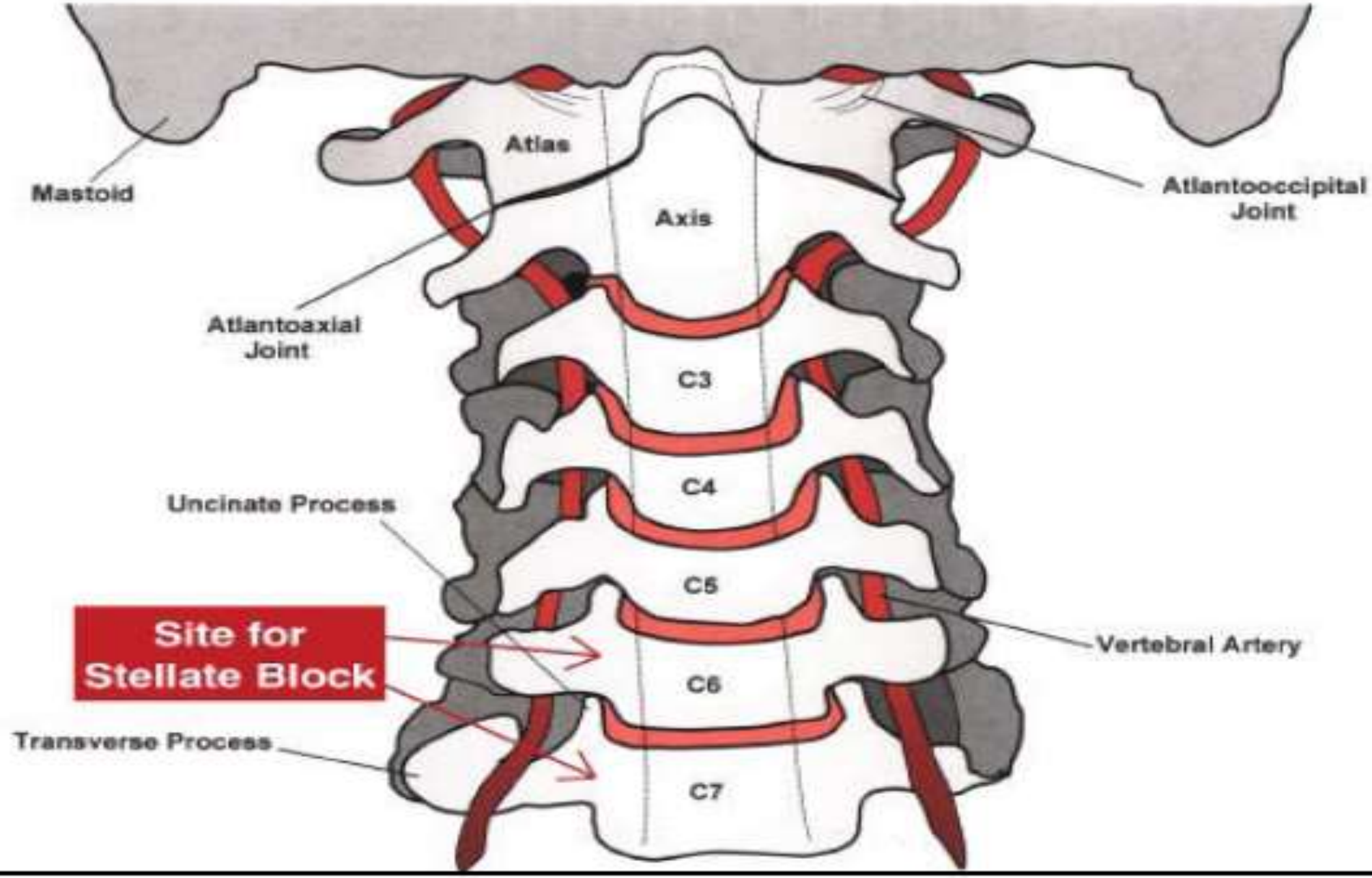
Inject up to 5 cc of local anesthetic in divided doses with intermittent aspiration

Approaches

- **C6 level** — **Classic Approach at the level of C6 (Chassaignac tubercle)**

- **C7 level** — **less pronouaced landmarks, risk of pneumothorax, risk of Vertebral artery**

ANTERIOR VIEW OF CERVICAL SPINE



➢Cervical sympathetic chain block is often performed at the C6 level. Relatively large volumes (5 to 20 mL) are injected 2 mm superficial to the C6 tubercle; the intent is to spread solution downward to reach the stellate and upper thoracic ganglia.

➢Injection at the C7 level requires a smaller volume, but this approach increases the risk of vertebral artery injection and pneumothorax.

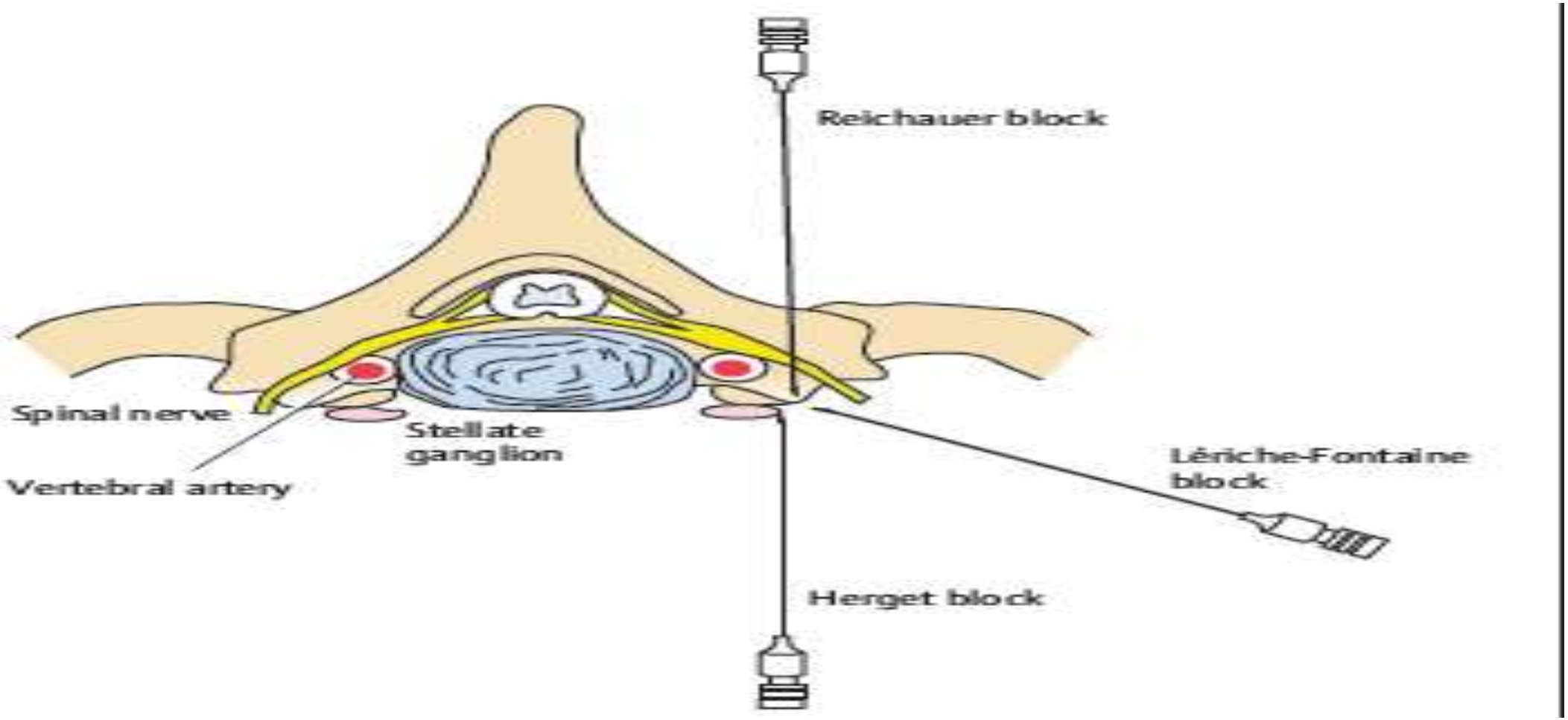
Approaches

- Blind Paratracheal
- Ultrasonography
- Fluoroscopy Paratracheal,
  posterior Approach
  Oblique Approach

- The use of ultrasound is increasing and may increase efficacy, decrease complications, and reduce exposure to radiation.

- Regardless of technique, stellate ganglion block is a safe procedure when performed by properly trained physicians.

Approaches


Reichauer block
Spinal nerve
Stellate ganglion
Vertebral artery
Lériche-Fontaine block
Herget block

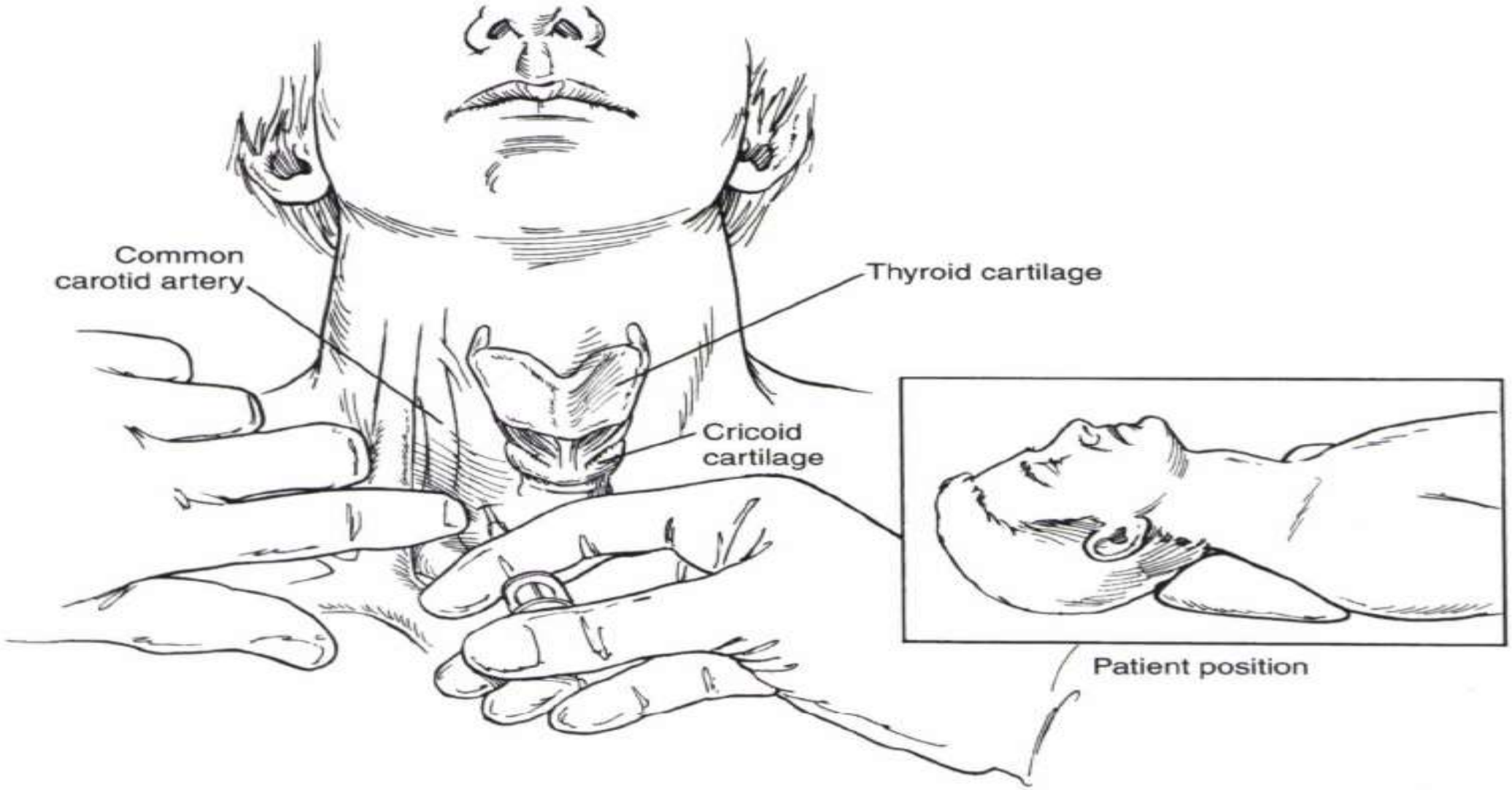
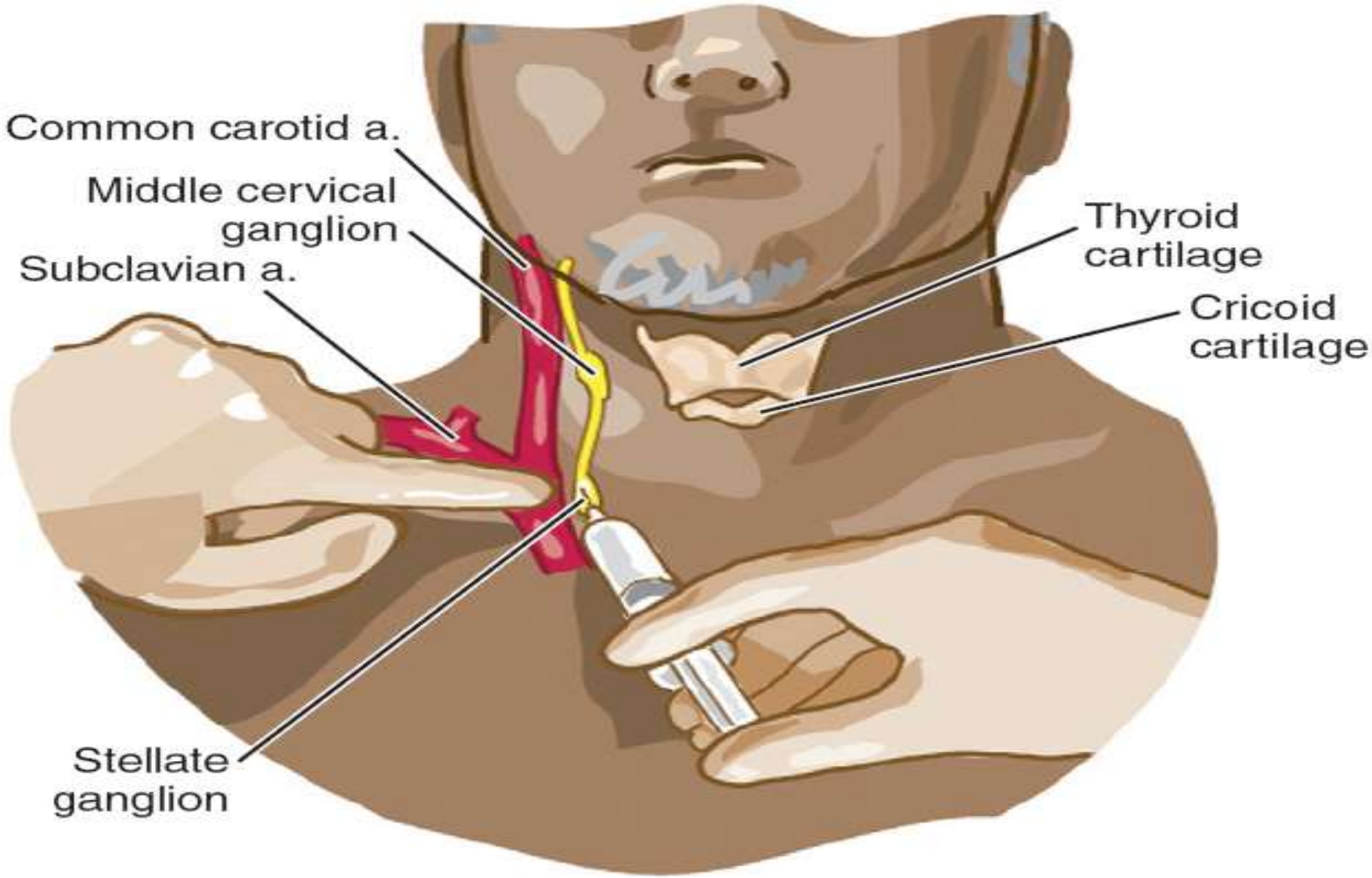
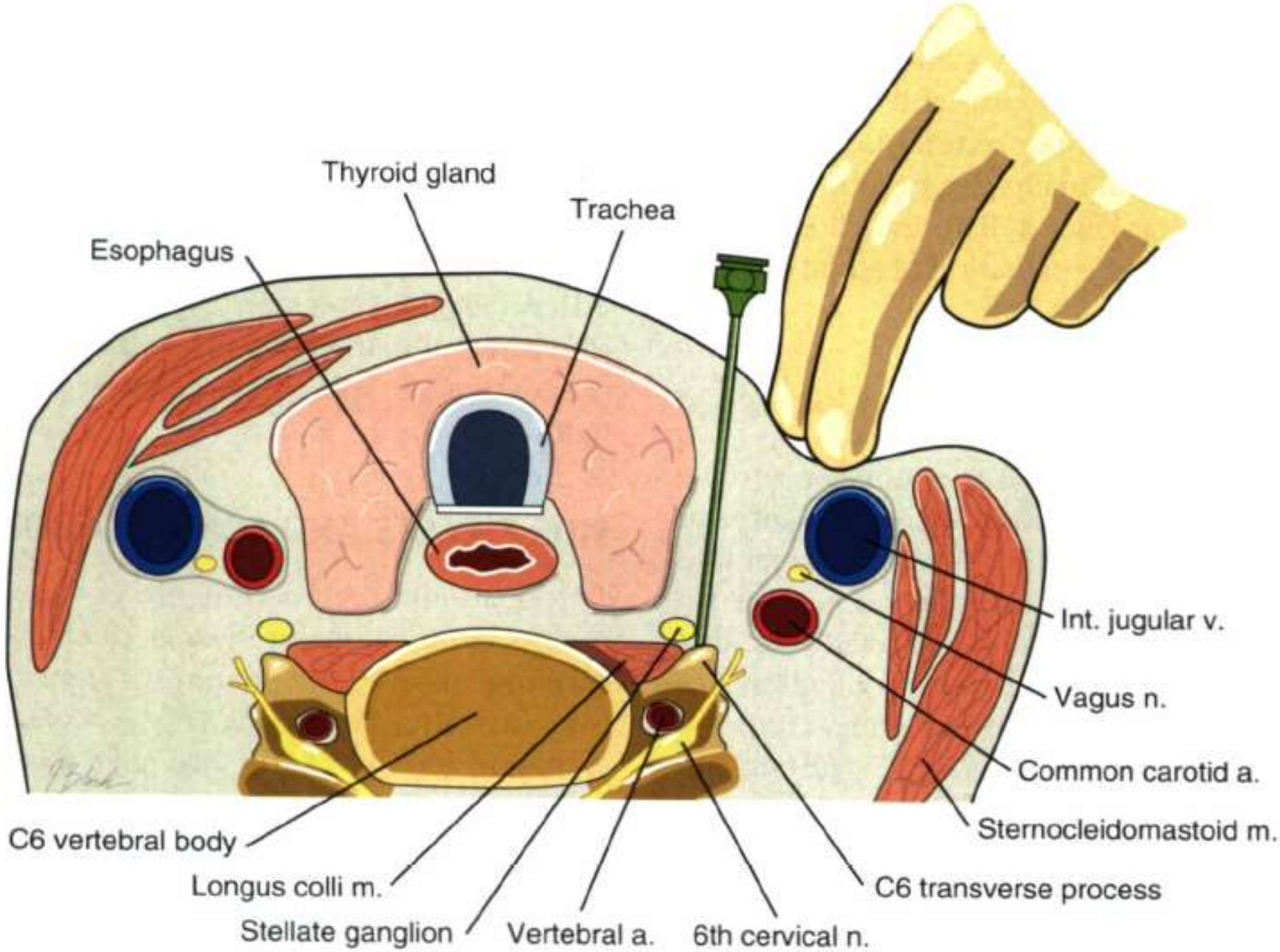
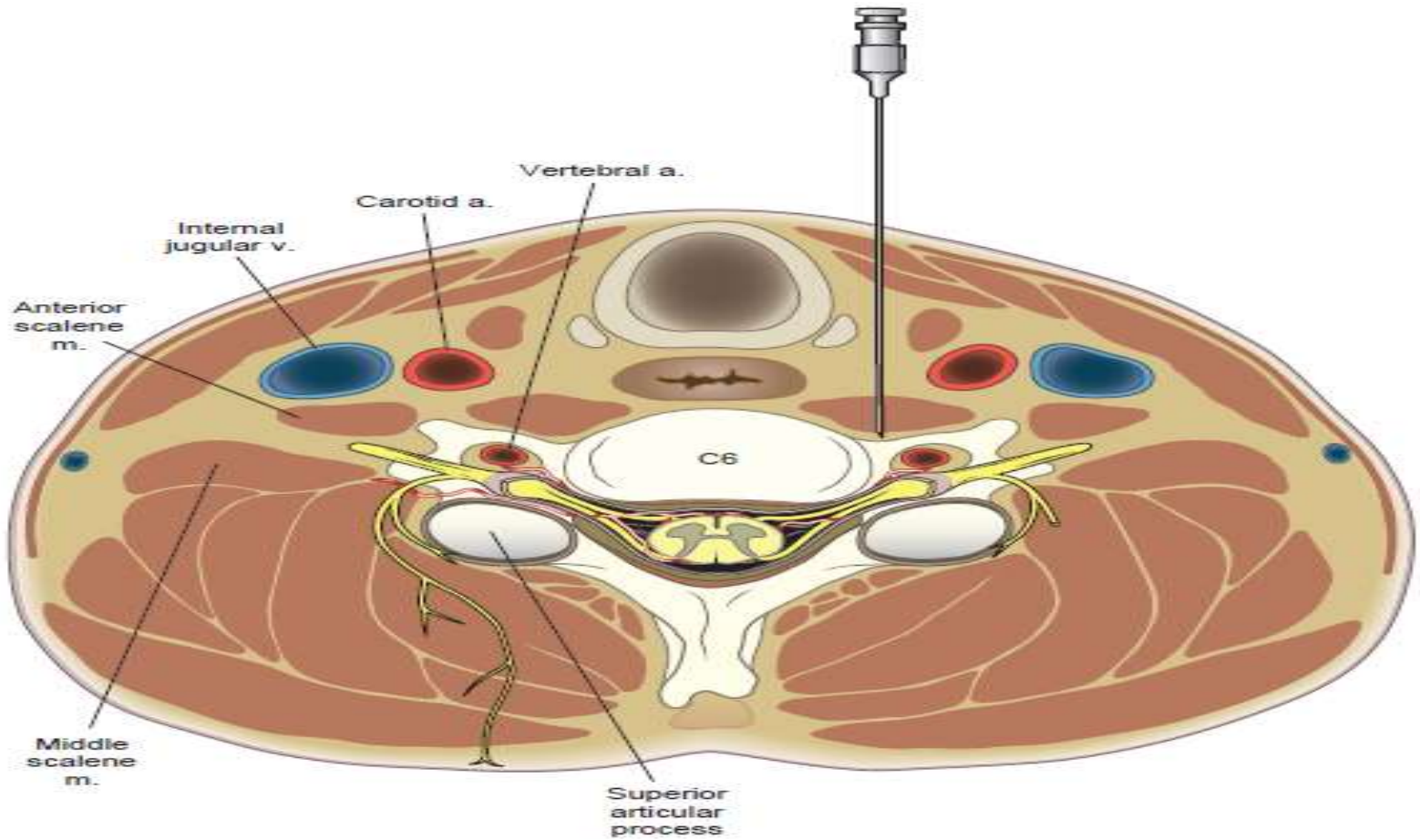


