

# ACUTE PIJN

## Locoregionale en Epidurale technieken

Dr Catherine Vandepitte Anesthesie  
ZOL – Campus St Jan 24-11-2022

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### BELANG BEHANDELING ACUTE PIJN?

On(der)behandelde pijn:

- CV stelsel: tachycardie, hypertensie, cardiac output ↑, O<sub>2</sub> verbruik ↑
- AH stelsel: oppervakkiger ademen, hypoventilatie, atelectase, infectie, O<sub>2</sub> aanbod ↓
- Stolling: abnormale stolling, DVT, ongemogen
- GI stelsel: vertraagde maag-darm transit
- Neuro-humoraal
- Immuniteit: immuunrespons ↓
- Evolutie naar chronische pijn

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### Multi-Modale Analgesie

**MEDICAMENTEUS**  
**NIET MEDICAMENTEUS**

**Systematisch multimodale analgesie ESSENTIEEL**

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## Niet Medicamenteus

- Spinale - Epidurale Analgesia (PCEA) - PVB
- Perifere Zenuwblocks/Plexus
  - Single Shot
  - Continu via catheter – (PCRA)
- Peri-operative infiltratie LA door chirurgen (LIA)

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## Doelstellingen

1. NEURAXIAAL
  - Spinaal
  - Epiduraal
  - Paravertebraal
2. PNB
3. QUESTIONS

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**ONDERBREEK MIJ**  
**STEL VRAGEN**

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# LAST

## Local Anesthetic Systemic Toxicity

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**LAST: SYMPTOMS, DIAGNOSIS & TREATMENT** NYSORA Learning System

**SYMPTOMS OF LAST (LOCAL ANESTHETIC SYSTEMIC TOXICITY)**

- CNS more sensitive to LA toxicity than CVS — CNS symptoms precede CVS symptoms
- LAs affect the balance between inhibitory and excitatory pathways in the CNS
- W/low doses of LA or inadvertent injection, CNS (prolonged) CV symptoms may be absent and
- W/high doses of LA or inadvertent injection, CNS (prolonged) CV symptoms may be absent and
- First manifestation could be CVS toxicity (11%)
- CV symptoms include:
  - systemic vascular resistance
  - hypotension
  - bradycardia
  - asystole
  - cardiac arrest

**EVERY BLOCK ROOM - CPR EQUIPMENT PRESENT - LIPID EMULSION PRESENT**

**DIAGNOSIS**

- LAST can occur immediately at the time of injection (usually accidental intravascular injection) or up to an hour after it (due to delayed tissue absorption)
- Continue monitoring for 30-45 min after injection of large volumes or toxic doses of LAs
- Monitor patients with any signs of LAST for 2-6 hrs because cardiovascular depression due to LAs can persist or recur after treatment

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**NYSORA Tips**

- There is a greater likelihood for LA systemic toxicity in petite patients (small muscle mass), those at the extremes of age, and patients with preexisting heart disease or carnitine deficiency.
- Roughly half the cases of LAST are atypical, with no seizures (other CNS symptoms), only CV toxicity or delayed onset.
- The incidence of toxicity increases with injections near richly vascular areas. It is highest with paravertebral injections, followed by upper and lower extremity PNBs.
- Prevention of LAST-related morbidity requires optimizing a complete system for regional anesthesia: patient selection, nerve block choice, drug and dose, complete monitoring and use of USGRA when possible, and preparing for LAST by having a kit available and practicing with simulation.
- Prevention also includes raising awareness and educating our non-anesthesiology colleagues about proper use of LAs and risks, including management of LAST.

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Emergency equipment – medicatie LRA	
Airway Equipment	Ambu bag with mask Oxygen source Oral and nasal airways Laryngoscope handles and blades Endotracheal tubes Eschmann stylet/bougie Syringes and needles
Emergency Drugs	Ephedrine Phenylephrine Epinephrine Atropine Sedative/hypnotic 20% lipid emulsion Succinylcholine

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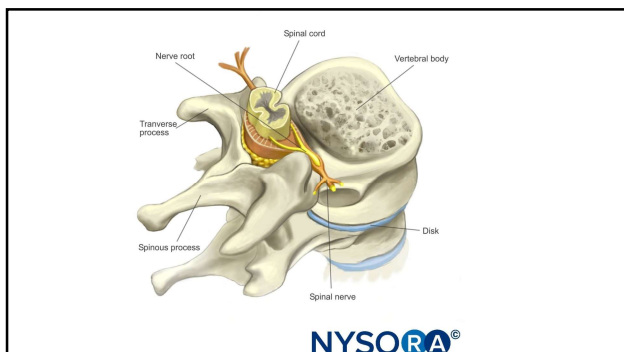
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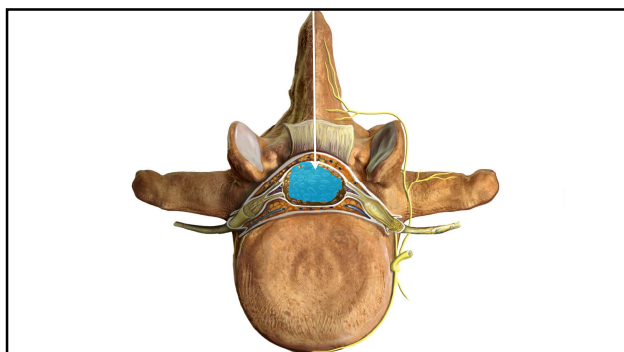
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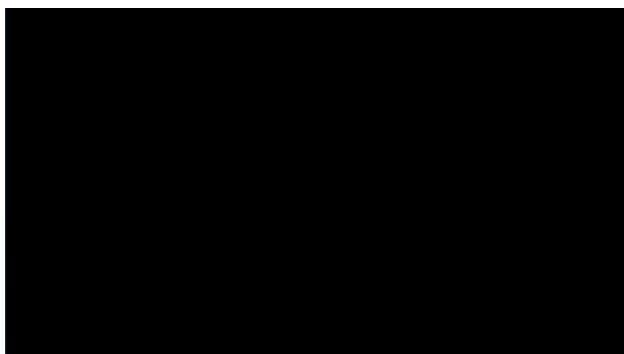
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**BILATERAAL MOTOR + SENSORISCH BLOCK:**

