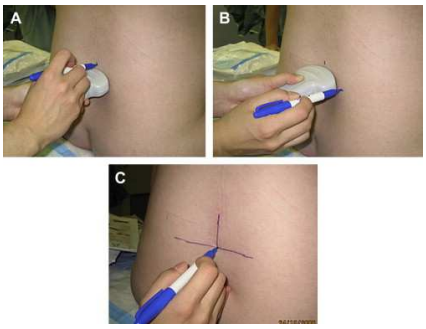
ECHOGRAPHIE DU RACHIS

TECHNIQUE & INDICATIONS

REPERAGE ANATOMIQUE PAR ECHOGRAPHIE



Quality of Anatomical Landmarks by Palpation and Structure Visualization by Ultrasound

Arzola, C. et al. Anesth Analg 2007;104:1188-1192

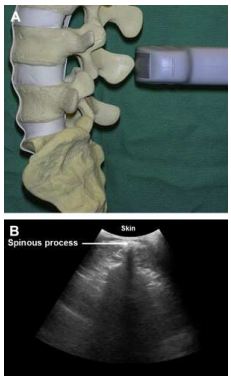
Table 2. Quality of Anatomical Landmarks by Palpation and Structure Visualization by Ultrasound

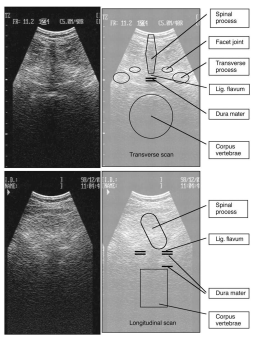
	Good (%)	Poor (%)
Palpation	81.0	19.0
Ultrasound visualization		
Spinous process	100	0
Vertebral body	98.4	1.6
Dural sac	98.4	1.6
Lig flavum–dura mater	100	0

69 parturients ; BMI: 29.7 +/- 4.8;

ANESTHESIA & ANALGESIA

Transverse approach at the tip of the spinous process identifies the midline of the spine

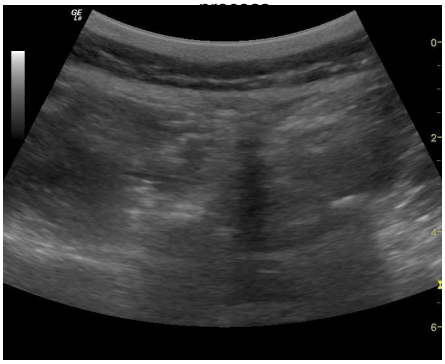




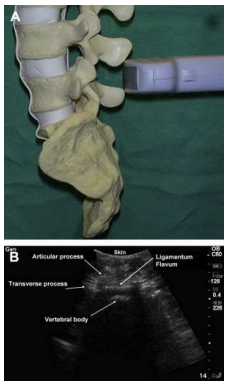
Grau, T. et al. Br. J. Anaesth. 2001 86:798-804;

BJA British Journal of Anaesthesia

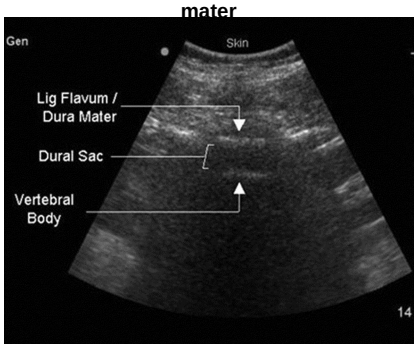
Transverse approach at the tip of the spinous



Transverse approach at a lumbar interspace shows the typical « flying bat » sign.



