

LABOUR ANALGESIA: TIPS AND TRICKS



Dr. Emilia Guasch

Division Chief. Hospital Universitario La Paz. Madrid.
Spain

WFSA Board and Council Member

WFSA Chair Obstetric Committee

ESAIC Non-Officer elected Member

EBA-UEMS Vice-President



BaltAnestIC 2023

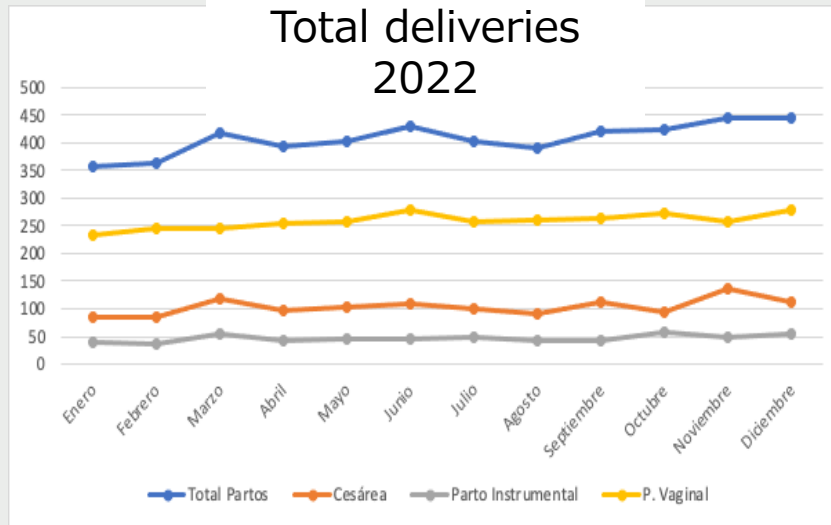
11th International Baltic Congress of Anaesthesiology and Intensive care
September 28-30, 2023, Tartu, Estonia [Estonian National Museum](#)

- No conflicts of interest



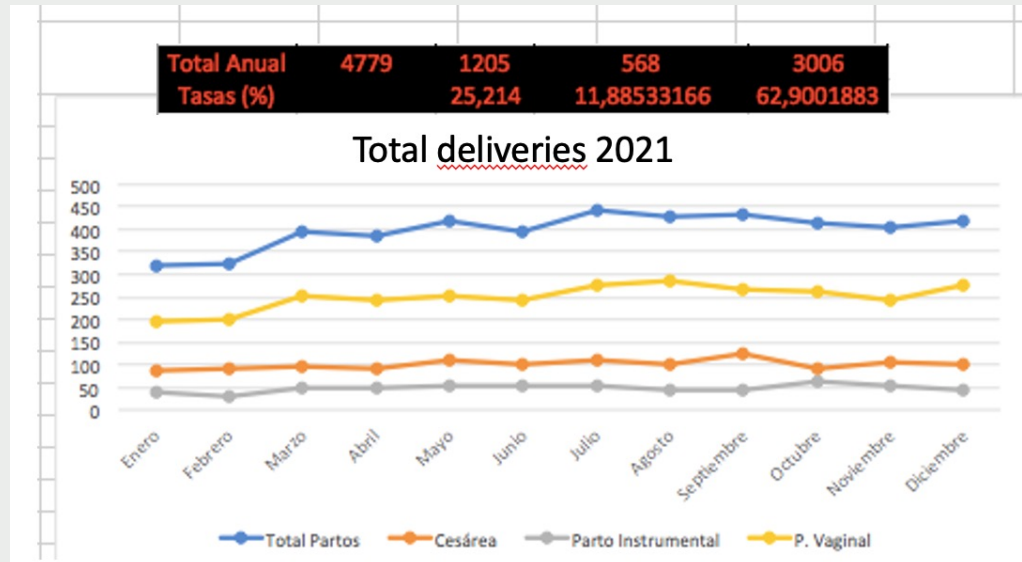
Goals

- 1. Initiation**
- 2. Maintenance**
- 3. Failing epidural**
- 4. Solving problems**



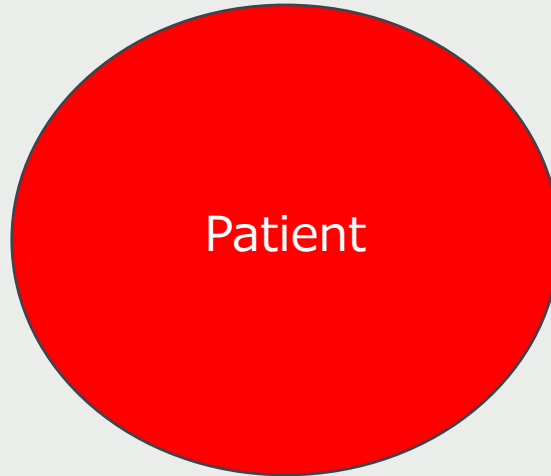
Total Anual	4896	1239	555	3102
Tasas (%)	408	25,31	11,34	63,36

