Anesthésie locorégionale en chirurgie thoracique

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ADARPEF

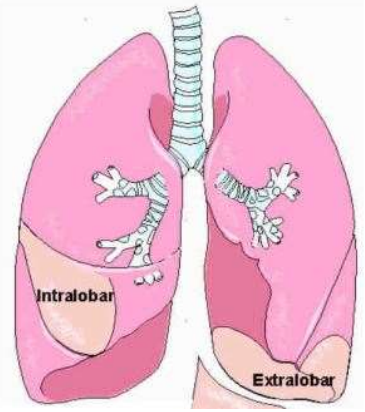
INTRODUCTION

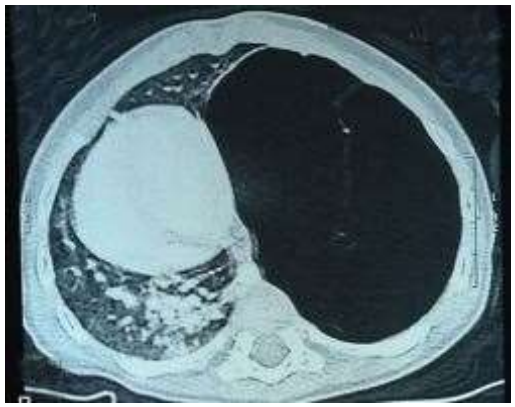
- Douleur aigue sévère qui dure quelques jours
- Retentissement de la douleur sur les différentes fonctions surtout ventilatoire
- Gestion multimodale de la douleur post op
- L'ALR pierre angulaire de l'analgésie multimodale

Pathologies principales

Pathologies congénitales pulmonaires

- Lésion kystique adénoïde : présence de kystes multiples au sein d'un lobe pulmonaire
- Séquestration pulmonaire : anomalie lobaire avec une exclusion d'une partie du parenchyme pulmonaire
- Emphysème lobaire congénital : malformation dystrophique bronchique qui se comporte lors de la ventilation comme une valve unidirectionnelle.
- Kyste bronchogénique : cavité kystique bordée d'un épithélium bronchique, avec des glandes bronchiques au contenu mucoïde.