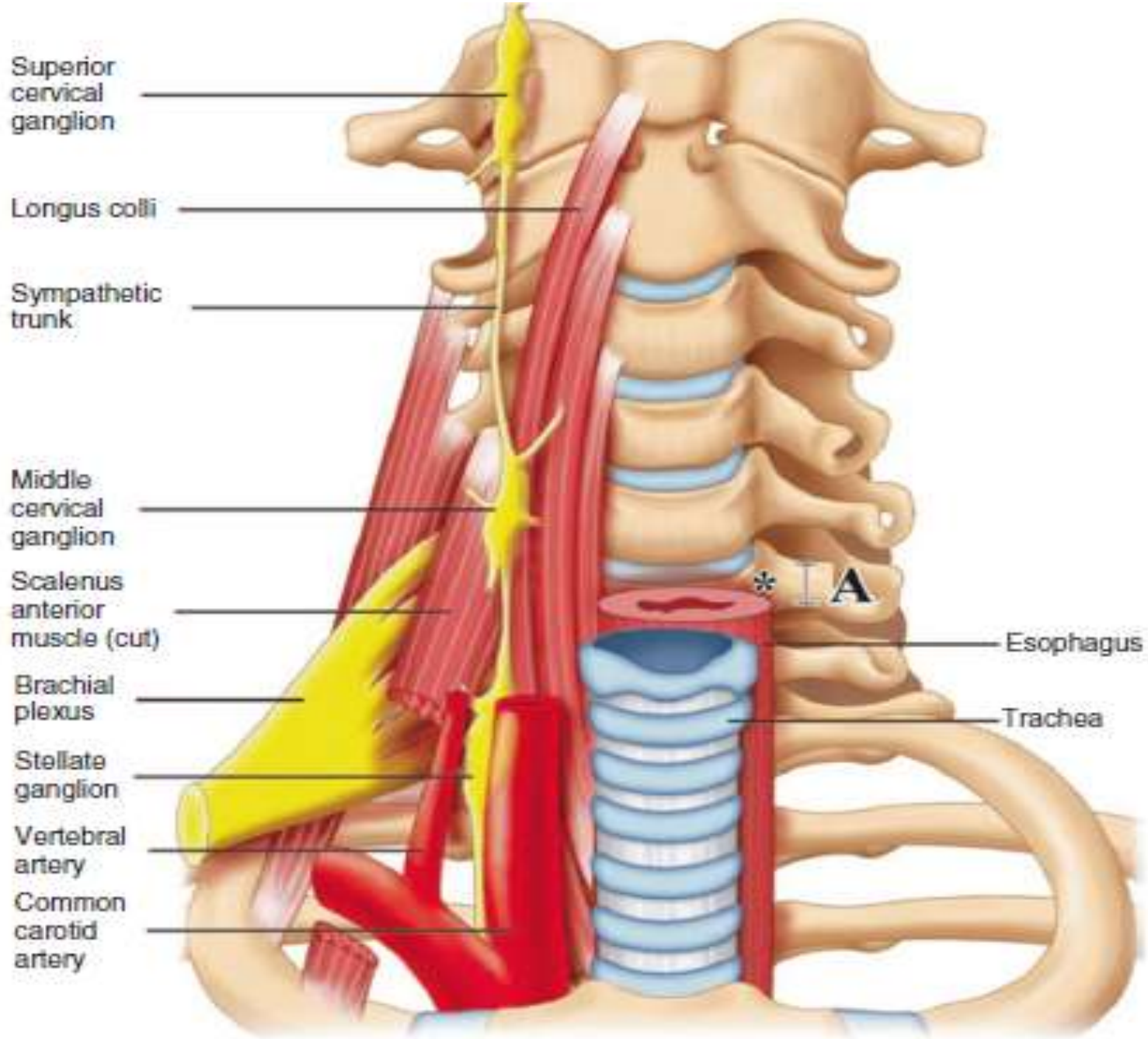
FIGURE 7–11

Stellate ganglion block. C6 anterior tubercle is directly beneath the operator's index finger. The carotid artery is retracted laterally when necessary. The needle is perpendicular to all skin planes and is inserted directly posterior from the point of entry. (Inset) The patient is positioned for stellate ganglion block. A pillow or roll should be placed between the shoulders to extend the neck, bring the esophagus to the midline, and facilitate palpation of Chassaignac's tubercle.


Common carotid a.
Middle cervical ganglion
Subclavian a.
Thyroid cartilage
Cricoid cartilage
Stellate ganglion

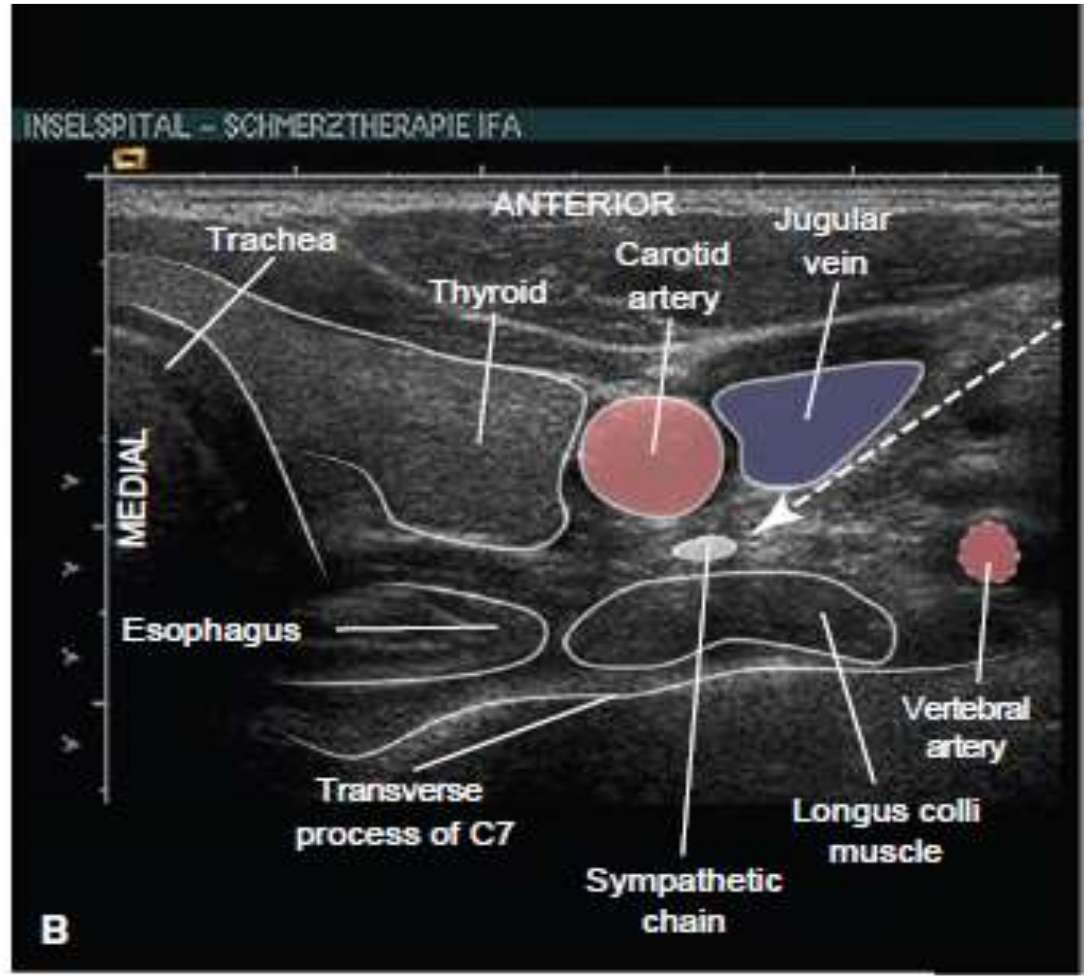

Thyroid gland
Trachea
Esophagus
Int. jugular v.
Vagus n.
Common carotid a.
Sternocleidomastoid m.
C6 vertebral body
Longus colli m.
Stellate ganglion
Vertebral a.
6th cervical n.
C6 transverse process

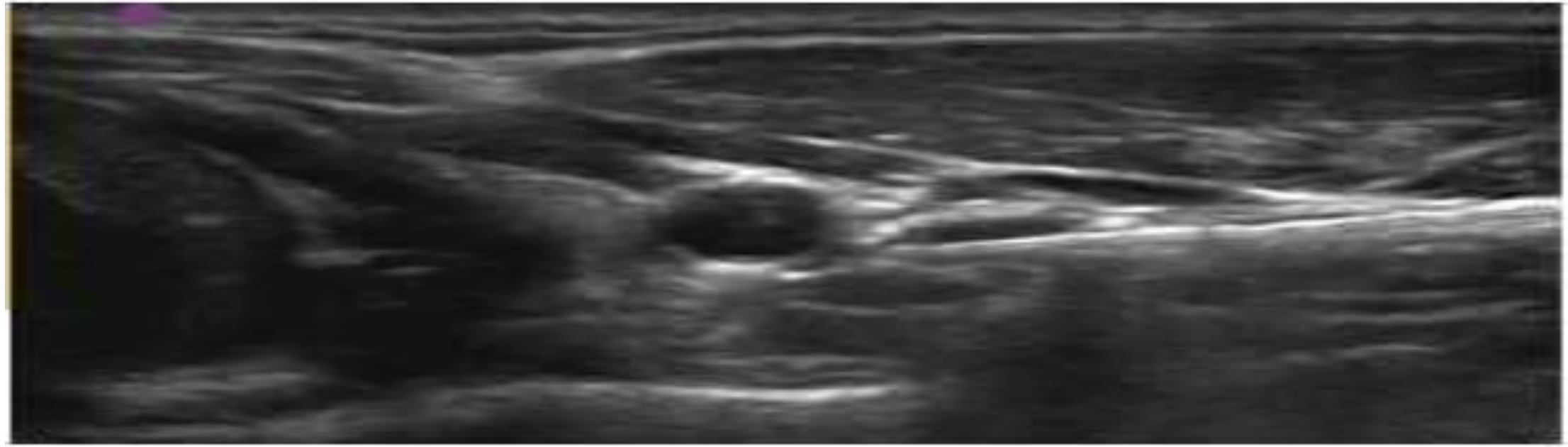

Vertebral a.
Carotid a.
Internal jugular v.
Anterior scalene m.
C6
Middle scalene m.
Superior articular process

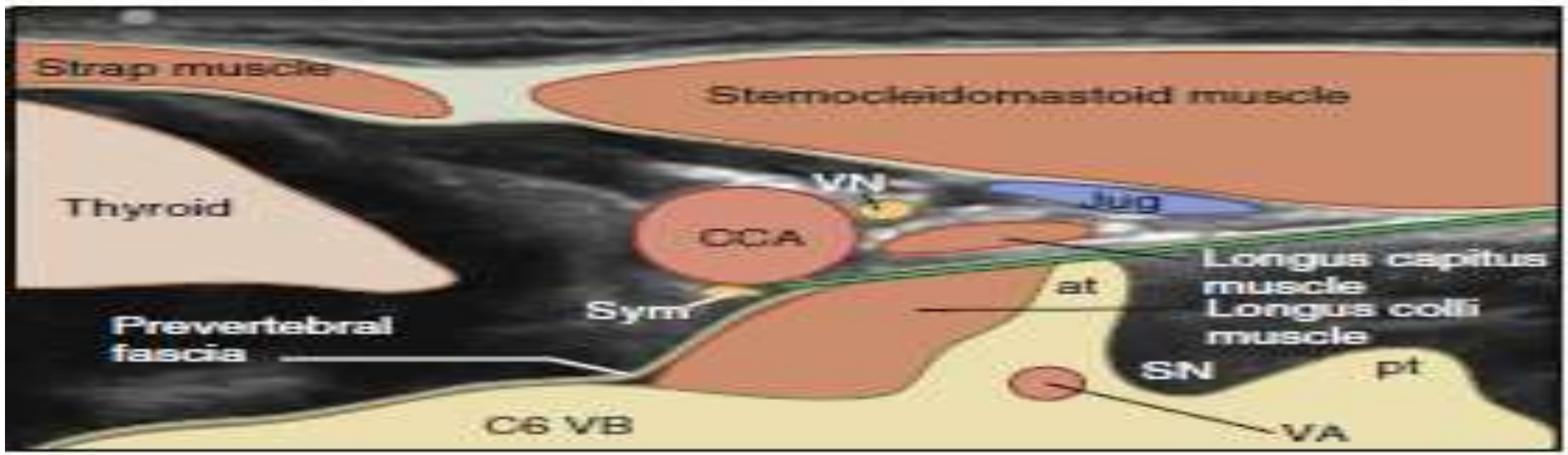

Superior cervical ganglion
Longus colli
Sympathetic trunk
Middle cervical ganglion
Scalenus anterior muscle (cut)
Brachial plexus
Stellate ganglion
Vertebral artery
Common carotid artery
*
A
Esophagus
Trachea