**SNELLE ONSET**

**DUUR : ifv lokaal anestheticum: SHORT vs LONG**

**Bvb. Spinale THP/TKP**  
10mg Bupivacaine isobaar: 3-4 uur motor block  
4-8 uur sensorisch block  
60mg Tachypri hyperbaar: 1,5-2 uur motor block  
3-4 uur sensorisch block

Sensorisch block recupereert meestal **NA** motor block  
→ voordeel = analgesie dadelijk postop

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**Aandachtspunten**

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Sensorisch block recupereert meestal **NA** motor block  
→ **Anticiperen wat pijnbeleid betreft!**

**NEUROLOGISCH** opvolgen !!

**HEMODYNAMISCH** opvolgen!!!

**VOCHTBELEID!!**

**URINERETENTIE** → BLADDERSCAN / sonderen zn

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# EPIDURALE ANESTHESIE - ANALGESIE

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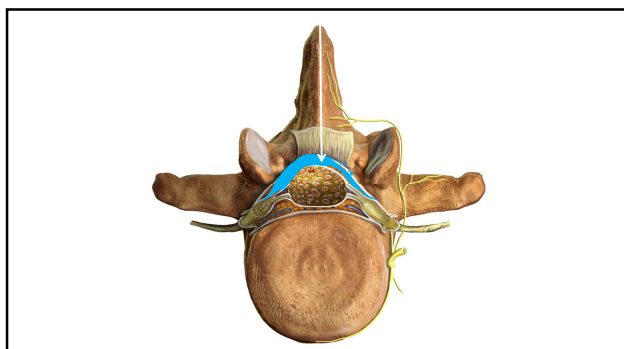
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### EPIDURAL ANESTHESIA: THORACIC AND LUMBAR TECHNIQUES


**PREPARATION**

1. **Patient evaluation:** Medical history, current medications, physical examination, baseline coagulation status (bleeding disorders)
2. **Equipment preparation:** Standard, sterile, disposable epidural tray - Emergency equipment
3. **Patient position:** Sitting or lateral decubitus



**4 APPROACHES TO THE EPIDURAL SPACE**

- Midline approach
- Paramedian approach
- Taylor (modified paramedian) approach
- Caudal approach




**TECHNIQUES TO IDENTIFY EPIDURAL SPACE**

- **Loss of resistance (LOR):** Relies on 4 tissue densities as needle passes through ligaments into epidural space
  - o **LOR to air:** ↑ resistance when needle enters the ligamentum flavum followed by a subtle "give" when light pressure is applied on plunger
  - o **LOR to saline (with/without air bubble):** Fill syringe with 2-3 mL of saline or saline with air bubble → advance needle as with LOR to air → apply

**MIDLINE APPROACH: STEP BY STEP**

1. Identify the desired interspace by surface anatomic landmarks and palpation guidance
2. Infiltrate the skin and subcutaneous tissue with LA (lidocaine 1%)
3. Insert the stylet/epidural needle along the same path with the bevel oriented
4. Advance the epidural needle through the skin, subcutaneous tissue, adipose ligament, interspinous ligament, and into the ligamentum flavum → needle
5. Remove the stylet from the epidural needle and attach the LOR syringe with air bubble to the needle hub
6. Advance the epidural needle into the epidural space → the LOR syringe plunger
7. Insert the catheter until the 15 cm mark, is visualized entering the needle hub without dislodging the catheter and thread the catheter 4-5-6 cm into the epidural space (short surgical procedures)
8. Inject LA
9. Secure the catheter to the patient's back with the connector at the patient's shoulder