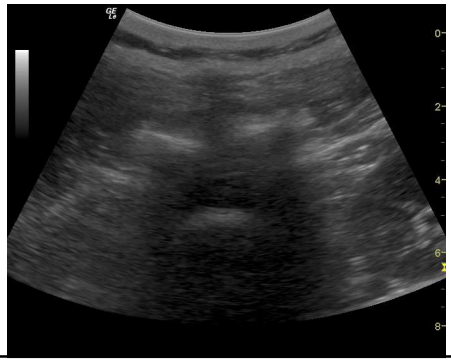
Ultrasound imaging in the transverse approach shows the vertebral body, dural sac, ligamentum flavum, and dura mater



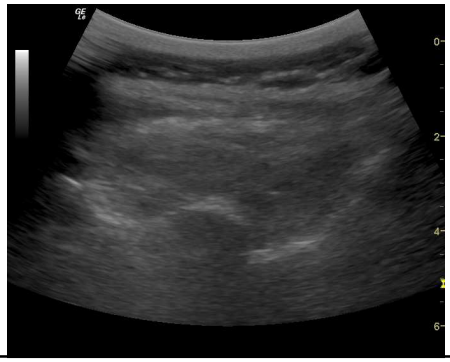
Arzola, C. et al. Anesth Analg 2007;104:1188-1192

ANESTHESIA & ANALGESIA

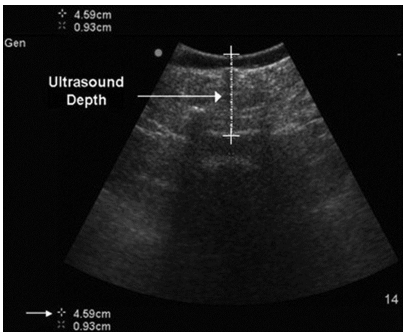
TRANSVERSE PLANE L4 - L5



TANSVERSE PLANE IMAGE L5-S1



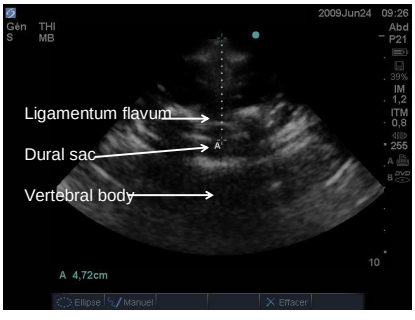
Ultrasound imaging shows measurements with the built-in caliper



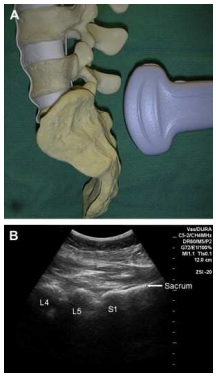
Arzola, C. et al. Anesth Analg 2007;104:1188-1192

ANESTHESIA & ANALGESIA

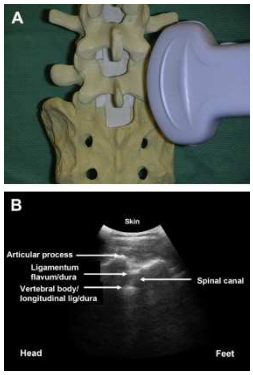
EVALUATION OF THE DEPTH OF THE EPIDURAL SPACE IN A TRANSVERSE VIEW



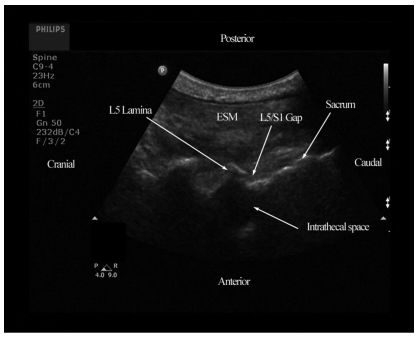
Longitudinal median approach identifies the sacrum and the lumbar interspaces.



Longitudinal paramedian approach with the typical saw sign.