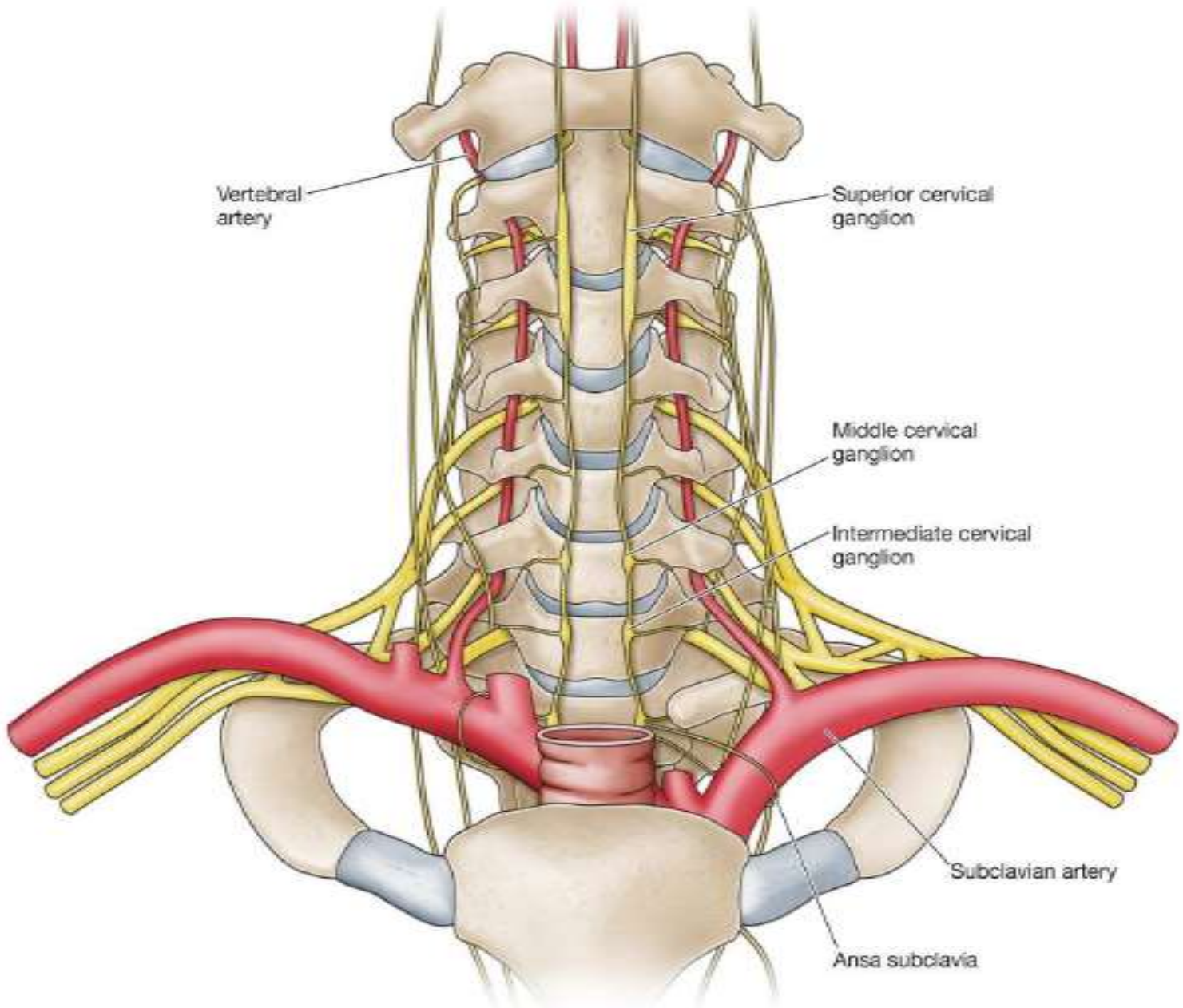
Ultrasonography Approach

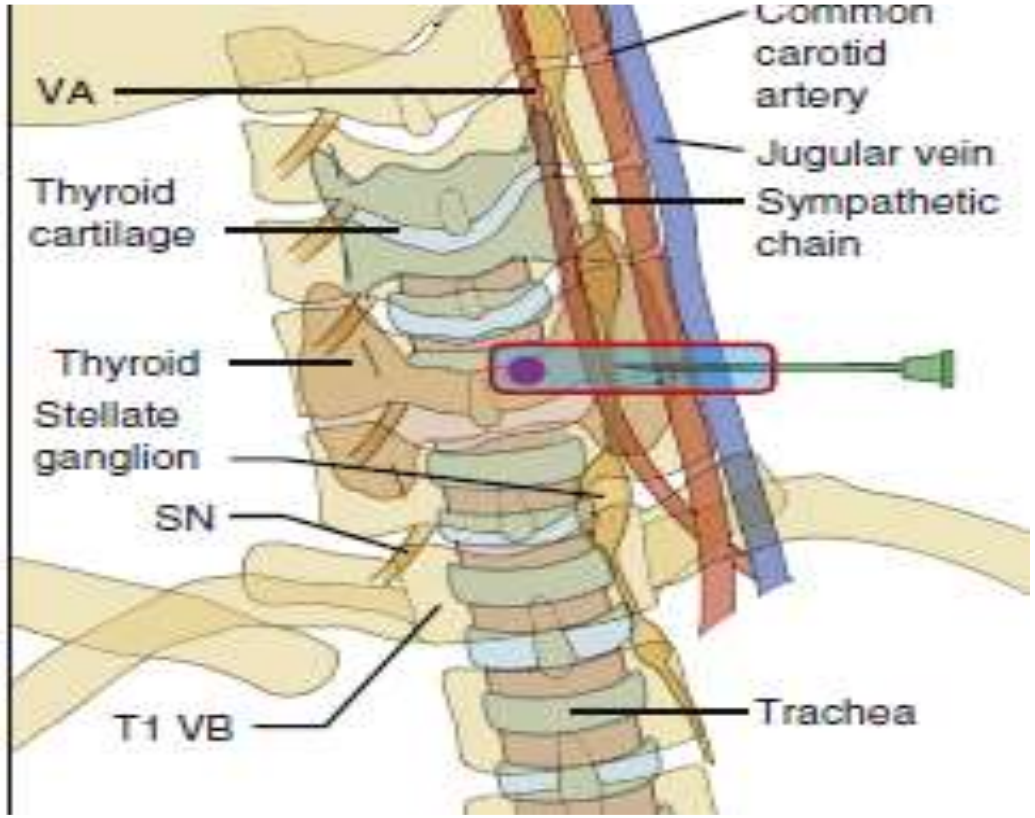

INSELSPITAL – SCHMERZTHERAPIE IFA
A

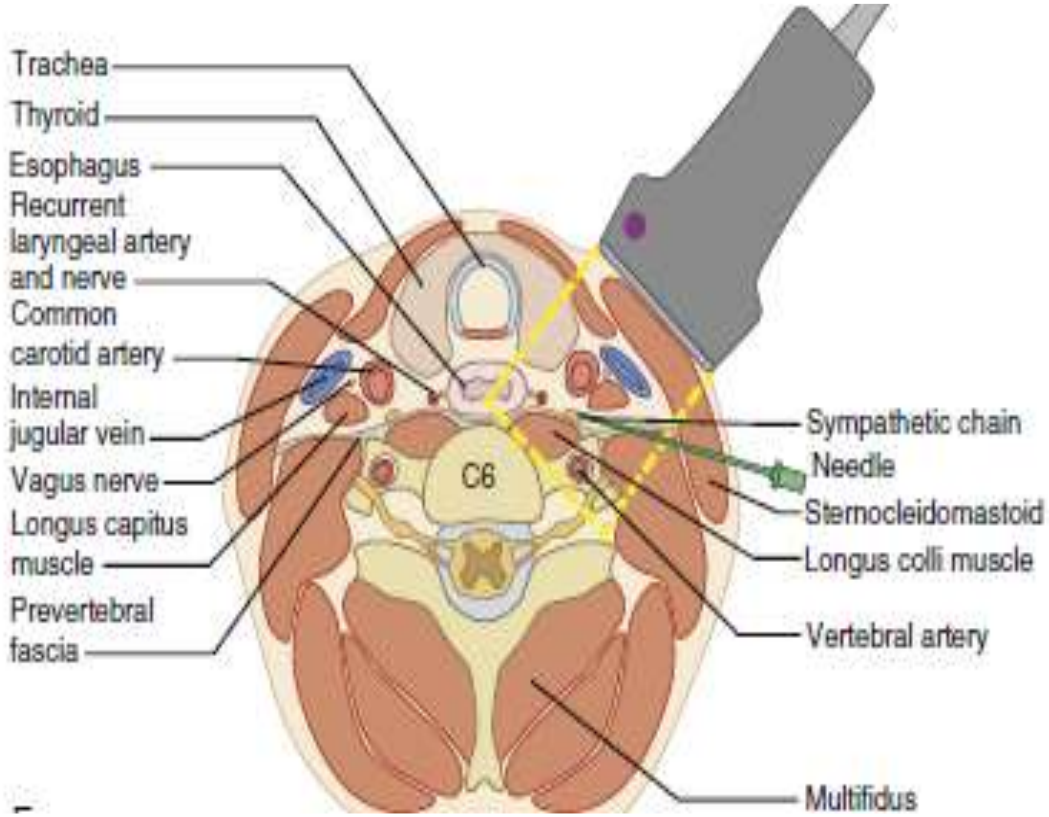

INSELSPITAL – SCHMERZTHERAPIE IFA
ANTERIOR
Trachea
Thyroid
Carotid artery
Jugular vein
MEDIAL
Esophagus
Vertebral artery
Transverse process of C7
Longus colli muscle
Sympathetic chain
B

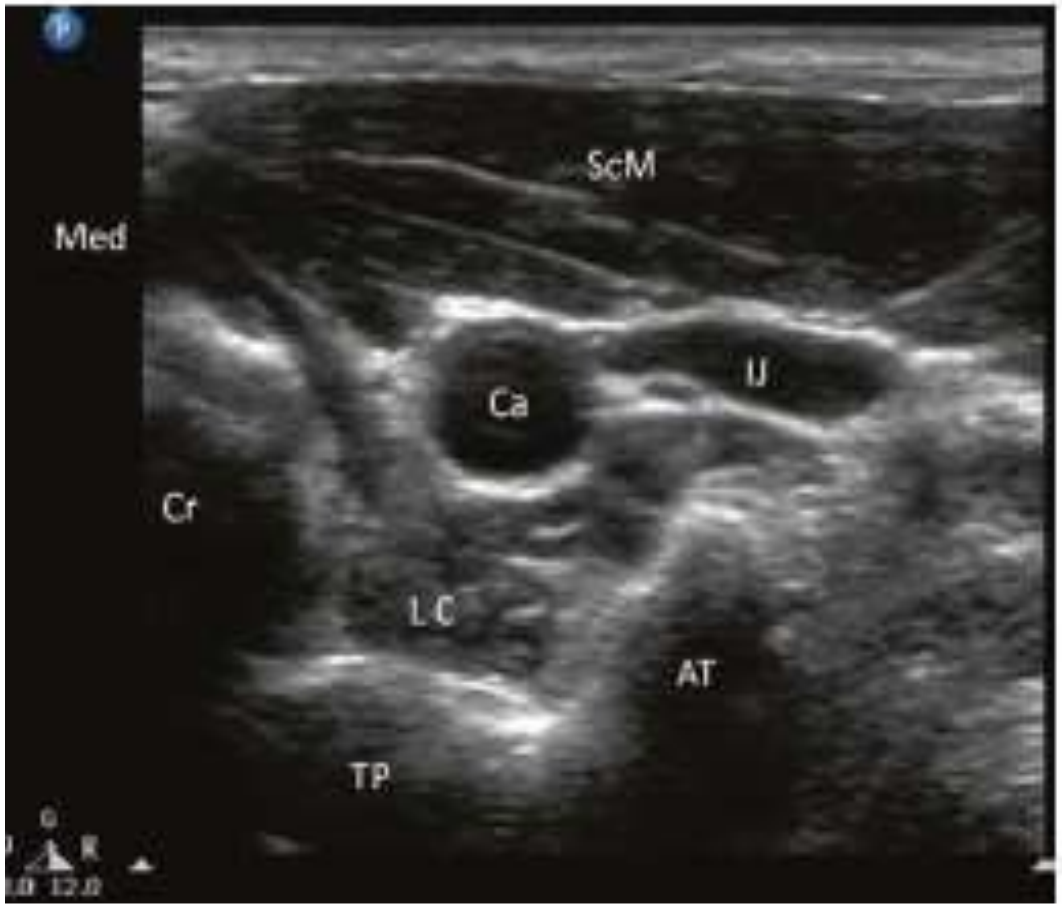



Strap muscle
Sternocleidomastoid muscle
Thyroid
VN
Jug
CCA
Longus capitus muscle
Longus colli muscle
at
Sym
Prevertebral fascia
SN
pt
C6 VB
VA


Vertebral artery
Superior cervical ganglion
Middle cervical ganglion
Intermediate cervical ganglion
Subclavian artery
Ansa subclavia


VA
Common carotid artery
Jugular vein
Thyroid cartilage
Sympathetic chain
Thyroid
Stellate ganglion
SN
T1 VB
Trachea


Trachea
Thyroid
Esophagus
Recurrent laryngeal artery and nerve
Common carotid artery
Internal jugular vein
Vagus nerve
Longus capitus muscle
Prevertebral fascia
C6
Sympathetic chain
Needle
Sternocleidomastoid
Longus colli muscle
Vertebral artery
Multifidus


Med
ScM
Ca
IJ
Cr
LC
AT
TP


Med
Ca
IJ
LC
AT
TP

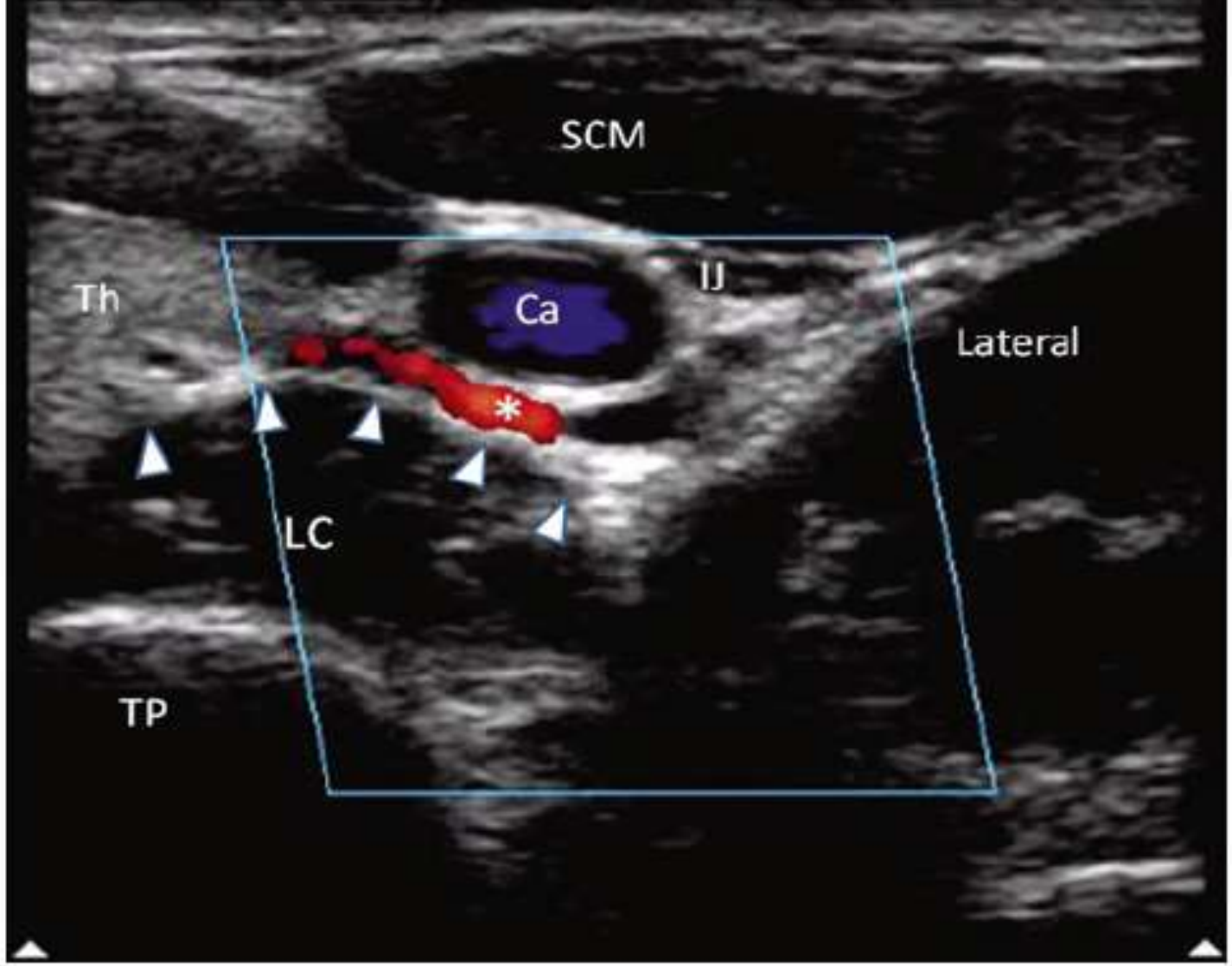
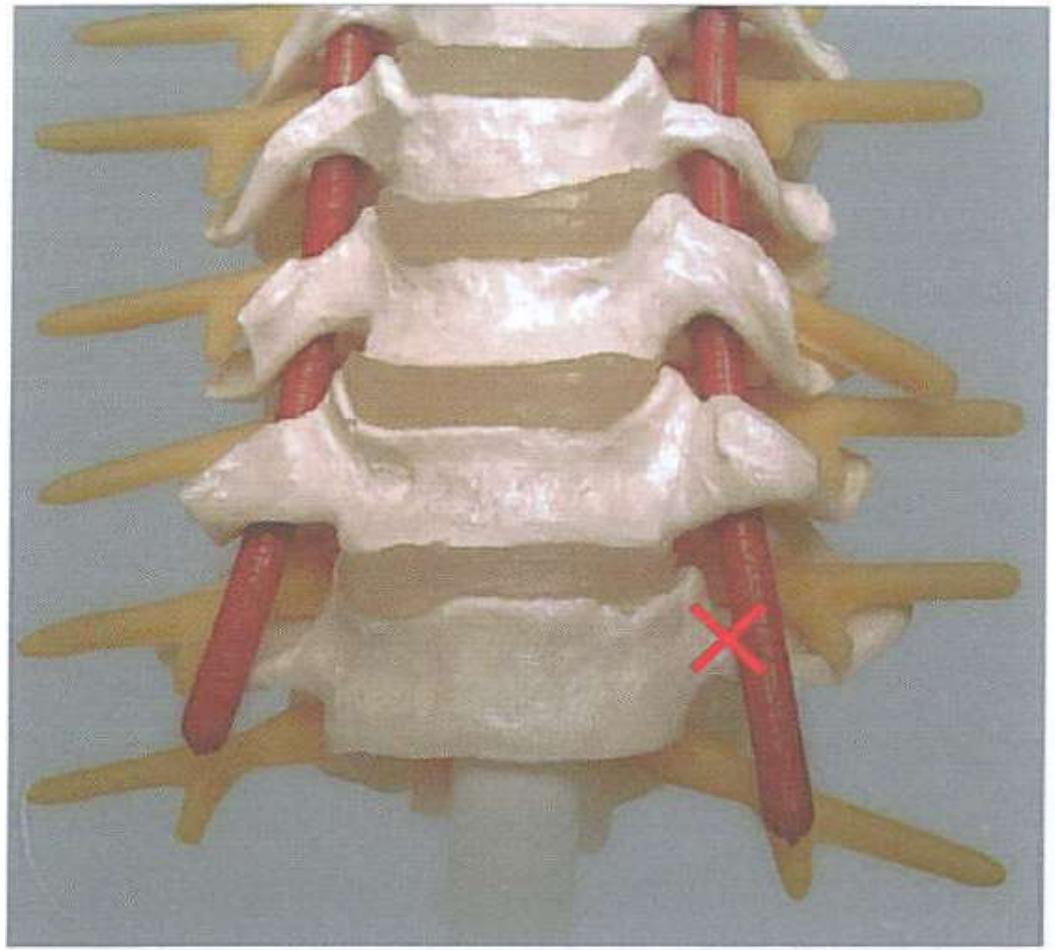


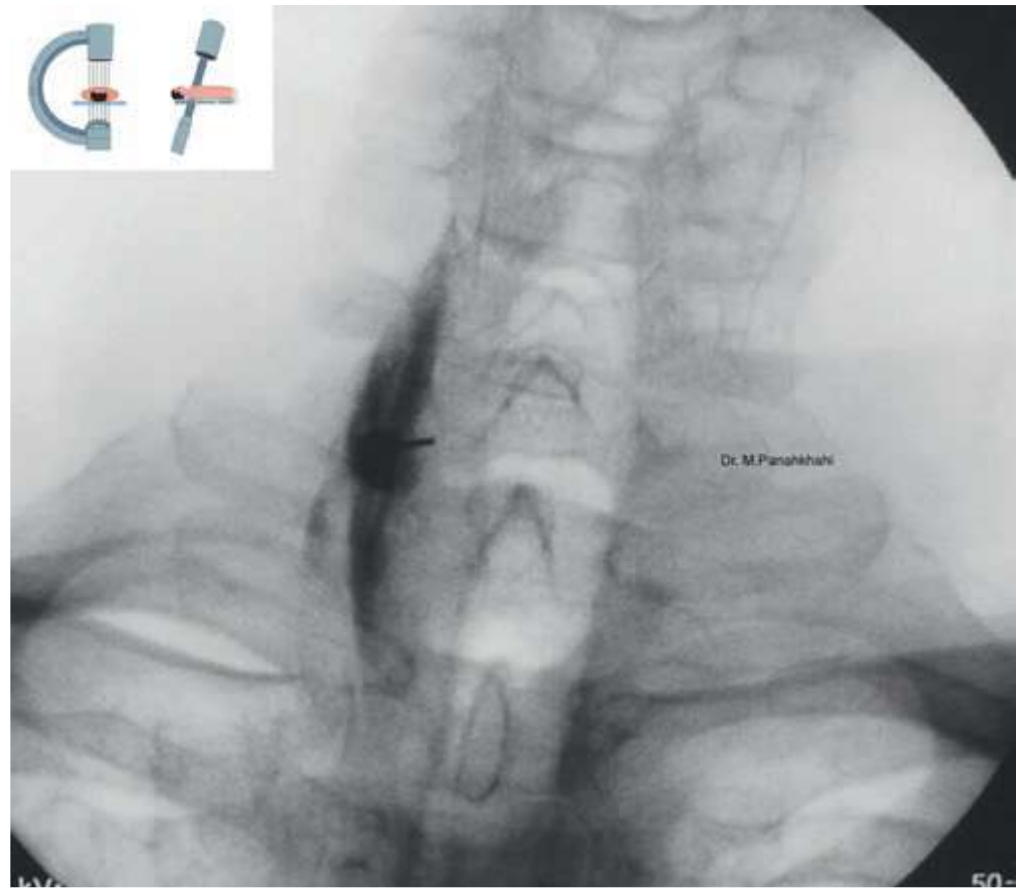
Figure 20.3. Ultrasonographic image with color Doppler. The inferior thyroidal artery was indicated with *asterisk*; the prevertebral fascia is marked by *solid arrowheads*. *TP* transverse process of C6, *Th* thyroid, *LC* longus colli muscle, *IJ* internal jugular vein. Reproduced with permission from USRA (www.usra.ca).