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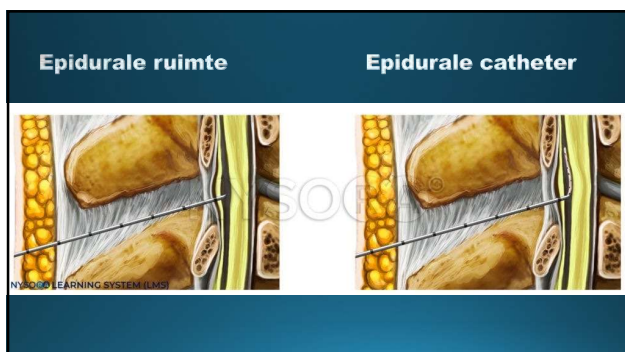
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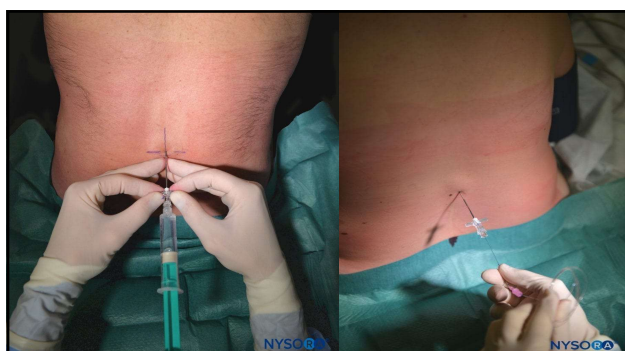
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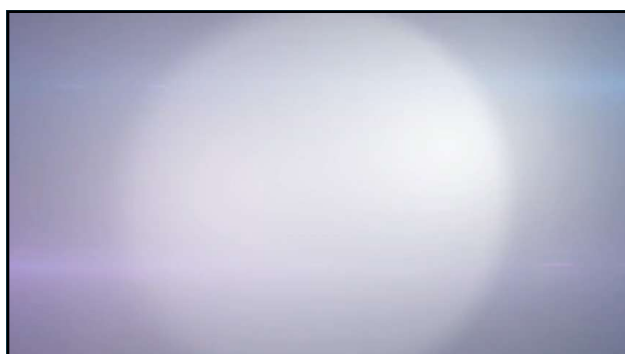
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Contraindications to epidural block.	
<b>Absolute</b>	<ul style="list-style-type: none"> <li>• Patient refusal</li> <li>• Severe <u>coagulation abnormalities</u> (eg, frank disseminated intravascular coagulation)</li> </ul>
<b>Relative and Controversial</b>	<ul style="list-style-type: none"> <li>• Sepsis</li> <li>• Elevated intracranial pressure</li> <li>• Anticoagulants</li> <li>• Thrombocytopenia</li> <li>• Other bleeding Diatheses</li> <li>• Preexisting central nervous system (eg, multiple sclerosis)</li> <li>• Fever/ infection (eg, varicella zoster virus)</li> <li>• Preload dependent states (eg, aortic stenosis)</li> <li>• Previous <u>back surgery, preexisting neurologic injury, back pain</u></li> <li>• Placement in anesthetized adults</li> <li>• Needle placement through tattoo</li> </ul>

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## EPIDURALE – AANDACHTSPUNTEN

- Niveau plaatsing Epidurale bepaalt level sensorisch blok
- Precieze plaatsing en titratie LA (continu+bolus) essentieel voor:
  - Bekomen van effectieve analgesie
  - Beperkt motor blok
  - Iedere patient is anders/reageert anders

**MULTIMODALE analgesie en ESCAPE – NOODZAKELIJK**

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## EPIDURALE – AANDACHTSPUNTEN

- Blaassonde ovw urine retentie
- Pruritus (jeuk) mogelijk : sufenta
- **NEUROLOGISCHE OPVOLGING ! OOK NA verwijderen catheter**
  - Alarm signalen?
    - Toenemend motorblok / unilateraal motorblok
    - Unresponsive patient
    - Motorblok/zadelblok na verwijderen epidurale catheter
    - LAST: oorsuizen – metaalsmaak – minder alert
    - Geen blok

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Tabel 4. Aanbevolen minimum tijdsintervallen of stollingstijden voor/na insertie van neuraxiale naalden/katheters en manipulatie/verwijdering van katheters (Gebaseerd op \*)

	Tijd tussen laatste dosis en insertie/verwijdering + labo onderzoek	Tijd tussen insertie/verwijdering en volgende dosis
<b>LMGH (Lage dosis)</b>	12 u Bloedplaatjesteuring zo LMGH > 5 dagen	4 u
<b>LMGH (Hoge dosis)</b>	24 u Bloedplaatjesteuring zo LMGH > 5 dagen	4 u
<b>OFH (Lage dosis)</b>	4 h	1 h