“La Paz”
My hospital in numbers



Epidural rate > 90%

Ideal technique



- Quick onset
- Predictable spread and quality
- Adjustable Depth and duration
- Minimal motor block
- Minimal maternal and fetal side effects

- Goals
- Capabilities
- Expectations



Before the block: Infection, Coagulation and Preparation

Infection:

- Bacterial: Prophylaxis Chorioamnionitis
- Viral (COVID-19): Coagulation concerns

Coagulation:

- Anticoagulants/Antiplatelet
- Thrombopenia: Risk Benefit
 - 0-49000 (better avoid)
 - 50000-69000 (individualize). Risk 0-2.9%
 - 70000-90000 (proceed). Risk 0-0.19%

Joo Suh Y, et al. PE + DVT in COVID 19, Radiology 2020

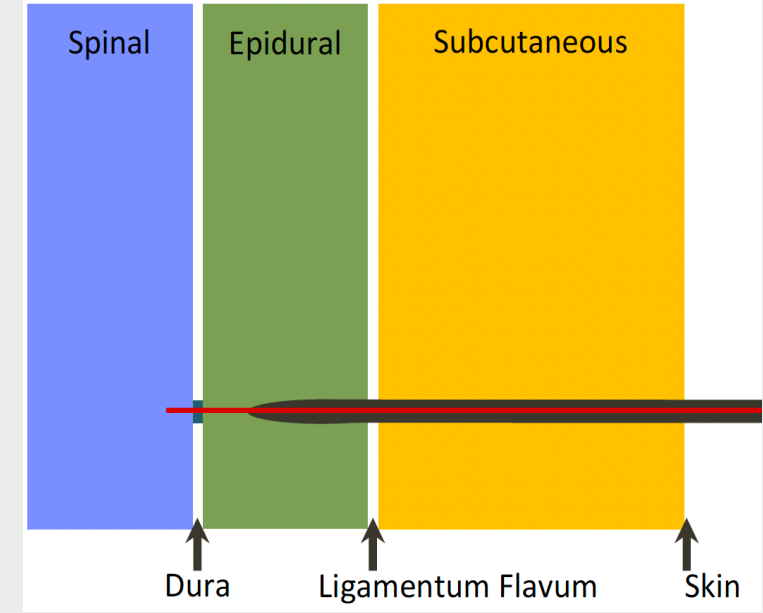
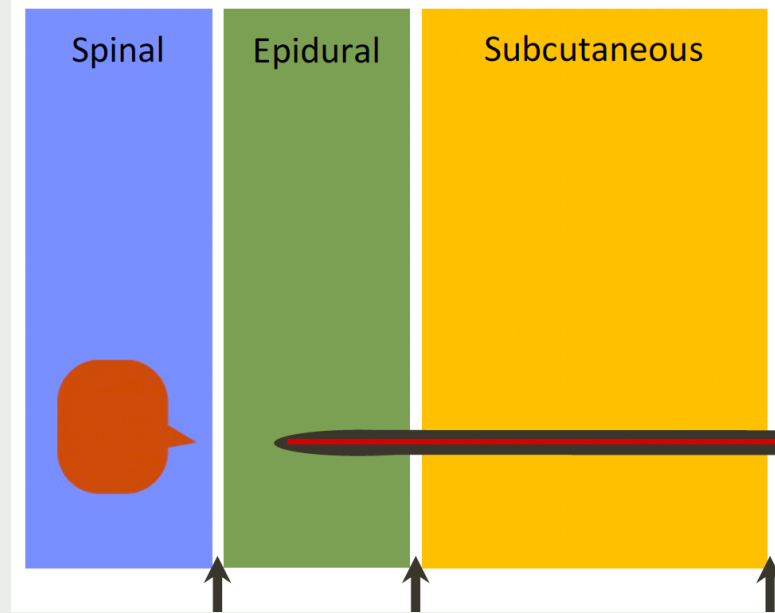
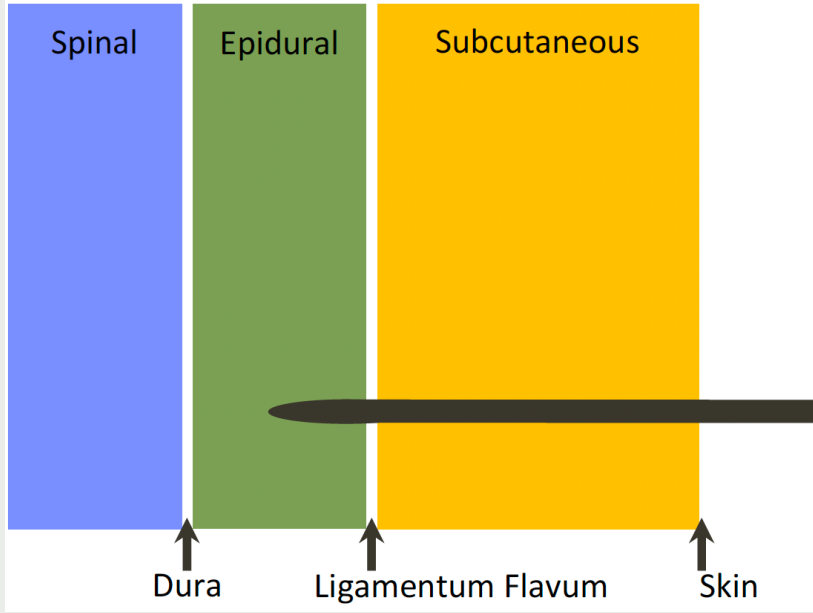
Agostinis C, et al. COVID 19, Preeclampsia, Complement System. Front Immune 2021