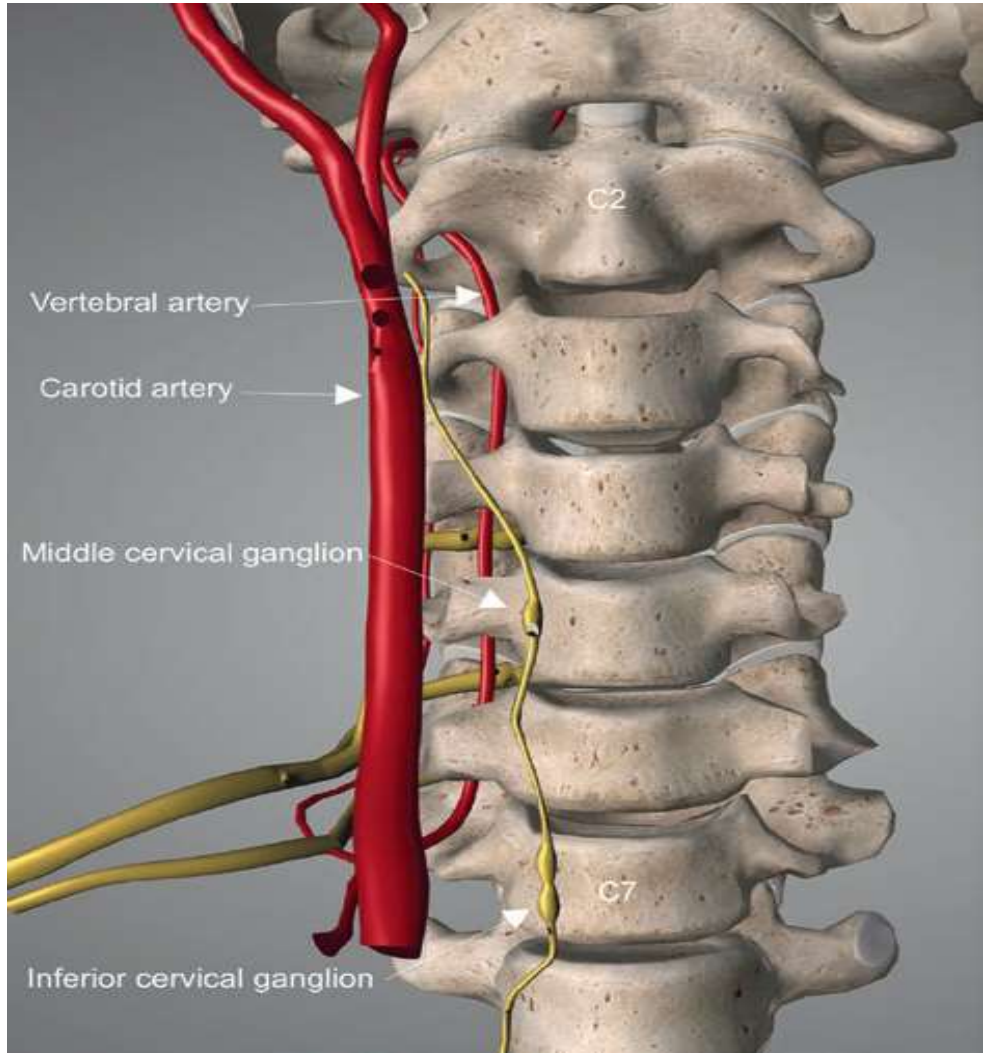
Fluoroscopy Approach

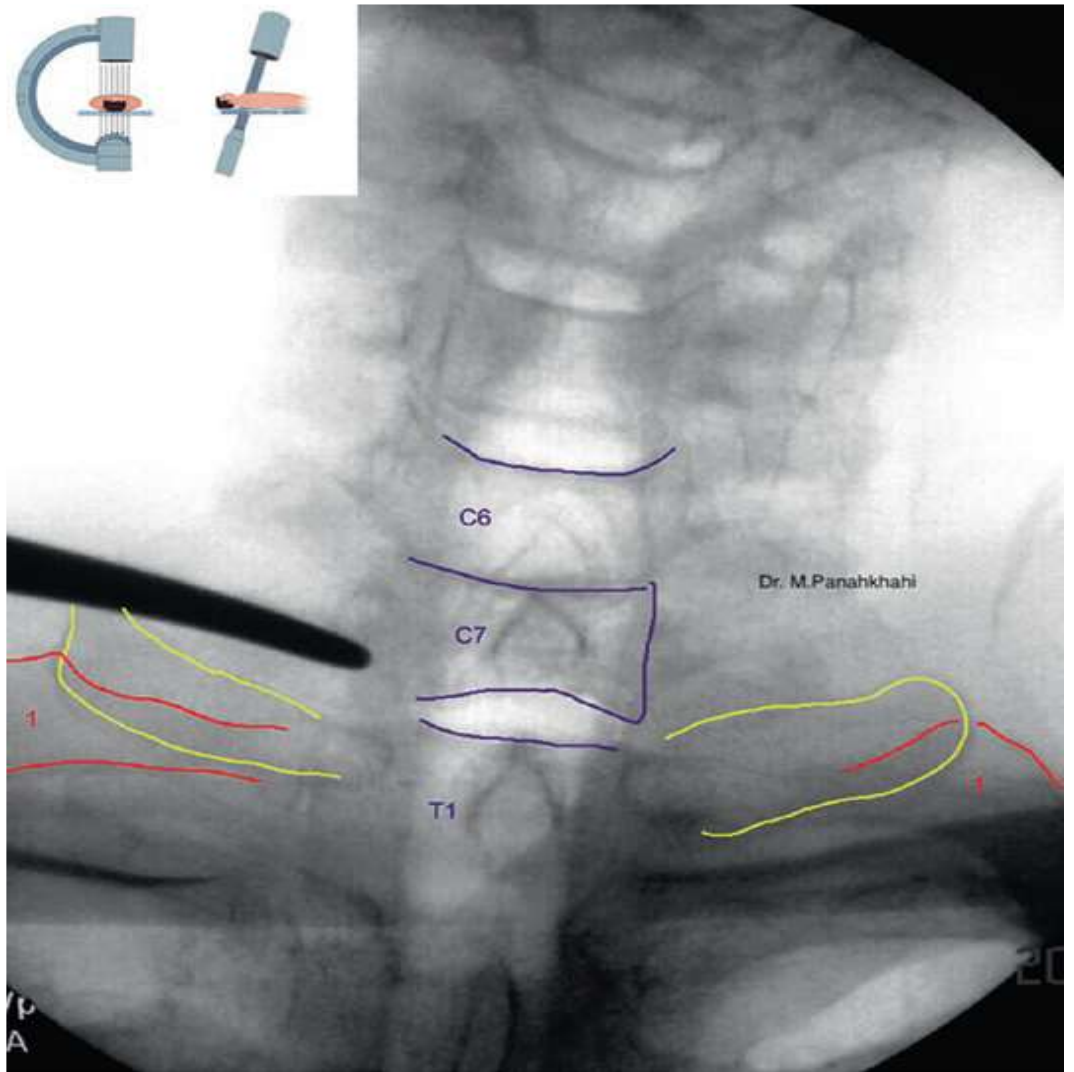
- **Paratracheal** classic approach
- **Posterior** Prone position, Arrival 4 cm lateral to SP of T1,T2
  2 Indication Infection or Tumor in Anterior, Neurolysis
- **Oblique** Preferred, 30-60 Degree caudal, 15-20 Degree ipsilateral
  Lower risk for Vascular or Esophagus, RLN

The patient lies supine with his/her head on a radio-lucent headrest; position the C-arm image intensifier in the antero-posterior plane in order to visualise the C6-C7-T1 area; then angle the intensifier very slightly caudally so as to obtain a clear view of C7; concentrate on the area where the tiny transverse process of C7 joins the body of the vertebra **(fig. 106)**.

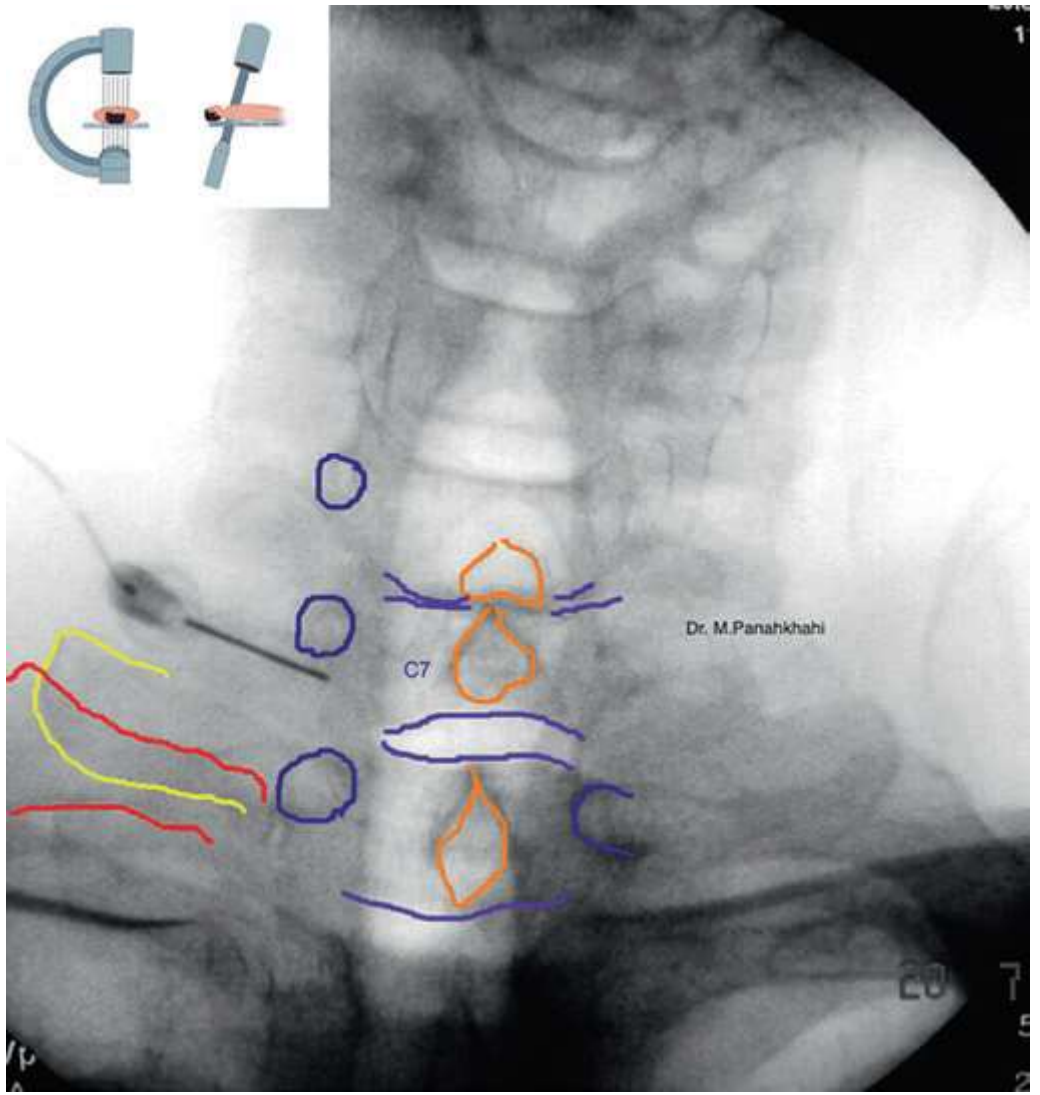



Dr. M.Panahkhahi

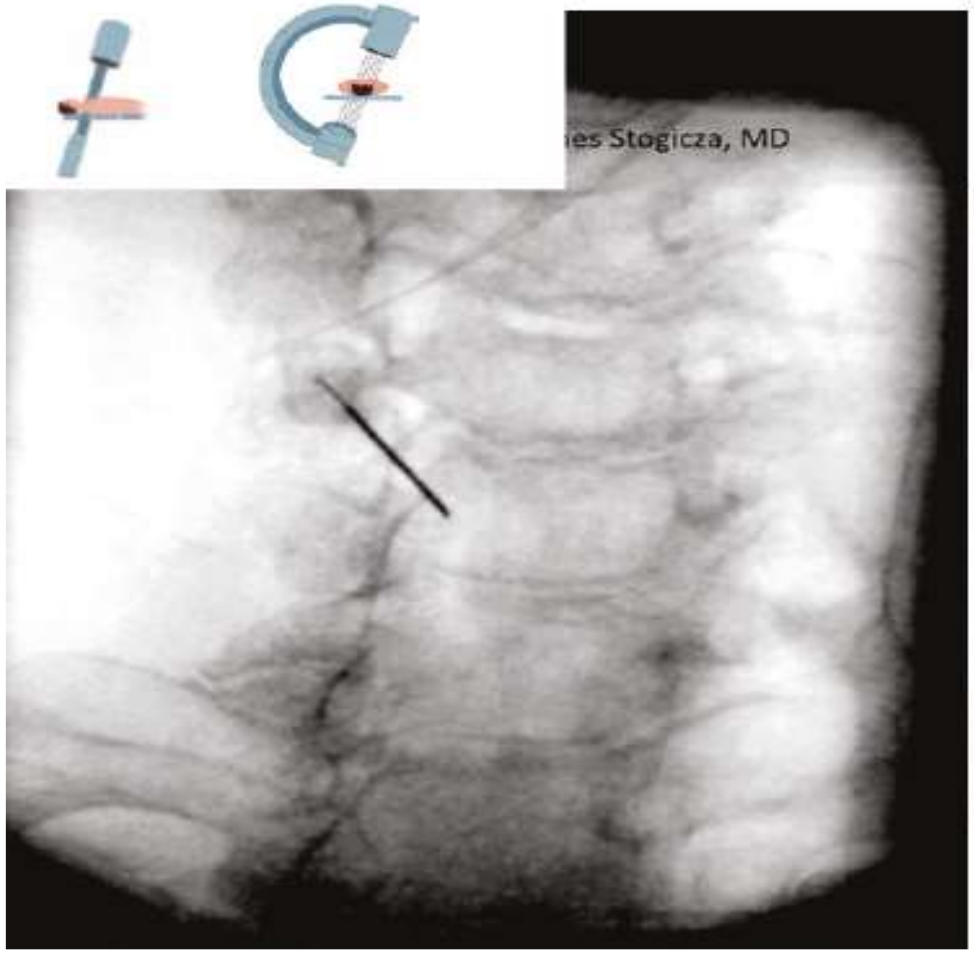

C2
Vertebral artery
Carotid artery
Middle cervical ganglion
C7
Inferior cervical ganglion

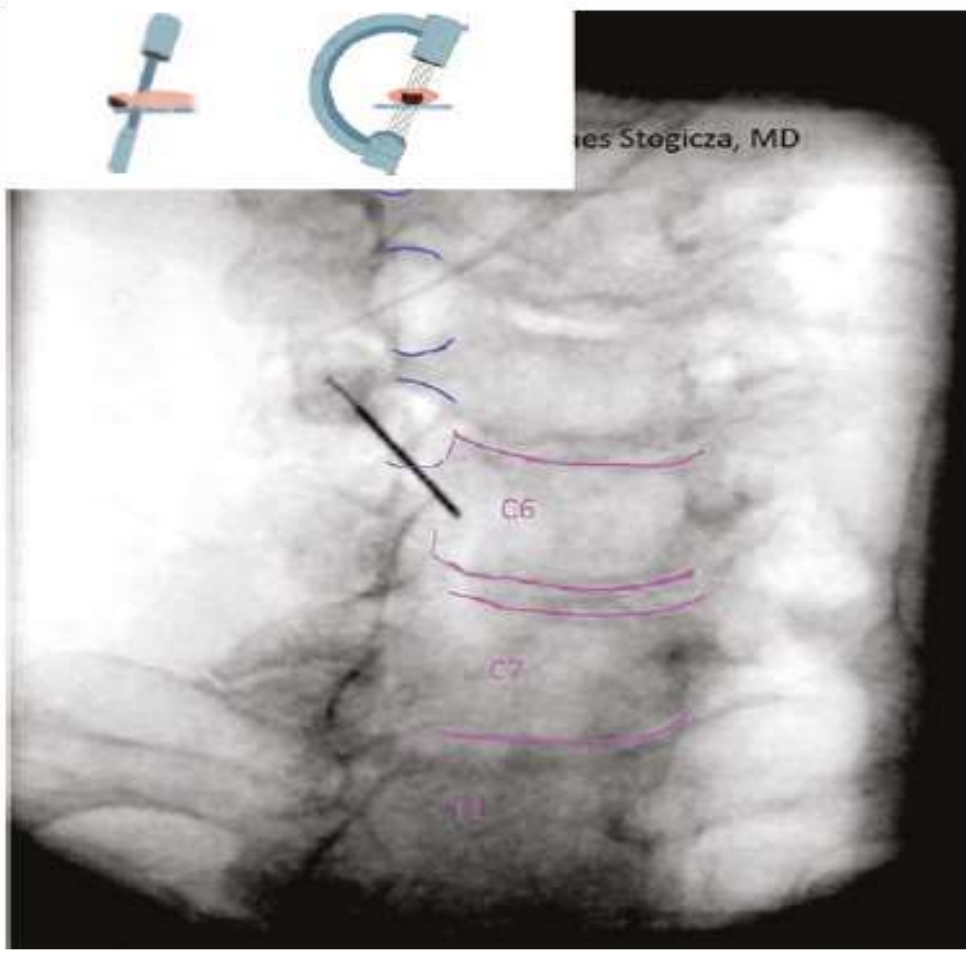

C6
C7
T1
1
1
Dr. M.Panahkhahi


Dr. M.Panahkhahi


C7
Dr. M.Panahkhahi

Oblique approach





Posterior Approach

4 Cm lateral to SP of T1-T2

22 G 10 cm Needle

The posterior paravertebral approach involves

walking a needle off the upper thoracic lamina;

fluoroscopy and contrast dye are required to confirm appropriate needle placement.

