

# Complicatii ale anesteziei regionale

Radu Tabacaru

Spit “Maria S Curie” Bucuresti

# Rahianestezia / epidurala

- Hipotensiunea
  - Hipovolemie
  - Stenoza Ao = Contra-Indicatie
- Reactii Vagale
  - Bradicardie extrema  $\pm$  hipotensiune 13-28%
  - Stop cardiac \*

\*Caplan RA, Ward RJ, Posner K, Cheney FW. Unexpected cardiac arrest during spinal anesthesia: a closed claims analysis of predisposing factors. *Anesthesiology* 1988; 68: 5–11.

\*Geffin B, Shapiro L. Sinus bradycardia and asystole during spinal and epidural anesthesia: a report of 13 cases. *Journal of Clinical Anesthesia* 1998; 10: 278–85.

- Rahianestezie totala
  - Afectare respiratorie + neurologica
  - Necesita asistare/ protezare respiratorie
    - Complicatie a: bloc interscalenic\*\*, plex lombar\*
- Rahianestezia inalta
  - Progresie extinsa a blocului
  - Monitorizare: inspir profund + tuse

\*Gentili M, Aveline C, Bonnet F. Total spinal anesthesia after posterior lumbar plexus block. Annales Franc,aises d'Anesthesie et de Reanimation 1998; 17: 740–2.

\*\*Harrop-Griffiths W, Denny NM. The cat in the kitchen: problems with the Pippa technique. Anaesthesia 2006; 61:1028–30.

- Esecul
  - rahianesteziei
    - Extrem de rar daca se obtine LCR
  - Epidural
    - Pierdere rezistenta falsa,
    - folosire aer
    - Cateter introdus > 5 cm

- Cefalee post punctie durala
- Hematom spinal\*
  - 1:150.000 peridurala
  - 1:220.000 rahianestezie
  - Diagnostic CT RMN
  - decompresie < 8-12 ore

\* Tryba M. Epidural regional anesthesia and low molecular heparin. Anesthesiol Intensivmed Notfallmed Schmerzther. 1993;2:179–81

- Abces epidural
  - Incidenta 0,015% si 0,07% \*
  - Diagnostic CT, RMN
  - stafilococii (57%) si streptococii (18%) si apoi bacilii gram negativi (13%)
- Meningita
  - Diagnostic punctie lombara
  - Streptococ alfa hemolitic cel mai frecvent

\* Epidural abscess complicating epidural anesthesia and analgesia. An analysis of the literature. Kindler CH, Seeberger MD, Staender SE Acta Anaesthesiol Scand. 1998 Jul; 42(6):614-20

- Arahnoidita
- Simptome neurologice tranzitorii\*
  - Dureri radiculare ( $\pm$  o spatamana)
  - 1993 incidenta 30%
- Sindrom de compartiment
- Glob vezical
- Leziuni de decubit

\* Transient neurologic toxicity after hyperbaric subarachnoid anesthesia with 5% lidocaine.  
Schneider M, Ettl T et al Anesth Analg. 1993 May; 76(5):1154-7

# Blocurile periferice

- Tehnica sigura.....!
- Leziuni nervoase\*
  - 0,03% supraclavicular
  - 3% interscalenic
  
- Majoritatea se remit in cateva saptamani

\*R Brull, C.McCartney,V. Chan, H El-Beheiry. Neurological Complications After Regional Anesthesia:Contemporary Estimates of Risk Anest & Analg Vol. 104, No. 4, April 2007



# Mecanisme ale leziunii

- Trauma cu acul
- Edem/ hematom al nervului
- Efectul de presiune al anesteziului
- Toxicitatea locala a anesteziului
- factori favorizanti
  - Neuropatie diabetica
  - Manipulare chirurgicala
  - Presiune turniquet
  - Presiune aparat gipsat

- Selander 1979\*
  - Injectarea intraneurala produce leziuni
- Sala-Blanch 2004\*\*
  - Cateter intraneural sciatic
- Bigeleisen 2006\*\*\*
  - Injectare intentionata intraneurala axilar