I h bij IV gebruik tijdens vaatheelkunde

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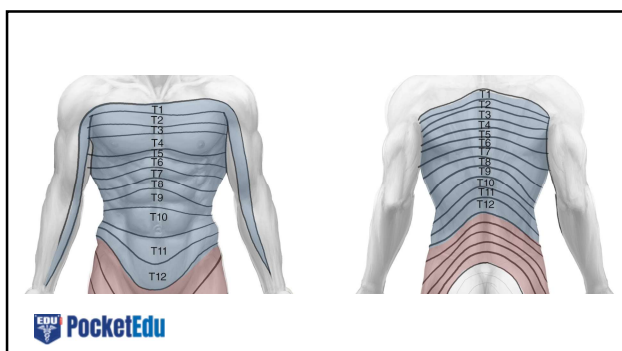
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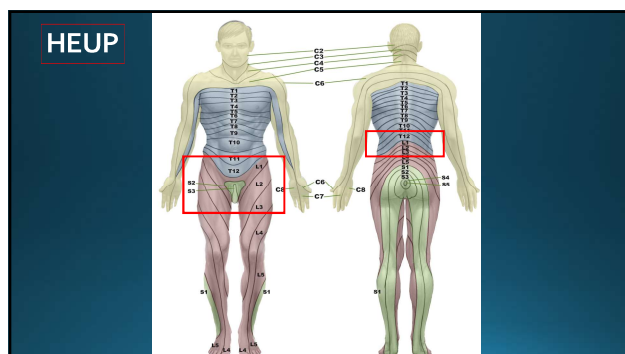
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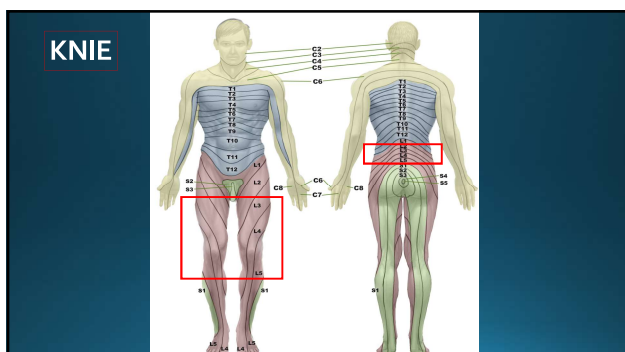
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COMPLICATIONS OF NEURAXIAL ANESTHESIA		NYSORA Learning System
<p><b>ABOUT</b></p> <ul style="list-style-type: none"> <li>Clear difference between physiologic effects = complications of neuraxial anesthesia</li> <li>It is important to understand and respect the risks of neuraxial anesthesia</li> </ul> <p><b>CENTRAL NERVOUS SYSTEM</b></p> <p><b>Paraplegia</b></p> <ul style="list-style-type: none"> <li>1:100,000</li> <li>Neurological injury: Needle trauma to the spinal cord + toxicity of injectant + hypotension and ischemia to the spinal cord</li> </ul> <p><b>Cauda equina syndrome (CES)</b></p> <ul style="list-style-type: none"> <li>1:100,000</li> <li>CES occurs when there is a dysfunction of multiple lumbar and sacral nerve roots of the cauda equina.</li> <li>Lumbosacral nerve roots are vulnerable to large doses (single injection and/or intermittent doses) of LA</li> </ul> <p><b>caudal hematoma</b></p> <ul style="list-style-type: none"> <li>7:100,000</li> <li>Can cause ischemic compression and permanent neurological damage when not recognized</li> <li>Risk factors: Difficult or traumatic needle/catheter placement, female, genetic, elderly</li> </ul> <p><b>Nerve injury</b></p> <ul style="list-style-type: none"> <li>1:100,000</li> <li>Radiculopathy more frequent with epidural anesthesia or CSE as compared to spinal anesthesia</li> <li>The occurrence of radicular pain or paresthesia during the procedure is a risk factor for permanent nerve damage</li> </ul> <p><b>Postdural puncture headache (PDPH)</b></p> <ul style="list-style-type: none"> <li>1:100 in spinal anesthesia</li> <li>Complication of puncture of the dura mater</li> <li>Frontal or occipital headache that worsens with upright or seated posture and is relieved by lying supine</li> </ul> <p><b>Transient neurologic symptoms (TNS)</b></p> <ul style="list-style-type: none"> <li>Characterized by bilateral or unilateral pain in the buttocks radiating to the legs or isolated buttock or leg pain</li> <li>More common with lidocaine injection</li> <li>Symptoms occur within 24 hrs of the resolution of an otherwise uneventful spinal anesthetic and are not associated with any neurologic deficits or laboratory abnormalities</li> <li>Resolve spontaneously within a week</li> </ul>	<p><b>CARDIOVASCULAR SYSTEM</b></p> <ul style="list-style-type: none"> <li><b>Hypotension</b> - Risk factors: Block height &gt;T5, &gt;40 years, low baseline BP/CSE</li> <li><b>Bradycardia</b> - Risk factors: Baseline HR &lt;60 bpm, &lt;37 years, male gender, non-emergency status, <math>\beta</math> blockers, and prolonged duration of surgery</li> <li><b>Cardiac arrest</b></li> </ul> <p><b>RESPIRATORY SYSTEM</b></p> <ul style="list-style-type: none"> <li><b>Respiratory depression</b> may stem from rostral spread of opioids within the CSF to the chemosensitive respiratory centers in the brainstem</li> <li><b>Dose dependent:</b> Occurs at a rate of 3% with injection of 0.8 mg intrathecal morphine</li> <li><b>Lipophilic anesthetics:</b> Respiratory depression may occur within the first 30 min -- <b>intrathecal morphine:</b> Late respiratory depression may occur up to 24 hrs after injection</li> </ul> <p><b>OTHER SIDE EFFECTS</b></p> <ul style="list-style-type: none"> <li>Purpura: 30-100%</li> <li>Urinary retention: 30%</li> <li>Nausea and vomiting</li> <li>Shivering</li> <li>Infection: Bacterial meningitis or abscesses (3:100,000)</li> </ul>	

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# ALTERNATIEVEN?