SOAP Consensus Statement Pregnant/Postpartum on Thromboprophylaxis or Higher Dose

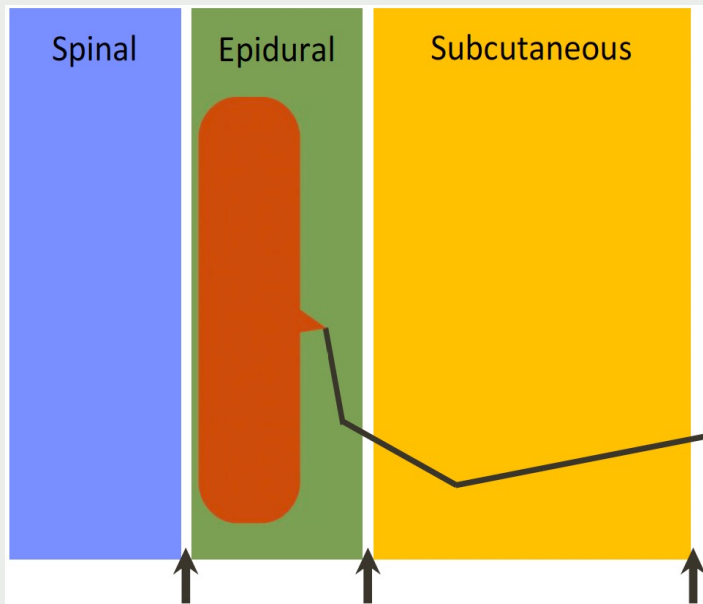
Anticoagulants Anesth Analg 2018. Ashken T, West S: BJA Educ 2021

Neuraxial Techniques in Obstetric Patients with Thrombocytopenia, 2021 (ASRA, ACOG, SMFM)