Radiofrequency

- Conventional RF lesioning is performed at 80°C for 1 minute or

- pulsed RF at 42°C for 120 seconds

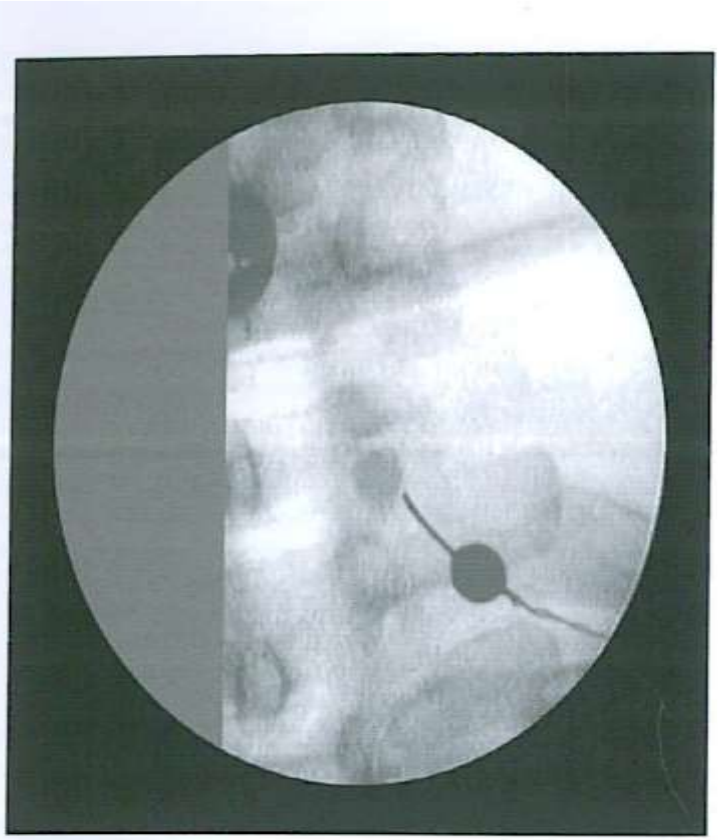


Fig. 107 Antero-posterior X-ray view showing tip of RF needle on transverse process of C7 vertebra

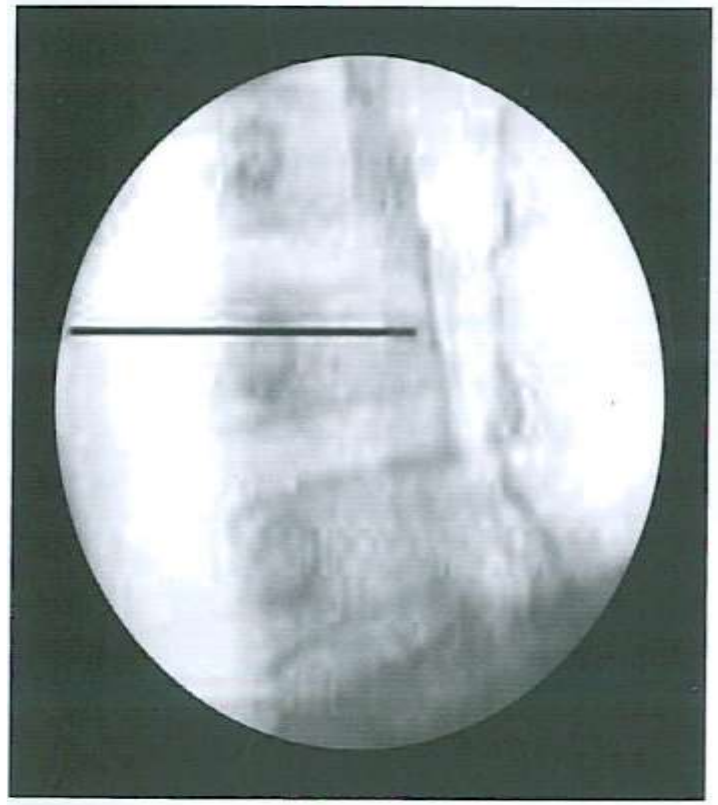


Fig. 108 Lateral (oblique) X-ray view showing tip of RF needle just ventral to intervertebral foramina

Fig. 109 Antero-posterior X-ray view showing RF needle following injection of contrast dye

Radiofrequency

Once the needle is correctly positioned in both antero-posterior and lateral X-ray views, replace the RF needle stilette with the thermocouple electrode.

If your are using pulsed RF, inject 1ml of 2% plain Lidocaine and pulse at 45V for 2 cycles of 120secs (temperature not to exceed 42°C).

If you are using conventional RF, apply sensory stimulation, using following parameters:

Frequency; 50Hz
Pulse width; 1ms
Voltage; up to 0.5V

You should not elicit any sensory reactions. Apply motor stimulation, using following parameters:

Frequency; 2Hz
Pulse width; 1ms
Voltage; double sensory threshold but at least 1V

While doing this, ask the patient to phonate; if you are dangerously close to the recurrent laryngeal nerve, phonation will be affected.

Lesion at 75°C for 60 seconds.


Увеличить

POSTPROCEDURE CONSIDERATIONS

- The patient should be monitored and observed for at least 30 minutes following the procedure.
- Identify if sensory or motor block is present versus selective sympathetic blockade.
- Ipsilateral temperature monitoring may be done to confirm sympathetic blockade.
- Pain score changes are recorded prior to discharge.
- The patient may be contacted the day following the procedure for follow-up and any questions or concerns.
- A discharge sheet is provided with instructions to call the pain center for any procedure-related complications.

- The cervical sympathetic chain supplies
  the heart, carotid body, pharynx, and thyroid gland, but
  these organs are only likely to be affected
  by a double-sided stellate block

- In cases of doubt, on the day of the injection they will not be fit to drive after the treatment, allowing them to prepare for
this eventuality.

Signs of Successful Stellate Ganglion Block

- Horner's syndrome
  - Miosis (pupillary constriction)
  - Ptosis (drooping of the upper eyelid)
  - Enophthalmos (recession of the globe within the orbit)
- Anhidrosis (lack of sweating)
- Nasal congestion
- Venodilation in the hand and forearm
- Increase in temperature of the blocked limb by at least 1°C

- The following can occur with injection to the stellate ganglion:

- Initial slight circulatory depression and slight slowing of the pulse.
- Slight dizziness.
- Congested feeling in the half of the nose on the same side (Guttmann's sign).
- Horner's symptom complex (ptosis, myosis, enophthalmus).
- Increased vascularity of the sclera.
- Feeling of warmth in the half of the head on the same side, the upper extremity, and the chest area.

❖The presence of Horner’s syndrome (ptosis, miosis, anhydrosis, enophthalmos) is a confirmatory sign of successful stellate ganglion blockade, as are warmer and dry extremity and dilated veins on the treated side.

❖However, since the Kuntz fibers bypass the stellate ganglion, a lack of effect in the hand does not confirm lack of sympathetic influence

Complications

The incidence of all complications has been reported to be 0.17%.

However, the severity of these potential complications renders neurolytic stellate ganglion block a relatively unattractive option.

➢At C7 level, the vertebral artery is more exposed;
it carries a bigger risk than at C6, where it is partially protected by bone at the transverse process and vertebral body junction.

➢However, in 10% of the cases, the vertebral artery enters the transverse foramina at higher levels (C3–5)

Complications

- Bleeding
- Infection
- Neuraxial injection
- Intravascular injection
- Pneumothorax
- Nerve damage

Structures to Keep in Mind and Possible Complications

- Carotid artery → seizure, stroke, dissection, bleeding
- Jugular vein: → bleeding
- Recurrent laryngeal nerve: injury → vocal cord paralysis, Hoarsness
- Vagus → bradycardia
- Phrenic nerve → diaphragm paralysis
- Thyroid gland: → bleeding causing airway compromise
- Esophagus → discomfort, infection, mediastinal infection
- Trachea
- Brachial plexus → nerve injury, somatic block instead of sympathetic block
- Vertebral artery → seizure, arterial dissection, stroke (C7 higher risk than C6)

- Dural sleeve of exiting nerves → epidural/spinal block
- Exiting nerve roots → nerve damage
- Pleura and apex of lung → pneumothorax (if injected at C7)
- Disc → discitis
- Infection
- Bleeding
- Post procedure pain
- Vasovagal reaction
- Allergic reaction

Noninvasive Stellate Ganglion Intervention

- US
- TENS
- LLLT Low Level Laser Therapy
- LPNIR Linearly polarized Near- Infrared Light Irradiation
- Xenon Lamps


Увеличить

Block Indication

- Disorders of the Head and Its Organs
- Disorders of the Neck and Its Organs
- Disorders of the Shoulder Girdle and Upper Extremity
- Disorders ofthe Thorax and Its Organs

17.3.1 Indications

Disorders of the Head and Its Organs

The indications given are only a sample of those possible:
- Cerebral circulation disorders.
- Apoplectic insult (new, old).
- Chronic recurring or persistent headache.
- Cerebral dizziness.
- First- to fourth-degree skull/brain injury.
- Posttraumatic head symptoms including epilepsy.
- Postoperative symptoms including edema formation.
- Bacterial and viral disorders of the cranial and facial skull.
- Malignant pain of the head.
- Neuritis and neuralgia of the cranial nerves (e.g., trigeminal nerve).
- Arterial and venous circulation disorders of the eye.
- Bacterial, viral, and nonspecific inflammation of the eye and eye socket.
- Arterial circulation disorders of the ear and balance organs (e.g., sudden deafness, otogenic dizziness, tinnitus, Meniere's disease).
- Research on chronic recurring otitis.
- Disorders of the nose, the paranasal sinuses, and the oral cavity with failed local treatment.

The expected success depends, among other things, on the the patient's "interference field situation."

Disorders of the Neck and Its Organs

The indications given are only a sample of those possible:
- Painful degenerative diseases of the cervical spine and neck muscles.
- Neuralgias in the supply area of the cervical spine (cer-
- Whiplash injury.
- Thyroiditis.
- Vertebral dizziness.
- Postoperative swelling.
- Tracheomalacia research.
- Bacterial and viral infections of the larynx, trachea, and pharynx.
- Pain from malignant diseases of the neck.

The expected success depends, among other things, on the the patient's "interference field situation."

Disorders of the Shoulder Girdle and Upper Extremity

The indications given are only a sample of those possible:
- Cervicobrachialgia.
- "Frozen shoulder."
- Painful shoulder syndrome.
- Root irritation between C5 and T6.
- Degenerative-inflammatory disorders of the shoulder girdle joints and the upper extremity.
- Plexus neuralgia and neuritis of the brachial plexus.
- Traumatic plexus lesions.
- Chronic root tendinopathy of the shoulder girdle and arm muscles.
- Chronic tendovaginitis.
- Arterial circulation disorders of the upper extremities (Raynaud's disease, arteritis nodosa, arteritis obliterans).
- Lymphedema of the upper extremities, also after lymphadenectomy.
- Malignant pain of the shoulder girdle and upper extremities.
- Sudeck's atrophy (CRPS) of the upper extremity.

The expected success depends, among other things, on the the patient's "interference field situation."

Disorders of the Thorax and Its Organs

The indications given are only a sample of those possible:
- Chronic degenerative disease of the thoracic vertebrae segments T1–T6.
- Bacterial, viral, and nonspecific pleuritis.
- Pneumonia.
- Lung emphysema with dyspnea.
- Bronchial asthma.
- Chronic bronchitis.
- Interstitial edema.
- Adjuvant in pulmonary embolism (stellate infiltration on both sides with an interval of 30 minutes).[289]
- Research on chronic cough with unexplained origin.
- Pain from inoperable tumor diseases.
- Congestive heart failure.
- Heart rhythm disorders.
- As supplemental therapy for mediastinitis.

Disorders of the Head and Its Organs

- Cerebral circulation disorders.
- Apoplectic insult (new, old).
- Chronic recurring or persistent headache.
- Cerebral dizziness.
- First- to fourth-degree skull/brain injury.
- Posttraumatic head symptoms including epilepsy.
- Postoperative symptoms including edema formation.
- Bacterial and viral disorders of the cranial and facial skull.

Disorders of the Head and Its Organs

- Malignant pain of the head.
- Neuritis and neuralgia of the cranial nerves (e.g., trigeminal nerve).
- Arterial and venous circulation disorders of the eye.
- Bacterial, viral, and nonspecific inflammation of the eye and eye socket.
- Arterial circulation disorders of the ear and balance organs

(e.g., sudden deafness, otogenic dizziness, tinnitus, Meniere's disease).

- Research on chronic recurring otitis.
- Disorders of the nose, the paranasal sinuses, and the

oral cavity with failed local treatment.

Disorders of the Neck and Its Organs

- Painful degenerative diseases of the cervical spine and neck muscles.
- Neuralgias in the supply area of the cervical spine (cervical plexus).
- Whiplash injury.
- Thyroiditis.
- Vertebral dizziness.
- Postoperative swelling.
- Tracheomalacia research.
- Bacterial and viral infections of the larynx, trachea, and pharynx.
- Pain from malignant diseases of the neck.

Disorders of the Shoulder Girdle and Upper Extremity

- Cervicobrachialgia.
- "Frozen shoulder."
- Painful shoulder syndrome.
- Root irritation between CS and T6.
- Degenerative-inflammatory disorders of the shoulder girdle joints and the upper extremity.
- Plexus neuralgia and neuritis of the brachial plexus.
- Traumatic plexus lesions.
- Chronic root tendinopathy of the shoulder girdle and arm muscles.
- Chronic tendovaginitis.

Disorders of the Shoulder Girdle and Upper Extremity

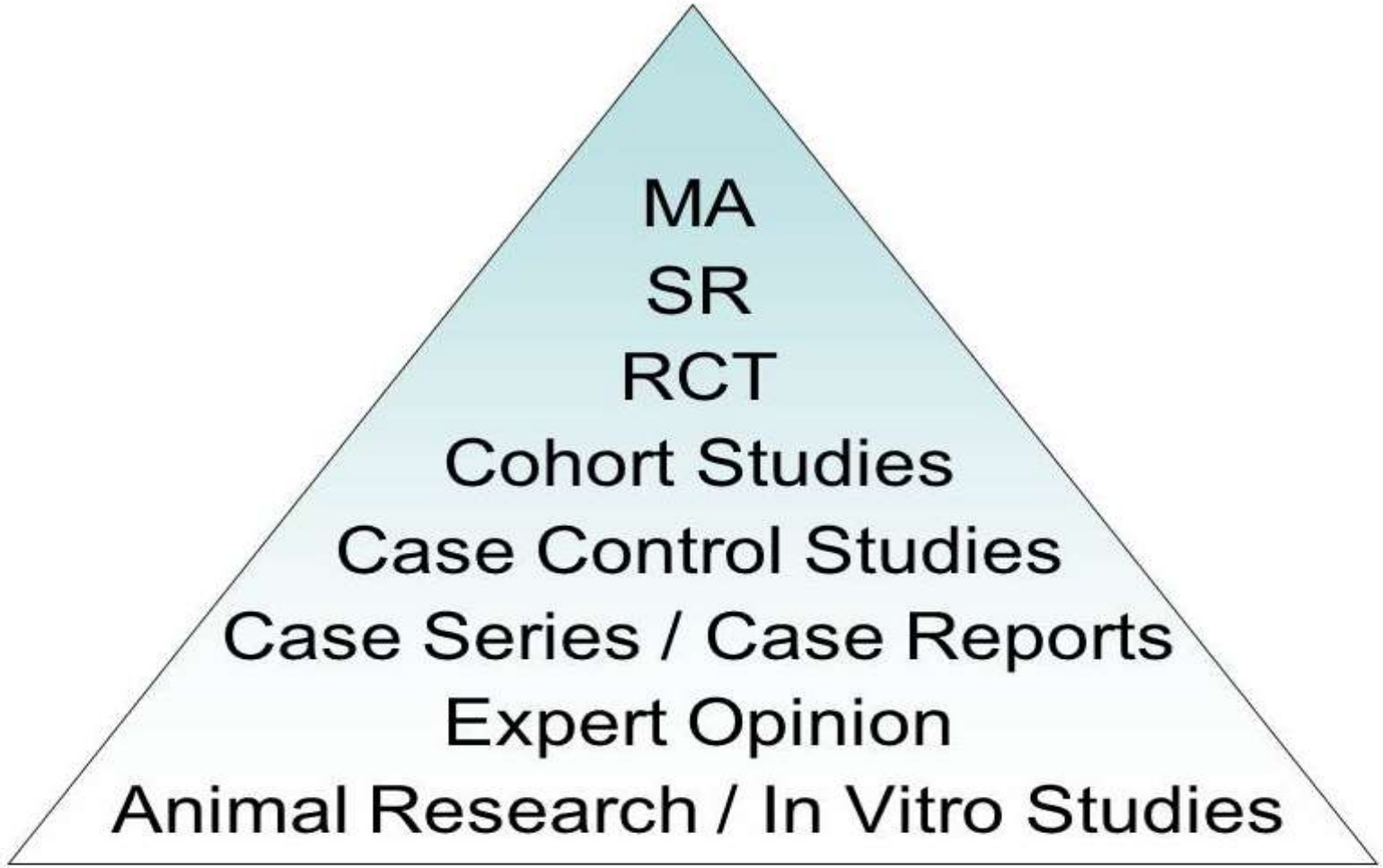
- Arterial circulation disorders of the upper extremities (Raynaud's disease, arteritis nodosa. Arteritis obliterans).
- Lymphedema of the upper extremities, also after lymphadenectomy.
- Malignant pain of the shoulder girdle and upper extremities.
- Sudeck's atrophy (CRPS) of the upper extremity.

Disorders of the Thorax and Its Organs

- Chronic degenerative disease of the thoracic vertebrae segments T1-T6.
- Bacterial, viral, and nonspecific pleuritis.
- Pneumonia.
- Lung emphysema with dyspnea.
- Bronchial asthma.
- Chronic bronchitis.
- Interstitial edema
- Adjuvant in pulmonary embolism (stellate infiltration on both sides with an interval of 30 minutes)

Disorders of the Thorax and Its Organs

- Research on chronic cough with unexplained origin.
- Pain from inoperable tumor diseases.
- Coronary heart disease.
- Cardiac pain after bypass, stent, or dilatation.
- Cardiac asthma.
- As supplemental therapy for myocarditis.
- Congestive heart failure.
- Heart rhythm disorders.
- As supplemental therapy for mediastinitis.



MA = Meta-Analyses SR = Systematic Reviews
RCT = Randomized Controlled Trials

Grades of Recommendation

Grade of Recommendation	Level of Evidence	Type of Study
A	1a	Systematic review of (homogeneous) randomized controlled trials
A	1b	Individual randomized controlled trials (with narrow confidence intervals)
B	2a	Systematic review of (homogeneous) cohort studies of "exposed" and "unexposed" subjects
B	2b	Individual cohort study / low-quality randomized control studies
B	3a	Systematic review of (homogeneous) case-control studies
B	3b	Individual case-control studies
C	4	Case series, low-quality cohort or case-control studies
D	5	Expert opinions based on non-systematic reviews of results or mechanistic studies

Levels of Evidence

Critically-appraised individual articles and synopses include:

Filtered evidence:

- Level I: Evidence from a systematic review of all relevant randomized controlled trials.
- Level II: Evidence from a meta-analysis of all relevant randomized controlled trials.
- Level III: Evidence from evidence summaries developed from systematic reviews
- Level IV: Evidence from guidelines developed from systematic reviews
- Level V: Evidence from meta-syntheses of a group of descriptive or qualitative studies
- Level VI: Evidence from evidence summaries of individual studies
- Level VII: Evidence from one properly designed randomized controlled trial

Unfiltered evidence:

- Level VIII: Evidence from nonrandomized controlled clinical trials, nonrandomized clinical trials, cohort studies, case series, case reports, and individual qualitative studies.
- Level IX: Evidence from opinion of authorities and/or reports of expert committee

Two things to remember:

1. Studies in which randomization occurs represent a higher level of evidence than those in which subject selection is not random.

2. Controlled studies carry a higher level of evidence than those in which control groups are not used.

niques.[12]

First, a determination was made as to whether the potential benefits outweigh the risk and/or burden. The benefit/risk assessment was assigned a *numerical value* of 1 if the benefit because of the effectiveness of the treatment was greater than the risk and burden of potential complications. A value of 2 was given when the benefit of the effect was closely balanced with the risk and burden of possible side effects.