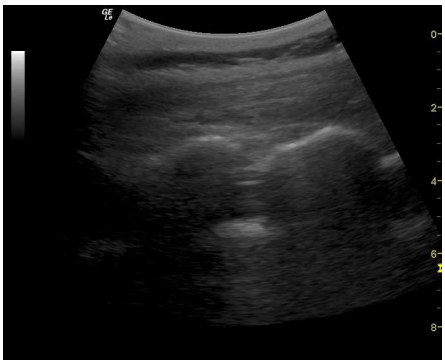
Paramedian sagittal sonogram of the lumbosacral junction



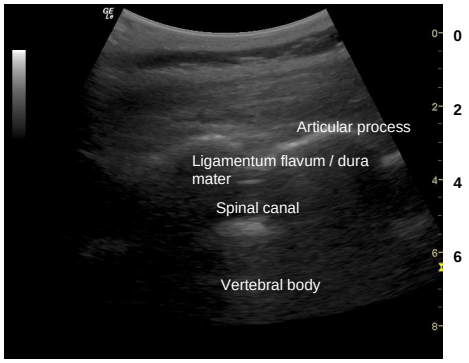
Karmakar, M. K. et al. Br. J. Anaesth. 2009 102:845-854;

ESM erector spinal muscle.

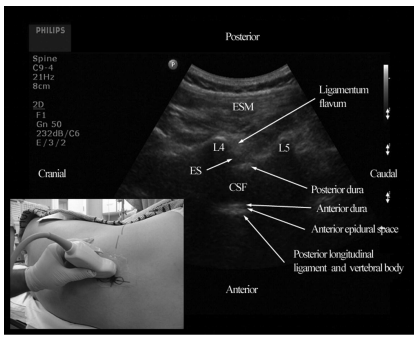
LONGITUDINAL PARAMEDIAN APPROACH



LONGITUDINAL PARAMEDIAN

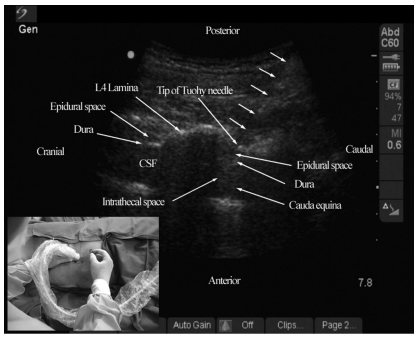


Paramedian oblique sagittal sonogram of the lumbar spine



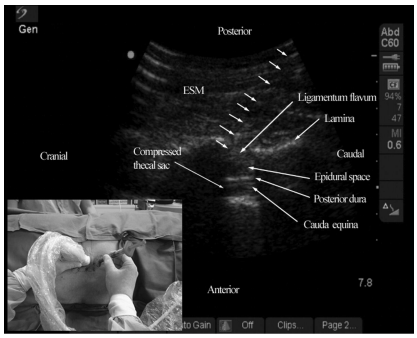
Karmakar, M. K. et al. Br. J. Anaesth. 2009 102:845-854;

Paramedian oblique sagittal sonogram of the lumbar spine during real-time US-guided paramedian epidural access



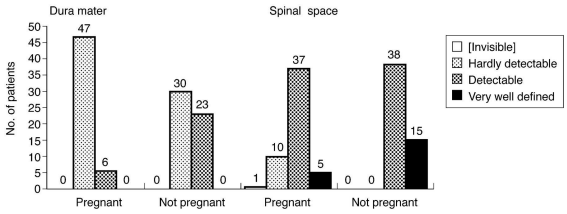
Karmakar, M. K. et al. Br. J. Anaesth. 2009 102:845-854; doi:10.1093/bja/aep079

Paramedian oblique sagittal sonogram of the lumbar spine showing the sonographic changes within the spinal canal after the LOR to saline



Karmakar, M. K. et al. Br. J. Anaesth. 2009 102:845-854; doi:10.1093/bja/aep079

VISIBILITE ECHOGRAPHIQUE
DE LA DURE MERE ET DE L'ESPACE PERIDURAL
EN FIN DE GROSSESSE



Grau, T. et al. Br. J. Anaesth. 2001 86:798-804;

