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REVISIÓN BIBLIOGRÁFICA: PUESTA AL DÍA

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Servicio de Anestesia Reanimación y Tratamiento del Dolor
Consorcio Hospital General Universitario de Valencia



SARTD-CHGUV Sesión de Formación Continuada

Valencia 29 de Noviembre de 2011

Neuraxial techniques in patients with pre-existing back impairment or prior spine interventions: a topical review with special reference to obstetrics

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- Revisión de artículos publicados desde 1985: técnicas anestésicas en pacientes con lesiones preexistentes de espalda o de medula.
- Consideraciones anestésicas más que recomendaciones anestésicas.





THERE is a growing concern that neuraxial anaesthetic techniques may lead to post-operative neurological deficit or to an exacerbation of pre-existing neurological disorders. However, the causality of such post-operative deficits is not always easy to determine. Often, regional anaesthesia is all too easily blamed.

- Alteraciones neurológicas de todo tipo → consideradas contraindicación para anestesia regional, especialmente anestesia neuroaxial.
- Miedo a problemas medicolegales.
- Heterogeneidad en la literatura, dificultad para realizar ensayos controlados, tamaños muestrales discretos → dificultad para establecer recomendaciones.





THERE is a growing concern that neuraxial anaesthetic techniques may lead to post-operative neurological deficit or to an exacerbation of pre-existing neurological disorders. However, the causality of such post-operative deficits is not always easy to determine. Often, regional anaesthesia is all too easily blamed.

Many colleagues, mainly because of litigation issues, are reluctant to consider a neuraxial technique when there may exist whatever kind of neurological problem before surgery or delivery. On the other hand, not infrequently, regional anaesthesia may be beneficial such as in the case of respiratory involvement or in obstetric patients. As it is not always feasible to perform controlled studies comparing general and regional techniques, recommendations are difficult to make and

mostly inspired by anecdotal reports and studies with a limited sample size.

Several reviews have been published during recent years on anaesthetic management of patients suffering a neurological disease.^{1,2} The present topical review will focus on anaesthetic considerations rather than recommendations as regards neuraxial anaesthesia in patients with pre-existing back problems and conditions after spinal injury or different types of spinal interventions. Mostly, experiences in obstetric patients are reported because the demand for regional anaesthesia and analgesia is more prominent as it is commonly accepted to be safer than general anaesthesia or systemic analgesia. For non-obstetrical surgery, general anaesthesia may be an equally valuable alternative in terms of safety and morbidity.

910



Spinal cord injury/para- and quadriplegia

- Traumatismos
- Sangrado
- Lesiones ocupantes de espacio

Therapeutic interventions after spinal cord injury

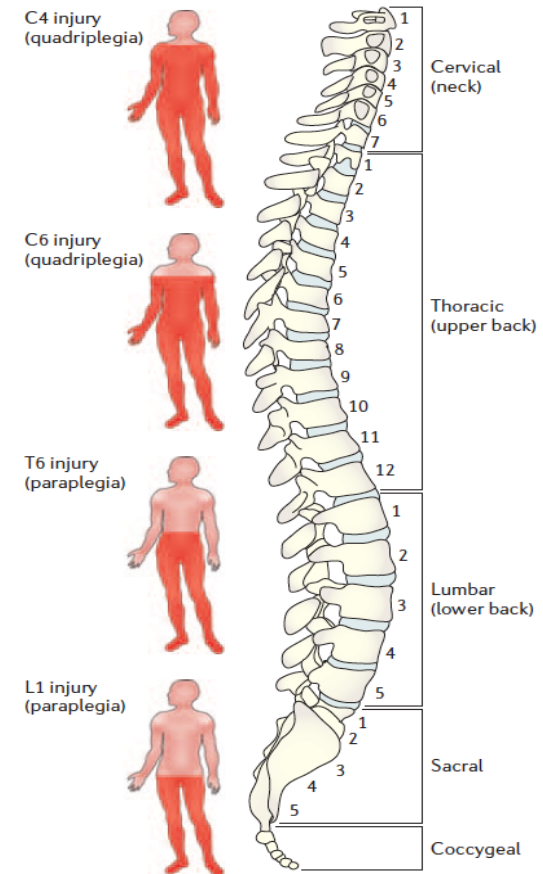
Sandrine Thuret¹*, Lawrence D. F. Moon^{2,3} and Fred H. Gage⁴

Box 1 | The ASIA Impairment Scale

Classification of spinal cord injury (SCI) severity using the American Spinal Injury Association (ASIA) Impairment Scale. The main categories of the Impairment Scale are as follows:

- A (complete): No motor or sensory function is preserved in the sacral segments S4–S5.
- B (incomplete): Sensory but not motor function is preserved below the neurological level and includes the sacral segments S4–S5.
- C (incomplete): Motor function is preserved below the neurological level, and more than a half of key muscles below the neurological level have a muscle grade of <3.
- D (incomplete): Motor function is preserved below the neurological level, and at least a half of key muscles below the neurological level have a muscle grade of ≥3.
- E (normal): Motor and sensory functions are normal.

Extent of injury after damage to specific spinal segments is illustrated in the figure (see [American Spinal Injury Association](#) in Online links box for the complete standard neurological classification of SCI).





Spinal cord injury/para- and quadriplegia

Fisopatología de la lesión espinal:

Disrupción brusca de las vías ascendentes y descendentes.

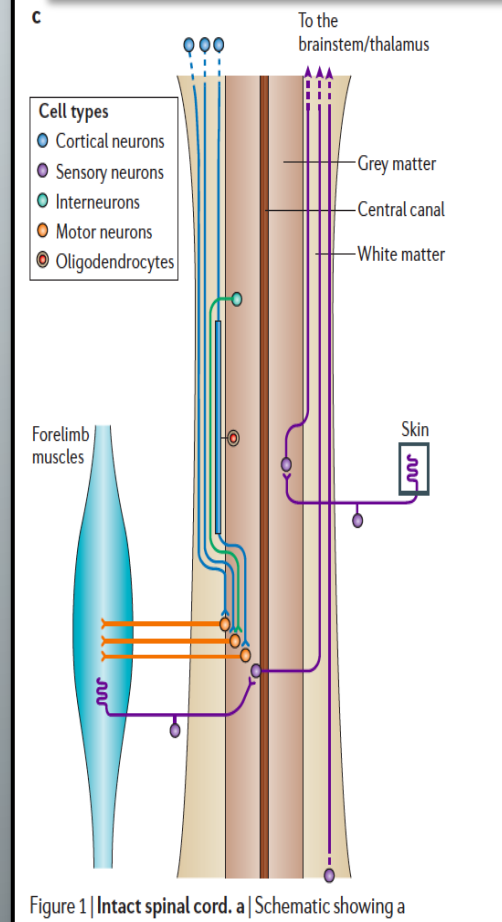
Shock medular:

FASE AGUDA:

1. Parálisis flácida y ausencia de sensibilidad por debajo del nivel de la lesión.
2. Pérdida de reflejos espinales por debajo de la lesión.
3. Alteración en mecanismo de autorregulación de la temperatura.