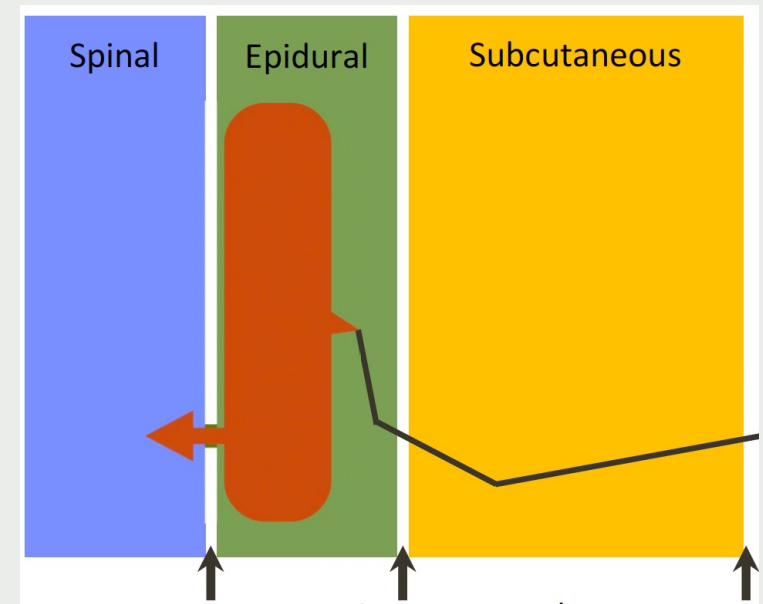
Techniques



DPE



CSE





Strengths



Weaknesses

TABLE 23-1 Advantages and Disadvantages of Neuraxial Techniques in Labor

Neuraxial Technique	Advantages	Disadvantages
Continuous epidural	<ul style="list-style-type: none"> Continuous analgesia No dural puncture required Ability to extend analgesia to anesthesia for cesarean delivery 	<ul style="list-style-type: none"> Slow onset of analgesia Larger drug doses required when compared with spinal techniques Greater risk for maternal systemic toxicity Greater fetal drug exposure
Combined spinal-epidural	<ul style="list-style-type: none"> <u>Continuous analgesia</u> Low doses of local anesthetic and opioid Rapid onset of analgesia Rapid onset of sacral analgesia Ability to extend analgesia to anesthesia for cesarean delivery <u>Complete analgesia with opioid alone</u> Decreased incidence of failed epidural analgesia 	<ul style="list-style-type: none"> Delayed verification of correctly placed and functioning epidural catheter Increased incidence of pruritus Possible higher risk for fetal bradycardia

Table 1

Advantages and disadvantages of CSE.

Advantages of CSE	Rapid onset of block Good analgesia More reliable epidural catheters. Replacement rate and interventions for breakthrough pain reduced. Reduced epidural catheter dislocation and replacement Less motor block Less local anesthetic consumption
Disadvantages	PDPH Risk of neurologic injury Meningitis Maternal Hypotension FHR abnormalities

Table 2

Indications for CSE in obstetric anesthesia*.

Labor pain	
<ul style="list-style-type: none"> ➤ Need for rapid pain relief ➤ Resiting of epidural catheter ➤ High epidural failure risk ➤ Obese patient (first choice) ➤ Cardiac parturients ➤ High risk of cesarean section ➤ Anticipated difficult airway 	<ul style="list-style-type: none"> ● CSE for labor analgesia produces rapid analgesia with excellent pain relief and a reduced incidence of breakthrough pain and a reduced need for epidural catheter replacement. ● CSE for labor analgesia can induce FHR abnormalities. ● CSE must be inserted lower than the L2-L3 interspace.
Cesarean section	
<ul style="list-style-type: none"> ➤ All cesarean deliveries in spite of a higher cost and time of performance, compared with spinal technique 	

Source: Gausch E, Wenk M. 2020 (ref 34).



Dural puncture epidural versus conventional epidural block for labor analgesia: a systematic review of randomized controlled trials

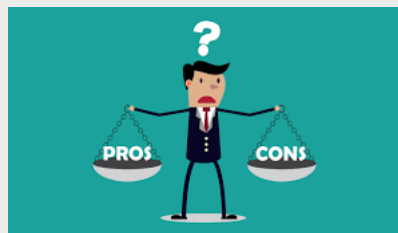
M. Heesen,^a K. Rijs,^b R. Rossaint,^c M. Klimek^b

International Journal of Obstetric Anesthesia (2019) 40, 24–31

5 studies. 584 patients

A recommendation for DPE cannot be made unless more sufficiently powered evidence is published. Also, the additional costs of the needle for DPE have to be taken into account.

Advantages



Characteristic	CSE	DPE	Epidural
Location Confirmation	X	X	
Onset	X	X	
Sacral Spread	X	X	
Bilateral Spread	X	X	
Tested Catheter		X	X

Cappiello E, O'Rourke N, Segal S, Tsen LC. Anes Analg 2008;107:1646-51
Chau A, Bibbo C, Huang CC, Elterman KG, Cappiello E, Tsen LC. Anesth Analg 2017

Disadvantages



Characteristic	CSE	DPE	Epidural
Fetal Bradycardia	X		
Uterine Hypertonus	X		
Workload	X		X
Adverse Events	X		
High Spinal/Motor Block			X
PDPH			

Cappiello E, O'Rourke N, Segal S, Tsen LC. Anes Analg 2008; Chau A, Bibbo C, Tsen LC. Anesth Analg 2017; Yin H, Tong X, Huang H. J Anesth 2022

Catheter failure rates and time course with epidural versus combined spinal-epidural analgesia in labor

J. Groden, A. Gonzalez-Fiol, J. Aaronson, A. Sachs, R. Smiley
Department of Anesthesiology, Columbia University College of Physicians and Surgeons, New York, NY, USA

CSE vs epidural

International Journal of Obstetric Anesthesia (2016) 26, 4–7

6

Epidural and CSE catheter failures

Table 1 Comparison of combined spinal-epidural and traditional epidural catheters