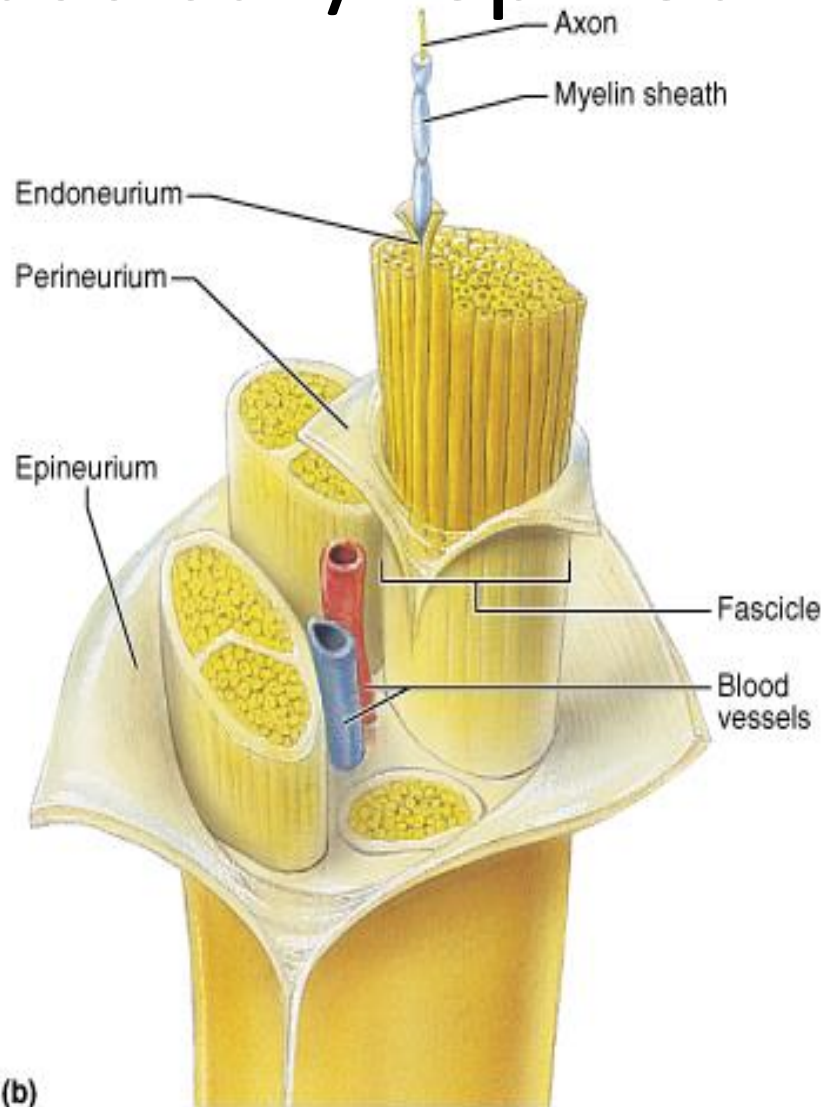
\*Selander D, Brattsand R, Lundborg G, Nordborg C, Olsson Y. Local anesthetics: Importance of mode of application, concentration and adrenaline for the appearance of nerve lesions. An experimental study of axonal degeneration and barrier damage after intrafascicular injection or topical application of bupivacaine (Marcain). Acta Anaesthesiol Scand 1979;23:127-36.

\*\*X Sala-Blanch, J Pomés, P Matute. Intraneural Injection during Anterior Approach for Sciatic Nerve Block: What Have We Learned and Where to Go from Here? Anesthesiology 6 2005, Vol.102, 1283-1284

\*\*\*Bigeleisen PE Nerve puncture and apparent intraneural injection during ultrasound-guided axillary block does not invariably result in neurologic injury. Anesthesiology. 2006 Oct;105(4):779-83