Therapeutic interventions after spinal cord injury

Sandrine Thuret^{1,2}, Lawrence D. F. Moon^{3,4} and Fred H. Gage⁵





Spinal cord injury/para- and quadriplegia

Shock neurogénico:

Lesiones medulares por encima de T5 → simpatectomía:

1. Hipotensión
 - Vasodilatación arteriolar y venosa
 - Pérdida de estímulo simpático del territorio esplácnico
2. Bradicardia.
3. Alteraciones del ECG: isquemia miocárdica.





Spinal cord injury/para- and quadriplegia

Función respiratoria:

Músculos preservado según el nivel de lesión:

- ✓ C1-C3 Músculos accesorios
- ✓ C3-C5 Diafragma y músculos accesorios
- ✓ C6-C8 Diafragma, Accesorios y Escalenos
- ✓ D1-D5 Diafragma Accesorios, Intercostales y Abdominales
- ✓ D6-D10 Diafragma, Escalenos, Accesorios, Intercostales y Abdominales

- Apnea total.
- Respiración paradójica.
- Disminución de la CV.
- Dificultad movilización secreciones.
- Capacidad respiratoria íntegra.

**PROTOCOLO DE ANESTESIA EN CIRUGÍA DE RAQUIS
CON LESIÓN MEDULAR AGUDA**
Servicio de Anestesia, Reanimación y Tratamiento del Dolor
Consortio Hospital General Universitario de Valencia
Grupo de trabajo SARTD-CHGUV para Neuro Anestesia
Dr^a M. Murcia; Dr^a M.A. Soldado

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Valencia 29 de Noviembre de 2011





**Spinal cord injury/para- and
quadriplegia**

FASE CRÓNICA

Hipoventilación alveolar
Espasticidad muscular
Infecciones respiratorias
Infecciones del tracto urinario: litiasis e Ins. Renal
Paresia gástrica e intestinal
Alteración de la termorregulación
Osteoporosis
Úlceras por presión
TVP
Dolor
Trastornos mentales

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Spinal cord injury/para- and quadriplegia

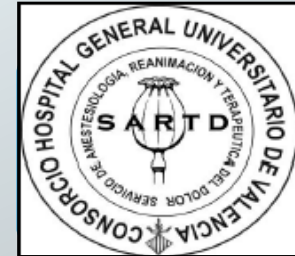
HIPERREFLEXIA AUTONÓMICA:

2- 3 semanas tras lesión

- Lesiones por encima de T5 (> 85%)
- Respuesta simpática excesiva a estímulos infralesionales
Ausencia de respuesta inhibitoria de cordones descendentes
- Estímulos vanales



Crisis hipertensivas
Disritmias o bradicardias
Convulsiones
Hemorragia cerebral



Spinal cord injury/para- and quadriplegia

- [Anaesthetic aspects of implanting diaphragmatic pacing in patients with spinal cord injury.](#)
- 4. Story D, Mariampillai E, Nikfarjam M, Howard M, Nunn A, Onders R. *Anaesth Intensive Care*. 2010 Jul;38(4):740-3. PMID: 20715740 [PubMed - indexed for MEDLINE] [Related citations](#)
- [\[Anesthetic management of a patient with chronic spinal cord injury for laparoscopic cholecystectomy\].](#)
- 5. Sugiyama T, Kobayashi Y, Suga K, Yoshida A, Satoh N, Kaneko T. *Masui*. 2010 Aug;59(8):1013-5. Japanese. PMID: 20715530 [PubMed - indexed for MEDLINE] [Related citations](#)
- [Reversal of prolonged rocuronium neuromuscular blockade with sugammadex in an obstetric patient with transverse myelitis.](#)
- 6. Weekes G, Hayes N, Bowen M. *Int J Obstet Anesth*. 2010 Jul;19(3):333-6. Epub 2010 Jun 2. PMID: 20627694 [PubMed - indexed for MEDLINE] [Related citations](#)
- [Fatal cerebral hemorrhage associated with autonomic hyperreflexia during surgery in the prone position in a quadriplegic patient: a case report.](#)
- 7. Yoo KY, Jeong CW, Kim WM, Lee HK, Kim SJ, Jeong ST, Lee JK, Lee J. *Minerva Anestesiol*. 2010 Jul;76(7):554-8. PMID: 20613698 [PubMed - indexed for MEDLINE] **Free Article** [Related citations](#)
- [Fatal cerebral hemorrhage associated with autonomic hyperreflexia during surgery in the prone position in a quadriplegic patient: a case report.](#)
- 8. Yoo KY, Jeong CW, Kim WM, Lee HK, Kim SJ, Jeong ST, Lee JK, Lee J. *Minerva Anestesiol*. 2010 Apr 12. [Epub ahead of print] PMID: 20386511 [PubMed - as supplied by publisher] **Free Article** [Related citations](#)
- [Confirmation of epidural catheter placement in a quadriplegic patient using a nerve stimulator.](#)
- 9. Riaz S, Niazi AU, Tumber PS, Peng P. *Can J Anaesth*. 2010 Mar;57(3):276-7. Epub 2010 Jan 20. No abstract available. PMID: 20087712 [PubMed - indexed for MEDLINE] [Related citations](#)
- [\[Case of autonomic hyperreflexia treated with intravenous nicardipine\].](#)
- 10. Saito J, Kimura F, Ishihara H, Hirota K. *Masui*. 2008 Dec;58(12):1838-40. Japanese.

Issue: 4 (2011) (doi:10.1111/j.1399-6576.2011.02443.x)
Pregnancy following spinal cord injury.
[West J Med. 1991]
See all (2)...

Find related data

Database:

Search details

("autonomic dysreflexia"[MeSH Terms]
OR ("autonomic"[All Fields] AND
"dysreflexia"[All Fields]) OR "autonomic
dysreflexia"[All Fields] OR "autonomic"
[All Fields] AND "hyperreflexia"[All

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Spinal cord injury/para- and quadriplegia

In the acute phase of the spinal cord injury, general anaesthesia may be the best choice because of the possible spinal shock or respiratory dysfunction. Besides, the consequence of patient manipulation for a neuraxial technique may aggravate the existing damage. However, to prevent hyperre-



Anesthesia for Cesarean section in a patient with paraplegia resulting from tumour metastases to spinal cord

Brian P. Jones MD,*
Brock C. Milliken MD,†
Donald H. Penning MD MSc†



- Mujer de 19 con antecedentes de osteosarcoma de pierna izda.
- Semana 29: debilidad de MMII. RMN: metástasis osteosarcoma T8-11 y L4-5
Laminectomía descompresiva.
Paraplejía incompleta por debajo de T10.
- Semana 31: pielonefritis. Preeclampsia: HTA, proteinuria, edemas con fovea y trombocitopenia.