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# PARAVERTEBRAL BLOCKS

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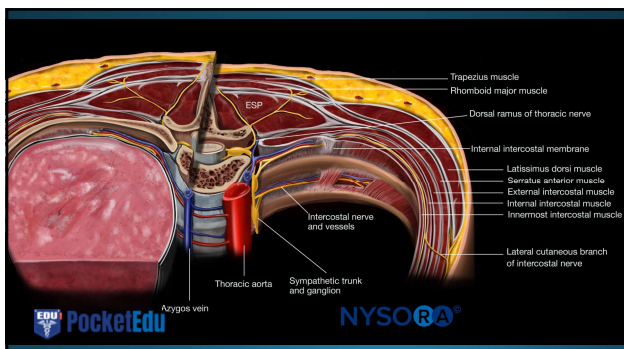
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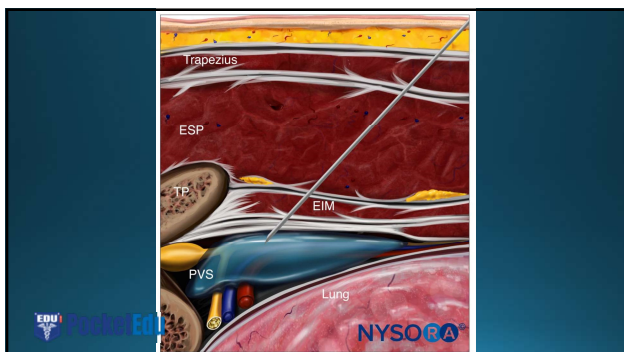
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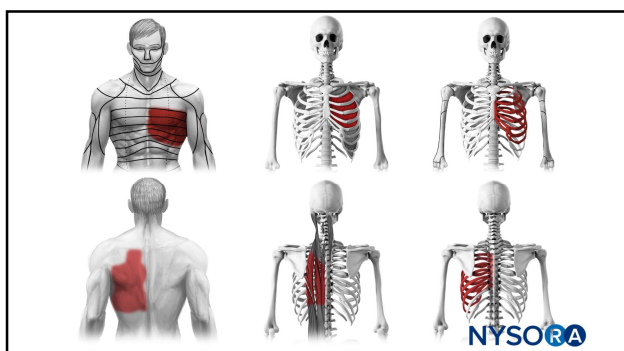
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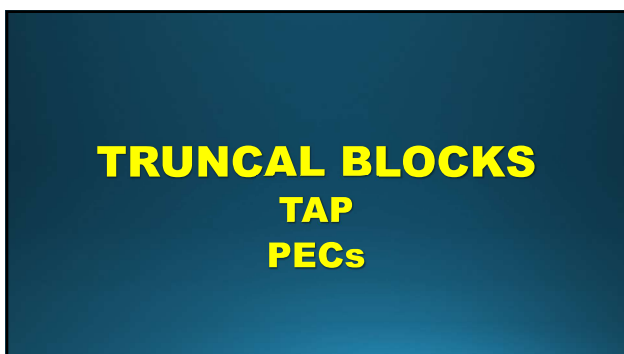
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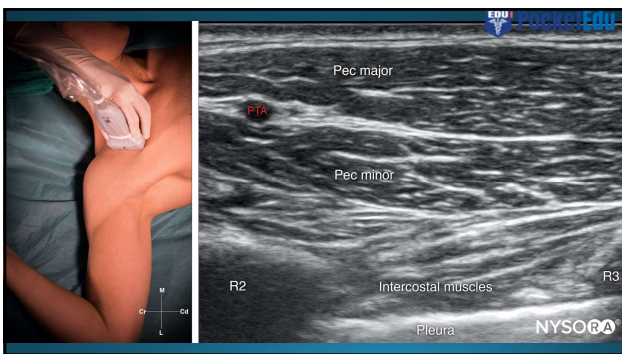
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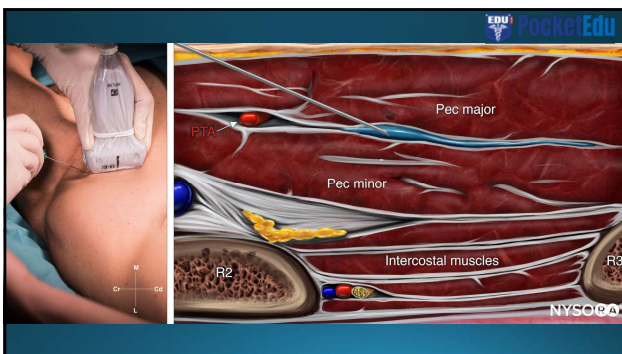
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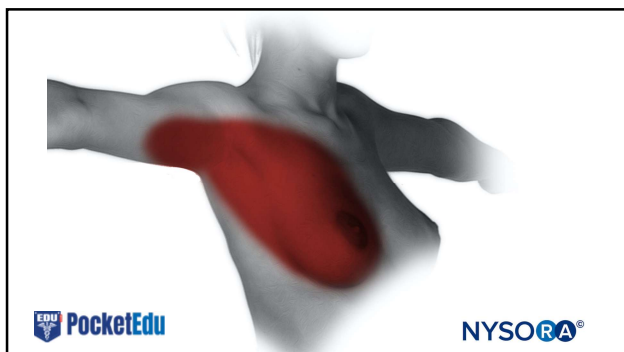
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# Transversus Abdominis Plane Blocks