	CSE	Epidural	Overall	<i>P</i> value
Number	85	59	144	
Age (years)	31.3 ± 5.6	30.2 ± 6.3	30.8 ± 5.9	0.27
Body mass index (kg/m ²)	32.0 ± 7.2	32.0 ± 7.7	32.0 ± 7.5	1.0
Nulliparous	55	34	89	0.49
No. of physician boluses pre replacement	2.28 ± 1.74	2.02 ± 1.47	2.17 ± 1.63	0.35
Initiation of analgesia to delivery (min)	788 ± 455	633 ± 420	724 ± 446	0.04
Loss of resistance (cm)	5.8 ± 1.5	6.1 ± 1.4	5.9 ± 1.4	0.23
Depth catheter fixed (cm)	10.9 ± 1.50	11.4 ± 1.97	11.1 ± 1.69	0.10
Catheter failure rate	2.1%	3.9%	2.6%	<0.001
<u>Time to replacement (min)</u>	512 ± 422	354 ± 300	446 ± 383	<u>0.02</u>

Data are number, percentage, mean ± SD.

Epidural catheter replacement rates with dural puncture epidural labor analgesia compared with epidural analgesia without dural puncture: a retrospective cohort study



International Journal of Obstetric Anesthesia 52 (2022) 103590

A.A. Berger^{*}, J. Jordan, Y. Li, J.J. Kowalczyk[†], P.E. Hess[†]

Beth Israel Deaconess Medical Center, Department of Anesthesiology, Critical Care, and Pain Medicine, Harvard Medical School, Boston, MA, USA

Less failure, no PDPH

Conclusions: Dural-puncture epidural is associated with fewer catheter failures and replacements than LEA, without an increase in the rate of post-dural puncture headache or epidural blood patch.

Dural puncture epidural versus conventional epidural analgesia for labor: a systematic review and meta-analysis of randomized controlled studies

Journal of Anesthesia (2022) 36:413–427
N=1099

Haiying Yin¹ · Xin Tong¹ · Han Huang¹

after labor analgesia. No adverse event was found with DPE analgesia. We conclude that compared with EP analgesia, DPE analgesia is beneficial for labor pain relief by shortening the time to achieve satisfactory pain control. Meanwhile, DPE analgesia is not associated with increased adverse maternal/fetal events.

Faster onset

Comparison of the incidence of fetal prolonged deceleration after induction of labor analgesia between dural puncture epidural and combined spinal epidural technique: a pilot study

N=302

Okahara *et al. BMC Pregnancy and Childbirth* (2023) 23:182
<https://doi.org/10.1186/s12884-023-05473-0>

Shoko Okahara¹, Rie Inoue¹, Yumi Katakura¹, Hitomi Nagao¹, Saori Yamamoto¹, Shuko Nojiri², Jun Takeda³, Atsuo Itakura³ and Hiroyuki Sumikura^{1*}

Safe for fetuses

Conclusion DPE appears to be a safer method compared to CSEA for neuraxial labor analgesia in the early stages of labor for nulliparous women.

Practice Guidelines for Obstetric Anesthesia

An Updated Report by the American Society of Anesthesiologists Task Force on Obstetric Anesthesia and the Society for Obstetric Anesthesia and Perinatology* *Anesthesiology* 2016; 124:00–00

Analgesia/Anesthetic Techniques

Early Insertion of a Neuraxial (*i.e.*, Spinal or Epidural) Catheter for Complicated Parturients.

- Consider early insertion of a neuraxial catheter for obstetric (*e.g.*, twin gestation or preeclampsia) or anesthetic indications (*e.g.*, anticipated difficult airway or obesity) to reduce the need for general anesthesia if an emergent procedure becomes necessary.
 - In these cases, the insertion of a neuraxial catheter may precede the onset of labor or a patient's request for labor analgesia.

One size does not fit all...

- Epidural/CSE/DPE:
 - Spont/induced delivery, early insertion (complicated patients)



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MAINTENANCE

COMET Study

N = 1054

Group	Initiation	Maintenance
1	Epidural bupivacaine, 0.25%	Intermittent boluses, bupivacaine 0.25%
2	Epidural bupivacaine, 0.1% w/ fentanyl	Continuous infusion, bupivacaine 0.1% w/ fentanyl
3	CSE, bupivacaine/fentanyl	Intermittent boluses, bupivacaine 0.1% w/ fentanyl



**What to do?
Manipulate?**

What can we manipulate?

- Drug
 - Mass
 - Volume / concentration
- Mode of delivery
 - Bolus vs. infusion

Maintenance regimes



- ✓ **Bolus vs continuous infusion**
- ✓ **Continuous infusion vs PCEA**
- ✓ **PCEA (with or without background infusion)**
- ✓ **Programmed intermittent epidural boluses (PIEB)**

How is modern labour neuraxial analgesia maintained ?