SONOANATOMY OF PREGNANT WOMEN AT TERM
Borges BCR Reg Anesth pain Med 2009;34:581

Interspace level	Atypical LF images n=100	Inconclusive s images n=100	atypical LF / conclusive images %
L1 – L2	2	1	2.0
L2 –L3	1	0	1.0
L3 – L4	3	4	3.1
L4 – L5	18	9	19.8
L5 – L6	19	34	28.8

DISTANCE FROM SKIN-EPIDURAL SPACE IN TRANSVERSE SCAN

Interspace level	SS-ES cm	DSW cm
L1-L2	4.55 +/-0.64	1.03+/-0.19
L2-L3	4.98+/-0.66	0.91+/-0.16
L3-L4	5.37+/-0.70	0.82+/-0.18
L4-L5	5.71+/-0.78	0.65+/-0.19
L5-S1	5.91+/-1.04	0.56+/-0.28

Borges BCR Reg Anesth Pain Med 2009;34:581-5

ANALGESIE PERIDURALE & OBESITE MORBIDE

OBESITE ET ACCOUCHEMENT

- Difficultés de réalisation de l'analgésie péridurale
  - Absence de repères
  - Incidence plus élevée de brèches vasculaires
  - Incidence plus élevée de brèche de la dure mère
  - Taux d'échec supérieur (42% Hood DD Anesthesiology 1993)
  - Réduction de la dose d'anesthésique local (diminution du vol du LCR & diminution de l'espace péridural)

ANALGESIE DE LA PARTURIENTE OBESE

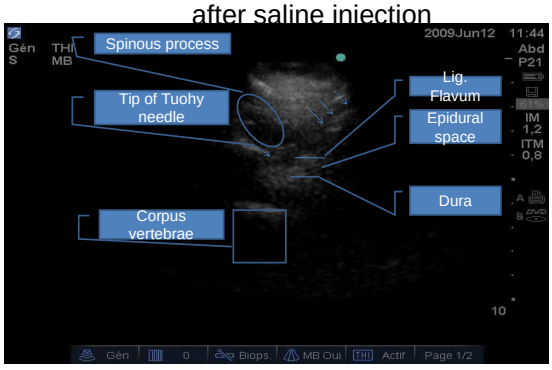
- Tout faire pour mettre en place un cathéter péridural efficace
  - Echographie
  - Répéter les tentatives
  - Insérer le cathéter sur une distance > 4 cm
- Eviter l'anesthésie générale et le risque d'intubation (morbidité x 20)

INTERET DU REPERAGE ECHOGRAPHIQUE

- Identification précise de l'espace
- Identification de la distance peau-espace péridural
- Facilitation de l'apprentissage
- Diminution du nombre de tentatives (meilleur taux de succès à la première tentative – moins de ponctions multiples)
- Meilleure confort des patientes