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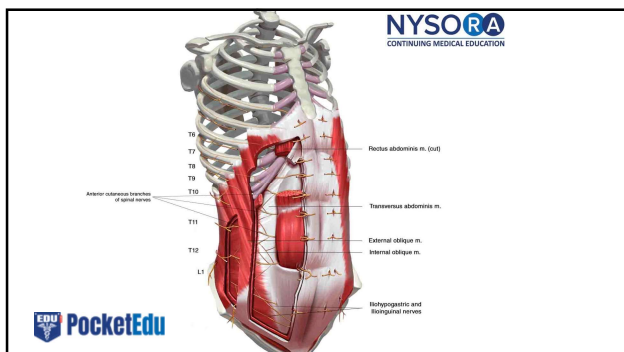
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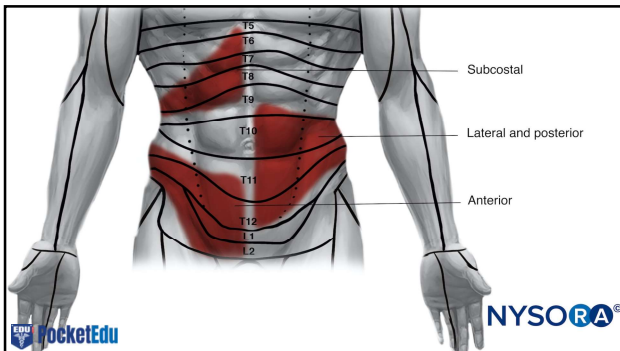
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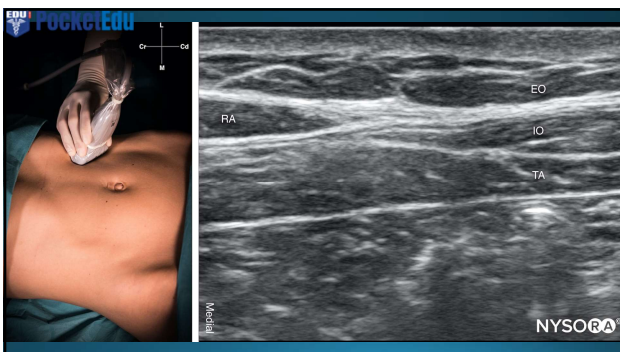
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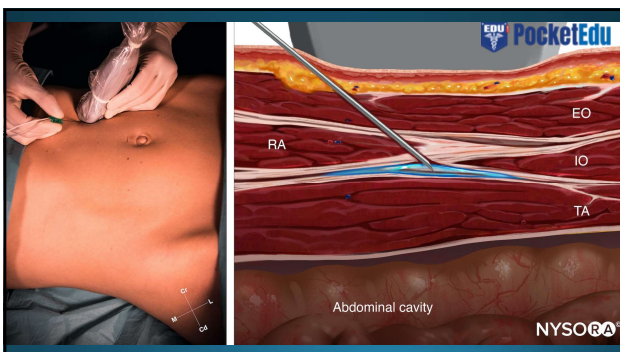
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# PNB

## Peripheral Nerve Blocks

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<u>Single shot</u>	<u>Katheter</u>
<ul style="list-style-type: none"><li>• Eenmalige injection</li><li>• Geen PCA</li><li>• Beperkt in duur – ifv duur LA</li></ul>	<ul style="list-style-type: none"><li>• Verlengen analgesie</li><li>• PCA</li><li>• Continuous infusion</li><li>• +/- Bolus</li><li>• of Bolus only</li></ul>

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# LRA ifv orthopedische ingrepen

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# SCHOUDER

- Arthroscopie schouder
  - Rotatorcuff herstel
  - Totale schouderprothese
  - Mobilisatie frozen shoulder
  - Proximale humerusfractuur
  - ...
- AA + ISB single shot / katheter

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# INTERSCALENE BRACHIAL PLEXUS BLOCK

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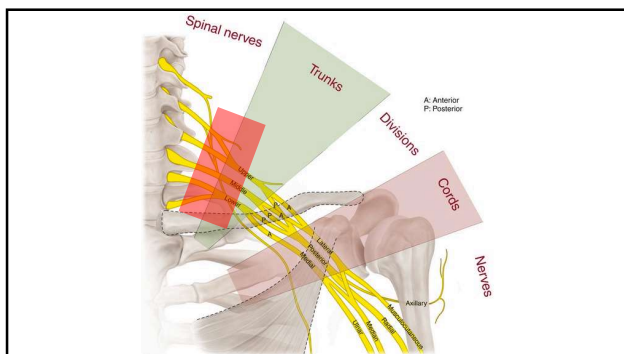
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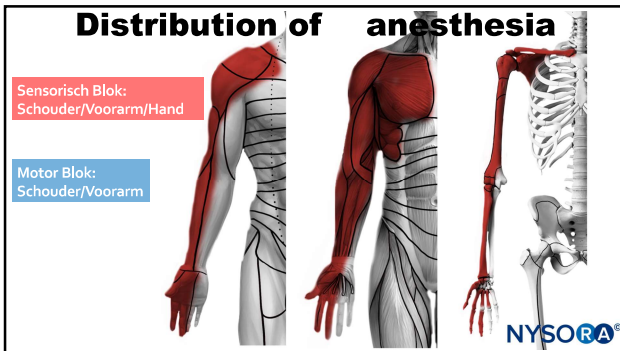
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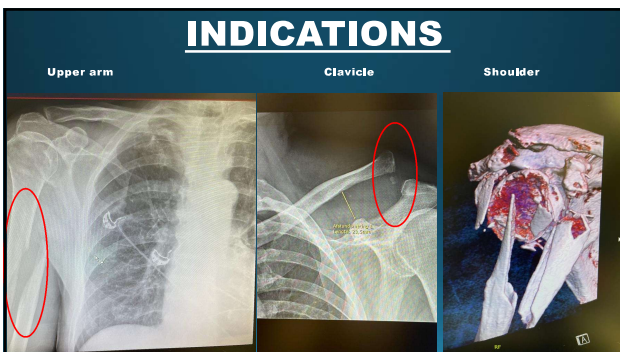
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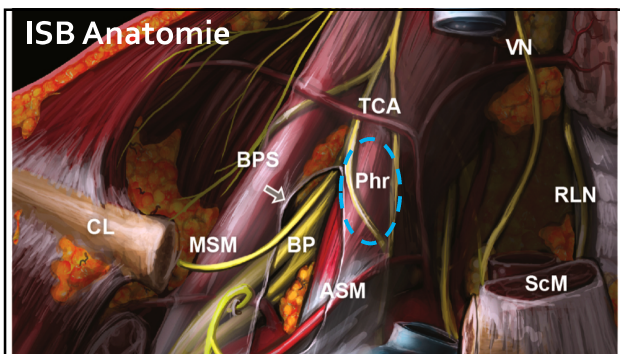
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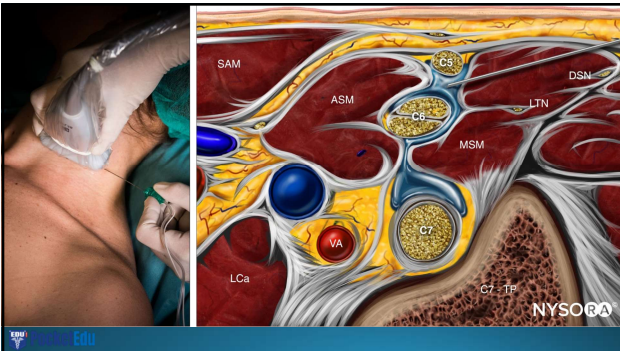
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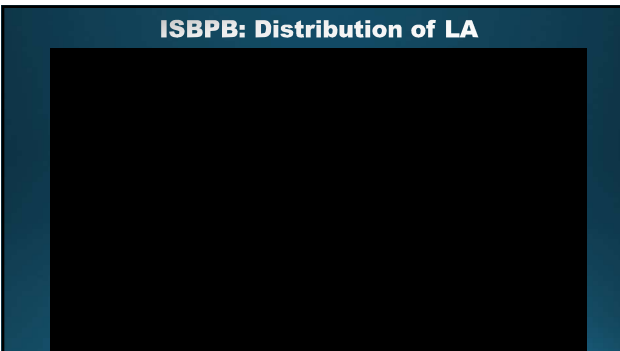
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Ziekenhuis Oost-Limburg