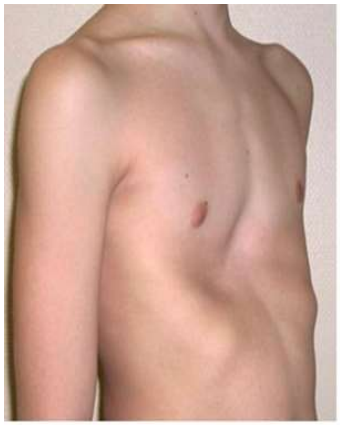




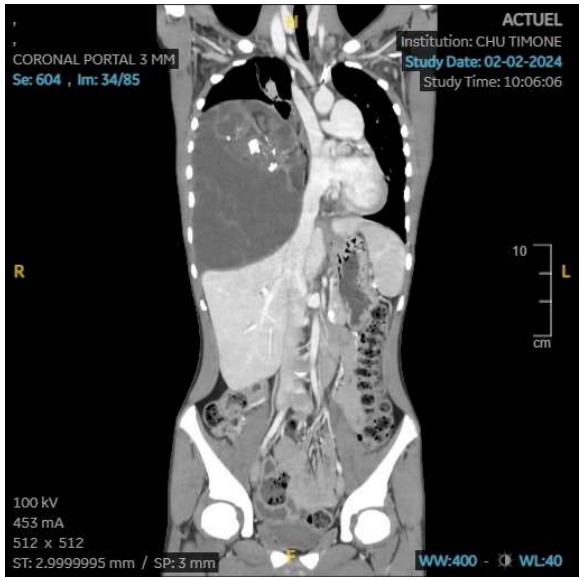
Pathologies principales

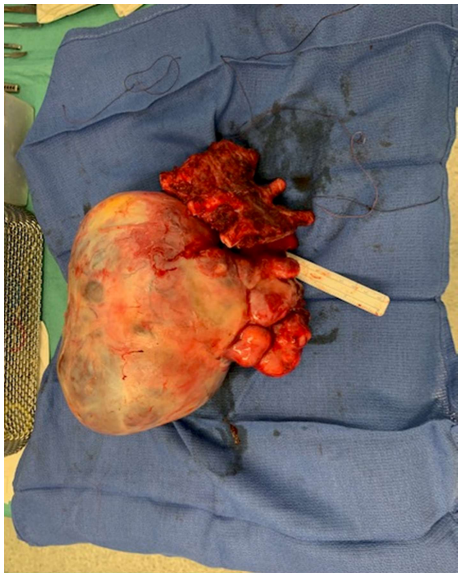
Malformations thoraciques

- Thorax en entonnoir ou pectus excavatum
- Thorax en carène ou pectus carinatum

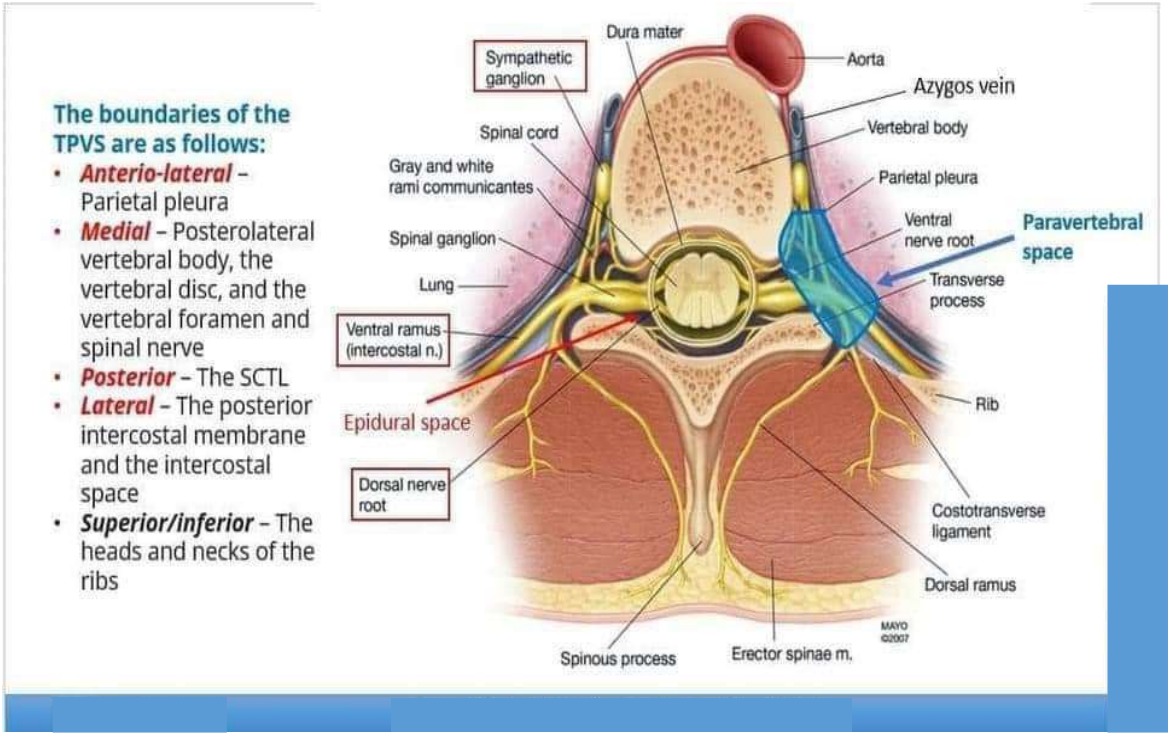


Tumeurs





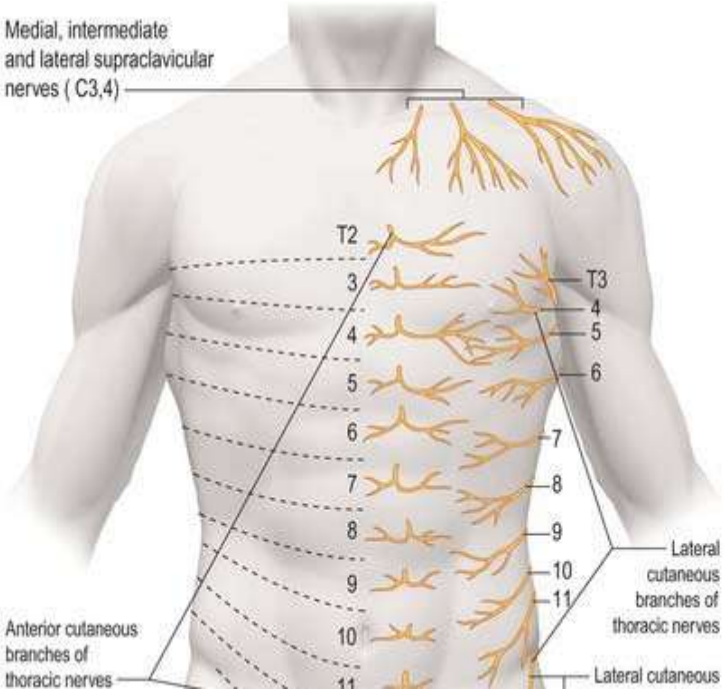
La douleur thoracique

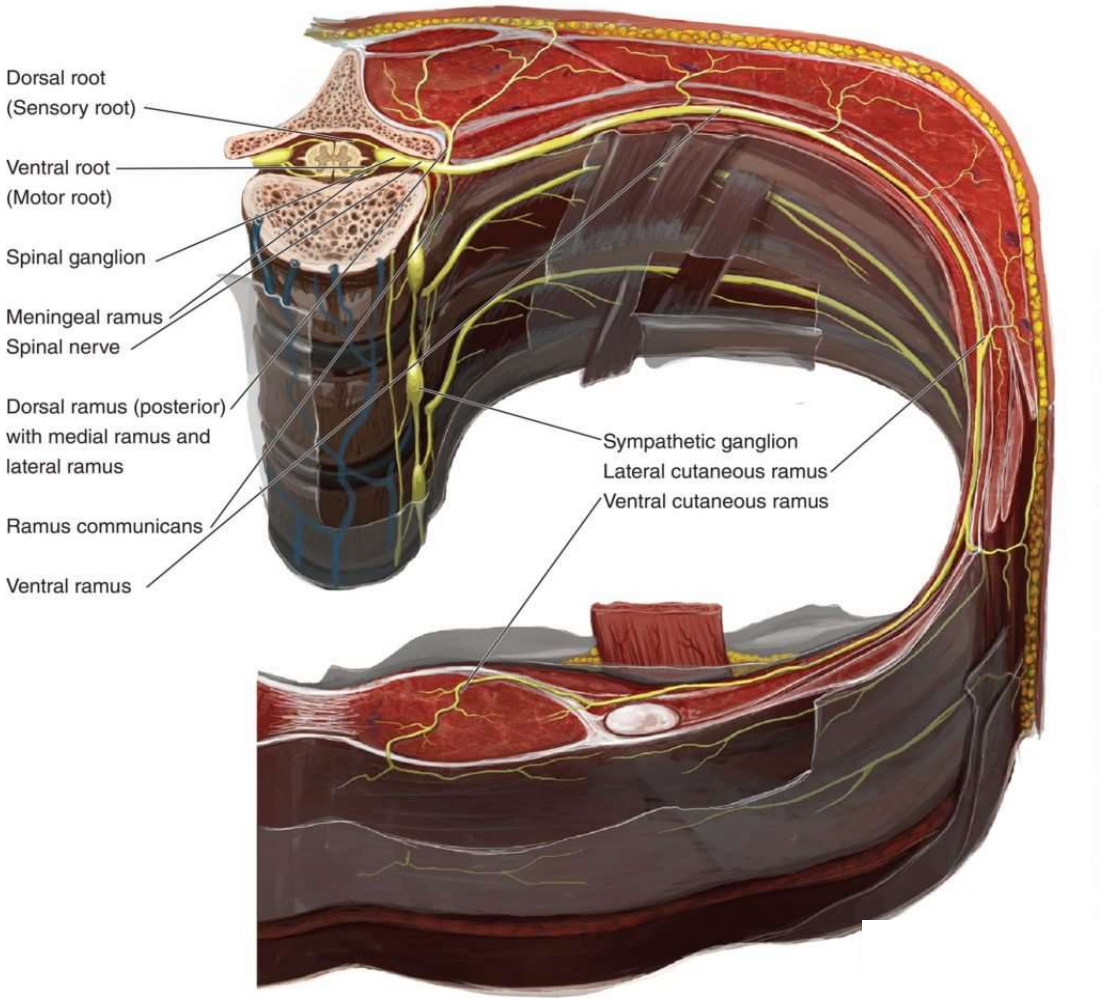


Les composants de la douleur thoracique

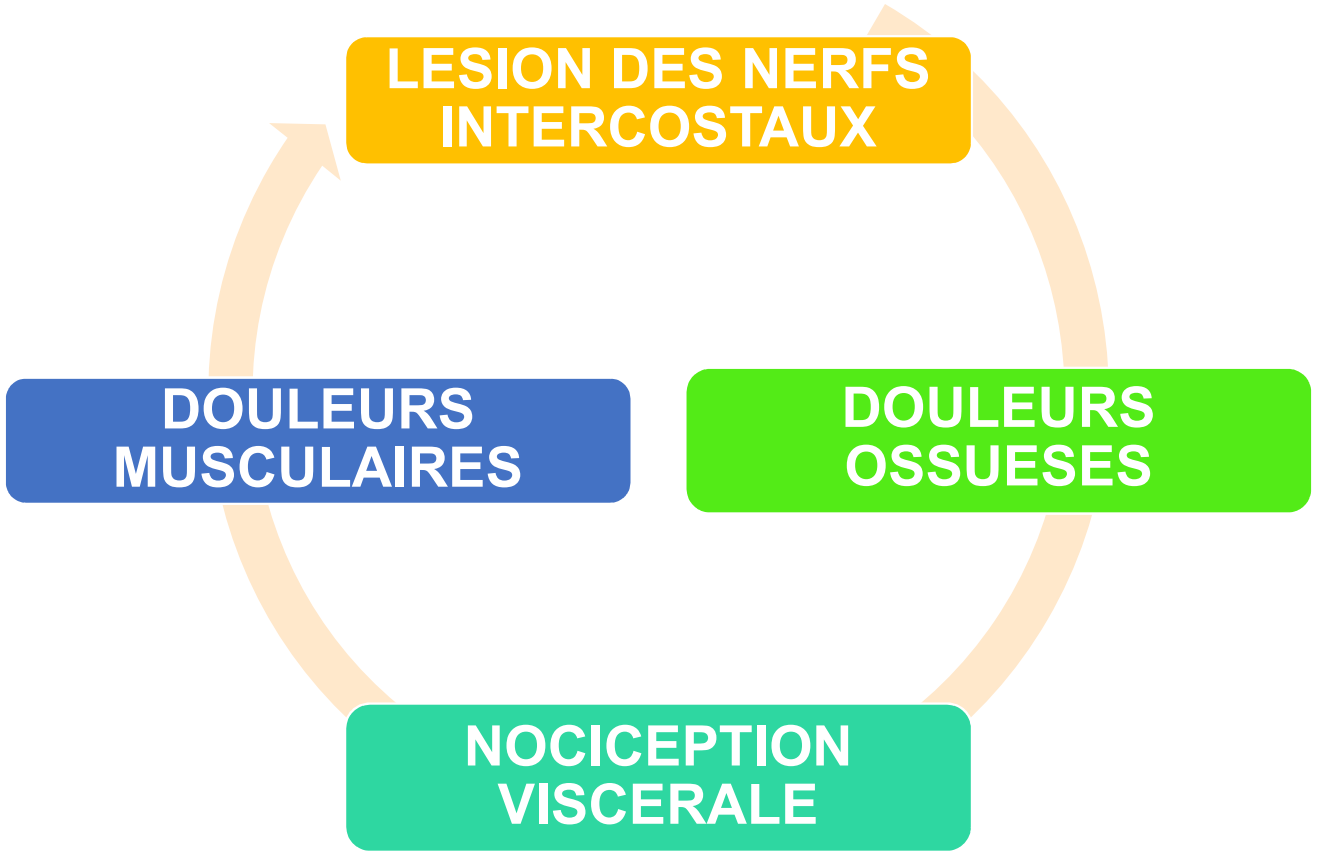
- **Douleur pariétale**: en relation à la stimulation ou à la lésion des nerfs intercostaux. Plusieurs muscles peuvent être intéressés (intercostaux, grand dorsal, trapèze, rhomboïde)
- **Douleur viscérale**: l'origine de la douleur est une lésion de la plèvre pariétale (rameaux pleuraux des nerfs intercostaux).
- **Douleurs projetées**: irritation de la muqueuse bronchique, irritation plevrale

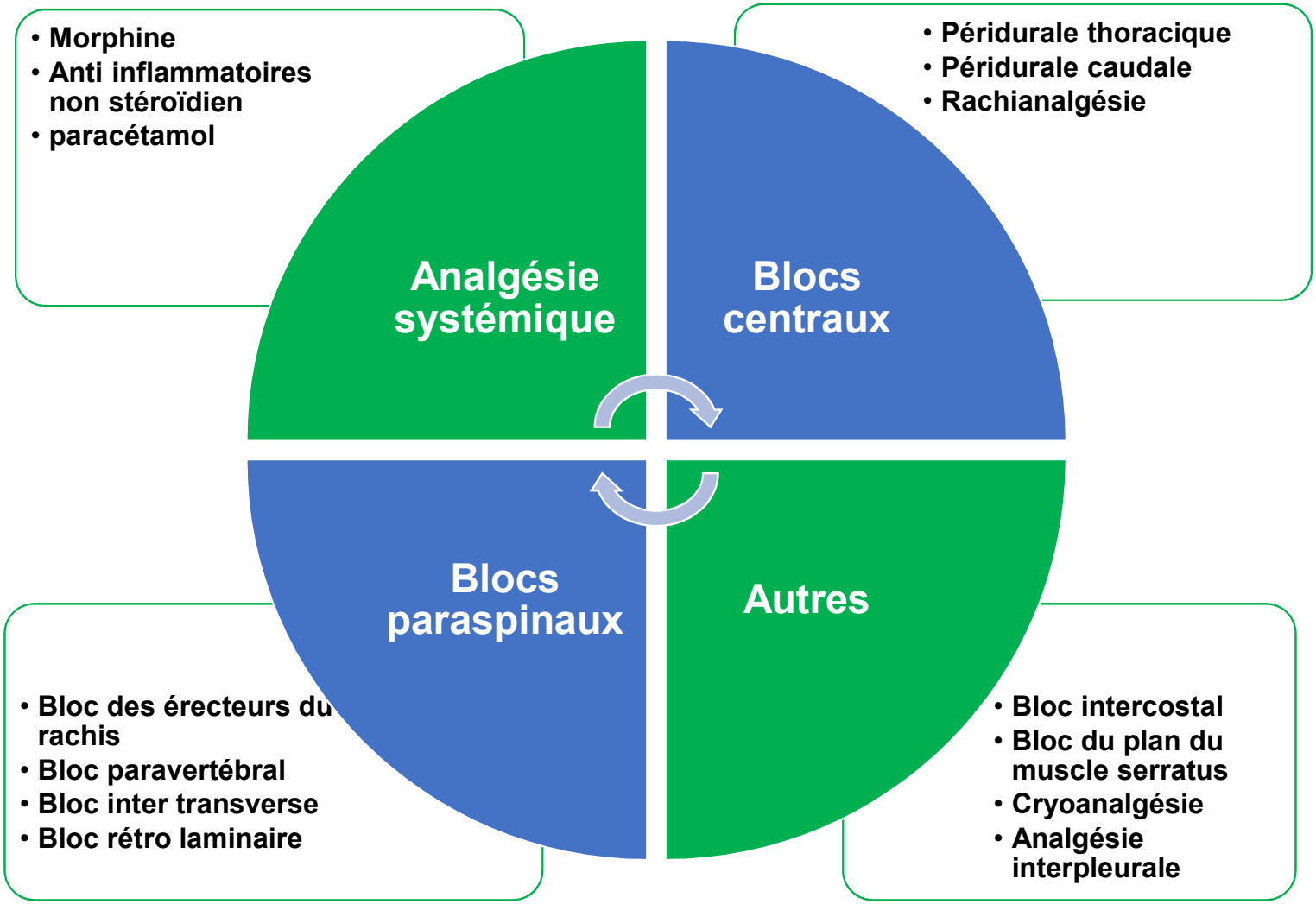
INNERVATION DU THORAX





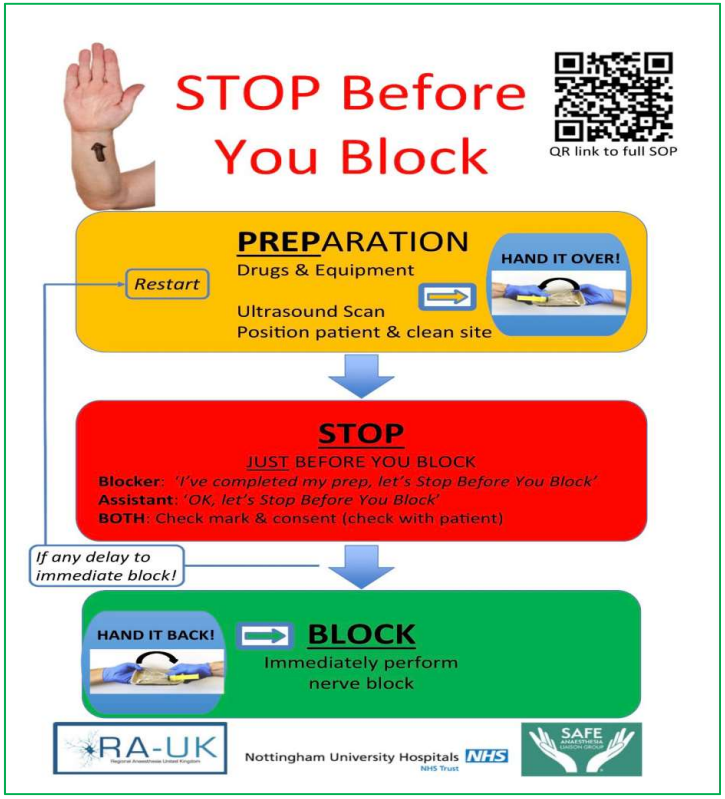
Physiopathologie de la douleur en chirurgie thoracique