Cesárea



Anesthesia for Cesarean section in a patient with paraplegia resulting from tumour metastases to spinal cord

Brian P. Jones MD,*
Brock C. Milliken MD,†
Donald H. Penning MD MSc†



- Monitorización: ECG, SatO₂, PAI.
- Decúbito supino con lateralización izqda
- AG, con IOT mediante fibrobroncoscopio
- Inducción con tiopental
- Mantenimiento con Isoflurano 0.5% + O₂/N₂O 50%
- Analgesia con fentanilo tras parto

Sin incidencia intraoperatorias

No administración BNM.

No empleo anestesia regional



Anesthesia for Cesarean section in a patient with paraplegia resulting from tumour metastases to spinal cord

Brian P. Jones MD,*
Brock C. Milliken MD,†
Donald H. Penning MD MSc†



Discussion

uncommon.^{2,3} Patient with incomplete spinal cord lesions are less likely to develop AH, as the descending inhibitory tracts have a greater likelihood of being intact. Since this patient had a relatively low and incomplete injury, her likelihood of developing AH was low. However, regional anesthesia would have been preferred as she was at risk.² Neuraxial regional anesthesia prevents autonomic hyperreflexia^{1,2,4,5} when an appropriate sensory level is achieved. It may be difficult to determine a sensory level from regional analgesia in a labouring, paraplegic patient. Autonomic hyperreflexia in the face of a failed epidural catheter has been seen and treated by replacement with a working catheter.⁶



Anesthesia for Cesarean section in a patient with paraplegia resulting from tumour metastases to spinal cord

Brian P. Jones MD,*
Brock C. Milliken MD,†
Donald H. Penning MD MSc†



Thrombocytopenia was one deterrent to regional anesthesia. The hematologists thought it unlikely that the thrombocytopenia was from chemotherapy rather than from preeclampsia. The patient's fever and possible urosepsis was another deterrent to regional anesthesia. Blood cultures were drawn on the day of surgery. Epidural hematoma and abscess may not be as catastrophic in this patient as in the normal population, but may have increased the chance of further urgent surgery, or decreased this patient's rehabilitation potential. We perceived that the tumour in her spinal canal and the previous back surgery might make epidural catheter placement difficult,¹ and the block ineffective due to restricted local anesthetic spread in



Anesthesia for Cesarean section in a patient with paraplegia resulting from tumour metastases to spinal cord

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the epidural space. Bolus administration of local anesthetic in the epidural space may have caused further compression of the spinal cord. Considering the potential to introduce tumour into the cerebrospinal fluid during a spinal block, we chose to avoid this option. While introduction of tumour into the CSF with a spinal needle may not be a well described occurrence, we did not want to feel responsible if tumour extension into the subarachnoid space occurred. Positioning for neuraxial regional anesthesia in this obese, paraplegic patient also would have been difficult. We did not see an absolute contraindication for neuraxial anesthesia, but in our opinion general anesthesia was preferable.



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Review Article



Técnicas neuroaxiales empleadas:

Anestesia combinada **intradural-epidural** con bajas dosis.

Anestesia **espinal** **continua**

Anestesia **epidural**

Anestesia **intradural** con punción única: mayor inestabilidad hemodinámica.



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- Amplia experiencia en obstetricia.
- El empleo de la anestesia epidural durante el trabajo del parto bloquea la hiperreflexia autonómica.
- Casos en que no ha sido efectiva¹:
 - Dificultad en la determinación del nivel de bloqueo sensitivo
 - Malposición del catéter epidural
- Alteraciones anatómicas por espasticidad y cirugías previas dificultan la realización de la técnica neuroaxial.

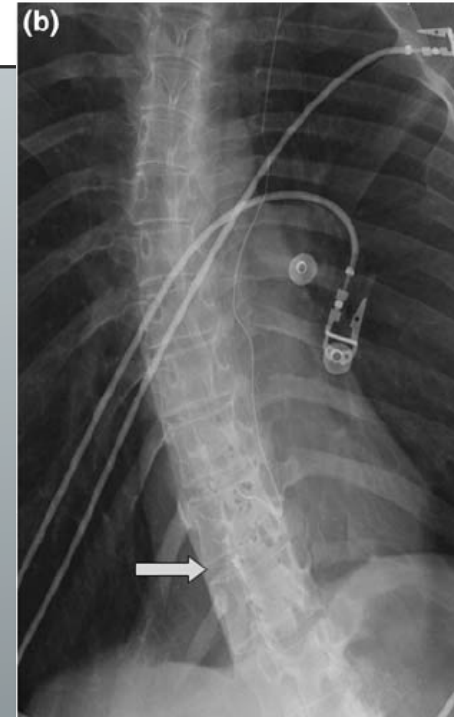
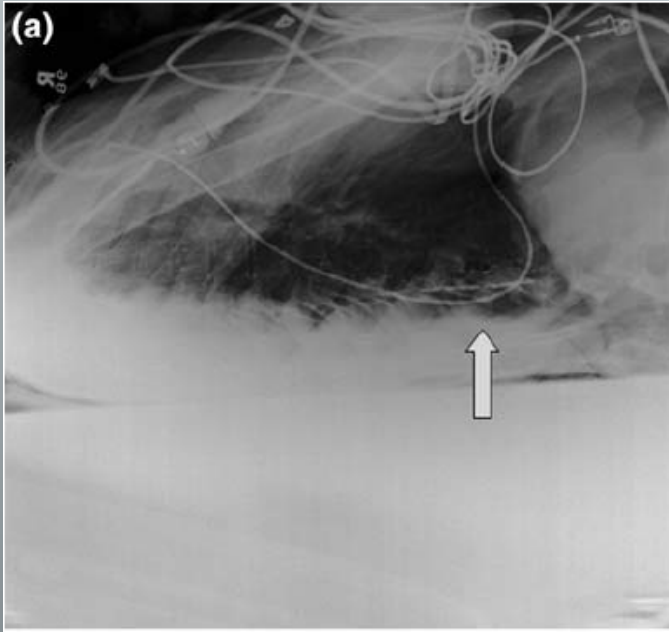
1. Owen MD. Autonomic hyperreflexia in a pregnant paraplegic patient. Case report. Reg Anesth 1994; 19: 415-7



CORRESPONDENCE

Confirmation of epidural catheter placement in a quadriplegic patient using a nerve stimulator

Sheila Riazi, MD · Ahtsham U. Niazi, MBBS ·
Paul S. Tumber, MD · Philip Peng, MBBS



Clinical Reports

Autonomic hyper-reflexia during labour

Atsuko Kobayashi MD PhD, Toshiki Mizobe MD PhD,
Hideaki Tojo MD, Satoru Hashimoto MD PhD