Interrupted

- Manual top up (midwife /anaesthetist)
- Patient controlled epidural analgesia (PCEA)

Continuous

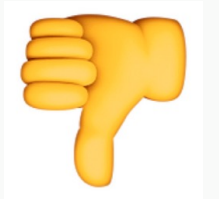
- Continuous epidural infusion
- PCEA with background infusion
- Automated intermittent mandatory bolus
- Programmed intermittent bolus
- Computer Integrated PCEA (CI-PCEA)



Intermittent (on demand) top ups



- ✓ Titrate dose and volume to progress of labour
- ✓ Less frequent motor block
- ✓ Less local anaesthetic consumption



- ❖ Pain free intervals only
- ❖ Time to re-establish analgesia/delay
- ❖ Staff required/increased workload

Continuous epidural infusion



- **Continuous analgesia**
- **Reduced staff workload**

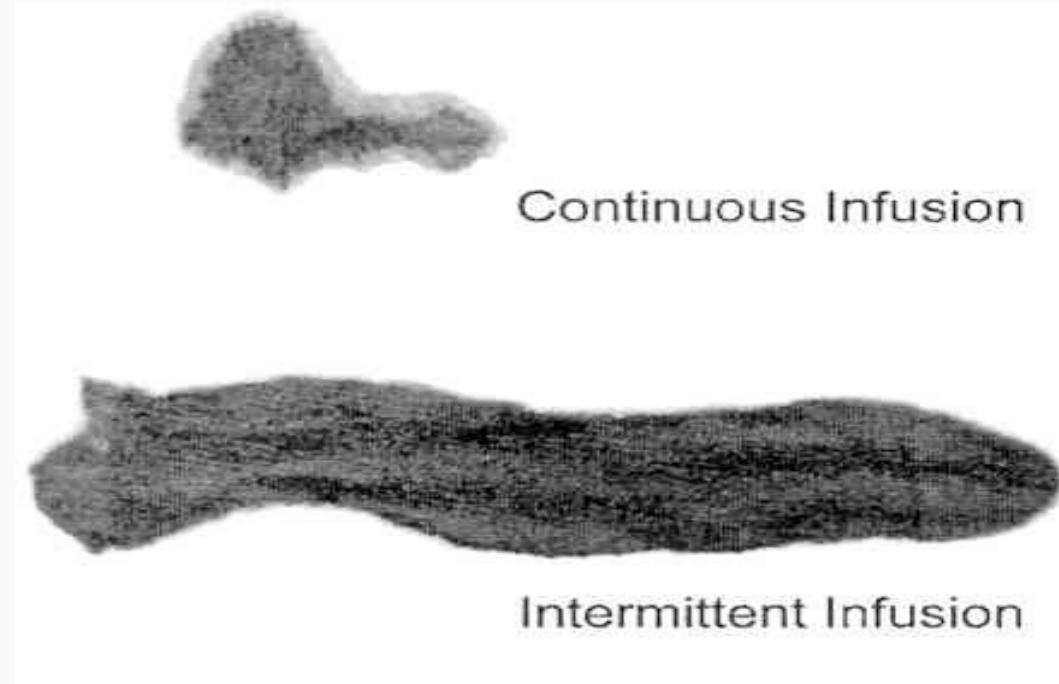


- ❖ **Increased motor block/urinary catheterisation**
- ❖ **Increased assisted delivery**
- ❖ **Increased local anaesthetic consumption**

Infusion vs bolus?

Area of diffusion of the contrast agent during continuous and intermittent infusions.

10.5 ml/hr



3.5 ml bolus

Patient controlled epidural analgesia



- ✓ Flexibility & autonomy
- ✓ Titratable
- ✓ ? Reduced LA consumption
- ✓ ? Reduced motor block



Optimal bolus & lockout not determined

Programmed intermittent epidural bolus (PIEB)

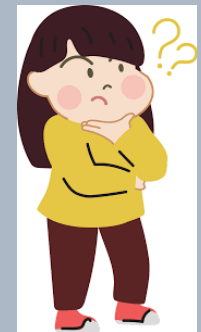


- ✓ Decreased local anaesthetic consumption
- ✓ Decreased rescue boluses
- ✓ Increased maternal satisfaction



- ❖ Optimal programmed epidural bolus settings remain to be elucidated
- ❖ Volume of injection, drugs concentration and intervals of administration

EPIDURAL FAILURE/PROBLEM



Epidural failure rate using a standardised definition

A. Thangamuthu, I.F. Russell, M. Purva

Department of Anaesthesia, Hull Royal Infirmary, Hull and East Yorkshire NHS Trust, Hull, UK



- Definition of failure

- Lack of adequate pain relief by 45min from the start of epidural placement
- Dural puncture
- Re-siting or abandoning the epidural
- Maternal dissatisfaction with analgesia at the follow-up visit.