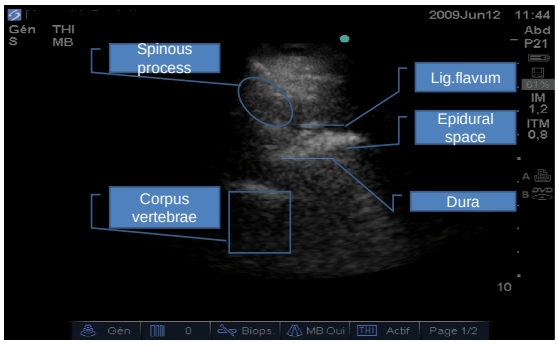
BLOOD PATCH UNDER US GUIDANCE

after saline injection



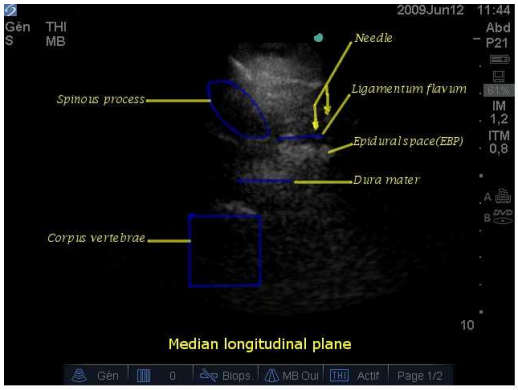
LONGITUDINAL PLANE

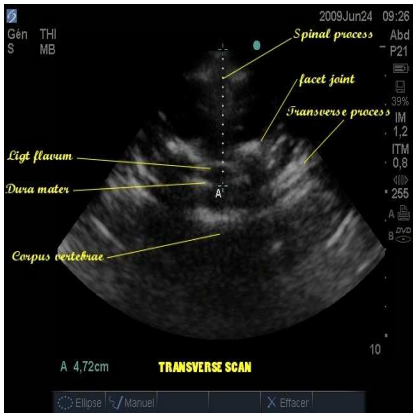
BLOOD PATCH UNDER US GUIDANCE



LONGITUDINAL PLANE

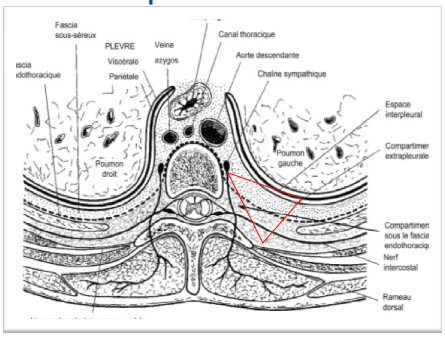
BLOOD PATCH UNDER US



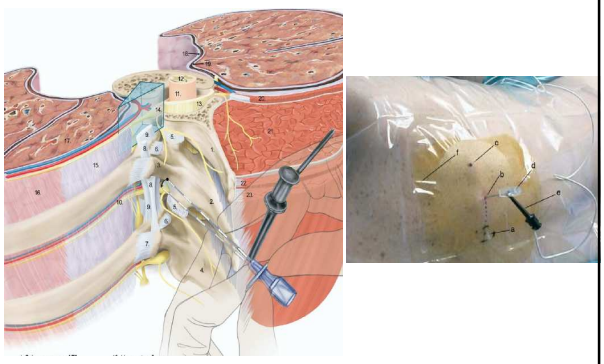


THORACIC PARAVERTEBRAL BLOCK

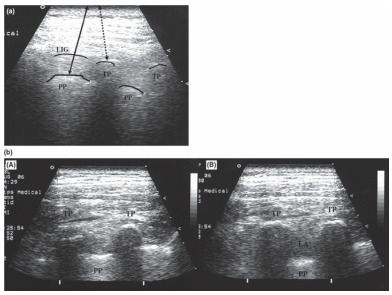
Coupe transversale



Thoracic Paravertebral Block • Boezaart and Raw

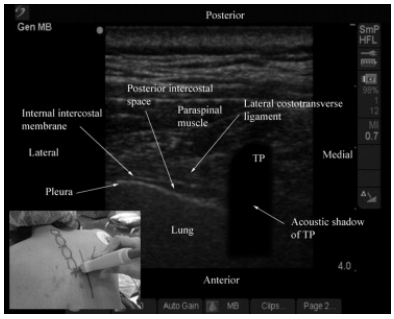


Regional Anesthesia and Pain Medicine Vol. 31 No. 5 September–October 2006



(a) Distances from the skin to the transverse process and pleura on US longitudinal image at T4.
TP ¼ transverse process, PP ¼ parietal pleura, LIG ¼ intertransverse and superior costotransverse ligaments. , distance from the skin to TP; , distance from the skin to PP.
(b) Visualisation of local anaesthetic and the downward shift of PP on US longitudinal image. (A) Before injection, (B) After injection. TP ¼ transverse process, PP ¼ parietal pleura; LA = local anaesthetic
Hara K et al Anaesthesia; 2009:64:216-29

