Rectus sheath block is an established technique for pain control after umbilical hernia repair in children. Wide variability in plasma local anesthetic levels has been demonstrated, depending on block type, location and age.\(^1\) Potentially toxic LA concentrations have been described in adults after tissue plane blocks.\(^2\) LA blood levels following ultrasound-guided rectus sheath block (USGRSB) in children has not been investigated.

Methods
- Randomized blinded double-cohort study
- 40 children undergoing umbilical hernia repair
- Group I (n=20) received wound infiltration of 0.4ml/kg 0.25% bupivacaine (1mg/kg) at the end of surgery
- Group R (n=20) received a bilateral USGRSB using 0.2ml/kg 0.25% bupivacaine each side (1mg/kg total) prior to incision
- Standardized anesthetic (Sevoflurane via LMA or ETT)
- 3ml blood samples following the USGRSB or local infiltration: baseline, 10, 20, 30, 45 and 60 minutes

Background


Results
1. Maximum bupivacaine concentrations were higher following USGRSB than local infiltration (663.1 ng/ml ± 171.8 and 419.5 ng/ml ± 205.4 respectively; p= 0.0003)
2. Time to maximum concentration was longer in the USGRSB group (43.5 min ± 15.4 vs 27.2 min ± 14.3; p= 0.0018)
3. No measured plasma bupivacaine levels exceeded 1 mcg/ml (CNS toxicity 1-2 mcg/ml in adults)

Conclusions
1. This is believed to be the first pharmacokinetic study of an USGRSB in children
2. 0.2ml/kg 0.25% bupivacaine bilaterally for USGRSB (1 mg/kg total) appears to be associated with safe plasma bupivacaine levels in children
3. Bupivacaine levels peak higher and later following USGRSB than local infiltration. This confirms the recent finding in adult patients that significant local anesthetic absorption occurs.
4. Anesthesia providers are cautioned against injecting large volumes of local anesthetics of higher concentrations for USGRSB or similar tissue plane blocks (TAP, ilioinguinal)