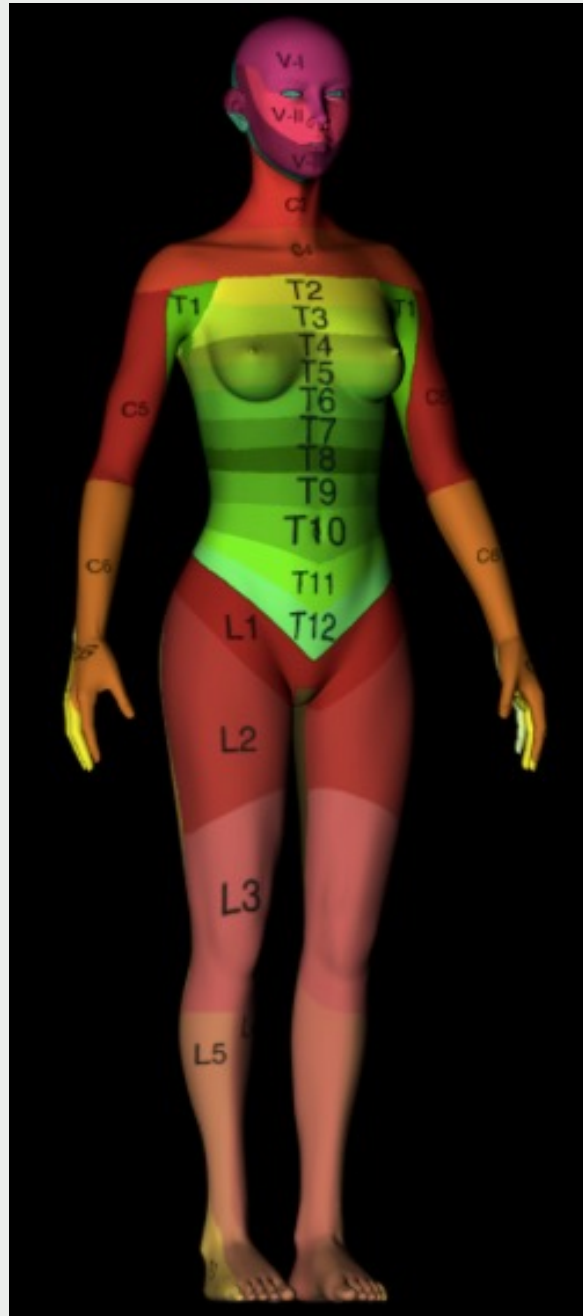
Standardise care: Minimise risk

Reduce the chance of problems occurring. Increase the chance of problems being recognised early



- Epidural insertion level.
 - Choosing and identifying the level
- Needle approach
 - Median/paramedian
 - Saline/air
- Epidural catheter depth
 - 3-5 cm
- Initiation of analgesia
 - Epi/CSE/DPE
- Maintenance of analgesia
 - PIEB, PCEA, infusion...
- Monitoring and surveillance
 - Training and protocols

Test the block!!!



Bromage 3 (complete)
Unable to move feet or knees



Bromage 2 (almost complete)
Able to move feet only



Bromage 1 (partial)
Just able to move knees



Bromage 0 (none)
Full flexion of knees and feet

Assesing the problematic LEA

History

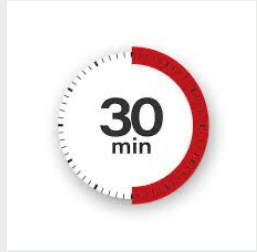
- Is the problem <30 min or >30 min after initiation?
- Any analgesia? Any motor block? Where is the pain?
- Any other unusual symptom (maternal or fetal)

Examination:

- ✓ Observation: maternal, CTG, FHR
- ✓ Technical: Pump?, drug? Connections?
- ✓ Block: sensitive?, motor?, sympathetic? (warm feet?)
- ✓ Block: Absent, unilateral, patchy, desproportionate?
- ✓ Insertion point: Dressing intact?, dry?

**Maternal
expectations/preferences?**

Stage of labor?



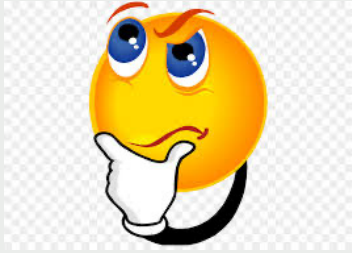
When do catheters need to be replaced?