Transverse sonogram of the thoracic paravertebral region

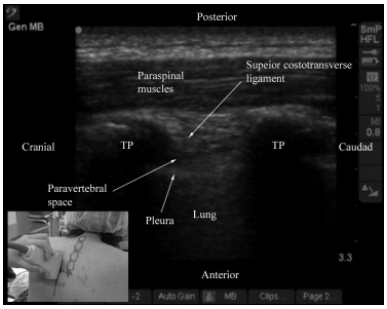


Sonographic measurement of needle insertion depth in paravertebral blocks in women
Pusch F et al Brit J Anaesth 2000;85:841-3

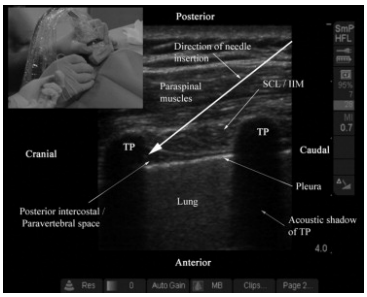
Mean distances from the skin (mm) to anatomical landmarks

Skin to transverse process (ultrasound)	21 (9–34)
Skin to parietal pleura (ultrasound)	35 (24–52)
Skin to bony contact (needle)	25 (15–38)
Angle of needle deviation to bony contact	8 (0–25)
Skin to LOR using needle	40 (24–56)
Angle of needle deviation to LOR	35 (20–50)

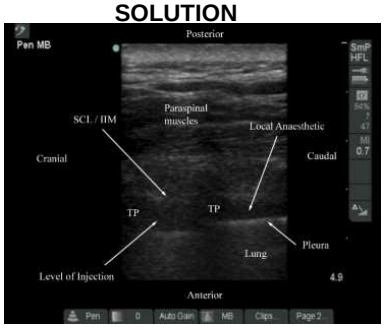
PARAMEDIAN SAGITTAL SONOGRAM OF THE THORACIC PARAVERTEBRAL REGION



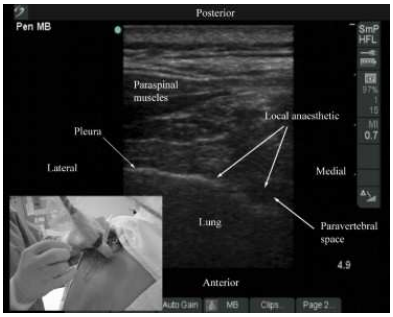
PARAMEDIAN OBLIQUE SAGITTAL SCAN
Arrow represents the direction of the needle in plane needle insertion



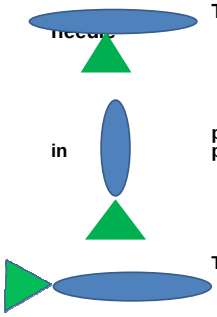
PARAMEDIAN SAGITTAL SONOGRAM OF THE PARAVERTEBRAL SPACE INJECTION OF LOCAL ANAESTHETIC SOLUTION



TRANSVERSE SCAN NEEDLE IN PLANE



Ultrasound-guided thoracic paravertebral block



Transverse scan with short axis insertion

use the transverse process landmark

paramedian oblique sagittal scan with plane needle insertion

Challenging to visualize the needle
Widening ot the PV space
anterior displacement of the pleura

Transverse scan with in plane needle insertion

good vizualisation
inconfortable for the patient

QUELQUES SITES

- Nysora.com (the new york school or regional anesthesia)
- Usra.ca/gt_sb (utrasound for regional anesthesia : principles and techniques)
- Ultrasound-guided thoracic paravertebral block. Karmakar MK Techniques in Regional Anesthesia and pain Management 2009;12:14é-9