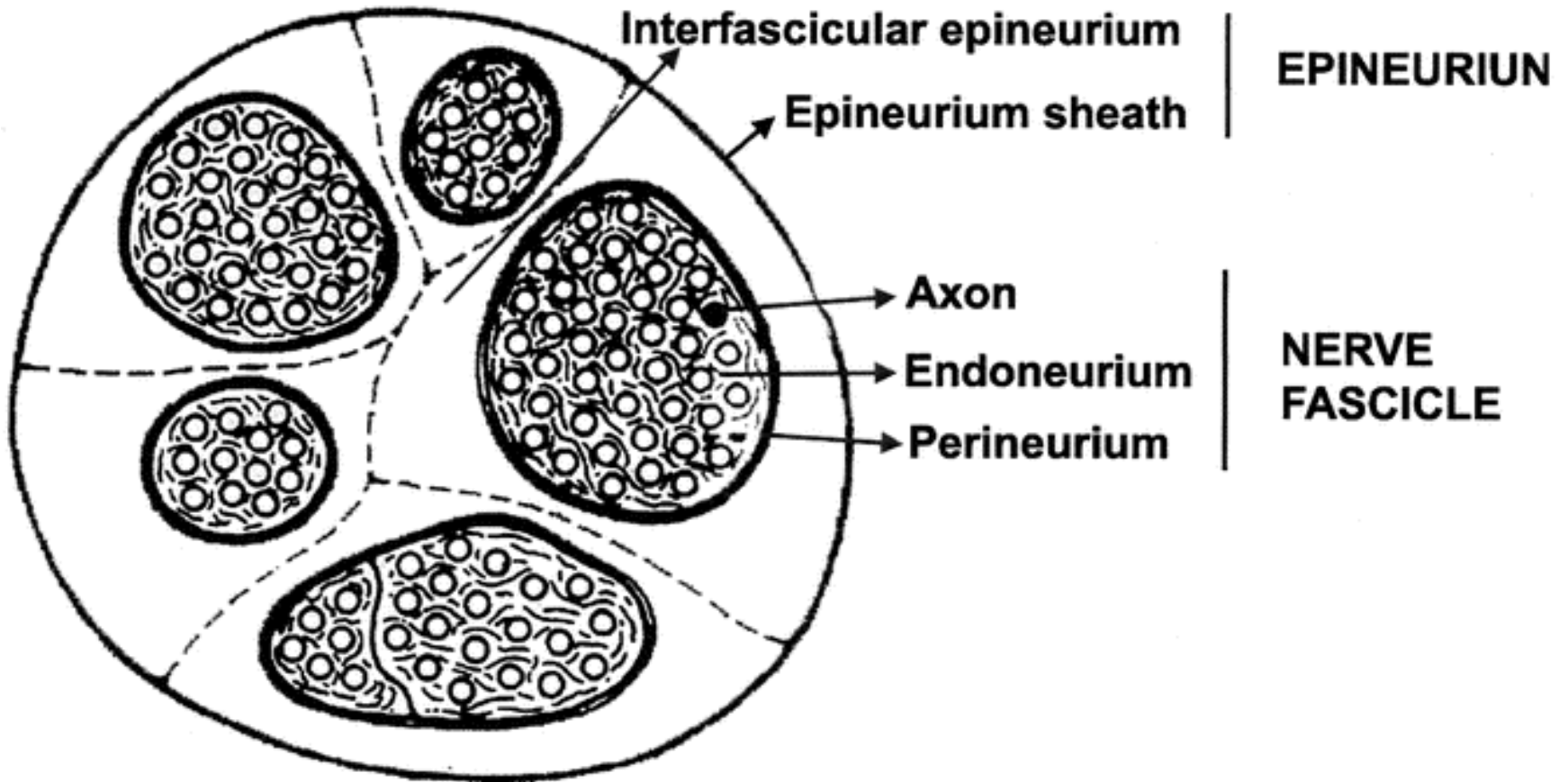
- 2009 Robarts echo+stimulare (0,2-0,5) sciatic
  - 83% raspuns doar dupa inteparea nervului !!!
    - 0,2-0,5 mA < 20psi
  - restul nu s-a obtinut raspuns chiar la 1,5mA intraneural !!!
  - deci probabil blocurile fara echo sunt multe intraneural

# Fascicul / epineurium



(b)

# Structura nervi



# Intra-fascicular / extra-fascicular

- Locul de injectare are importanta covarsitoare\*
  - Extrafascicular NU produce leziuni
  - Intrafascicular produce leziuni
    - Presiune intrafasciculara...
    - Efect toxic direct
      - Bupivacaina0,5%, mepivacaina1% < procaina2%, teracaina1%

\* Gentili F, Hudson A; Hunter D, Kline D. Nerve injection injury with local anesthetic agents: a light and electron microscopic, fluorescent microscopic, and horseradish peroxidase study. Neurosurgery 1980; 6(3):263-272

- riscul de injectare intra-fasciculara este dependent de locul in care se face injectarea
- respectiv de raportul fascicul / epineurium (F/E)
  - supraclavicular raport F:E = 1:1
  - subclavicular raport F:E = 1:2

# Mecanismul injuriei nervoase

- Traumatism produs de ac
  - Se pare ca acele mici produc leziuni mai reduse \*
  - Bizoul scurt = fibrele nervoase “fug” din calea acului\*\*
- Ischemia
- Compresia
- Tractiunea

\*Steinfeld T Nerve injury by needle perforation in regional anesthesia: does size matter? BJAesthesia 2010;104(2):245-253

\*\*Selander D. Peripheral Nerve Injury due to Injection Needles used for Regional Anesthesia Acta Anesth. Scand. 1977;21(3):182-188



# Mecanismul injuriei nervoase

- Natura substantei injectate
  - Anestezicele sunt potential toxice\*
  - Scad fluxul sanguin\*\*
  - Adrenalina ↓ flux cu 30%
  - Adren + Lidocaina ↓ cu 80% !!!
    - Clinic fara consecinte nefaste.....