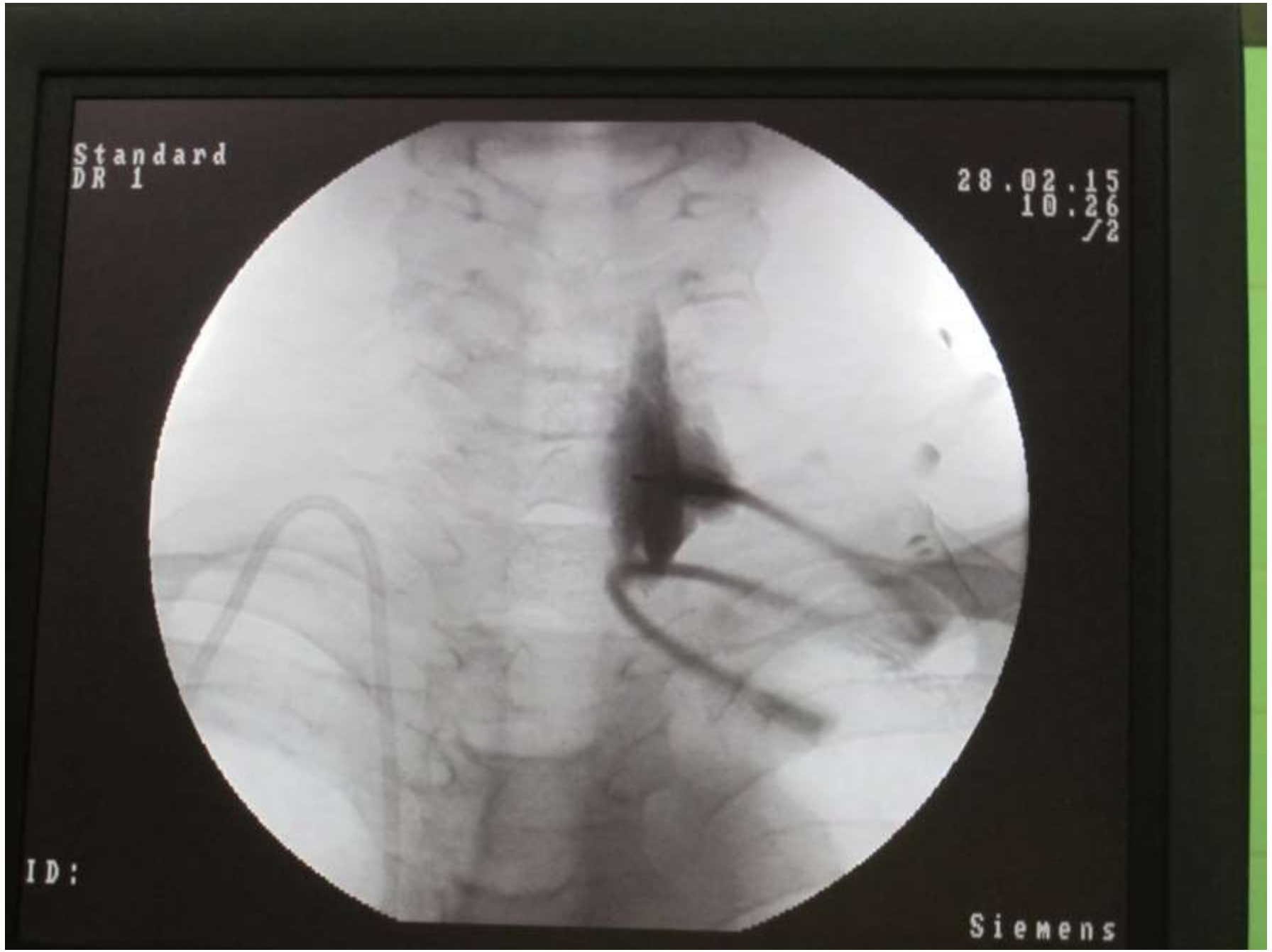
This information [illegible] domized study.

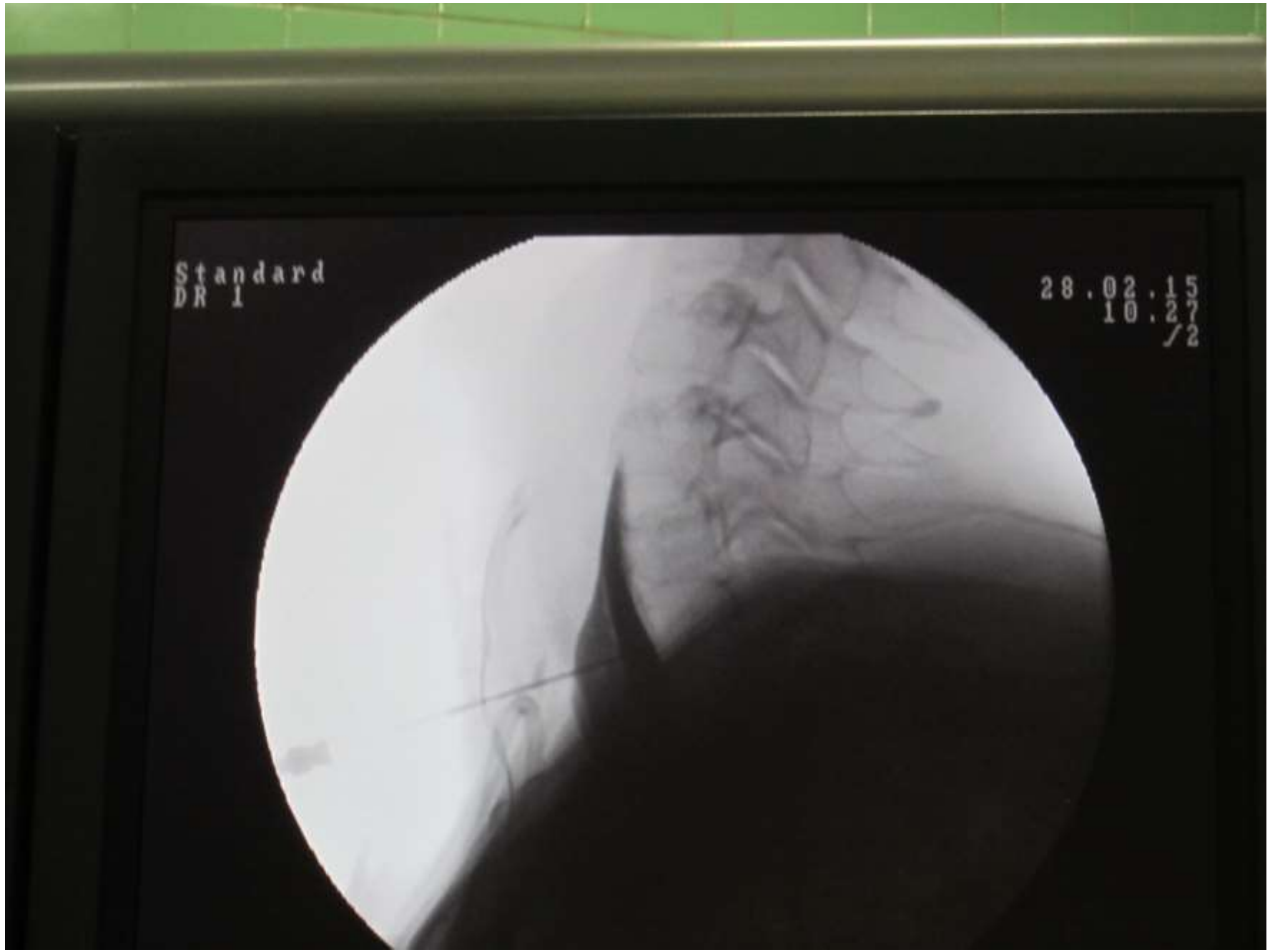
Certain pain management techniques require an extensive expertise and specialized materials and equipment. Therefore, it is appropriate that those specific techniques should be performed in specialized pain centers.

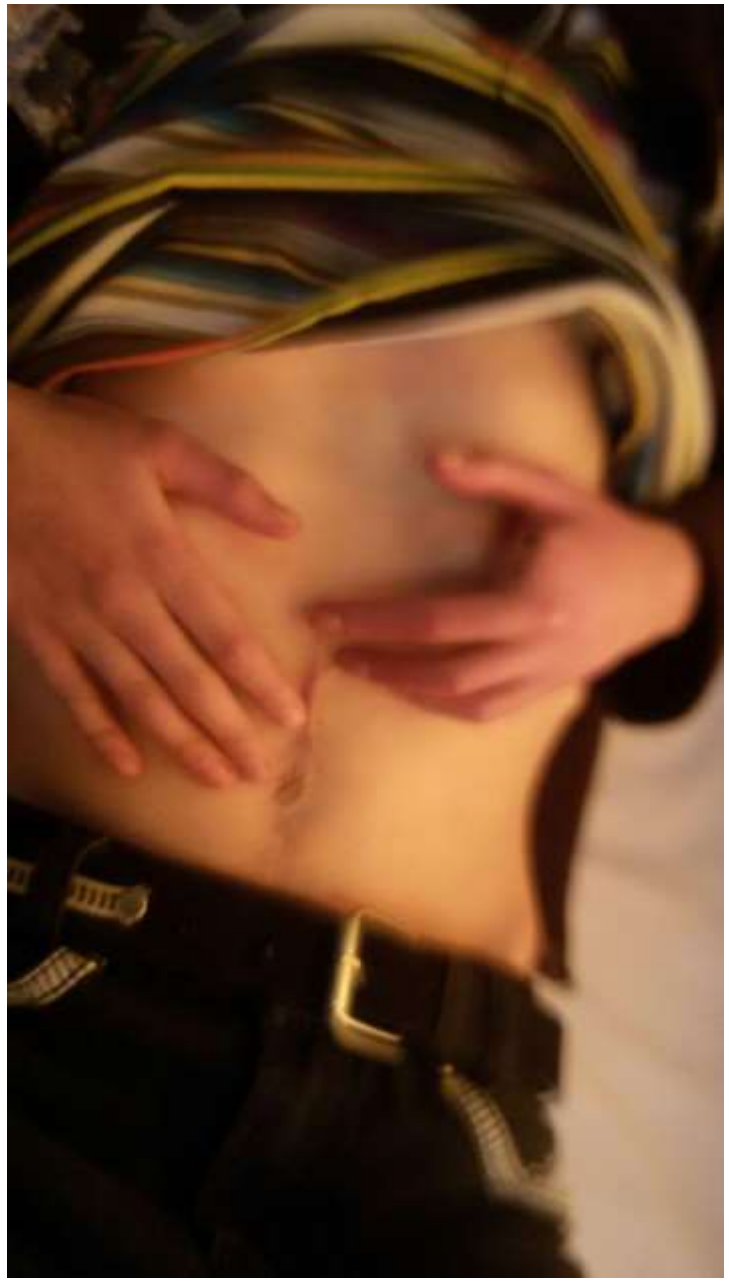
Table 1. Summary of Evidence Scores and Implications for Recommendation.

Score	Description	Implication
1 A +	Effectiveness demonstrated in various RCTs of good quality. The benefits clearly outweigh risk and burdens	Positive recommendation
1 B +	One RCT or more RCTs with methodological weaknesses, demonstrate effectiveness. The benefits clearly outweigh risk and burdens	
2 B +	One or more RCTs with methodological weaknesses, demonstrate effectiveness. Benefits closely balanced with risk and burdens	
2 B ±	Multiple RCTs, with methodological weaknesses, yield contradictory results better or worse than the control treatment. Benefits closely balanced with risk and burdens, or uncertainty in the estimates of benefits, risk and burdens.	Considered, preferably study-related
2 C +	Effectiveness only demonstrated in observational studies. Given that there is no conclusive evidence of the effect, benefits closely balanced with risk and burdens	
0	There is no literature or there are case reports available, but these are insufficient to prove effectiveness and/or safety. These treatments should only be applied in relation to studies.	Only study-related
2 C –	Observational studies indicate no or too short-lived effectiveness. Given that there is no positive clinical effect, risk and burdens outweigh the benefit	Negative recommendation
2 B –	One or more RCTs with methodological weaknesses, or large observational studies that do not indicate any superiority to the control treatment. Given that there is no positive clinical effect, risk and burdens outweigh the benefit	


CoolWallpapers.ir


Standard
DR 1
28.02.15
10:26
/2
ID:
Siemens


Standard
DR 1
28.02.15
10.27
/2



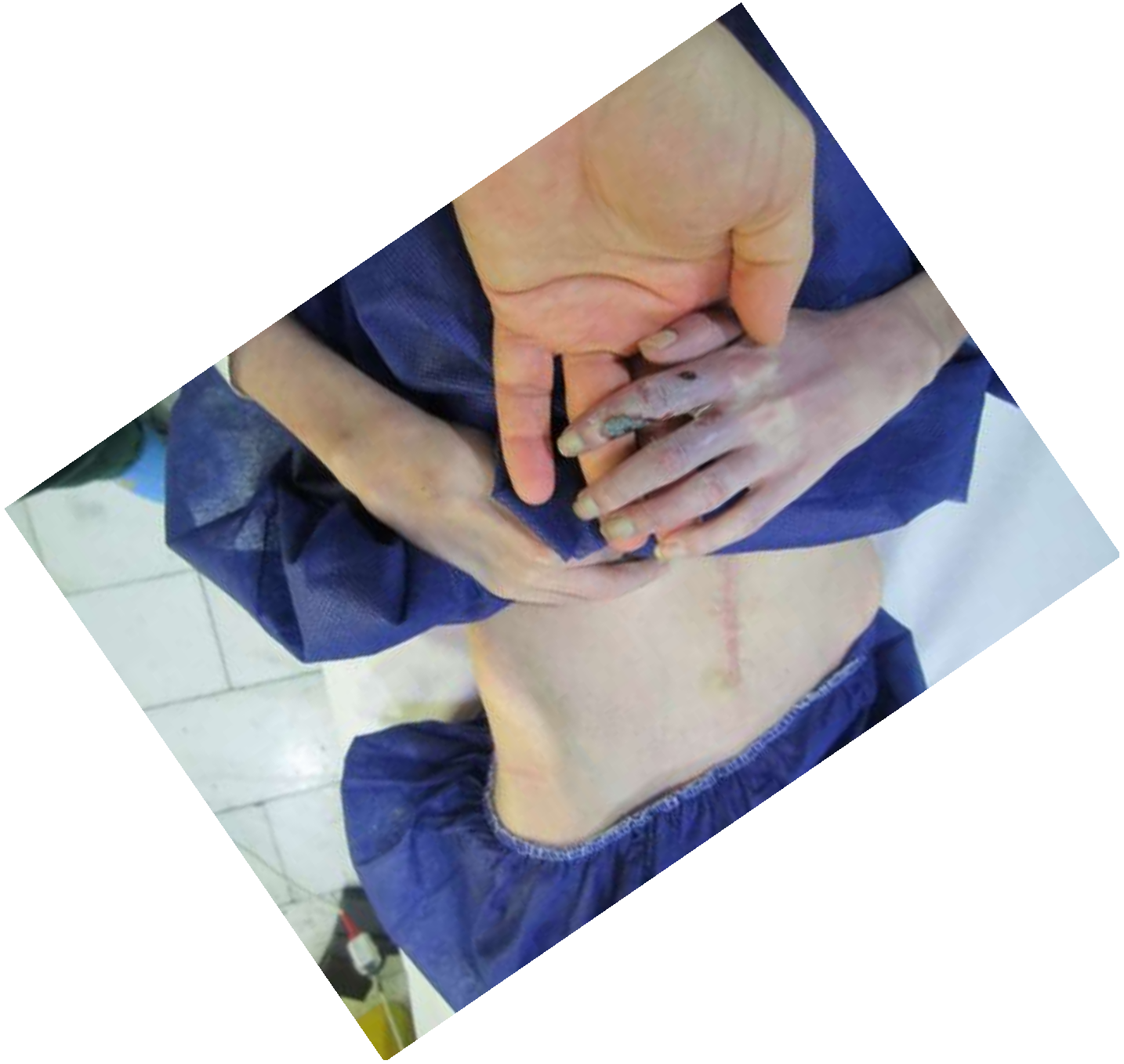


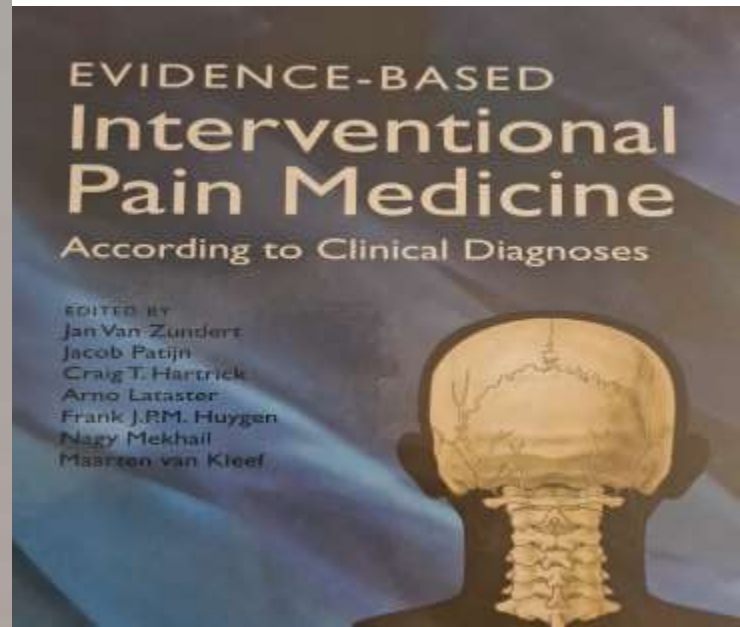
Table 17.1. Summary of evidence for interventional management of pain due to herpes zoster infection.

Technique	Evaluation
Interventional pain treatment of acute herpes zoster	
Epidural injections	2 B+
Sympathetic nerve block	2 C+
Prevention of PHN	
One-time epidural injection	2 B–
Repeated paravertebral injections	2 C+
Sympathetic nerve block	2 C+
Treatment of PHN	
Epidural injections	0
Sympathetic nerve block	2 C+
Intrathecal injection	?
Spinal cord stimulation	2 C+

PHN, post-herpetic neuralgia.

Recommendations

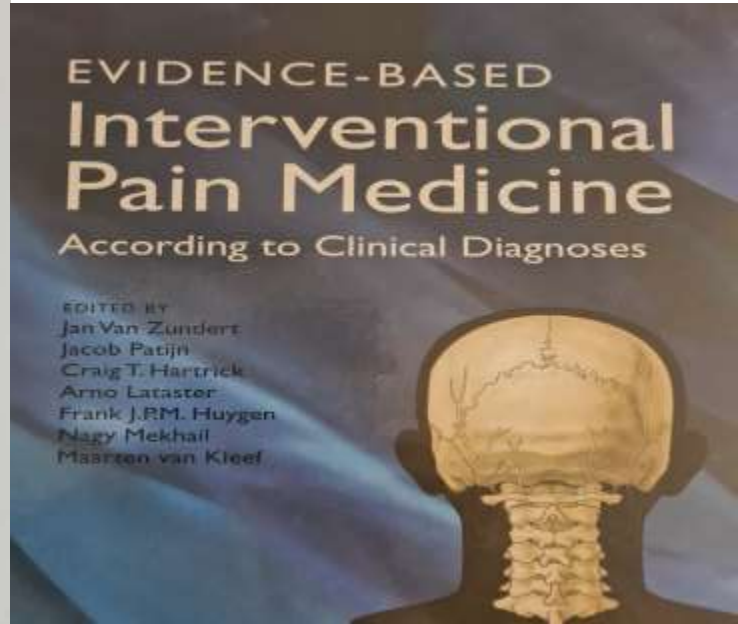
An epidural injection of corticosteroids with local anesthesia can be used in patients with pain caused by herpes zoster that has been inadequately reduced by pharmacological treatment. Monitoring of the correct needle position with radiography has a theoretical benefit compared with a "blind" technique. Effectiveness and safety of transforaminal epidural corticosteroid injections for



Based upon the available evidence with regard to effect and complications, we recommend the following interventional techniques for the treatment of CRPS.

Table 16.5. Summary of evidence for interventional pain management of CRPS.

Technique	Score
Intravenous regional block guanethidine	2A–
Ganglion stellatum (stellate ganglion) block	2B+
Lumbar sympathetic block	2B+
Plexus brachialis block	2C+
Epidural infusion analgesia	2C+
Spinal cord stimulation	2B+
Peripheral nerve stimulation	2C+



Level of Evidence

Quality of Evidence and Grading of Recommendation			
Grade of Recommendation/ Description	**Benefit vs. Risk and Burdens**	**Methodological Quality of Supporting Evidence**	**Implications**
RECOMMENDATION: *Sympathetic blocks, including stellate ganglion block. The use of sympathetic blocks may be considered to support the diagnosis of sympathetically maintained pain. They should not be used to predict the outcome of surgical, chemical, or radiofrequency sympathectomy. Lumbar sympathetic blocks or stellate ganglion blocks may be used as components of the multimodal treatment of CRPS if used in the presence of consistent improvement and increasing duration of pain relief. Sympathetic nerve blocks should not be used for long-term treatment of non-CRPS neuropathic pain.*			
2C/weak recommendation, low-quality or very low-quality evidence	Uncertainty in the estimates of benefits, risks, and burden; benefits, risk, and burden may be closely balanced	II-2: Observational studies or case series	Very weak recommendations; other alternatives may be equally reasonable

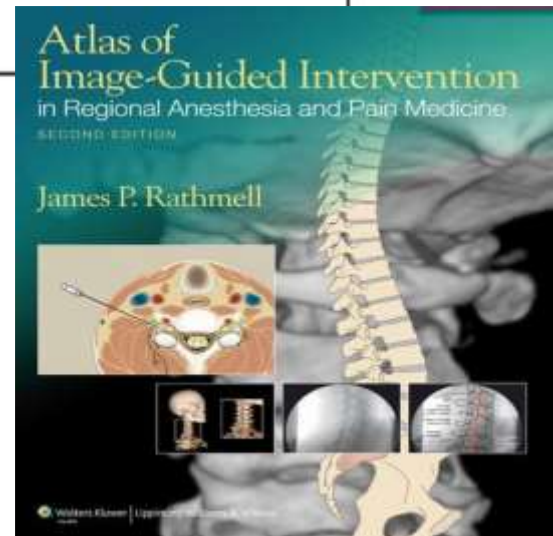


Table 7.1 Level of evidence and recommendations by the Benelux section of the World Institute of Pain

These recommendations are based on both a review of the literature in 2015 by an independent third party (Kleijnen Systematic Reviews LTD) and the previous published guidelines published in Pain Practice. The recent literature, the potential risk for complications, and the grade of invasiveness were considered when deciding to upgrade or downgrade the recommendation.