CAN J ANAESTH 1995 / 42: 12 / pp 1134-6

potension, bradycardia, and even, asystole. It is important to note that AH can develop before or after delivery. In our two patients, AH occurred before, during and after delivery. A single administration of spinal anaesthesia was thus impractical in obtaining a prolonged period of reflex control. Baraka¹⁰ recommends epidural

Our experience suggests that an epidural catheter can be placed two to three weeks before the anticipated date of delivery, because the onset of labour in a patient with spinal cord damage is difficult to predict and can proceed very rapidly, as in Case #1. The epidural catheter can be maintained with care in avoiding catheter displacement and infection. Also, the epidural catheter is available after the delivery. Crosby¹³ recommended that the epidural catheter be maintained for 24–48 hr postpartum. We suc-





- La administración neuroaxial de opioides es insuficiente.
- Algunos autores prefieren el uso de soluciones isobaras → difusión restringida de AL hiperbárico → acumulación → toxicidad neurológica.¹

1. King HK et al. Isobaric spinal anesthesia for paraplegic patients. Acta Anesthesiol Sin 1999; 37: 29-34



Spinal congenital anomalies



- No se pueden establecer recomendaciones por la ausencia de estudios o revisiones.
- Espina bífida (Meningocele, mielomeningocele...), lipomas, malformaciones vasculares (Von Hippel-Lindau, Klippel-Trenaunay...).
- Individualizar cada caso.
- Exploración neurológica previa.
- RMN lo más próximo posible al momento de realización de la técnica¹. Cualquier técnica neuroaxial debería contraindicarse si no se puede realizar RMN².
- Tras la retirada del catéter, vigilancia neurológica para detectar cualquier signo de hematoma epidural

1. Successful use of spinal anesthesia in a patient with severe Klippel-Trenaunay syndrome associated with upper airway abnormalities and chronic Kasabach-Merritt coagulopathy. *J Anesth* 2010; 24: 134-8
2. Anesthetic and obstetric considerations in a parturient with Klippel-Trenaunay syndrome. *Can J Anaesth* 2006; 53: 487-91



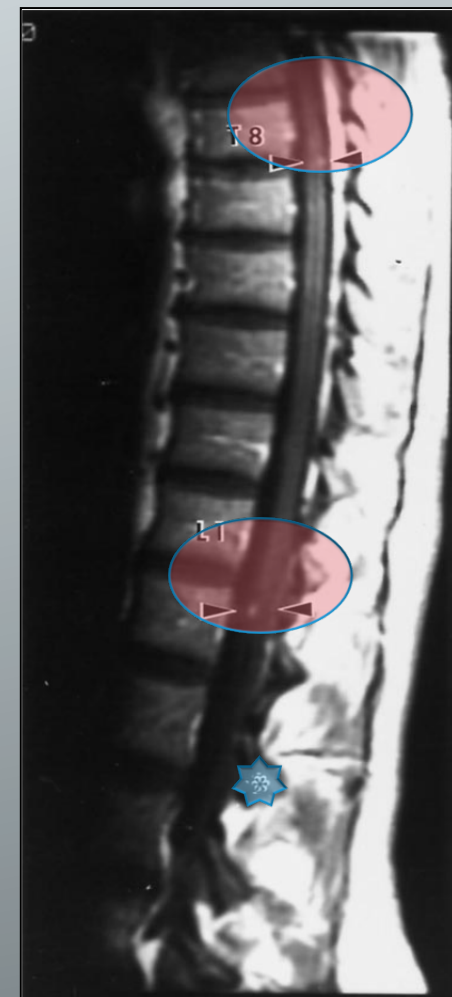
Epidural Anesthesia for Cesarean Section in a Patient with von Hippel-Lindau Disease and Multiple Sclerosis

Alan Wang, MD, and Raymond S. Sinatra, MD, PhD

Department of Anesthesiology, Yale University School of Medicine, New Haven, Connecticut



- Paciente 45 años, secundípara.
- AP: Enfermedad de Von Hippel-Lindau con hemangioblastomas en retina y cerebelo. Suprarrenalectomía bilateral por feocromocitomas.
- Cesárea por el riesgo de rotura de hemangioblastomas durante el trabajo de parto.
- RMN previa: hemangiomas medulares.
- Técnica epidural sin incidencias.
- Descartan técnica subaracnoidea por el mayor riesgo de alcanzar la lesión.



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Chronic back problems/spinal stenosis

- Temor al empeoramiento de patología previa. Temor a futuros problemas medicolegales.
- Tratamiento con corticosteroides epidurales de patologías como dolor crónico de espalda o raquis postquirúrgico.

SPINE Volume 31, Number 9, pp 1056-1059
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Cord and Cauda Equina Injury Complicating Elective Orthopedic Surgery

Kai-Uwe Lewandrowski, MD,* Robert F. McLain, MD,* Isadore Lieberman, MD, FRCS,*†
and Douglas Orr, MD, FRCS*

- Casos descritos en la literatura de empeoramiento o aparición de sintomatología en pacientes con estenosis de canal (no diagnosticada) poco o nada sintomática.



■ PAIN AND REGIONAL ANESTHESIA

Anesthesiology 2004; 101:950-9

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Severe Neurological Complications after Central Neuraxial Blockades in Sweden 1990–1999

Vibeke Moen, M.D.,* Nils Dahlgren, M.D., Ph.D.,† Lars Irestedt, M.D., Ph.D.‡



Methods: A retrospective study of severe neurologic complications after central neuraxial blockades in Sweden 1990–1999 was performed. Information was obtained from a postal survey and administrative files in the health care system. During the study period approximately 1,260,000 spinal blockades and 450,000 epidural blockades were administered, including 200,000 epidural blockades for pain relief in labor.

Table 3. Complications According to Type of Central Neuraxial Blockade

	EB	CSE	SB	Continuous SB	Total
Spinal hematoma	21 (7/14)	4 (1/3)	7 (0/7)	1 (1/0)	33 (9/24)
Cauda equina syndrome	8 (4/4)	4 (0/4)	18 (13/5)	2 (1/1)	32 (18/14)
Purulent meningitis	5 (1/4)	1 (0/1)	20 (14/6)	3 (2/1)	29 (17/12)
Epidural abscess	12 (5/7)		1 (0/1)		13 (5/8)
Traumatic cord lesion	8 (3/5)		1 (0/1)		9 (3/6)
Cranial subdural hematoma	3 (1/2)		2 (2/0)		5 (3/2)
Paraparesis	3 (1/2)		1 (1/0)		4 (2/2)
Other	2 (0/2)				2 (0/2)
Total	62 (22/40)	9 (1/8)	50 (30/20)	6 (4/2)	127 (57/70)

The number of males/females is in parentheses.

CSE – combined spinal epidural blockade; EB – epidural blockade; SB – spinal blockade.



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Chronic back problems/spinal stenosis

Síndrome cauda equina



Dolor de espalda

Dolor MMII

Parestesia perineales

Debilidad MMII o paraplejia

Disfunción urinaria y fecal

Pérdida de reflejos.