\*Lambert LA, Lambert DH, Strichartz GR. Irreversible conduction block in isolated nerve by high concentrations of local anesthetics. Anesthesiology. 1994 May;80(5):1082-93.

\*\*H Bouaziz et al. Effects of Levobupivacaine and Ropivacaine on Rat Sciatic Nerve Blood Flow .Br J Anaesth 95 (5), 696-700.

# Prevenirea leziunilor nervoase

- Durere la injectare
  - Are neajunsuri:
    - Dificil de evaluat
    - Subiectiva
    - Greu de diferentiat fata de disconfortul introducerii acului
    - Stari patologice: diabet, neuropatii
    - Premedicatia

# Prevenirea leziunilor nervoase

- Bigeleisen provoaca 72 injectari intraneurale din care doar 66 au parestezii/disestezii dar nici unul complicatii neurologice \*
- Durerea nu se poate folosi ca indicator la pacientii:
  - Pediatrici
  - Sedati /anesteziati
  - Tulburari neuropsihice
  - Politraumatizati
  - Blocuri repetate

\*Bigeleisen PE Nerve puncture and apparent intraneural injection during ultrasound-guided axillary block does not invariably result in neurologic injury. *Anesthesiology*. 2006 Oct;105(4):779-83

# Prevenirea leziunilor nervoase

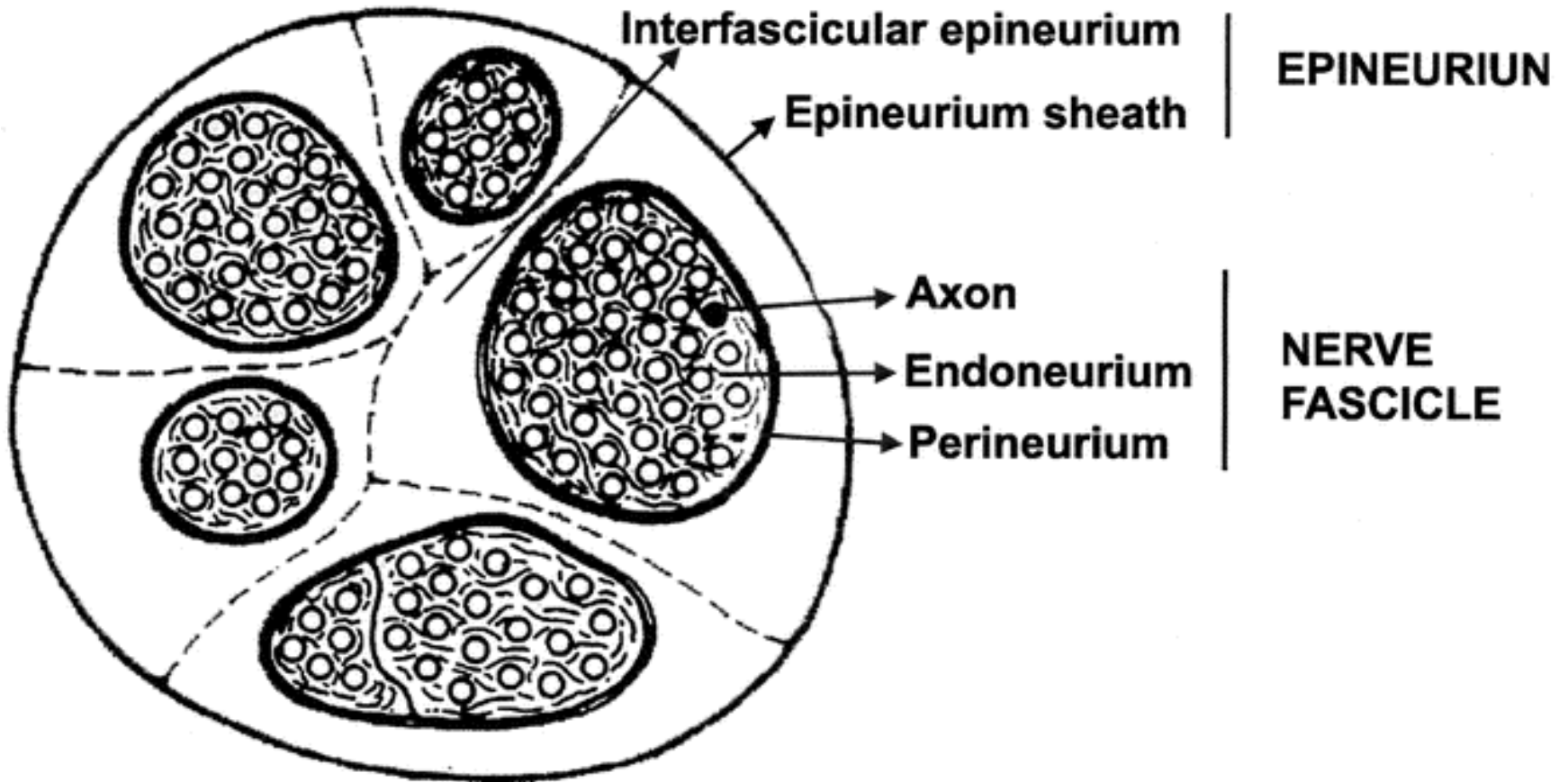
- Stimulare electrica
  - Limitari raspuns  $< 0,2 \text{ mA}$  = intraneural !!!
- Ecografia
  - tumefiera nervului la injectare nu este asociata in totdeauna cu un deficit neurologic.
- Ecografia este dependenta de
  - Abilitatile medicului
  - Natura tesutului si a tipul acului
  - Performatele ecografului (rezolutia este limitata)
  - Exista injectari intraneurale (si intravasculare) accidentale cu ecograful
  - In momentul in care se observa tumefierea nervului raul este deja produs

