

NEURAXIAL IN PEDIATRICS

PEDIATRIC FACTORS

IMPLICATIONS

① lower termination of spinal cord (L_3)

↑ risk of direct trauma to SC
∴ Avoid epidural above L_3

② lower projection of dural sac (S_3)

↑ risk of penetration of dura mater
• Check for CSF reflex
• Favour low approaches

③ Delayed myelination of nerve fibres

• Easier intraneural penetration of LA
• Onset time is shorter!
∴ Diluted LA in children = conc. LA in adults

④ Cartilaginous structures of bone & vertebrae

• ↓ resistance to penetration.
• Direct trauma to ossification nuclei
↓
Compromising further bone growth.
∴ Prefer short & bevelled needle & not sharp ones.

⑤ Lack of fusion of sacral vertebrae

∴ Intervertebral Sacral epidural can be performed upto 8 yrs. of age

⑥ Changing axis of coccyx & absence of growth of sacral hiatus

Sacral hiatus is smaller with ↑ age
∴ Identification of Sacral hiatus is more difficult after 6-8 yrs of age.

⑦ Delayed development of curvature of spine.

- Cervical lordosis (3-6 mo)
- Lumbar lordosis (8-9 mo)

∴ To adapt needle orientation according to spinal flexure

⑧ Delayed ossification & growth of Iliac crests (Tuffier's line)

- Paeds: L5 - S₁
- Adults: L4 - L5

⑨ ↑ fluidity of epidural fat

• ↑ diffusion of LA
∴ Excellent blockade after Caudal upto 6-7 yrs of age.

⑩ Loose attachment of sheath & aponeurosis to underlying structures

↑ Spread along nerve paths thus blocking distant nerves
• Larger LA - for epidural
(d/t leakage along spinal Nv roots.)

• Smaller LA - for PNB

⑪ Enzymatic Immaturity

Slower metabolism of LA
↑ mean body residency time
× $t_{1/2}$ with accumulation

⑫ ↑ Extracellular fluids

• ↑ V_d

• ↓ C_{max} after single injection; accumulation
repeated injections.

⑬ ↑ C.O & HR

↑ regional blood flow

∴ ↑ systemic absorption of LA

∴ **ADRENALINE** (causing vasoconstriction) is used to ↓ absorption; thus ↓ toxicity & prolong duration of blockade

⑭ Sympathetic Immaturity

∴ Hemodynamic Stability during neuraxial blockade

Thus, fluid pre-loading & use of vasoactive agents are unnecessary.