# Aandachtspunten

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Ziekenhuis Oost-Limburg

## NERVE BLOCK/PLEXUS **ALTIJD**

Krachtsverlies/gevoelsverlies lidmaat  
→ verpleegkundige interventies:

- \* **juiste positionering:**
  - ondersteun arm
  - kussens/draagdoek
  - bescherm het lidmaat!



- \* **informeer patient: cave verbranden**



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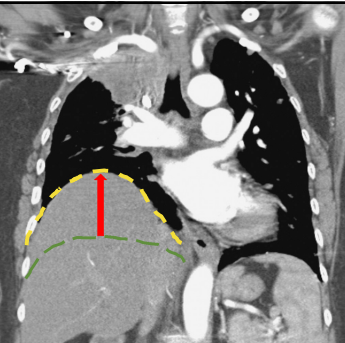
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## 1. Hemidiafragma Parese

Ademhalingsmoeilijkheden



Ziekenhuis Oost-Limburg

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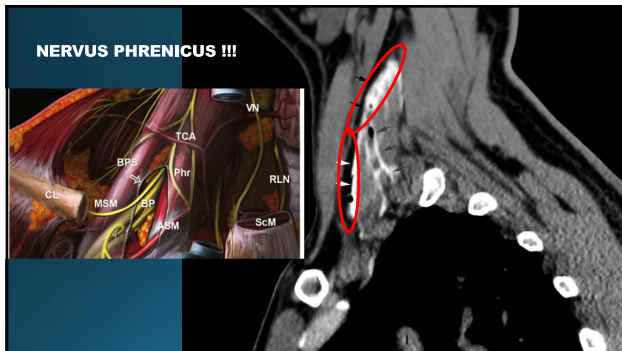
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1. Hemidiafragma Parese

→ **verpleegkundige interventies:**

- Geruststellen- uitleggen
- Half zittende houding



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**Fowler's Position**

Head and torso raised between 45 and 60 degrees.



NURSE PLUS ACADEMY

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1. Hemidiafragma Parese

Ziekenhuis Oost-Limburg

→ **verpleegkundige interventies:**

- Geruststellen- uitleggen
- Half zittende houding
- **Neem contact op met anesthesie**
- Geef indien nodig zuurstof 2l (bril)/6l (masker)

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2. Horner syndroom **Symptomen**

- Hangend ooglid (= ptose)
- Kleine pupil ipsilateraal (= miose)
- Verminderd zweten in het gelaat aan getroffen zijde (= anhidrose)
- Dieper liggend oog

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**2. Horner syndroom** 

**VOLUME LA**

→ **Verpleegkundige interventies**

- Informeren/geruststellen van de patiënt
- Documenteren
- Contacteer anesthesie zo nodig



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**3. Nasale congestie** 

**4. Heesheid/stemverlies**

**VOLUME LA**

→ **verpleegkundige interventies:**

- Informeren patiënt
- Documenteren
- Contacteer anesthesist



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**5. Slikproblemen**  
(n. Glossopharyngeus) 

**VOLUME LA**

→ **verpleegkundige interventies:**

- Informeren/geruststellen patiënt
- Rechtzittende houding
- Aangepaste voeding om slikken te voorkomen
- Contacteer anesthesist



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**INTERSCALEEN Katheter**  
**ALTIJD**