Indication	Procedure	Recommendation 2009[1]	Grade 2015[2]	Recommendation 2018[3,4]
Herpes zoster and posttherpeutic neuralgia	Acute phase: stellate ganglion block (ganglion stellatum)	2C+	Low	Weak

[1]van Wijck AJ, Wallace M, Mekhail N, van Kleef M. Evidence-based interventional pain medicine according to clinical diagnoses. 17. Herpes zoster and post-herpetic neuralgia. Pain Pract. 2011;11:88–97

[2]Kleijnen Systematic Reviews Ltd.: Search and evaluation of the literature. 2015.

[3]Huygen F, Kallewaard JW, van Tulder M, Van Boxem K, Vissers K, van Kleef M, et al. Evidence-based interventional pain clinical diagnoses: update 2018. Pain Pract. 2019;19:664–75

[4]https://www.anesthesiologie.nl/publicaties/praktische-richtlijnen-anesthesiologische-pijnbestrijding

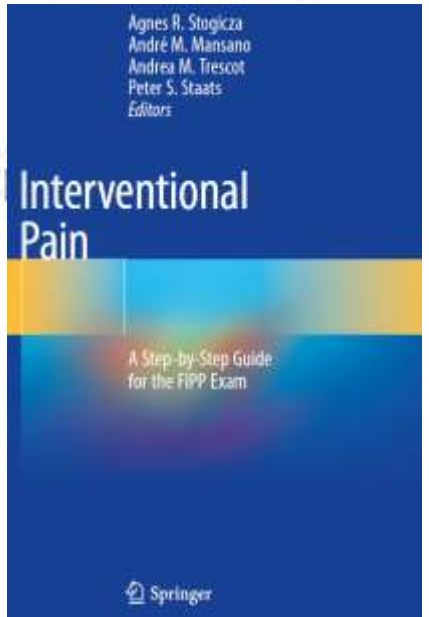
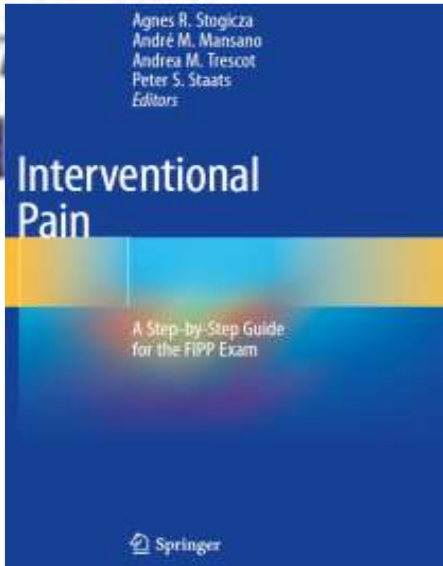


Table 7.2 Level of evidence based on the American Society of Interventional Pain Physicians (ASIPP) review of the literature

Stellate ganglion blocks[1]	Evidence
Ganglion stellate block for CRPS	Level III

[1]Vydyanathan A, Bryan G, Gritsenko K, Hansen H, Manhikanti L. Cervical and thoracic sympathetic blocks. In: Manchikanti L, Kaye AD, Falco FJE, Hirsch JA, editors. *Essentials of interventiona niques in managing chronic pain*. Springer International Publ 2018. p. 531–550



Pain Medicine, 2023, **24**, 775–781
https://doi.org/10.1093/pm/pnad011
Advance access publication 2 February 2023
Review Article

Stellate ganglion block for non-pain indications: a scoping review

Guy Feigin, MD,[1] Sofia Velasco Figueroa, MD,[1] Marina F. Englesakis, BA(Hons), MLIS,[2] Rohan D'Souza, MD, PhD, FRCOG,[3,4] Yasmine Hoydonckx, MD, MSc, FIPP,[1] Anuj Bhatia, MD, PhD, FRCA, FRCPC[1,*]

[1]Department of Anesthesia and Pain Medicine, University of Toronto, University Health Network—Toronto Western Hospital, Toronto, Ontario M5T 2S8, Canada
[2]Library & Information Services, University Health Network, Toronto, Ontario M5G 2C4, Canada
[3]Department of Obstetrics & Gynaecology and Department of Health Research Methods, Evidence and Impact, McMaster University, Hamilton, Ontario L8S 4L8, Canada
[4]Department of Obstetrics and Gynaecology, Lunenfeld Tanenbaum Research Institute, Toronto, Ontario M5G 1X5, Canada
*Correspondence to: Department of Anesthesia and Pain Management, Toronto Western Hospital—University Health Network and University of Toronto, 399 Bathurst Street, McL 2-405, Toronto, Ontario M5T 2S8, Canada. Email: anuj.bhatia@uhn.ca

Abstract

Introduction: Stellate ganglion block (SGB) is performed to relieve head, face, neck, or upper limb pain, and several non-pain indications for performing this block have emerged over the years. To date, there has been no attempt to synthesize evidence on SGB for treating non-pain indications. This scoping review presents a summary of the efficacy and adverse effects of SGB when performed for 6 non-pain indications.

Methods: This scoping review was accomplished through the use of Arksey and O'Malley framework. A literature search was conducted for relevant articles in medical databases to identify publications on SGB and specified study types. Two reviewers independently assessed the risk of bias for randomized controlled trials, nonrandomized comparative studies, and case series. Results were summarized and recommendations were made on the basis of the strength of the available evidence according to the US Preventative Services Task Force grading system.

Results: Twenty-four studies (19 randomized controlled trials and 5 nonrandomized studies) were included in this review. On the basis of the evidence, SGB is recommended for obtunding cardiovascular sympathetic stimulation, improving perfusion in limbs, and alleviating menopausal symptoms with a Grade B or C recommendation and a moderate-to-low level of certainty. There was insufficient evidence to recommend SGB for the other indications.

Conclusions: SGB can be considered for obtunding cardiovascular sympathetic stimulation and stress response, reducing vascular tone to improve vascular insufficiency in the limbs and perioperative hemodynamic stability, and alleviating hot flashes in menopause, in conditions refractory to conventional medical management.

Keywords: stellate ganglion block; sympathetic nervous system; arrhythmias; post-traumatic stress disorder (PTSD); deafness; menopause; lymphedema; vascular insufficiency

Introduction

Stellate ganglion block (SGB) is performed by anesthesiologists and pain physicians for a variety of pain conditions affecting the head, neck, and upper limbs. However, over the past 20 years, there has been growing interest in the role of this procedure for non-pain indications (Figure 1). The SGB is formed by fusion of the in
anteri
first r

The confluence of sympathetic nerves at the stellate ganglion makes it a target to block for pathological conditions that are sustained by increased activity of the sympathetic nervous system. Regional anesthesiologists and pain medicine physicians are often approached by specialists, including cardiologists, gynecologists, psychiatrists, and otorhinolaryngol-
erform
n syn-
success

1- Stellate ganglion block for non-pain indications: a scoping review

Conclusions:

SGB can be considered for obtunding cardiovascular sympathetic stimulation and stress response, reducing vascular tone to improve vascular insufficiency in the limbs and perioperative hemodynamic stability, and alleviating hot flashes in menopause, in conditions refractory to conventional medical management.

- **Department of Anesthesia and Pain Medicine, University of Toronto, University Health Network—Toronto Western Hospital, Toronto,**

Ontario M5T 2S8, Canada

- **Pain Medicine, 2023, 24, 775–781**

https://doi.org/10.1093/pm/pnad011 Advance access publication 2 February 2023 Review Article

Meta-Analysis and Systematic Review

Journal of INTERNATIONAL MEDICAL RESEARCH

Journal of International Medical Research
2024, Vol. 52(5) 1–12

DOI: 10.1177/03000605241252237
journals.sagepub.com/home/imr
Sage

Efficacy of ultrasound-guided stellate ganglion block in relieving acute postoperative pain: a systematic review and meta-analysis

Yan Zhao and Xiangli Xiao

Abstract

Objective: The efficacy of ultrasound-guided stellate ganglion block (SGB) in alleviating postoperative pain remains unclear. This meta-analysis was performed to determine the efficacy of ultrasound-guided SGB in relieving acute postoperative pain in patients undergoing surgery with general anesthesia.

Methods: This systematic review and meta-analysis focused on randomized controlled trials comparing SGB with control or placebo. The primary outcome was the pain score at 24 hours after surgery. A random-effects model was used to calculate the mean difference (MD) or risk ratio with a confidence interval (CI) of 95%.

Results: Eight studies involving 470 patients were included in the meta-analysis. The results revealed that ultrasound-guided SGB was significantly associated with a lower pain score at 24 hours after surgery (MD = −0.74; 95% CI = −1.39, −0.08; I^2 = 86%; low evidence) and at 8 hours after surgery (MD = −0.65; 95% CI = −1.03, −0.28; I^2 = 29%; moderate evidence).

Conclusion: Ultrasound-guided SGB is effective in alleviating acute postoperative pain. However, considering the limited number of trials performed to date, more large-scale and high-quality randomized controlled trials are required to confirm these findings.

2- Efficacy of ultrasound-guided stellate ganglion block in relieving acute postoperative pain: a systematic review and meta-analysis

Eight studies involving 470 patients were included in the meta-analysis

Conclusion:

Ultrasound-guided SGB is effective in alleviating acute postoperative pain

Yan Zhao and Xiangli Xiao

Journal of International Medical Research. 2024, Vol. 52(5) 1–12

Received: 27 January 2022 | Revised: 12 May 2022 | Accepted: 15 May 2022
DOI: 10.1002/ibra.12047

REVIEW

Ibrain WILEY

Stellate ganglion intervention for chronic pain: A review

Qingyang Luo[1,2] | Song Wen[1,2] | Xinran Tan[1,2] | Xi Yi[1,2] | Song Cao[1,2,3]

[1]Department of Anesthesiology, Affiliated Hospital of Zunyi Medical University, Zunyi, Guizhou, China
[2]Department of Pain Medicine, Affiliated Hospital of Zunyi Medical University, Zunyi, Guizhou, China
[3]Guizhou Key Laboratory of Anesthesia and Organ Protection, Zunyi Medical University, Zunyi, Guizhou, China

Correspondence
Song Cao, Department of Anesthesiology, Affiliated Hospital of Zunyi Medical University, Zunyi, 563000 Guizhou, China.
Email: caosong4321@163.com

Funding information
The Excellent Young Talents Project of Zunyi Medical University, Grant/Award Number: 18zy-004; The Innovation Group Major Research Project of Guizhou Province Education Department, Grant/Award Number: QianjiaoheKY[2017]043; Program for Major Research Projects for Innovation Groups in Guizhou Province, Grant/Award Number: (2018)025

Abstract
Stellate ganglion (SG) intervention is currently widely being studied in many kinds of chronic pain. As one of the convenient ways to treat the sympathetic nervous system, the indications for stellate ganglion intervention (SGI) include complex regional pain syndrome, postherpetic neuralgia, cancer pain of different origins, orofacial pain, and so forth. SGI refers to the reversible or irreversible blocking of the cervical sympathetic trunk, cervical sympathetic ganglion, and their innervation range through noninvasive or minimally invasive treatment. Current treatment options include stellate ganglion block (SGB), SG pulsed radiofrequency, continuous radiofrequency treatment, and noninvasive SGB. In particular, SGB continues to be one of the most studied methods in chronic pain management. However, a single SGB usually provides only short-term effects; repeated SGB may result in complications such as hoarseness, light-headedness, and vessel or nerve injury. Meanwhile, the mechanism of SGI is still unclear. This review discusses the research progress of SGI methods, effectiveness, complications, and possible mechanisms in the management of chronic pain.

KEYWORDS
chronic pain, pulse radiofrequency, stellate ganglion, stellate ganglion block

1 | INTRODUCTION

Chro... However, research has found that sympathetic nerves ...ds of ...hetic ...ffect

3- Stellate Ganglion Intervention for Chronic Pain: A Review

- Acute Herpes Zoster
- Post herpetic Neuralgia
- Complex Regional Pain Syndrome
- Facial Pain
- Fibromyalgia Syndrome
- Post Mastectomy Pain

- **Luo Q. Wen S. Tan X. et al. Ibrain published by Affiliated Hospital of Zunyi Medical University and Wiley-VCH GmbH.China. 2022.210-218**

TABLE 1 Summary of stellate ganglion intervention (SGI) therapy for chronic pain.

Disease	SGI type	Study type	Treatment protocol
PHN	SGB[34]	Randomized-controlled trial	6 ml 0.125% bupivacaine and 8 mg dexamethasone.
	LPNIR[28]	Prospective double-blind, randomized study	1800 mW; irradiation for 2 s, followed by a 4 s pause; irradiation duration of 10 min.
	PRF[35]	Randomized-controlled trial	42°C for 300 s (pulse width: 20 ms, frequency: 2 Hz).
CRPS	SGB[36,38,40]	Descriptive study	A volume of 15 ml of equal parts 0.5% bupivacaine and 1% prilocaine–hydrochloride, three times, with an interval of 1 week between treatments.
		Retrospective observational study	5 ml of 0.5% bupivacaine; 5 ml of 1% ropivacaine; 3 ml of 1% ropivacaine; and 2 ml of 1% ropivacaine + 30 μg of clonidine in 1 ml saline, resulting in a volume of 3 ml.
		Descriptive study	5 ml of 0.3% bupivacaine and 4 mg of dexamethasone.
	PRF[19,41]	Case report	42°C (2 Hz, 45 V), two cycles of 120 s.
		Retrospective observational study	PRF was performed for 420 s at 42°C on the C6- and C7-level sympathetic chain.
	RFN[42]	Retrospective observational study	Place needles sequentially at the C7 and TI levels and perform three 60-s RFN cycles at each level in injury mode at 70, 80, and 90°C.
	LPNIR[34]	Descriptive study	Linearly polarized 0.6–1.6 mm light (0.92 W, 88.3 J).
Facial pain	SGB[15,43,45,46]	Randomized-controlled trial	4, 6, or 8 ml of 1.0% lidocaine.
		Case series	10 ml of 0.25% bupivacaine.
		Case report	6 ml of 1.5% lidocaine, 2–3 times a week, 12 times in total.
		Case report	0.25% bupivacaine (5 ml) mixed with 8 mg of dexamethasone.
	PRF[35,44]	Randomized-controlled trial	42°C for 300 s (pulse width: 20 ms, frequency: 2 Hz), two cycles.
		Case report	42°C for 60 s, twice.
	LPNIR[26]	Case series	Power: 5.0 W, Pulse width: 3 ms, interpulse period: 7 ms, duration: 3 min, once a week for 10 weeks.
FMS	SGB[55]	Randomized-controlled trials	15 ml of 0.25% bupivacaine.
	LPNIR[23]	Descriptive study	Bilateral xenon light irradiation (0.38–1.1 μm) around the SG.
PMPS	TRF[57]	Prospective randomized trial	Perform nerve release for 60 s at 80°C, then repeat twice after needle tip rotation.

Abbreviations: CRPS, complex regional pain syndrome; FMS, fibromyalgia syndrome; LPNIR, linearly polarized near-infrared light irradiation; PHN, postherpetic neuralgia; PMPS, postmastectomy pain syndrome; PRF, pulsed radiofrequency; RFN, radiofrequency neurolysis; SGB, low-level laser therapy; TRF, thermal radiofrequency.


SGB
PRF of SG
CRF of SG
Noninvasive SGI
methods
Stellate ganglion intervention (SGI)
indications
PHN
CRPS
Headache and facial pain
FMS
Other pain

Pain Physician 2024; 27:E597-E610 • ISSN 2150-1149

Bibliometric Analysis

A Comprehensive Overview of the Stellate Ganglion Block Throughout the Past Three Decades: A Bibliometric Analysis

Ying Ren, MD[1,2], Zhen Zhang, MD[1], Hong-Ping Li, MD[1,2], Peng-Ju Zhang, MD[1,2], Jietai Duo, MD[3], and Hao Kong, MD[1]

From: [1]Department of Anesthesiology, Peking University First Hospital, Beijing, China; [2]Department of Anesthesiology, Peking University First Hospital Ningxia Women's and Children's Hospital, Yinchuan, China; [3]Department of Anesthesiology, FoKind Cancer Hospital, Lhasa, China

Address Correspondence: Hao Kong, MD Department of Anesthesiology, Peking University First Hospital No. 8 Xishiku Street, Beijing 100034, China Email: konghao2438@126.com; konghao@bjmu.edu.cn

Disclaimer: Ying Ren and Zhen Zhang contributed equally to the study. This research was funded by the National High-Level Hospital Clinical Research Funding (Interdepartmental Research Project of Peking University First Hospital) (number: 2023IR22) and the Youth Clinical Research Project of Peking University First Hospital (number: 2021CR19).

Conflict of interest: Each author certifies that he or she, or a member of his or her immediate family, has no commercial association (i.e., consultancies, stock ownership, equity interest, patent/licensing arrangements, etc.) that might pose a conflict of interest in connection with the submitted article.

Article received: 10-26-2023

Background: Over the past 3 decades, clinicians and scholars have used and studied the stellate ganglion block (SGB) extensively, making this field a highly anticipated research hot spot. To the best of our knowledge, there has been no bibliometric analysis of the SGB until now.

Objective: Our study aimed to complete multiple tasks regarding SGB research: identify the collaboration and impact of countries, institutions, journals, and authors, evaluate the knowledge base, trace the trends in hot spots, and explore the emerging topics relevant to the field.

Study Design: A bibliometric analysis.

Methods: Publications that were associated with the SGB and published between the years of 1993 and 2022 were retrieved from the Web of Science Core Collection on September 21st, 2023. CiteSpace 6.1.R6 and VOSviewer 1.6.18 were used to perform bibliometric and knowledge-map analyses.

Results: This study found a total of 837 publications originating from 51 countries and 1006 institutions. These articles were published in 393 journals. The United States was the country that produced the most articles focused on SGB, and the University of California, Los Angeles was the institution associated with the greatest number of publications. The anesthesiology and cardiology journals surveyed for this study published the most articles and received the most citations. Among the authors whose works were examined, Kitajima T had the greatest number of published articles, and Lipov E was the most frequently cited co-author. Five main domains of SGB research included electrical storm and refractory ventricular arrhythmia, breast cancer and climacteric medicine, post-traumatic stress disorder, pain management, and cerebrovascular diseases. The latest hot topics involving this field focused on SGB's anti-arrhythmic and anti-cerebral vasospasm effects and its treatment of long COVID syndrome.

Limitations: Data were retrieved only from the WoSCC; therefore, publications in other databases might have been missed.

Conclusion: This comprehensive bibliometric analysis conducted a complete overview of SGB research, which was helpful in furthering our understanding of research trends and locating research hot spots and gaps in this domain. This field is developing rapidly and will garner significant and continuous attention from future scholars.