• Morphine
• Anti inflammatoires non stéroïdien
• paracétamol
• Péridurale thoracique
• Péridurale caudale
• Rachianalgésie
Analgésie systémique
Blocs centraux
Blocs paraspinaux
Autres
• Bloc des érecteurs du rachis
• Bloc paravertébral
• Bloc inter transverse
• Bloc rétro laminaire
• Bloc intercostal
• Bloc du plan du muscle serratus
• Cryoanalgésie
• Analgésie interpleurale

Les règles de sécurité

Avant le bloc



Bloc périphérique 0,3 à 0,5ml/kg/bloc

Bloc du tronc 0,2 à 0,3ml/kg/bloc

Bloc de la face et du périnée 0,1 à 0,2ml/kg/bloc

INTOXICATION AUX ANESTHÉSIQUES LOCAUX EN PEDIATRIE

TOXICITE CARDIAQUE

❑ **Souvent au premier plan car toxicité neurologique masquée par l'AG**

- Tachycardie / bradycardie
- BAV et élargissement du QRS
- Hypotension / Collapsus
- Arrêt cardiorespiratoire

TOXICITE NEUROLOGIQUE

❑ Signes précoces:
Goût métallique / dysesthésies bucco-linguales / dysarthrie / malaise / céphalées / vertiges, nausées / acouphènes / secousses musculaires

❑ Signes de toxicité systémique:
Céphalées, paresthésies, perte de conscience, convulsions, coma

❑ Toxicité immédiate si injection intravasculaire
❑ Toxicité retardée (jusqu'à 40 minutes) si résorption (selon le site)
❑ Doses max : Lidocaïne : 6 mg/kg - Mépivacaïne : 5 mg/kg - Ropivacaïne : 3 mg/kg
Lévo-bupivacaïne : 3 mg/kg - Bupivacaïne : 2 mg/kg

APPEL A L'AIDE
STOP Chirurgie

TRAITEMENT : dès la suspicion

❑ Arrêt de l'injection d'anesthésiques locaux
❑ Contrôle des voies aériennes :
- Oxygénothérapie ou FiO_2 = 1 et hyperventiler (pour limiter l'acidose)
- Intubation si ACR ou convulsions généralisées

❑ Réanimation cardio-respiratoire en cas d'ACR :
- Massage cardiaque externe
- Pas de doses importantes d'adrénaline (débuter par 1 à 5 µg/kg)
- Amiodarone (5 mg/kg IVL) si arythmie ventriculaire (pas de lidocaïne)

❑ Traitement des convulsions : Benzodiazépine en première intention (Midazolam 0,2 mg/kg IV)

❑ Traitement par émulsion lipidique à 20 % :
❑ **Intralipide 20 % : 1,5 ml/kg** en bolus sur une minute, puis perfusion 0,25 ml/kg/min. Répéter le bolus initial si persistance du collapsus (1 à 2 fois à 5 minutes d'intervalle) et augmenter le débit à 0,5 ml/kg/min. Dose max 10 ml/kg en 30 minutes
❑ ou **Medialipide 20 %: 6 à 9 ml/kg** en bolus, à répéter à 5 minutes si collapsus persistant

❑ Envisager ECMO si inefficacité du traitement et ACR réfractaire
❑ Surveillance monitorée pendant minimum 6 heures
❑ Dosage du toxique (prélèvement tube sec)
❑ Déclaration évènement indésirable grave

Réalisée en 2019 par le CAMR et ADARPEF, mise à jour en 2022
Références : RFE SFAR 2016 ALR perineveuse https://sfar.org/wp-content/uploads/2019/10/rfe-anesthesie-loco-regionale-perineveuse.pdf
American Society of Regional Anesthesia and Pain Medicine Local Anesthetic Systemic Toxicity checklist : 2020 version. Reg Anesth Pain Med 2021;46:81-82

Quels moyens pour prévenir et traiter la douleur post-opératoire ?

Les principaux blocs disponibles:

- Péridurale thoracique
- Bloc paravertébral
- Bloc des érecteurs du rachis
- Bloc caudale

Thérapie intraveineuse multimodale:

- Morphine
- AINS
- Paracétamol

Les approches de la péridurale thoracique et de la caudale

Péridurale thoracique

Péridurale Caudale

Analgésie péridurale par voie caudale

L'histoire

CLINICAL REPORTS

Anesthesiology
69:265–269, 1988

Thoracic Epidural Anesthesia *Via* Caudal Route in Infants

ADRIAN T. BÖSENBERG, F.F.A.(S.A.),* BARRY A. R. BLAND, F.F.A.R.C.S.,†
OTTHEINZ SCHULTE-STEINBERG, M.D.D.A. (MCGILL),‡ JOHN W. DOWNING, F.F.A. (S.A.)§

TABLE 2. Clinical Data of Patients in Phase 3

No.	Age in Weeks	Wt. in kg	Diagnosis	Catheter	Position of Tip Aim T7–T8 Level	Dose in Ml 0.5% Bupivacaine
1	4	4.1	Biliary atresia	M	T8	2
2	8	4.5	Biliary atresia	M	T7	2.5
3	12	5.9	Biliary atresia	M	T9	3
4	16	4.8	Biliary atresia	C	T8	3
5	8	4.5	Biliary atresia	M	T7	2.5
6	12	4.5	Neonatal hepatitis	C	T7	2.5
7	11	4.4	Biliary atresia	C	T8	3.0
8	16	4.3	Biliary atresia	M	T7	2.25
9	10	6.0	Biliary atresia	M	T8	3
10	8	6.5	Choledochal cyst	C	T7	3
11	16	5.6	Biliary atresia	C	T9	3
12	6	2.8	Biliary atresia	C	T9	1.5
13	14	5.0	Biliary atresia	C	T8	2.5
14	12	4.1	Biliary atresia	C	T7	2
15	12	5.7	Biliary atresia	C	T12*	3.5
16	6	2.7	Neonatal hepatitis	C	T8†	1.6
17	22	6.0	Choledochal cyst	C	T8	3.5
18	12	6.1	Biliary atresia	C	T9	3.0
19	16	5.0	Biliary atresia	C	T8	2.5
20	12	4.0	Biliary atresia	C	T8	2.0

M = Medican; C = Contiplex.
* Held up 1.5 cm short of calculated distance.
† Blood in catheter—subsequently cleared.

L'actualité (l'échographie)

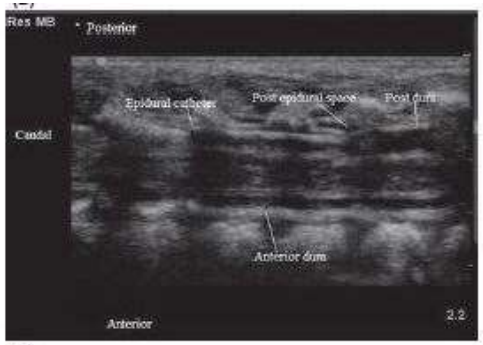
Accepted: 30 June 2017
DOI: 10.1111/pan.13212

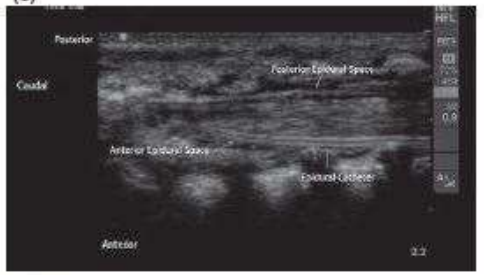
RESEARCH REPORT

WILEY Pediatric Anesthesia

Does ultrasound guidance add accuracy to continuous caudal-epidural catheter placements in neonates and infants?

Vrushali C. Ponde | Vinit V. Bedekar | Ankit P. Desai | Kiran A. Puranik





the caudal space.
(B) Epidural catheter as seen in posterior epidural space. (C) Epidural catheter seen in anterior epidural space

Analgésie péridurale

Pediatric Anesthesia

Pediatric Anesthesia ISSN 1155-5645

ORIGINAL ARTICLE

Continuous chloroprocaine infusion for thoracic and caudal epidurals as a postoperative analgesia modality in neonates, infants, and children

Giorgio Veneziano[1,2], Peter Iliev[1], Jennifer Tripi[1], David Martin[1,2], Jennifer Aldrink[3,4], Tarun Bhalla[1,2] & Joseph Tobias[1,2]

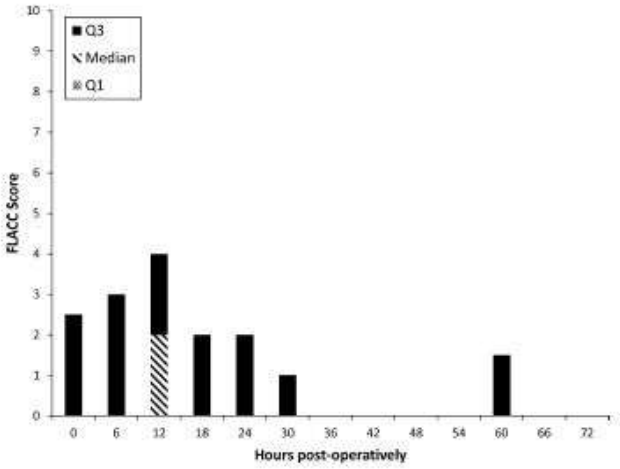


Figure 5 FLACC (Faces, Limbs, Activity, Cry, Consolability) as the first quartile (Q1), median, and third quartile (Q3) scores every 6 h starting from the initial postoperative assessment.