Ziekenhuis  
Oost-Limburg

- Indien verband los:  
check diepte catheter (markering)
- Bij twijfel positie: contacteer anesthesie  
Controle US-guidance

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**Positionering ISB**



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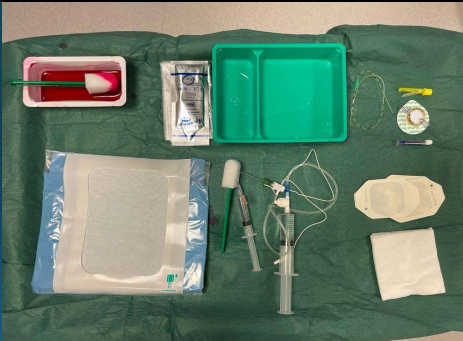
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**NERVE BLOCK SET**



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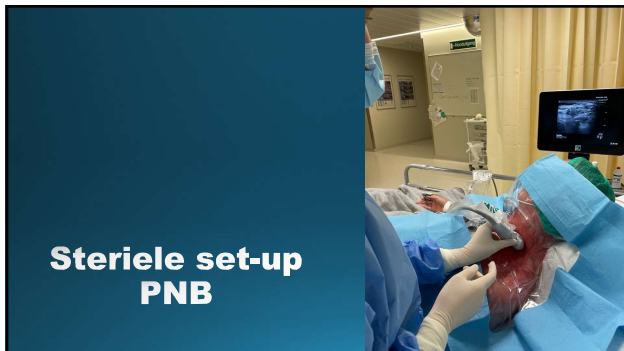
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**Steriele set-up  
PNB**

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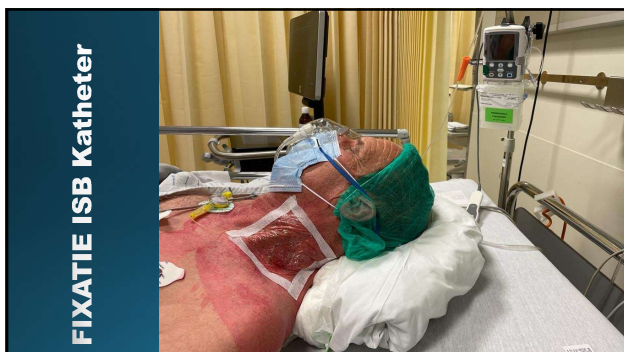
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**FIXATIE ISB Katheter**

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**CAVE - EJV PUNCTURE**

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**Effect of neck movement on catheter**



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**ALTERNATIEF ?**  
- schouderchirurgie  
- respiratoire insufficiëntie

**Motor Sparing** Nerve Blocks for the Upper Limb

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**SHOULDER BLOCK**

**= SUPRASCAPULAR & AXILLARY NERVE BLOCK**

81

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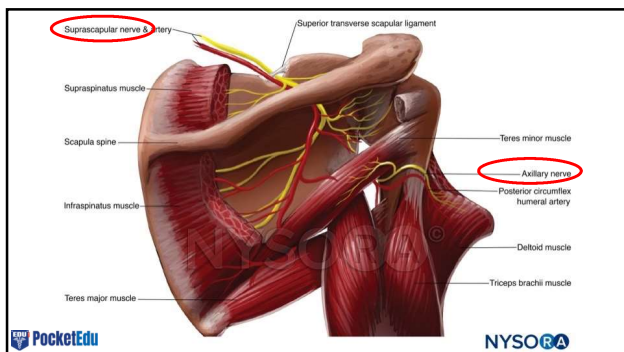
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A	
B	
C	

### INDICATIONS

- **Shoulder**
- **Unable to tolerate >20% reduction FRC**

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# ELLEBOOG

- Elleboogprothese/fractuur
- Nervus ulnaris release
- ...

Supra/Infraclavicular Block ss/kt +/- AA

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# SUPRACLAVICULAR BRACHIAL PLEXUS BLOCK

85

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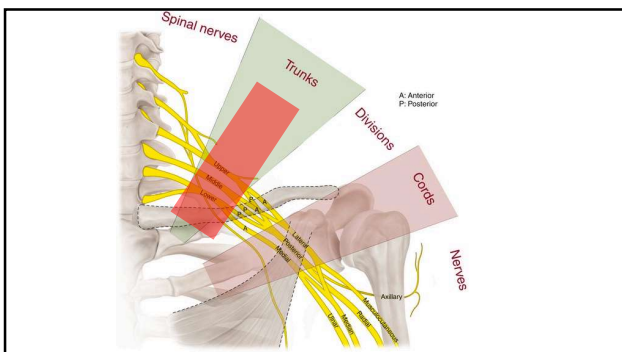
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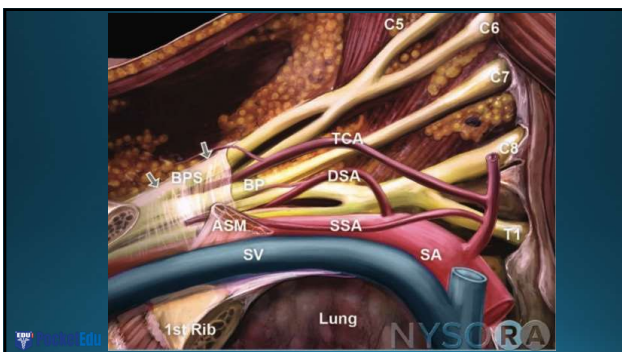
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