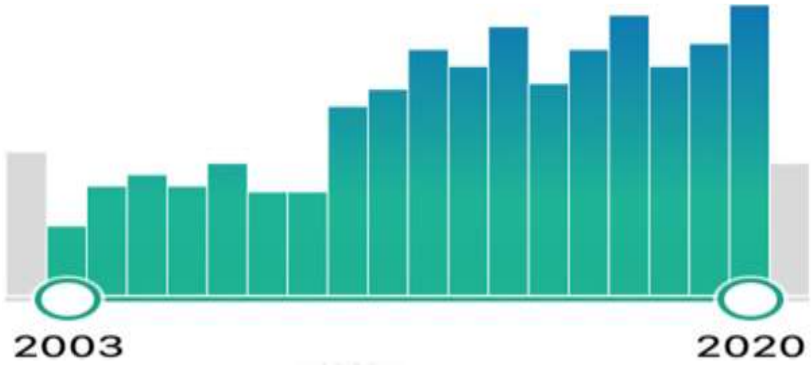
Key words: Stellate ganglion block, bibliometric, knowledge-map, VOSviewer, CiteSpace, post-

4- A Comprehensive Overview of the Stellate Ganglion Block Throughout the Past Three Decades: A Bibliometric Analysis

- Conclusion:

This comprehensive bibliometric analysis conducted a complete overview of SGB research, which was helpful in furthering our understanding of research trends and locating research hot spots and gaps in this domain. This field is developing rapidly and will garner significant and continuous attention from future scholars.

- **Pain Physician 2024; 27:E597-E610 • ISSN 2150-1149**


2003
2020

Citation
Publication
y = 0.1184x² - 2.2118x + 24.87
R² = 0.9182
y = 2.0986x² - 14.537x + 101.92
R² = 0.9765
Publication
Citation
Polynomial Trendline (Annual Publications)
Polynomial Trendline (Annual Citations)

Review Article

Stellate ganglion block beyond chronic pain: A literature review on its application in painful and non-painful conditions

Heena Singh, Manikandan Rajarathinam

Department of Anesthesia and Perioperative Medicine, Western University, London, Ontario, Canada

Abstract

Cervical sympathetic or stellate ganglion blocks (SGBs) have been commonly used in the treatment of painful conditions like complex regional pain syndrome (CRPS). However, there is literature to suggest its utility in managing non-painful conditions as well. The focus of this literature review is to provide an overview of indications for SGB for painful and non-painful conditions. We identified published journal articles in the past 25 years from Embase and PubMed databases with the keywords "cervical sympathetic block, stellate ganglion blocks, cervical sympathetic chain, and cervical sympathetic trunk". A total of 1556 articles were obtained from a literature search among which 311 articles were reviewed. Among painful conditions, there is a lack of evidence in favor of or against the use of SGB for CRPS despite its common use. SGB can provide postoperative analgesia in selective surgeries and can be effective in temporary pain control of refractory angina and the acute phase of herpes zoster infection. Among non-painful conditions, SGB may have beneficial effects on the management of post-traumatic stress disorder (PTSD), refractory ventricular arrhythmias, hot flashes in postmenopausal women, and breast cancer–related lymphedema. Additionally, there have been various case reports illustrating the benefits of SGB in the management of cerebral vasospasm, upper limb erythromelalgia, thalamic and central post-stroke pain, palmar hyperhidrosis, orofacial pain, etc. In our review of literature, we found that SGB can be useful in the management of various non-painful conditions beyond the well-known treatment for CRPS, although further studies are required to prove its efficacy.

Keywords: Cervical sympathetic block, complex regional pain syndrome, stellate ganglion

Introduction

Cervical sympathetic blocks are frequently used in the management algorithm of complex regional pain syndrome (CRPS) for pain control. Autonomic disturbances have been implicated as one of

treatment of various conditions where sympathetic input is thought to play a role in their pathophysiology. Recent studies have indicated a larger and broader use for this modality in conditions ranging from post-traumatic stress disorder (PTSD), refractory arrhythmias, breast cancer–related complications

5- Stellate ganglion block beyond chronic pain: A literature review on its application in painful and non-painful conditions

- **Heena Singh, Manikandan Rajarathinam**
- Department of Anesthesia and Perioperative Medicine, Western University, London, Ontario, Canada

- We identified published journal articles in the past 25 years from Embase and PubMed databases with the keywords “cervical sympathetic block, stellate ganglion blocks, cervical sympathetic chain, and cervical sympathetic trunk”.
- A total of 1556 articles were obtained from a literature search among which 311 articles were reviewed.

- **Singh H, Rajarathinam M. Stellate ganglion block beyond chronic pain: A literature review on its application in painful and non-painful conditions. J Anaesthesiol Clin Pharmacol 2024;40:185-91.**

- Among painful conditions, there is a lack of evidence in favor of or against the use of SGB for CRPS despite its common use.
- SGB can provide postoperative analgesia in selective surgeries and can be effective in temporary pain control of refractory angina and the acute phase of herpes zoster infection.
- Among non-painful conditions, SGB may have beneficial effects on the management of post-traumatic stress disorder (PTSD), refractory ventricular arrhythmias, hot flashes in postmenopausal women, and breast cancer–related lymphedema.
- Additionally, there have been various case reports illustrating the benefits of SGB in the management of cerebral vasospasm, upper limb erythromelalgia, thalamic and central post-stroke pain, palmar hyperhidrosis, orofacial pain, etc.
- In our review of literature, we found that SGB can be useful in the management of various non-painful conditions beyond the well-known treatment for CRPS, although further studies are required to prove its efficacy.

- Singh H, Rajarathinam M. Stellate ganglion block beyond chronic pain: A literature review on its application in painful and non-painful conditions. J Anaesthesiol Clin Pharmacol 2024;40:185-91.

Painful conditions

➢Complex regional pain syndrome (CRPS)

Limited evidence does not support or refute the role of local anesthetic sympathetic blockade in the pain management of CRPS. A series of blocks can be advocated to provide a pain-free window to facilitate active physiotherapy and rehabilitation.

➢Post-herpetic neuralgia (PHN)

RCTs have shown that SGB during the acute phase of herpes zoster may shorten the duration of pain.

➢Refractory angina

Observational data suggest that SGB may provide temporary symptom relief with refractory angina.

➢Acute post-surgical pain

Limited evidence shows postoperative analgesic benefits of SGB in upper limb orthopedic procedures, unilateral mastectomies, and head and neck oncologic surgeries.

Non-painful conditions

- Post-traumatic stress disorder (PTSD)

RCTs and prospective studies have demonstrated that SGB reduced PTSD symptoms.

- Refractory ventricular arrhythmias (VA) or electrical storms

Systematic reviews of case series have concluded that SGB was effective in the management of acute electrical storms.

- Menopausal vasomotor symptoms

RCTs have shown that SGB reduces the frequency of moderate-to-very-severe VMS (hot flashes).

- Breast cancer–related lymphedema (BCRL)

RCTs and systematic reviews suggest that SGB is effective in reducing swelling in breast cancer–related lymphedema.

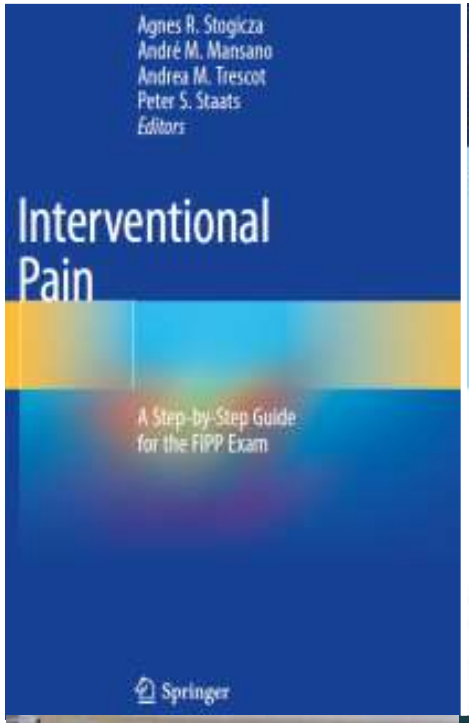
- Cerebral vasospasm

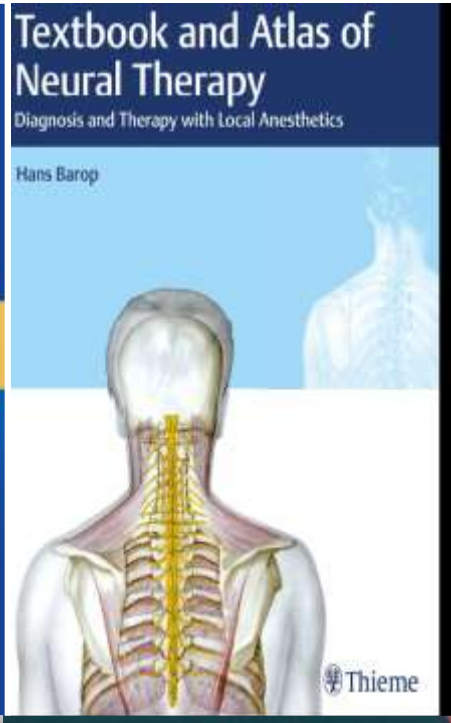
Observational data have shown that SGB may relieve the cerebral vasospasm after SAH but the data is limited to support its use in the high mortality condition.

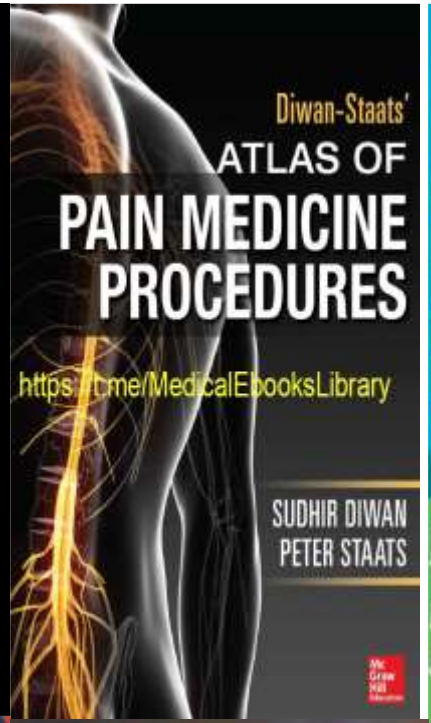
Unifying Theory

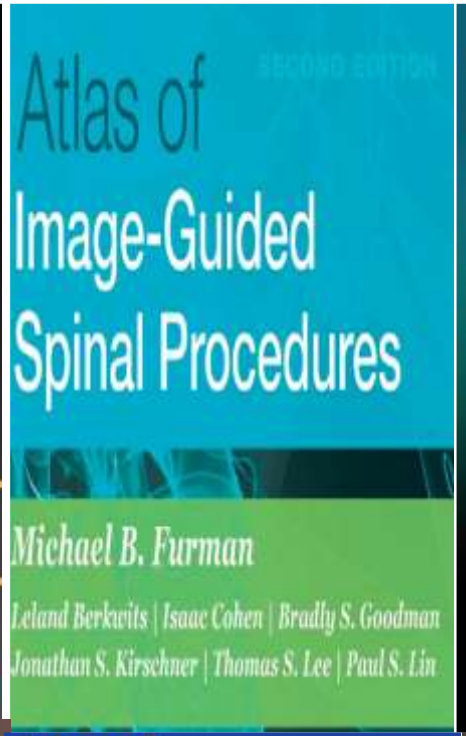
- Reversing the cascade of events that cause increased sympathetic sprouting,
- Reversing increased nerve growth factor (NGF), and an increase in the brain norepinephrine seen in these conditions.

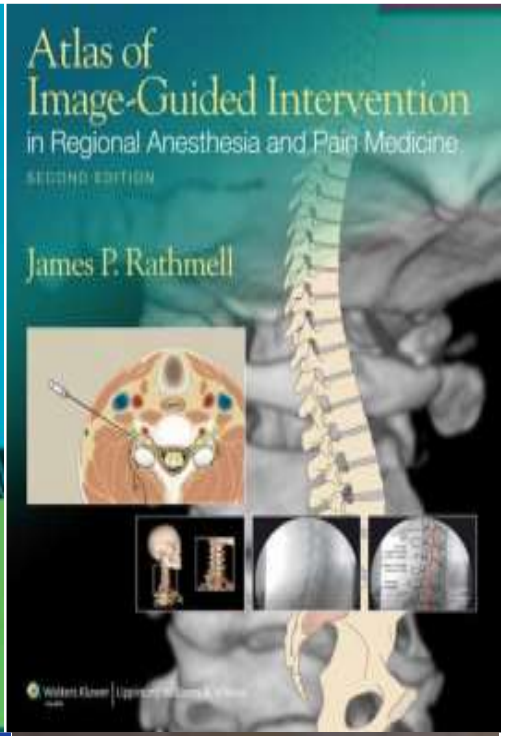
- Singh H, Rajarathinam M. Stellate ganglion block beyond chronic pain: A literature review on its application in painful and non-painful conditions. J Anaesthesiol Clin Pharmacol 2024;40:185-91.
- Lipov EG, Joshi JR, Sanders S, Slavin KV. A unifying theory linking the prolonged efficacy of the stellate ganglion block for the treatment of chronic regional pain syndrome (CRPS), hot flashes, and posttraumatic stress disorder (PTSD). Med Hypotheses 2009;72:657-61.

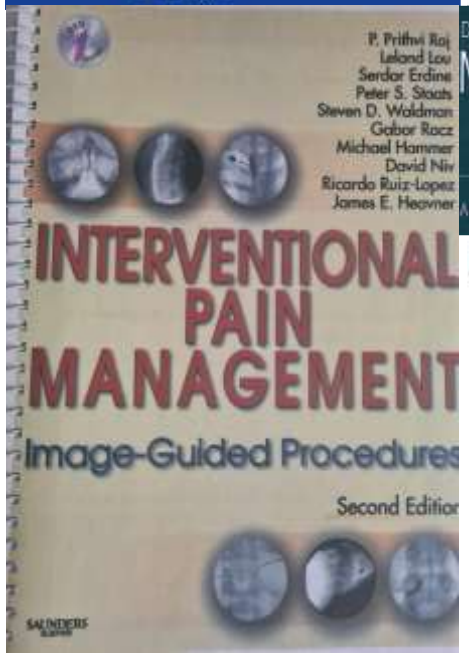

Agnes R. Stogicza
André M. Mansano
Andrea M. Trescot
Peter S. Staats
Editors
Interventional Pain
A Step-by-Step Guide for the FIPP Exam
Springer

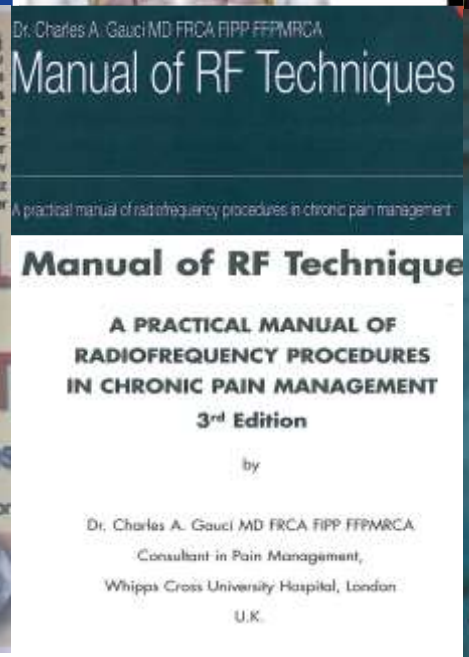

Textbook and Atlas of Neural Therapy
Diagnosis and Therapy with Local Anesthetics
Hans Barop
Thieme

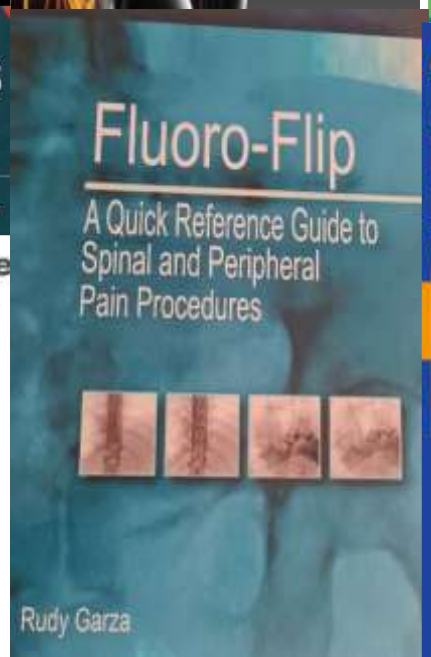

Diwan-Staats'
ATLAS OF
PAIN MEDICINE PROCEDURES
https://t.me/MedicalEbooksLibrary
SUDHIR DIWAN
PETER STAATS

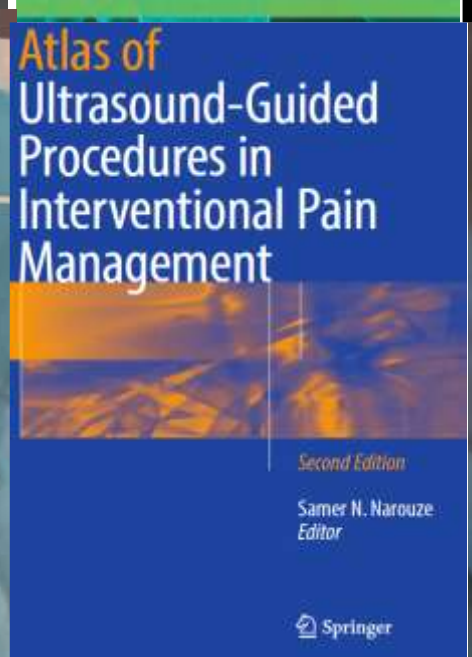

Atlas of
Image-Guided Spinal Procedures
Michael B. Furman
Leland Berkwits | Isaac Cohen | Bradly S. Goodman
Jonathan S. Kirschner | Thomas S. Lee | Paul S. Lin

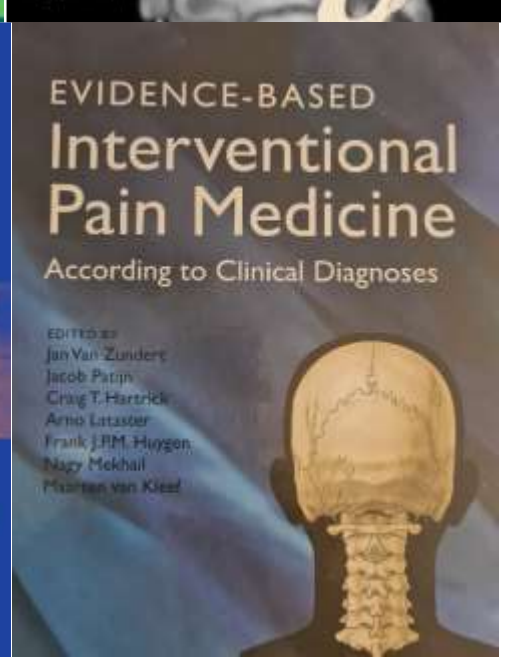

Atlas of
Image-Guided Intervention
in Regional Anesthesia and Pain Medicine
SECOND EDITION
James P. Rathmell


P. Prithvi Raj
Leland Lou
Serdar Erdine
Peter S. Staats
Steven D. Waldman
Gabor Racz
Michael Hammer
David Niv
Ricardo Ruiz-Lopez
James E. Heavner
INTERVENTIONAL PAIN MANAGEMENT
Image-Guided Procedures
Second Edition
SAUNDERS


Dr. Charles A. Gauci MD FRCA FIPP FFPMRCA
Manual of RF Techniques
A practical manual of radiofrequency procedures in chronic pain management
Manual of RF Technique
A PRACTICAL MANUAL OF RADIOFREQUENCY PROCEDURES IN CHRONIC PAIN MANAGEMENT
3rd Edition
by
Dr. Charles A. Gauci MD FRCA FIPP FFPMRCA
Consultant in Pain Management,
Whipps Cross University Hospital, London
U.K.


Fluoro-Flip
A Quick Reference Guide to Spinal and Peripheral Pain Procedures
Rudy Garza


Atlas of
Ultrasound-Guided Procedures in Interventional Pain Management
Second Edition
Samer N. Narouze
Editor
Springer


EVIDENCE-BASED
Interventional Pain Medicine
According to Clinical Diagnoses
EDITED BY
Jan Van Zundert
Jacob Patijn
Craig T. Hartrick
Arno Lataster
Frank J.P.M. Huygen
Nagy Mekhail
Maarten van Kleef


Thanks for your attention