Table 1 Patient demographics, primary diagnosis, surgery, epidural catheter insertion level, depth of threaded catheter at the skin, and confirmed level of catheter tip with method used for confirmation

Age	Weight (kg)	Gender	Primary diagnosis	Surgery	Epidural placement level/depth/tip location
2 M	2.54	F	Tracheoesophageal fistula, choledochal cyst	TEF/EA repair, hepaticojejunostomy	T9-10, 5 cm at skin, tip at T7 (CXR)
11 D	3.3	F	Left upper lobe congenital lobar emphysema	Left upper lobectomy	T8-9, 4 cm at skin, tip at T7-8 (CXR)
4 D	2.154	M	Left congenital cystic adenomatous malformation on the lung	Left upper lobe Lobectomy	Sacral hiatus, 9.5 cm at skin, tip at T11 (CXR)
2 M	3.9	M	Gastroschisis status post jejunostomy and mucous fistula	Colostomy, ileostomy closure	T8, 7 cm at skin, tip at T6 (CXR)
8 M	7.22	M	Liver mass	Wedge resection of liver	T8, 7 cm at skin
1 D	1.73	M	Tracheoesophageal fistula	Tracheoesophageal fistula repair	Sacral hiatus, 11.5 cm at skin, tip at T7-8 (US)
44 D	3.47	F	Jaundice and choledochal cyst	Choledochal cyst	Sacral hiatus, 11 cm at skin, tip at T7 (US)
3 Y	15.5	M	Stage IV neuroblastoma	Exploratory laparotomy and resection of retroperitoneal mass	T8-9, 5 cm at skin, tip at T7 (CXR)
2 M	4.6	M	Left thoracic paraspinal mass	Resection of paraspinal mass	Sacral hiatus, 17 cm at skin, tip at T5 (US)
8 D	3.5	F	Liver mass, mesenchymal hamartoma of the left lung	Wedge resection left lobe and resection of hepatic mass	Sacral hiatus, 13 cm at skin, tip at T10 (US)
5 M	5.82	M	Right suprarenal mass	Exploratory laparotomy with resection of right suprarenal mass	Sacral hiatus, 14 cm at skin, tip at T7-8 (US)
13 M	7.45	F	Giant omphalocele with ventral hernia	Repair of giant abdominal wall hernia	T11-12, 7 cm at skin, tip at T11 (CXR)
8 M	6.2	M	Large incisional hernia, inguinal hernia	Incisional hernia repair, inguinal hernia repair	T9-10, 4.5 cm
7 M	9.35	M	Abdominal neuroblastoma	Ex Lap with liver wedge biopsy	T8-9, 9 cm at skin
5 M	5.5	M	Hartmann's pouch with ileostomy and mucous fistula	Takedown of Hartman's pouch, mucous fistula revision	T10, 6 cm at skin
8 M	7.78	F	Spinal muscular atrophy	Open Nissen fundoplication and gastrostomy tube placement	T8, 7 cm at skin, tip at T4 (CXR)
3 M	5.18	M	Left suprarenal mass	Exploratory laparotomy, removal of suprarenal mass	Sacral hiatus, 19 cm at skin, tip to T7 (US)
6 M	8.53	M	4th degree burn to left leg	L BKA, skin grafting L arm	Sacral hiatus, 6 cm at skin
25 D	4.32	F	Choledochal cyst	Roux-en-Y hepaticojejunostomy	T8-9, 4.5 cm at skin, tip at T4 (CXR)
1 D	3	F	Duodenal atresia	Duodenal atresia repair	T8, 5.5 cm at skin
2 M	4.52	M	Biliary atresia	Kasai procedure	Sacral hiatus, 14.5 cm at skin, tip at T7 (US)

CXR, chest radiograph; US, ultrasound.

Distances dure mère - moelle

RESEARCH REPORT

WILEY Pediatric Anesthesia

Dura to spinal cord distance at different vertebral levels in children and its implications on epidural analgesia: A retrospective MRI-based study

Tariq Wani[1,2] | Ralph Beltran[2] | Giorgio Veneziano[2] | Faris AlGhamdi[1] | Hatem Azzam[1] | Nahida Akhtar[1] | Dmitry Tumin[2] | Yasser Majid[1] | Joseph D. Tobias[2]

88 enfants < 8 ans
Âge: 51 +/- 20 mois
Taille: 101 +/- 14 cm
Poids: 17 +/- 8 kg

TABLE 1 Comparisons of distance from dura to spinal cord at various levels according to patient gender

Levels	Female (n = 32) Mean, mm (SD; range)	Male (n = 56) Mean, mm (SD; range)
T_{6-7}	5.9 (1.7; 3.5-9.9)	5.9 (1.5; 1.4-9.3)
T_{9-10}	4.9 (1.3; 2.4-7.1)	5.0 (1.2; 1.2-8.1)
L_{1-2}	3.4 (1.2; 1.5-6.5)	3.7 (1.2; 1.2-6.8)

SD, standard deviation.

Problèmes liés aux cathéters

Journal of Anesthesia (2022) 36:335–340
https://doi.org/10.1007/s00540-022-03048-5

ORIGINAL ARTICLE

Paths of thoracic epidural catheters in children undergoing the Nuss procedure for pectus excavatum repair

Kanna Nakamura[1] · Ayanori Sugita[2] · Shuichi Sekiya[2] · Akira Kitamura[3] · Hiromasa Mitsuhata[1] · Keisuke Yamaguchi[1] · Masakazu Hayashida[4]

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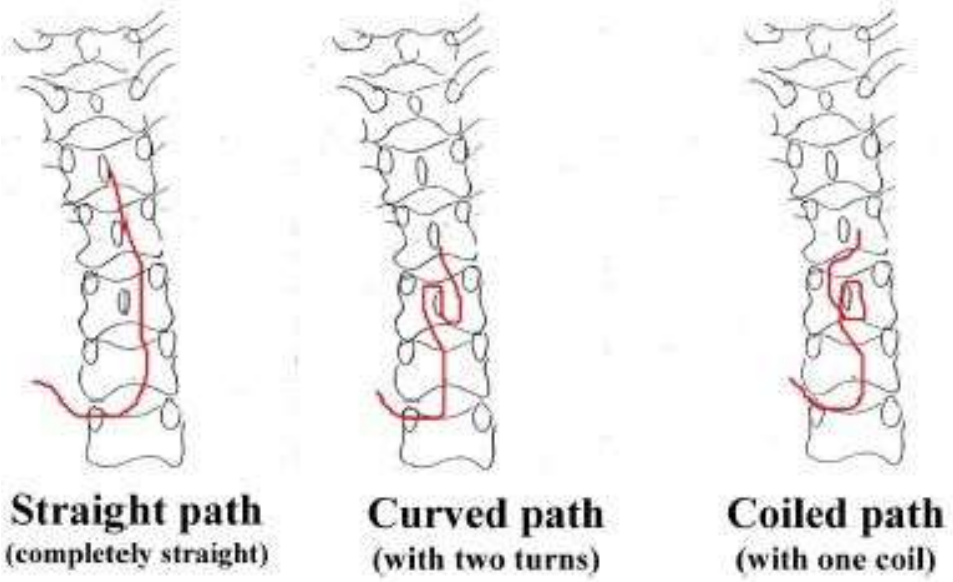
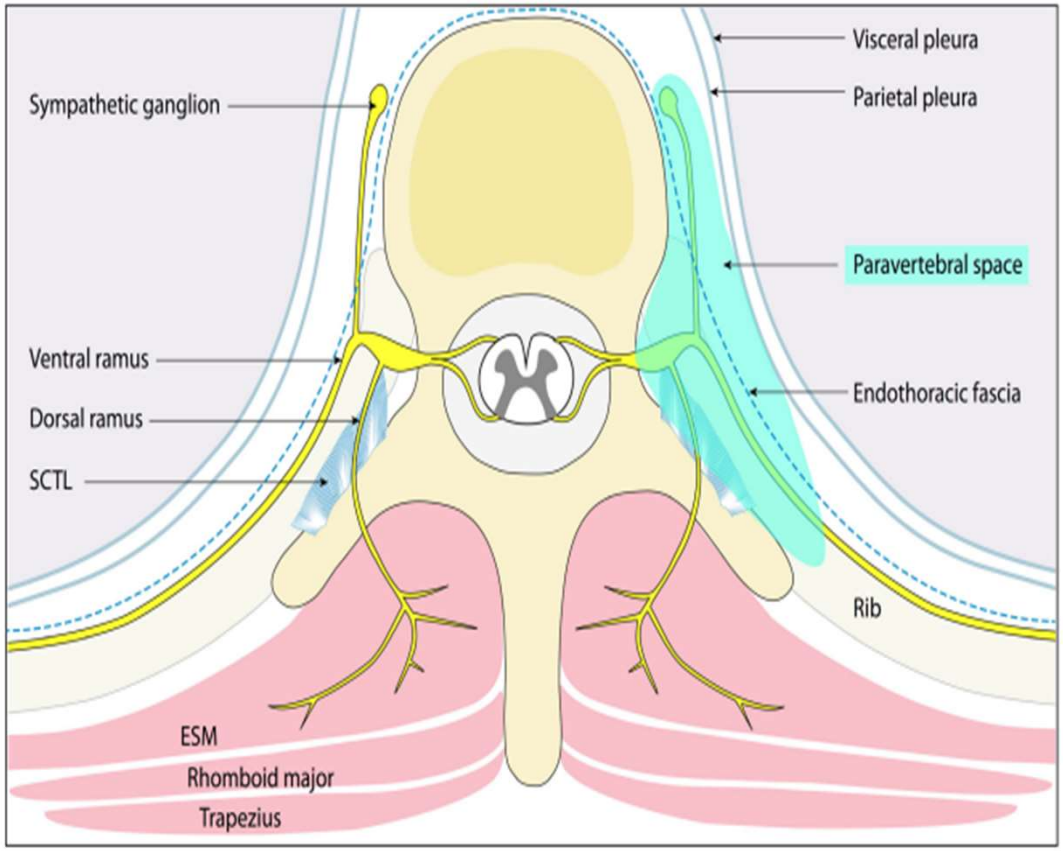
Table 1 Demographic and catheterization data for children who underwent the Nuss procedure for pectus excavatum repair under combined general and epidural anesthesia