# Prevenirea leziunilor nervoase

- Presiunea la injectare !!!
  - injectarii intraneurale
    - evita penetrarea perineurium-ului
    - Evita penetrarea si injectarea intrafasciculara
  - injectarea intrafasciculara                      pres > 20 psi
  - injectarea extrafasciculara                      pres < 20 psi
  - injectarea extraneurala                              pres scazuta\*

\* Kapur E, Vuckovic I, Dilberovic F Neurologic and histologic outcome after intraneural injection of lidocaine in canine sciatic nerve Acta Anesth, Scand 2007;51, (1): 101-107

# Structura nervi



# Prevenirea leziunilor nervoase

- Nici o metoda nu este infailibila
- Asociere
  - Echo = vizualizare
  - Stimulare = pierdere raspuns  $> 0,2$  mA
  - Presiune =  $< 20$  psi
  - Injectare nedureroasa
  - Injectare fractionata (...concentratii ↓)

# Managementul neuropatiei postoperatorii

- 95% din neuropatii se rezolva in 4-6 saptamani
- 99% se rezolva in primele cateva luni - un an \*
- Simptomele care incep sa se remita
  - Urmarire , explicatii.....

\* Sorenson EJ. Neurological injuries associated with regional anesthesia. Reg Anesth Pain Med. 2008 Sep-Oct;33(5):442-8



- Simptomele care persista/ agraveaza:
- EMG + Studiul Conducerii Nervoase
  - Localizeaza leziunea nervoasa
  - Natura fibrelor afectate motorii/ senzitive
  - Determina daca sunt leziuni preexistente
  - Timing
    - 2-4 zile de la debut
    - 4-6 saptamani
- Consult neurologic / neurochirurgical

# Toxicitate sistematica

- Manifestari neurologice
  - Excitatorii
    - Tinitus, tulb focalizare, parestezii periorale, fasciculatii
    - Convulsii
  - Depresie
    - Coma
    - Depresie respiratorie
- Sedativele /premedicatia...
  - mascheaza simptome

# Toxicitate sistematica

- Manifestari cardiace
  - Dupa manifestari neurologice
  - Tulb conducere Prelungire PR, QT, ORS
  - aritmii ventriculare
  - Inotropie ↓
- Refractare la tratament !!!

# Toxicitate anestezice

- Liposolubilitate – bupivacaina
- Levobupivacaina S enantiomer
  - Doza toxica cu 80% > bupivacaina
- Ropivacaina
  - Enantiomer S pur
  - Evenimente toxice f rare

# Toxicitate sistematica

- Preventie
  - Injectari mici, repetate, lente
  - Adrenalina .... Nu functioneaza totdeauna...
  - Monitorizare clinica 2-6 ore
  
  - Anestezia generala nu este un factor de risc

# Toxicitate sistematica

- Manifestari neurologice
  - Benzodiazepine, tiopental, IOT-VM
- Manifestari cardiovasculare
  - Antiaritmice - amiodarona
  - Vasopresoare - adrenalina
- **ADMINISTRARE LIPIDE**
  - Bolus 1,5 ml/kg intravenos in 1 min (aprox 100 ml)
  - Perfuzie 0,25 ml/kg/min (aprox 500 ml in 30 min)
  - Repeta bolus la 5 min in caz de colaps vascular