Chronic back problems/spinal stenosis

was diagnosed post-operatively. It is unclear whether this is caused by the technique *per se* or by the choice of drugs, volumes and mode of epidural administration (by bolus or infusion), but a relationship with the sudden onset of post-operative problems and the neuraxial technique cannot be ignored. Patients with pre-existing pressure upon neural structures such as in herniated disc or spinal stenosis may suffer additional injury either from local anaesthetics or from ischaemia related to the volume effects of the injectate.^{33,35} In addition, even a small, self-limiting epidural haematoma, probably asymptomatic in normal backs, may induce serious consequences in patients suffering spinal stenosis.^{35,36} Although the anaesthe-

- Técnica *per se* o elección de anestésicos
- Volumen de anestésico
- Modo de administración

- Toxicidad neurológica
- Isquemia

- Pequeños hematomas epidurales.

▽ ASRA Practice Advisory on Neurologic Complications

ASRA Practice Advisory on Neurologic Complications in Regional Anesthesia and Pain Medicine

Reg Anesth Pain Med 2008;33:404-415.

Table 2. Recommendations: Limiting, Diagnosing, and Treating Neuraxial Injury

Limiting injury

- Misidentification of vertebral level, unrecognized lateral needle placement or deviation, abnormal caudad termination of the spinal cord, or failure of the ligamentum flavum to fuse in the midline may contribute to direct needle injury to the spinal cord. Clinicians are advised to be aware of these anatomic conditions, particularly in patients with challenging surface anatomy. (Class I)
- Clinicians are advised to be aware of and to avoid conditions that have been linked to the formation of epidural hematoma or epidural abscess, as noted in previous ASRA Practice Advisories. Such conditions include concurrent or imminent anticoagulation, the use of multiple anticoagulants, improper aseptic technique, and needle placement during untreated active infection.^{1,3} (Class I)
- Patients with known tumor in the epidural space should undergo neuraxial imaging studies to define the extent of tumor mass. If the tumor is close to the planned site of epidural solution injection, alternative methods of anesthesia or analgesia should be considered. (Class II)
- Surgical positioning and specific space-occupying extradural lesions (e.g., severe spinal stenosis, epidural lipomatosis, ligamentum flavum hypertrophy, or ependymoma) have been associated with temporary or permanent spinal cord injury in conjunction with neuraxial regional anesthetic techniques. These conditions are particularly relevant when they coexist with an epidural hematoma or abscess. Awareness of these conditions should prompt consideration of risk vs. benefit when contemplating neuraxial regional anesthetic techniques. (Class II)
- Initial dosing or redosing of subarachnoid local anesthetic in excess of the maximum recommended dose may increase the risk of spinal cord or spinal nerve root neurotoxicity and should be avoided. (Class I)
- Epidural anesthetic procedures using the thoracic approach are neither safer nor riskier than using the lumbar approach. (Class I)
- The use of local anesthetic and/or opioid during neuraxial block for chronic pain treatments in the ambulatory setting should be accompanied by the same close monitoring and ability to perform resuscitative maneuvers that are available to those patients receiving neuraxial local anesthetic and/or opioid in the operating room. (Class I)

Diagnosis and treatment

- Magnetic resonance imaging (MRI) is the diagnostic modality of choice for suspected neuraxial lesions. Computed tomography (CT) should be used for rapid diagnosis if MRI is not immediately unavailable, especially when neuraxial compression injury is suspected. (Class I)
- Diagnosis of a compressive lesion within or near the neuraxis demands immediate neurosurgical consultation for consideration of decompression. (Class I)

Table 4. Recommendations: Performing Regional Anesthesia in Patients With Pre-Existing Neurologic Deficits

Pre-existing peripheral neuropathy

- Patients with chronic diabetes mellitus, severe peripheral vascular disease, multiple sclerosis, or previous exposure to chemotherapy (e.g., cisplatin or vincristine) may have clinical or subclinical evidence of a pre-existing peripheral neuropathy. Peripheral nerve block may theoretically increase the risk of new or progressive postoperative neurologic complications in these patients. However, existing data can neither confirm nor refute this theory in clinical practice. Under these clinical conditions, a careful risk-to-benefit assessment of regional anesthesia to alternative perioperative anesthesia and analgesia techniques should be considered. (Class II)

Pre-existing central nervous system disorders

- Definitive evidence indicating that neuraxial anesthesia or analgesia may increase the risk of new or progressive postoperative neurologic complications in patients with pre-existing central nervous system disorders (e.g., multiple sclerosis, postpolio syndrome) is lacking. However, under these clinical conditions, a careful risk-to-benefit assessment of regional anesthesia to alternative perioperative anesthesia and analgesia techniques should be considered. (Class II)

Spinal stenosis or mass lesions within the spinal canal

- When neuraxial anesthesia is complicated by the development of mass lesions within the spinal canal (e.g., hematoma or abscess), resultant postoperative neurologic complications may be more likely or more severe in patients with pre-existing severe spinal stenosis or other obstructive spinal canal pathology. In patients with known severe spinal stenosis or mass lesions within the spinal canal, a careful risk-to-benefit assessment of regional anesthesia to alternative perioperative anesthesia and analgesia techniques should be considered. In these patients, high local anesthetic volume neuraxial techniques (i.e., epidural anesthesia) may be associated with a higher risk of progressive mass effect when compared with low volume techniques (i.e., spinal anesthesia). (Class II)
- For patients receiving neuraxial injection for treatment of pain (e.g., cervical epidural injection of steroids via an interlaminar route), radiologic imaging studies such as computed tomography or magnetic resonance imaging should be used to assess the dimensions of the spinal canal, and this information should be considered in the overall risk-to-benefit analysis, as well as guiding the selection of the safest level for entry. (Class II)

Overall approach to patients with pre-existing neurologic deficits

- Patients with pre-existing neurologic disease may be at increased risk of new or worsening injury regardless of anesthetic technique. When regional anesthesia is thought to be appropriate for these patients, modifying the anesthetic technique may minimize potential risk. Based on a moderate amount of animal data, such modifications may include using a less potent local anesthetic, minimizing local anesthetic dose, volume, and/or concentration, and avoiding or using a lower concentration of vasoconstrictive additives. Limited human data neither confirm nor refute these modifications. (Class II)

Patients with previous spinal surgery

- Prior spinal fusion or spinal corrective surgeries are not a contraindication to neuraxial anesthesia or analgesia. In these patients, spinal anesthesia may be technically easier to perform and more reliable than epidural anesthesia. A review of radiologic imaging and/or the use of fluoroscopy are recommended to refine the approach to the neuraxis. (Class II)



Back pain and disc herniation in pregnancy

- Mujeres embarazadas > incidencia de dolor de espalda y dolor radicular.
- Puede persistir meses tras el parto.
- Estudios muestran que no hay diferencias a largo plazo entre aquellas pacientes que recibieron analgesia epidural y las que no.¹