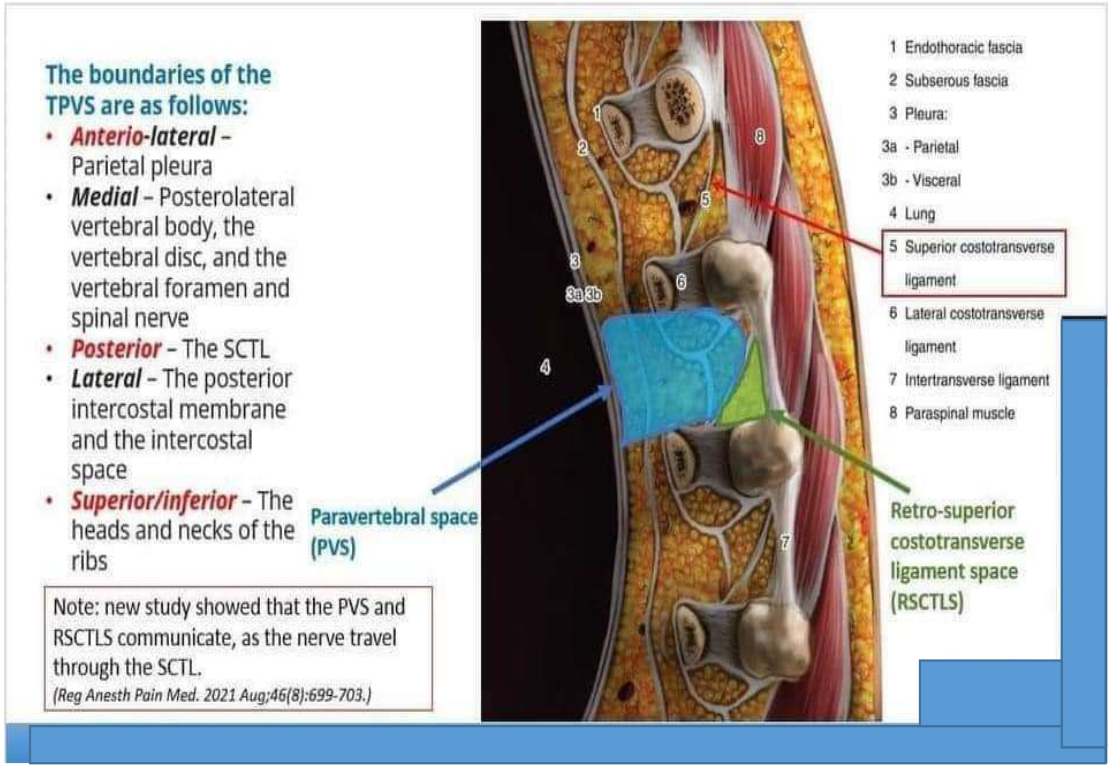
Sex, M:F	47:26
Age (year), mean ± SD (range)	7.8 ± 2.3 (4–12)
Body height (cm), mean ± SD (range)	128 ± 13 (102–159)
Body weight (kg), mean ± SD, (range)	24.5 ± 7.2 (16–47)
Intended insertion points	T5/6 (n = 62), T6/7 (n = 11)
Median [quartiles] (range)	T5/6 [T5/6, T5/6] (T5/6–T6/7)
Actual skin insertion points	T3/4 (n = 3), T4/5 (n = 19), T5/6 (n = 38), T6/7 (n = 13)
Median [quartiles] (range)	T5/6 [T4/5, T5/6] (T3/4–T6/7)
Actual epidural space insertion points	T3/4 (n = 5), T4/5 (n = 20), T5/6 (n = 35), T6/7 (n = 13)
Median [quartiles] (range)	T5/6 [T4/5, T5/6] (T3/4–T6/7)
Catheter direction immediately after entry in the epidural space	Cephalad (n = 72), Caudad (n = 1)
Catheter tip direction	Cephalad (n = 67), Caudad (n = 6)
Catheter tip position (vertebral level)	C6 (n = 1), C7 (n = 4), T1 (n = 7), T2 (n = 12), T3 (n = 23), T4 (n = 18), T5 (n = 7), T7 (n = 1)
Median [quartiles] (range)	T3 [T2, T4] (C6–T7)
Number of vertebrae crossed by catheter tips	5 (n = 1), 4.5 (n = 5), 4 (n = 15), 3.5 (n = 1), 3 (n = 13), 2.5 (n = 10), 2 (n = 14), 1.5 (n = 10), 1 (n = 2), 0.5 (n = 1), −0.5 (n = 1)
Median [quartiles] (range)	+2.5 [+2, +4] (−0.5 to +5)

Data are expressed as number, mean ± standard deviation (range), or median [quartiles] (range)

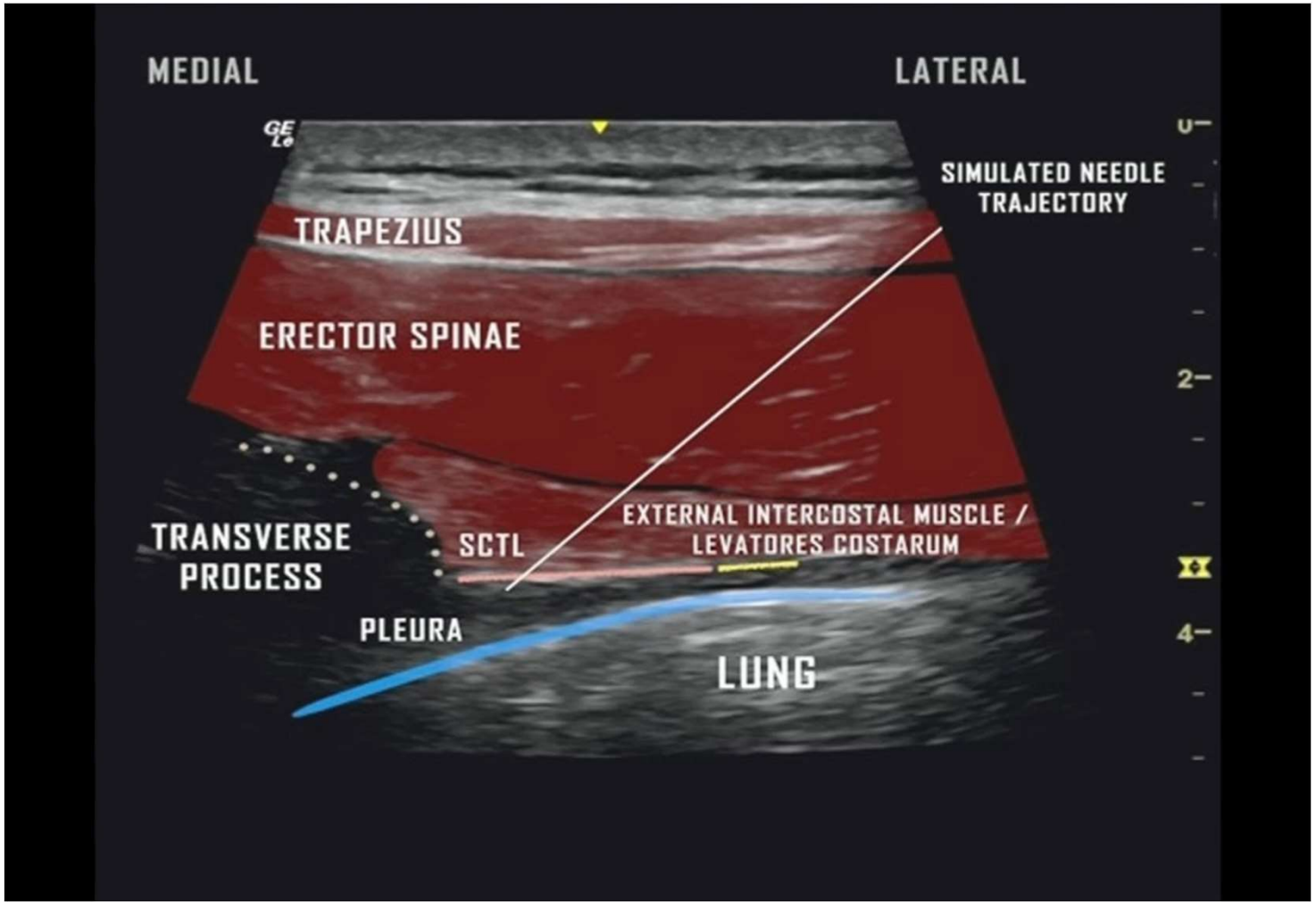


Les approches du bloc paravertébral





Les approches du bloc paravertébral



Regional Anesthesia and Acute Pain Medicine

Section Editor: **Richard Brull**

BRIEF REPORT

Thoracic Paravertebral Nerve Blocks in Pediatric Patients: Safety and Clinical Experience

Tricia Vecchione, MD,* David Zurakowski, PhD,* and Karen Boretsky, MD*†

Table 2. Distribution of PVNB Patients by Age

	Catheters Patients, n (%) n = 468	Single Injection Patients, n (%) n = 403	Weight (SD), kg
Infant	111 (23.7)	21 (5.2)	4.7 (2.9)
Toddler	46 (9.8)	35 (8.7)	12 (1.2)
Child	149 (31.8)	121 (30.0)	24.9 (10.0)
Adolescent	162 (34.6)	226 (56.1)	54.3 (18.1)

Abbreviations: PVNB, paravertebral nerve block; SD, standard deviation.

Table 1. Surgical Procedures With Continuous Catheters and With Single-Injection PVNBs

Continuous Catheters (n = 468)		Single-Injection PVNBs (n = 403)	
Procedure	**Number of Patients (%)**	**Procedure**	**Number of Patients (%)**
Thoracotomy	118 (25.2)	Laparoscopy; misc	187 (46.4)
Video-assisted thoracoscopy	81 (17.3)	Breast reduction	52 (12.9)
Laparotomy; miscellaneous	74 (15.8)	Robotic; misc	48 (11.9)
Pectus excavatum	33 (7.1)	Video-assisted thoracoscopy	35 (8.7)
Ileostomy/colostomy/colostomy takedown	31 (6.6)	Laparoscopic or open orchiopexy	13 (3.2)
Iliac crest graft harvest	27 (5.8)	Colostomy/ileostomy/colostomy takedown	9 (2.2)
Laparoscopy; miscellaneous	21 (4.5)	Periacetabular osteotomy	8 (2.0)
Open nephrectomy/pyeloplasty	31 (6.6)	Ventral hernia	6 (1.5)
Rib graft harvest/resection	18 (3.8)	Rib resection	4 (1.0)
Ventral hernia	6 (1.3)	Laparotomy; misc	4 (1.0)
Renal transplant	5 (1.0)	Inguinal hernia	4 (1.0)
Lung transplant	4 (0.9)	Other	33 (8.2)
Periacetabular osteotomy (combined with lumbar plexus)	4 (0.9)		
Other	15 (3.2)		

Abbreviation: PVNB, paravertebral nerve block.

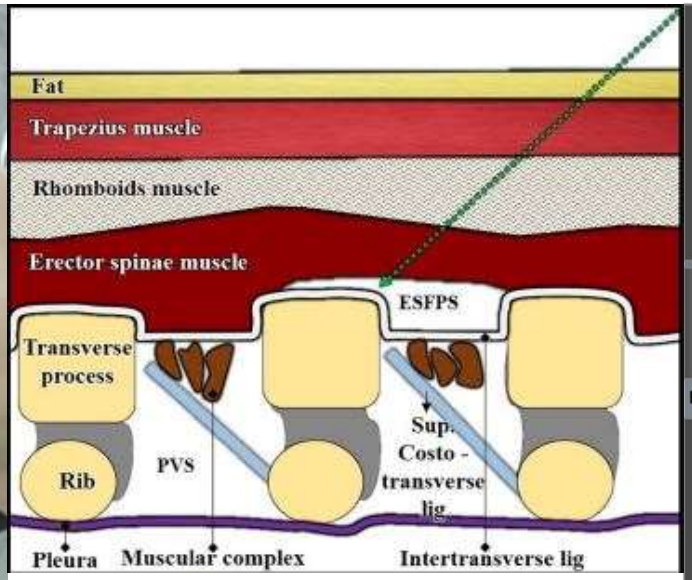
Cathéters positionnés entre T3 et T12

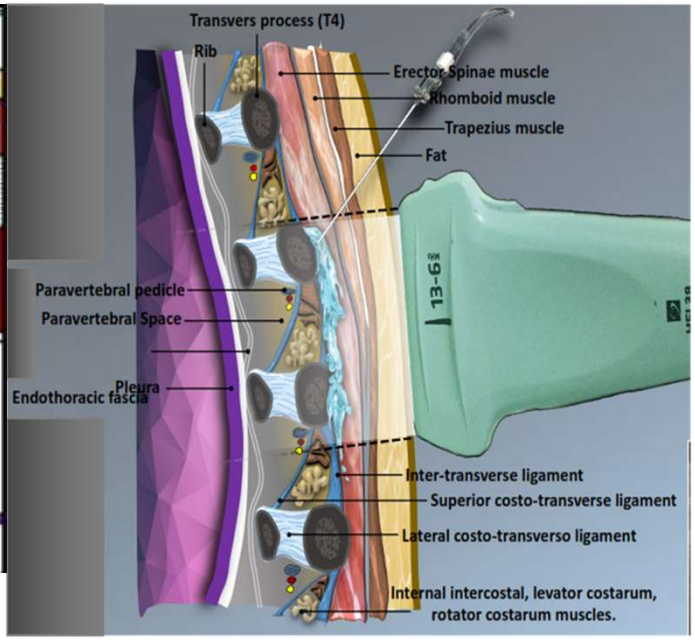
BPVT est une alternative valide à la morphine
1 complication sévère: enfant de 9 mois 9,4 kg perfusion de ropivacaine 0,1 % 0,2 ml/kg/h pour 16 heures. Crise épileptiques et désaturation d'O2 après bolus de chloroporocaine 3% sans conséquences.

Children's Hospital Pittsburgh

625 catheters were performed on 468 patients

Bloc des érecteurs du rachis





Bloc continu des érecteurs du rachis

J Med Cases. 2024;15(1):26-30

Continuous Erector Spinae Plane Block for Pain Management Following Thoracotomy for Aortic Coarctectomy

Jay D. Holladay[a, c], Christopher McKee[a, b], Olubukola O. Nafiu[a, b], Joseph D. Tobias[a, b], Ralph J. Beltran[a, b]

Table 1. Reports of ESPB Following Thoracotomy or Sternotomy in the Pediatric Population

Authors and reference	Study type and demographics	Treatment and outcomes
Kaushal et al, 2020 [5]	Prospective, randomized study. Study cohort of 80 children with acyanotic CHD for surgery with sternotomy and CPB.	Bilateral ESPB versus no block (control). Patients who received an ESPB had reduced MOPS, required significantly less, and had a prolonged time to postoperative fentanyl needs, and a lower postoperative sedation score. Ultrasound-guided bilateral ESPB was a reliable and effective postoperative analgesic modality for pediatric cardiac surgery through a midline sternotomy.
Macaire et al, 2020 [8]	Randomized, double-blind, placebo-controlled trial. Study cohort included 50 children following cardiac surgery with midline sternotomy.	Bilateral ESPB with 0.2% ropivacaine infusion versus saline infusion. Morphine requirements and intraoperative sufentanil were reduced in the ESPB group. Time to chest tube removal, first mobilization, pain scores (VAS) 2 h after chest tube removal, pain scores (VAS) at rest 1 month after surgery, and postoperative adverse events were decreased in the ESPB group. ESPB resulted in a decrease in intraoperative and postoperative opioid consumption, optimized rapid patient mobilization, and chest tube removal after cardiac surgery.
Singh et al, 2022 [10]	Prospective randomized controlled trial. Study cohort included 40 children, 2 - 7 years of age, scheduled for right or left thoracotomy under general anesthesia.	TEA versus ESPB analgesia. Intraoperative fentanyl requirements were greater in the TEA group when compared to the ESPB group while postoperative fentanyl requirements were comparable. The median FLACC score was equivalent between both groups. Higher incidence of adverse effects with TEA. ESPB provided similar postoperative analgesia to TEA with a lower incidence of adverse effects in pediatric patients undergoing thoracotomy.

CHD: congenital heart disease; CPB: cardiopulmonary bypass; ESPB: erector spinae plane block; MOPS: modified objective pain score; VAS: visual analogue scale; TEA: thoracic epidural anesthesia; FLACC: Face, Legs, Activity, Cry, Consolability.

Bloc des érecteurs du rachis

Erector spinae catheter for post-thoracotomy pain control in a premature neonate

Anna Swenson Schalkwyk,[1] James Flaherty,[1] Donavon Hess,[2] Balazs Horvath [1]

BMJ Case Rep 2020;**13**:e234480. doi:10.1136/bcr-2020-234480

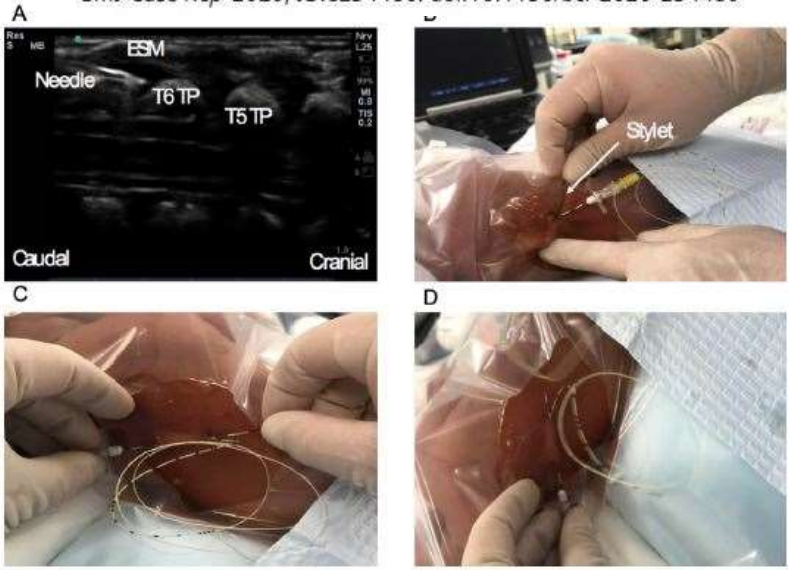


Figure 1 (A) Ultrasound image of the needle in the erector spinae muscle plane. (B–D) Tunnelling the catheter away from the surgical field by using the 20-gauge Tuohy needle and stylet to create a subcutaneous conduit for the catheter. ESM, erector spinae muscle; T6TP, thoracic 6 transversus process; T5TP, thoracic 5 transversus process.

Âge 2 jours, poids 2,250 kg, 35 semaines. Cathéter à T5-T6, chloroprocaine 3% 2 ml. Perfusion: 0,25 ml/kg/h (3,75 mg/kg/h)

Turkish Journal of Anaesthesiology &Reanimation

Continuous Erector Spinae Plane Block in Paediatric VATS: A Case Series

Vishal Saxena[1], Harick Shah[2], Swarup Ray[3], Amrit Kaur[2], Raylene Dias[3]
[1]Department of Anaesthesiology, Seth GS Medical College and KEM Hospital, Mumbai, India
[2]Department of Paediatric Anaesthesia, SRCC Children's Hospital, Mumbai, India
[3]Department of Paediatric Anaesthesia, Seth GS Medical College and KEM Hospital, Mumbai, India