1. Macarthur A, et al. Epidural anesthesia and low back pain after delivery: a prospective cohort study. Br Med J 1995; 311: 1336-9



Incidence of Postpartum Lumbosacral Spine and Lower Extremity Nerve Injuries

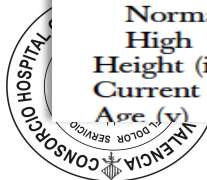
Cynthia A. Wong, MD, Barbara M. Scavone, MD, Sheila Dugan, MD, Joanne C. Smith, MD, Heidi Prather, DO, Jeanne N. Ganchiff, MPH, and Robert J. McCarthy, PharmD

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Table 4. Univariable Analysis of Risk Factors in Laboring Parturients

	No nerve injury (<i>n</i> = 5548)*	Confirmed nerve injury (<i>n</i> = 55)	<i>P</i>
Prolonged second stage (%)			
No	90.9	76.4	.001
Yes	8.1	23.2	
Nulliparity (%)			
No	48.6	25.5	.001
Yes	51.4	74.5	
Delivery (%)			
NSVD	81.7	69.1	.025
Vaginal, assisted	9.6	20.0	
Cesarean	8.7	10.9	
Regional labor analgesia (%)			
No	28.0	16.4	.055
Yes	72.0	83.6	
Newborn weight > 50th percentile (%)			
No	54.2	43.6	.116
Yes	45.8	56.4	
Prepregnancy BMI ($\text{kg} \cdot \text{m}^{-2}$) (%)[†]			
<19.8	18.4	27.8	.136
≥ 19.8 and ≤ 26.0	60.0	48.1	
>26.0	21.6	24.1	
Presentation/position (%)			
Cephalad, OA	90.5	83.6	.163
Cephalad, OP	7.7	14.6	
Other	1.8	1.8	
Gestation (%)			
<37 wk	8.4	3.6	.205
≥ 37 wk	91.6	96.4	
Weight gain (%)[‡]			
Low	23.7	23.4	.283
Normal	38.6	48.9	
High	37.7	27.7	
Height (in.)	64.6 \pm 2.8	64.3 \pm 2.7	.375
Current weight (kg)	77 \pm 14	79 \pm 18	.461
Age (y)	30 \pm 6	30 \pm 6	.778





Back pain and disc herniation in pregnancy

- Cambios ortostáticos de la espalda, incremento de la elasticidad de las estructuras periespinales o compresión directa del plexo lumbar
→herniación discal.
- Cirugía urgente en caso de sintomatología.



Clinical Studies

Pregnancy after anterior spinal surgery: fertility, cesarean-section rate, and the use of neuraxial anesthesia

William F. Lavelle, MD^{a,*}, Elizabeth Demers, MD^b, Amanda Fuchs^a, Allen L. Carl, MD^a

Table 6
Method of delivery after various vertebral levels of anterior spinal surgery

Type of anterior spinal surgery	Pregnant		Total
	Vaginal delivery	Cesarean section	
Surgery extends down to either the L4–L5 or L5–S1 disc space	4	2	6
Surgery extends down into the L3–L4 disc space	1	3	4
Surgery involves the thoracic/lumbar junction	7	2	9
Total	12	7	19

Table 7
Offering of neuraxial anesthesia after either isolated anterior spinal surgery or combined anterior and posterior approaches

Type of anterior spinal surgery	Method of delivery		Total
	Not offered	Received neuraxial anesthesia	
Anterior spinal surgery	9	2	11
Combined approaches	8	0	8
Total	17	2	19





Previous back surgery

- Muchos autores siguen considerándola contraindicación.
- Temor de la paciente.
- Dificultades técnicas.





Previous back surgery

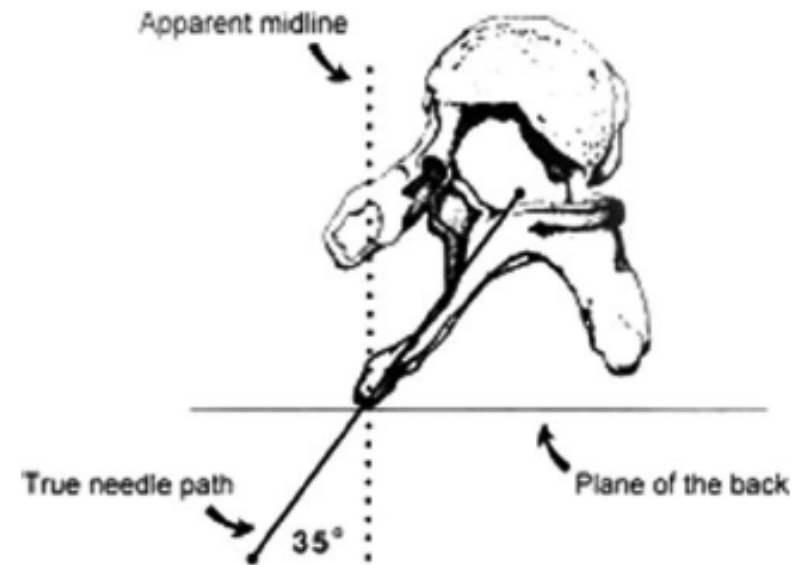
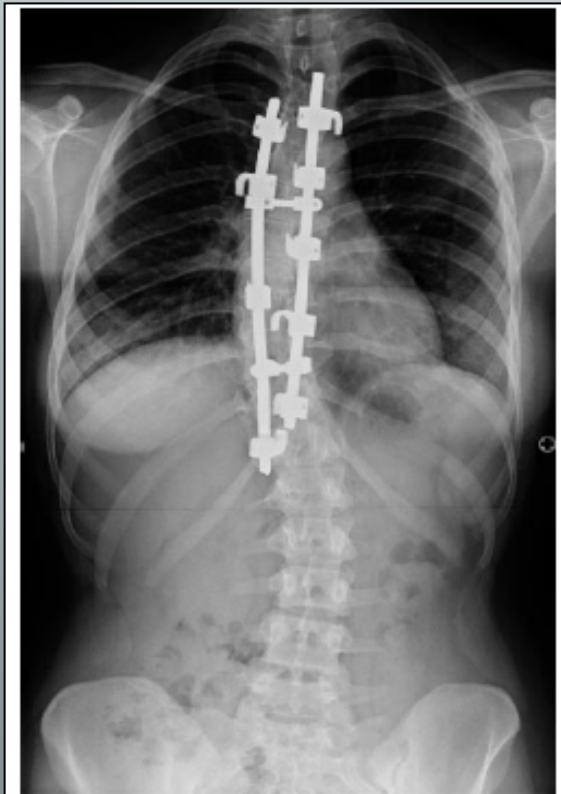


Figure 2. The neuraxial needle should be oriented toward the convexity of the scoliotic curve as it is advanced from the interspinous space toward the midpoint of the posterior epidural space (see arrow). Reproduced with permission from Crosby ET. Disorders of the vertebral column. In: Gambling DR, Douglas MJ, McKay RSF, eds. Obstetric anesthesia and uncommon disorders. 2nd ed. Cambridge: Cambridge University Press, 2008:139.