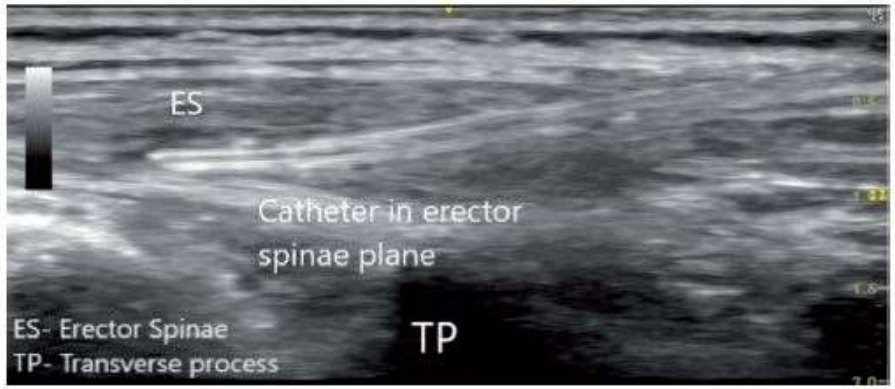
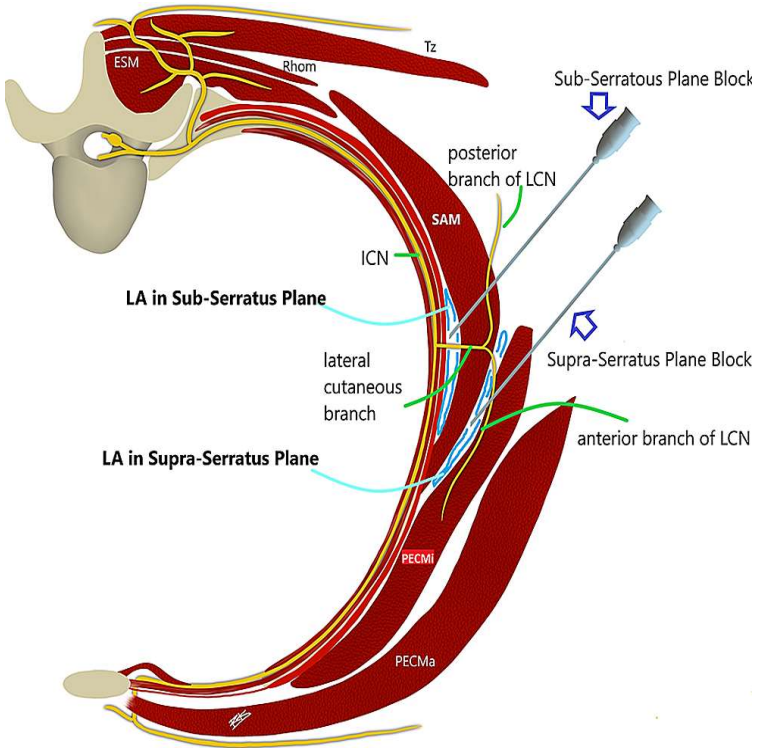
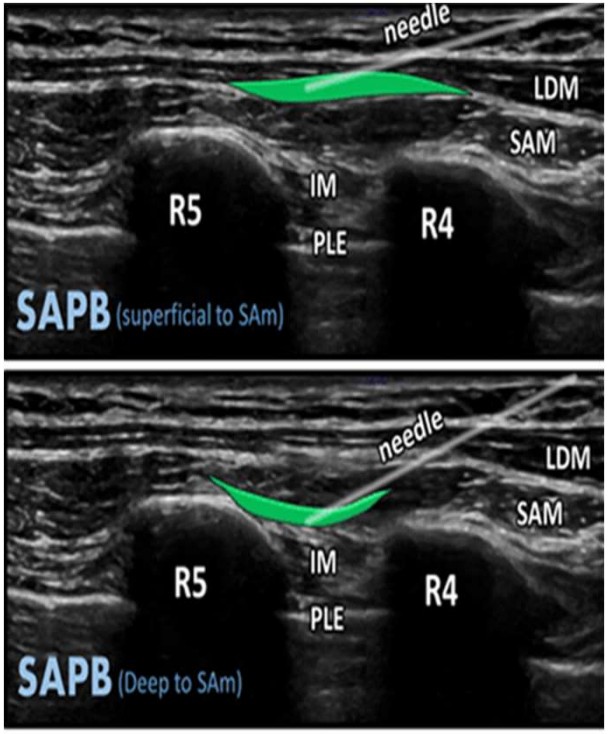


Figure 1. Catheter in the erector spinae plane which lies between erector spinae muscle above and the transverse process of vertebra below.

Âge 1,5-8 ans, cathéter 20 G, bupivacaine 0,125 % 0,3 ml/kg, Perfusion bupivacaine 0,125 % 0,25/0,3 ml/kg/h

Le bloc du plan du muscle serratus / Serratus plane block





BMJ Paediatrics Open

Single-injection serratus anterior plane block for cardiothoracic surgery via thoracotomy in children: a systematic review and meta-analysis of randomised controlled trials

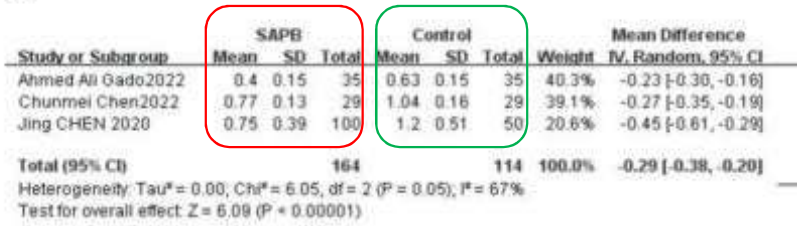
Yi He,[1] Zhi Li,[2] Mingzhe Xu,[1] Bin Du,[1] YunXia Zuo [1]

Table 1 Study characteristics of the included trails

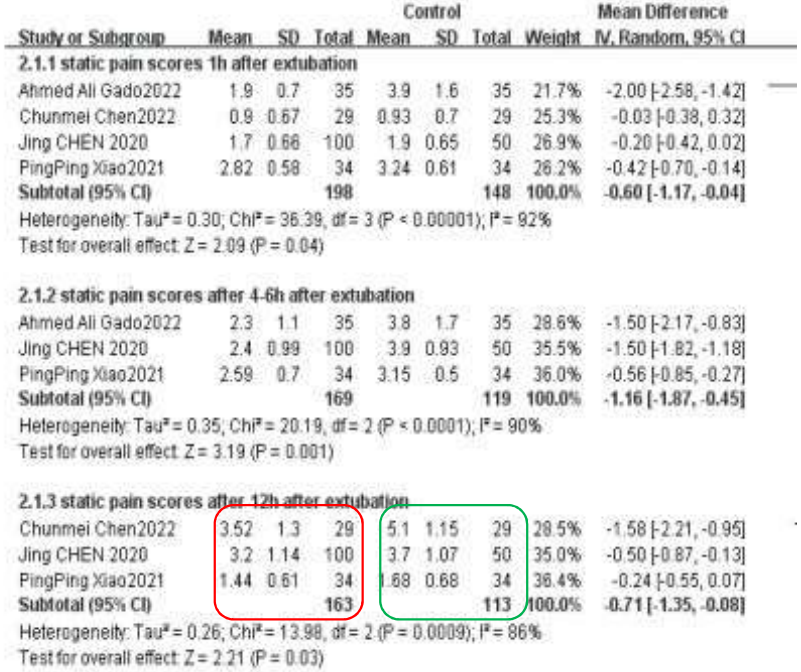
Reference	Year	Subjects number	Type of surgery	Local anaesthetic administered	Control	Age	Primary outcome	Adverse event	Pain scale
Gado *et al*[15]	2022	70	Unilateral thoracotomy	Bupivacaine 0.125% 0.4 mL/kg; unilateral SAPB	No block	6 months to 3 years	Postoperatively fentanyl in 24 hours	PONV	FLACC
Kaushal *et al*[19]	2019	72	Cardiac surgery through a thoracotomy	Ropivacaine 0.2% 3 mg/kg; unilateral SAPB	ICNB	6 months to 10 years	MOPS	NS	MOPS
Chen *et al*[18]	2022	58	Costal cartilage harvest through a thoracotomy	Ropivacaine 0.25% 3 mg/kg; bilateral SAPB	II	5–12 years	NRS	PONV opioid-related adverse	NRS
Jing *et al*[16]	2020	150	Cardiac surgery through a thoracotomy	Ropivacaine 0.2% 3 mg/kg; unilateral SAPB	Sham block	2–8 years	FLACC	PONV	FLACC
Xiao and Ma[17]	2021	68	Cardiac surgery through a thoracotomy	Ropivacaine 0.3% 0.5 mg/kg; unilateral SAPB	No block	1–5 years	FLACC	PONV	FLACC

FLACC, the face, legs, activity, cry, consolability behavioural tool; ICNB, intercostal nerve block; II, incision infiltration; MOPS, modified objective pain scoring method; NRS, numeric rating scales; NS, not statistically significant; PONV, postoperative nausea and vomiting; SAPB, serratus anterior plane block.

A



B



418 enfants, chirurgie cardiothoracique, SABP = bloc du plan du serratus antérieur
A consommation post-opératoire d'opiacés
B évaluation de la douleur à H 1-4-6-12

Confrontation des blocs pour la thoracotomie

Can Ultrasound-Guided Erector Spinae Plane Block Replace Thoracic Epidural Analgesia for Postoperative Analgesia in Pediatric Patients Undergoing Thoracotomy? A Prospective Randomized Controlled Trial

Swati Singh, Roshan Andaleeb, Dusu Lalin

Department of Anesthesiology and Intensive Care, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India

Table 1: Demographic data of the studied groups

	Thoracic epidural analgesia (TEA) *n*=20	Erector spinae plane block (ESPB) *n*=20
Age (years)	4.45±0.9	4.4±1.35
Gender (M/F)	15/5	15/5
Weight (kg)	15.6±3.6	14.7±3.2
Duration of surgery (min)	168.3±28.3	172.0±26.8
Type of surgery, *n* (%)		
	13 (65%)	14 (70%)
Lobectomy segmentectomy	7 (35%)	6 (30%)

Data presented as mean±SD or patient's number or number (percentage)

Table 3: Comparison of FLACC scores in the studied group in median and interquartile range

Time points	Thoracic epidural analgesia (TEA) *n*=20	Erector spinae plane block Group (ESPB) *n*=20	U-value and *z*-score	*P*-value
0 h	1 [2, 1]	2 [2, 1]	139.5 -1.62301	0.105
2 h	1 [2, 1]	2 [2, 1]	154 -1.23078	0.218
4 h	1 [1.75, 1]	2 [2, 1]	135 -1.74473	0.081
6 h	1 [1.75, 1]	2 [2, 1]	117.5 -2.21811	0.026*
8 h	1 [1.75, 1]	2 [2, 1]	137 -1.69063	0.091
12 h	1 [1.75, 1]	1.5 [2, 1]	157 -1.14963	0.250
24 h	1 [1, 1]	1.5 [2, 1]	130 -1.87998	0.060

**P*-value<0.05 is significant. Mann–Whitney U test applied

Table 2: Perioperative analgesia consumption in the study groups

	Thoracic epidural analgesia (TEA) *n*=20	Erector spinae plane block group (ESPB) *n*=20	Relative risk	*t*-Statistic and *P* value (95% confidence limit)
Total intraoperative fentanyl (µg)	35.4±11.44	30.4±9.08		*t*-value -1.530, *P* value- 0.134
Postoperative fentanyl consumption (µg)	44±2.82	44.25±13.72		*t*-value -0.02412 *P*-value -0.981
Number of patients who required fentanyl (%)	2 (10%)	4 (20%)	2.000	*P*-value- 0.3899 (0.4119-9.7119)

Data presented as mean±SD or number (percentage)

Table 4: Comparison of complication in the studied group

	Thoracic epidural analgesia (TEA) *n*=20	Erector spinae plane block group (ESPB) *n*=20	Relative risk	*t*-Statistic and *P* value (95% confidence limit)
Urinary retention	4 (10%)	0 (0%)	5.0000	1.060 *P*=0.2891 0.2551 to 98.0032
Hypotension	8 (40%)	0 (0%)	17.0000	1.992 *P*=0.0463 (1.0469 to 276.0432)

Data presented as number (percentage)

Confrontation des blocs pour la chirurgie de Nuss

World Journal of Pediatric Surgery

Pain management for the Nuss procedure: comparison between erector spinae plane block, thoracic epidural, and control

Lisgelia Santana ,[1] John Driggers,[2] Norman F Carvalho[1]

Table 1 Demographic characteristics and outcomes among three groups who received erector spinae plane (ESP) block, thoracic epidural (TE), and patient-controlled analgesia (PCA)

Variables	ESP block (n=19)	TE (n=41)	PCA (n=18)	P value
Sex, n (%)				
Male	19 (100)	33 (80)	15 (83)	0.122
Female	0 (0)	8 (20)	3 (17)	
Age*	15.6±1.8	15.0±2.2	15.4±1.3	0.505
Opioid use (MME)*	66.9±48.8	117.0±81.1	172.1±103.9	<0.001
Length of stay*	3.3±0.5	4.7±0.9	3.7±1.2	<0.001
Pain ratings (NPRS)*	4.5±1.5	3.4±1.5	4.1±1.5	0.029
ED visit, n (%)				
Yes	2	2	2	0.616
No	17	39	16	
Readmission, n (%)				
Yes	0	1	1	0.563
No	19	40	17	
Refill, n (%)				
Yes	5	11	5	0.995
No	14	30	13	

P values are obtained by χ^2 test or ANOVA analysis. For variables that are fewer than five patients in the subgroup, Fisher's exact test was applied.
*Data were presented as mean±SD.
ED, emergency department; MME, morphine milligram equivalent; NPRS, Numeric Pain Rating Scale.