Previous back surgery



Dificultad técnica

Falsa pérdida de resistencia

Punción dural

Punción traumática

Bloqueos incompletos o parcheados

Malposición del catéter epidural

Posible acumulación de AL

Neurotoxicidad por AL

SARTD-CHGUV Sesión de Formación Continuada

Valencia 29 de Noviembre de 2011



Clinical Implications of Neuraxial Anesthesia in the Parturient with Scoliosis

Table 1. Reports of Neuraxial Anesthesia in Scoliotic Parturients

Author	Patients <i>n</i>	Total neuraxial procedures <i>n</i>	Total neuraxial procedures by anesthetic technique <i>n</i>			
			Epidural	Continuous spinal	Single shot spinal	Combined spinal epidural Other
Uncorrected						
Carlson et al. ⁵	1	1	1			
Bozeman and Chandra ¹¹	1	2	1		1	
Moran and Johnson ⁷	1	2	1	1		
Douglas ⁶	1	1			1	
Smith et al. ^{a29}	24	16	7	7		2
Butwick and Carvalho ¹²	1	2			1	1
Corrected						
Hubbert ¹⁷	17	18	17		1	
Feldstein and Ramanathan ¹⁴	3	3	3			
Crosby and Halpern ²⁷	8	13	13			
Daley et al. ²⁸	18	21	21			
Howard and Anderson ¹⁶	1	1	1			
Kardash et al. ¹⁸	1	2			2	
Pascoe et al. ²²	1	2	1		1	
Silva and Popat ²³	1	2				2
Lee et al. ¹⁹	1	3	3			
Sudunagunta et al. ²⁴	1	1				1 CE
Ho et al. ¹⁵	1	1	1			
Suelto and Shaw ²⁵	1	1				1 PVB
Yeo and French ²⁶	1	3			3	
Smith et al. ^{a29}	16	17		12	4	1
Moeller-Bertram et al. ²⁰	1	3	2			1 CE
Okutomi et al. ²¹	1	1		1		
Costello and Balki ¹³	1	1			1	
Overall	103	117	72	21	15	6

CE — caudal epidural; PVB — paravertebral block.
 * Study that included both uncorrected and corrected patients.

Table 2. Outcomes of Neuraxial Procedures

	Total	Epidural	Continuous spinal	Single shot spinal	Combined spinal epidural	Other ^a
Uncorrected						
Procedures	24	10	8	3	3	0
Successful	19	8	7	1	3	0
Complications	0	0	0	0	0	0
Corrected						
Procedures	93	62	13	12	3	3
Successful	64	41	9	9	2	3
Complications	2 ^b	2 ^b	0	0	0	0

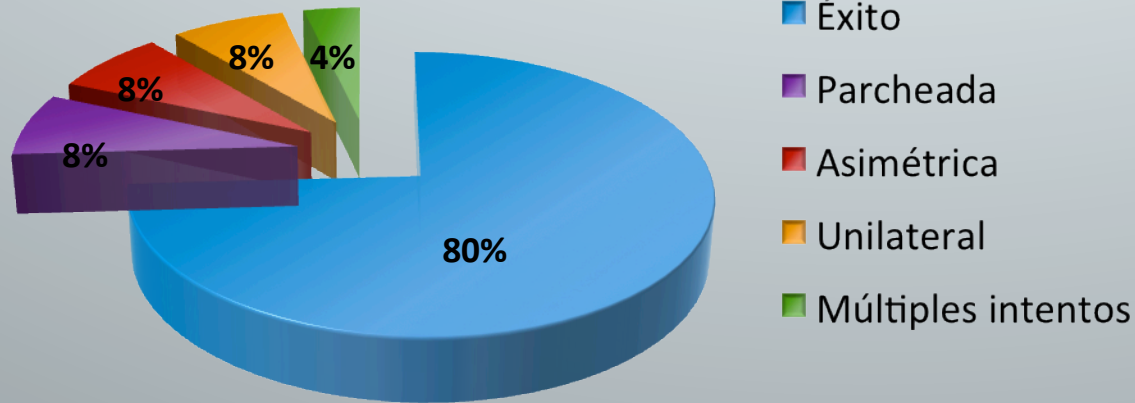
^a Two caudal epidurals, 1 paravertebral block.

^b Two cases of persistent lower back pain of unclear etiology after epidural placement.

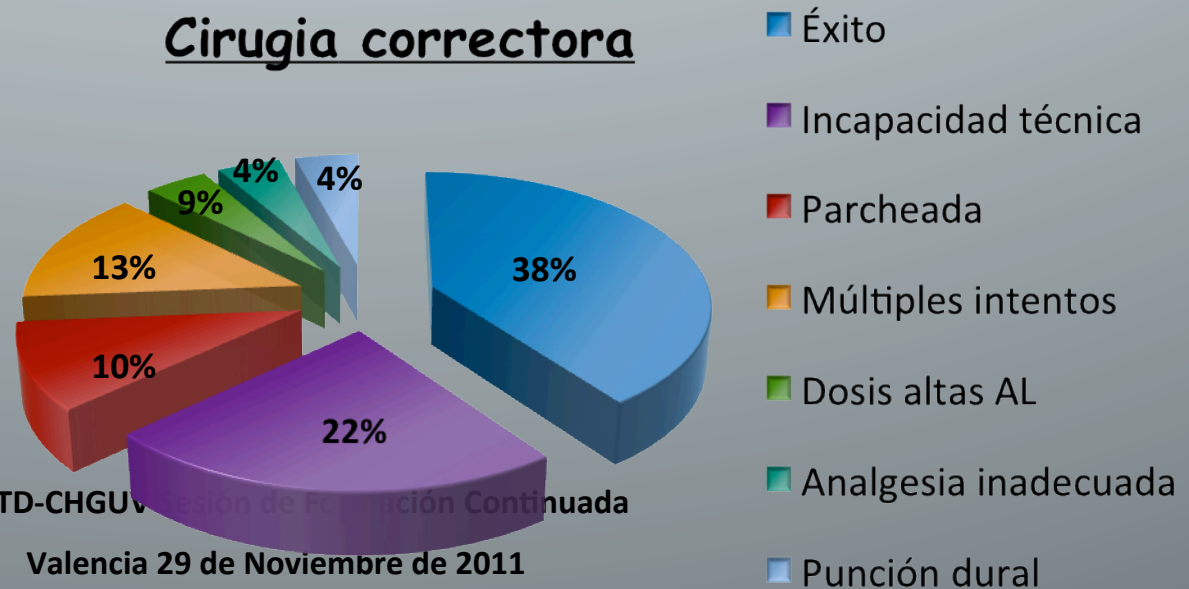
Valencia 29 de Noviembre de 2011

Clinical Implications of Neuraxial Anesthesia in the Parturient with Scoliosis

Sin cirugía correctora



Cirugía correctora



SARTD-CHGUV, Comisión de Formación Continuada

Valencia 29 de Noviembre de 2011



Previous back surgery

TÉCNICAS INTRADURALES:

- Pueden preferirse a las epidurales por menor dificultad técnica.
- **Técnica espinal con punción única:** usada con éxito incluso tras bloqueo epidural inadecuado.¹
- **Técnica combinada epidural- intradural:** mismas dificultades técnicas que la epidural, provee de buena calidad anestésica intraoperatoria, mientras que el catéter epidural se usa para analgesia postoperatoria.
- **Técnica intradural continua:** mayor incidencia de parestesias. Baja incidencia de cefalea post-punción dural.