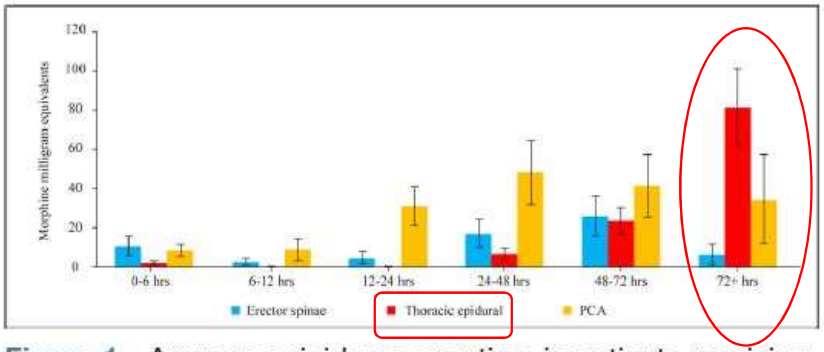


Figure 1 Average opioid use over time in patients receiving an erector spinae plane block, thoracic epidural, or patient-controlled analgesia (PCA) with error bars showing 95% CIs.

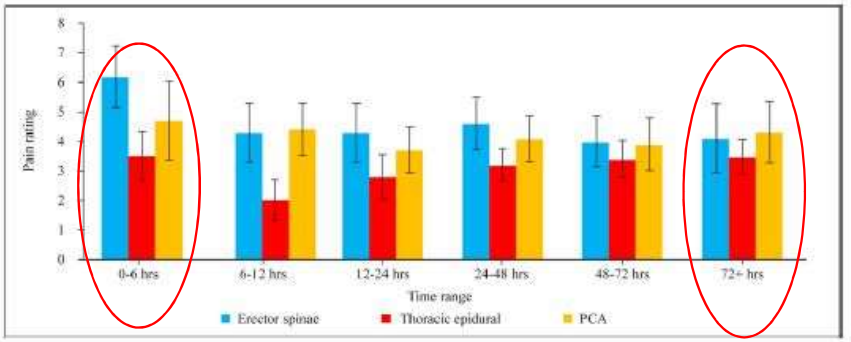


Figure 2 Average pain ratings over time in patients receiving an erector spinae plane block, thoracic epidural, or patient-controlled analgesia (PCA) with error bars showing 95% CIs.

Les doses anesthésiques de sécurité

Pediatric Anesthesia 2005 **15**: 739–749 doi:10.1111/j.1460-9592.2004.01550.x

Pharmacokinetics and efficacy of ropivacaine for continuous epidural infusion in neonates and infants

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Table 1
Patient details

Variable	*Value*	*Age groups (days)*				
		0–30 (n = 11)	*31–90* (n = 10)	*91–180* (n = 10)	*181–365* (n = 14)	*Total* (n = 45)
Age (days)	Median (range)	2 (0–7)	64 (41–86)	146 (105–176)	276 (199–362)	116 (0–362)
Weight (g)	Median (range)	3300 (2600–4400)	4390 (3140–5900)	5800 (3120–6640)	7430 (4920–10 900)	5300 (2600–10 900)
ASA	Class I	0	0	1	2	3
	Class II	8	7	8	11	34
	Class III	3	3	1	1	8
Sex	Male	7	6	4	5	22
	Female	4	4	6	9	23

Conclusion: Epidural infusions (0.2–0.4 $mg \cdot kg^{-1} \cdot h^{-1}$ ropivacaine) provided satisfactory pain relief in neonates and infants under 1 year. As plasma concentrations of unbound ropivacaine were not influenced by the duration of the infusion, ropivacaine can be safely used for postoperative epidural infusion for 48–72 h. Levels of unbound ropivacaine were higher in the neonates than in the infants, but were below threshold concentrations for CNS toxicity in adults ($\geq 0.35\ mg \cdot l^{-1}$). This should not preclude the use of ropivacaine infusions in neonates but suggests a need for caution during the first weeks of life.

Perspectives

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DOI: 10.1111/aas.14248

RESEARCH ARTICLE

acta Anaesthesiologica Scandinavica

The intertransverse process block single- or multiple-injection? A study protocol

Amanda de la Fuente Birkebæk[1] | Katrine Tanggaard[1] | Sophie Bojesen[2] | Anne Sofie Therkelsen[1] | Cecilie H. Klementsen[1] | Christian K. Hansen[1] | Mojgan Vazin[1] | Troels Dirch Poulsen[1] | Jens Børglum[1,3] | Martin V. Nielsen[1]

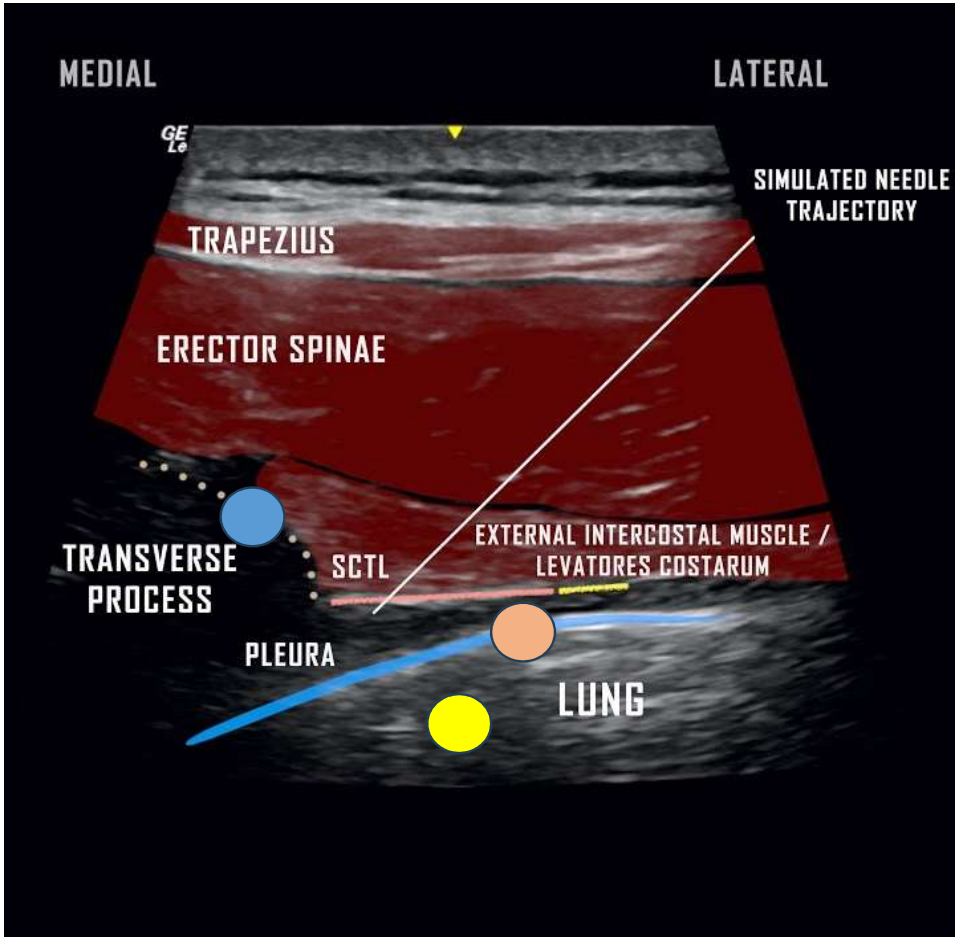
ESP

PVB

ITPB

Défini en 2021 comme faisant partie des blocs paraspinaux .

Expérience actuelle: patients > 18 ans



Standardizing nomenclature in regional anesthesia: an ASRA-ESRA Delphi consensus study of abdominal wall, paraspinal, and chest wall blocks

Cet article représente le premier consensus international sur la nomenclature et les descritpions anatomiques des blocs de paroi abdominale, thoraciques et paraspinaux.

Reg Anesth Pain Med 2021;46:571-580

Chest wall	15	Superficial serratus anterior plane (SAP) block (80%)	Injection in the plane superficial to the serratus anterior muscles (52%)
	16	Deep serratus anterior plane block (SAP) (91%)	Injection in the plane between the posterior surface of the serratus anterior muscle and the periosteum of the rib (76%)
	17	Superficial parasternal intercostal plane (PIP) block (90%)	Injection in the plane superficial to the internal intercostal muscles and ribs and deep to the pectoralis major muscle (83%)
	18	Deep parasternal intercostal plane (PIP) block (85%)	Injection in the plane between the internal intercostal and the transversus thoracis muscles (83%)
	19	Interpectoral plane (IPP) block (73%)	Injection in the plane between the pectoralis major and pectoralis minor muscles (94%)
	20	Pectoserratus plane (PSP) block (53%)	Injection in the plane between the pectoralis minor and serratus anterior muscles (76%)
Paraspinal	11	Paravertebral block (PVB) (96%)	Injection in the paravertebral space (between the superior costotransverse ligament and parietal pleura) in the thoracic region (98%)
	12	Intertransverse process (ITP) block (58%)	Injection in the tissue between two transverse processes, posterior to the superior costotransverse ligament or halfway between the posterior aspect of the transverse process and the pleura. (86%)
	13	Erector spinae plane (ESP) block (100%)	Injection in the plane between the erector spinae muscles and the transverse process (98%)
	14	Retrolaminar block (RLB) (89%)	Injection in the plane between the erector spinae muscles and the lamina (91%)


Merci pour votre attention