1. Pascoe HF. Successful spinal anesthesia after inadequate epidural block in a parturient with prior surgical correction of scoliosis. Reg Anesth 1993; 18: 191-2
2. Okutomi T. Spinal anesthesia using a continuous spinal catheter for cesarean section in a parturient with prior surgical correction of scoliosis. J Anesth 2006; 20: 223-6





Previous back surgery

TÉCNICAS INTRADURALES:

- Se desaconseja el uso de adrenalina intradural en pacientes con déficit neurológico preexistente¹.
- La edad es un factor de riesgo de padecer complicaciones neurológicas².

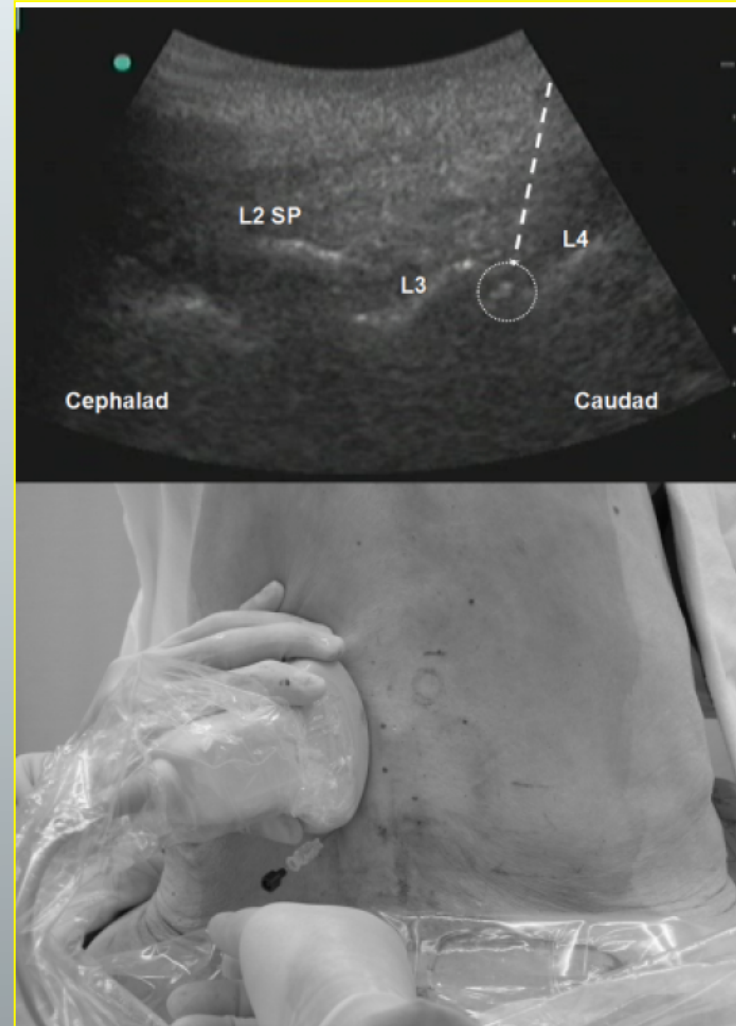
Vercauteren M. Anesthetic considerations for patients with pre-existing neurological deficit: are neuraxial techniques safe? Acta Anaesthesiol Scand 2007; 51: 831-8

Moen V. Severe neurological complications after central neuraxial blocks in Sweden 1990-1999. Anesthesiology 2004; 41: 445-52



Previous back surgery

ULTRASONIDOS





Implantable pumps and stimulators

- Riesgo de dañar el sistema, infección y efectos desconocidos.
- Casos descritos en la literatura de empleo de técnicas de analgesia epidural con éxito en pacientes con dispositivos intratecales o estimuladores medulares.
- No utilizar el sistema intratecal para analgesia o anestesia intraoperatoria, puesto que existe riesgo de infección del sistema o afectación de la estabilidad de la solución al añadir medicamentos.
- Siempre que sea posible, realizar la técnica en espacios inferiores y no introducir el catéter más allá de 3-5 cm en el espacio epidural.





Failed back surgery and epidural infiltration

- Infiltración epidural de AL con corticosteroides en paciente con dolor lumbar post-quirúrgico.
- Abordaje lumbar o abordaje caudal.

Pain Physician 2009; 12:109-135 • ISSN 1533-3159

Systematic Review

**Systematic Review of Caudal Epidural Injections
in the Management of Chronic Low Back Pain**

CONCLUSION

The results of this systematic review evaluating the effect of caudal epidural injections with or without steroids in managing various types of chronic low back and lower extremity pain emanating as a result of disc herniation or radiculitis, post lumbar laminectomy syndrome, spinal stenosis, and chronic discogenic pain without disc herniation or radiculitis has shown Level I evidence for short- and long-term relief of chronic pain secondary to disc herniation or radiculitis and discogenic pain without disc herniation or radiculitis. Further, this systematic review also provides indicated evidence of Level II-1 or II-2 for caudal epidural injections in managing chronic pain of post lumbar laminectomy syndrome and spinal stenosis.





Previous dural tap and blood patch

Previous Wet Tap Does Not Reduce Success Rate of Labor Epidural Analgesia

Robert Blanche, MD, James C. Eisenach, MD, Robin Tuttle, RN, and David M. Dewan, MD

- Parche hemático previo no afecta al éxito y la calidad analgésica para el parto.
- El riesgo de una nueva punción dural fue del 4%.



Conclusion



- Escaso número de ensayos clínicos.
- Temor a problemas médico-legales.
- Mayor experiencia de manejo de estos pacientes con AG.
- Individualizar riesgo-beneficio
- Uso de ultrasonidos.
- Examen preoperatorio cuidadoso.
- Explicar al paciente las consideraciones especiales, dificultades, riesgos y tasa de complicaciones.
- No utilizar altas concentraciones y elevados volúmenes de AL.
- Valorar el beneficio de la anestesia intradural sobre epidural.
- Especial precacuión en pacientes con estenosis de canal.
- En caso de aparición de sintomatología neurológica, no "culpar" automáticamente a la técnica anestésica y valorar manejo multidisciplinar.