Problems that occur within 30 mins of insertion

- (1/3 of all replaced epidurals).
- *Non-technical causes: Absent/inadequate analgesia 9%*
- **Technical causes:** Catheter is > dislodged, obstructed/kinked, intravascular, intrathecal. 91%

Problems that occur > 30 mins of insertion

- (2/3 of all replaced epidurals).
- **Non-technical causes:** Absent/inadequate analgesia 93%
- *Technical causes: Catheter is > dislodged, obstructed/kinked, intravascular, intrathecal. 7%*



**Which are
the
problems
with LEA?**

It does not Work

**It Works too
much!!**

**It Works
inadequately**

It Works oddly

Does not work

Problem <30 min of adequate loading dose. No analgesia

The cause

- Catheter not in correct place
 - Catheter may be iv
 - Pump not operational?.
 - No dose?.
 - Disconnexion/blockage
-
- No other problem but no analgesia



The solution

Fix technical problems

Replace. Consider CSE

Does not work



**Problem >30 min of adequate loading dose.
No analgesia**

Inadequate analgesia: The Cause

- ✓ Pump not working or disconnected
- ✓ Catheter displaced?
- ✓ Block regression?
- ✓ Unilateral block?

Analgesia requirements increased

- ✓ Increased oxytocin?
- ✓ Labour progression?
- ✓ Perineal pain?

Inadequate analgesia: The Solution

- ✓ Pump not working: fix it!!
- ✓ Catheter displaced, leakage?: re-site, CSE
- ✓ Catheter intact, no leak: low dose top up 10-20 mL. After 20 min: replace (CSE)

Perineal pain:

Low dose top up (10-20 ml).
Consider spinal or CSE

**It Works too
much!!!**



Excellent analgesia + atypical significant motor block

Occurs first 30 min after low dose mix

- ✓ Assume intrathecal catheter

Occurs after 30 min after low dose mix

- ✓ Exclude excessive dose
- ✓ Consider possible intrathecal catheter
- ✓ Consider (very rare) epidural hematoma

The catheter is located intrathecally

- ✓ No more doses until resolution
- ✓ Inform parturient and colleagues (IT catheter)
- ✓ Label the catheter clearly
- ✓ Local protocol (follow it!!!)
- ✓ Options:
 1. Use IT catheter for labour analgesia
 2. Remove catheter and replace

Works oddly



Atypical presentation. "Stranger things"...

Rare and unusual signs and symptoms

- ✓ Analgesia: Patchy and/or incomplete
- ✓ Cranial nerves involvement
- ✓ Unusually high level block (S-M)
- ✓ Altered consciousness, speech

Consider

- ✓ Intravascular catheter or dosing
- ✓ Subdural block
- ✓ Any co-existing disease?

IF YOU HAVE ANY DOUBT...TAKE IT OUT

- ✓ No more doses through this catheter
- ✓ Wait and watch for resolution ...and treat...
- ✓ Differential diagnosis
- ✓ Discuss and communicate with colleagues
- ✓ Consider a new epidural or an alternative analgesic technique

Important: Anesthesia follow up

Subdural block



Incidence:

- ✓ 0.0024%
- ✓ Radiological confirmation: 7%
- ✓ 1 retrospective study 0.82%

Symptoms and signs

- ✓ Sensory block: Absent, inadequate or extensive
- ✓ Scarce motor or sympathetic block
- ✓ Onset around 20 min or after
- ✓ Offset: < 2 hours
- ✓ Sometimes intercostal muscle weakness
- ✓ May be Horner or trigeminal palsy

Anaesth Intensive Care. 2010 Jan;38(1):20-6.

Diagnosis Reg Anesth Pain Med. 2009 Jan-Feb;34(1):12-6

Major criteria: Negative aspiration test + unexpected extensive sensory block

Minor criteria: Delayed onset block, variable motor block + disproportionate sympathetic block.

Diagnostic approach

- ✓ Was insertion unusual/problematic?
- ✓ CSF aspiration +/- ?
- ✓ Is dermatome spread excessive, restrictive, unexpected?
- ✓ Onset > 20 min
- ✓ Motor sparing?
- ✓ Patchy or asymmetrical spread?
- ✓ Cranean nerve involvement?

**Works
inadequately**

**Does not
work**

Problem after >30 min of good analgesia

Inadequate analgesia: The Cause

- ✓ Pump not working or disconnected
- ✓ Catheter displaced?
- ✓ Block regression?
- ✓ Unilateral block?

Analgesia requirements increased

- ✓ Increased oxytocin?
- ✓ Labour progression?
- ✓ Perineal pain?

Inadequate analgesia: The Solution

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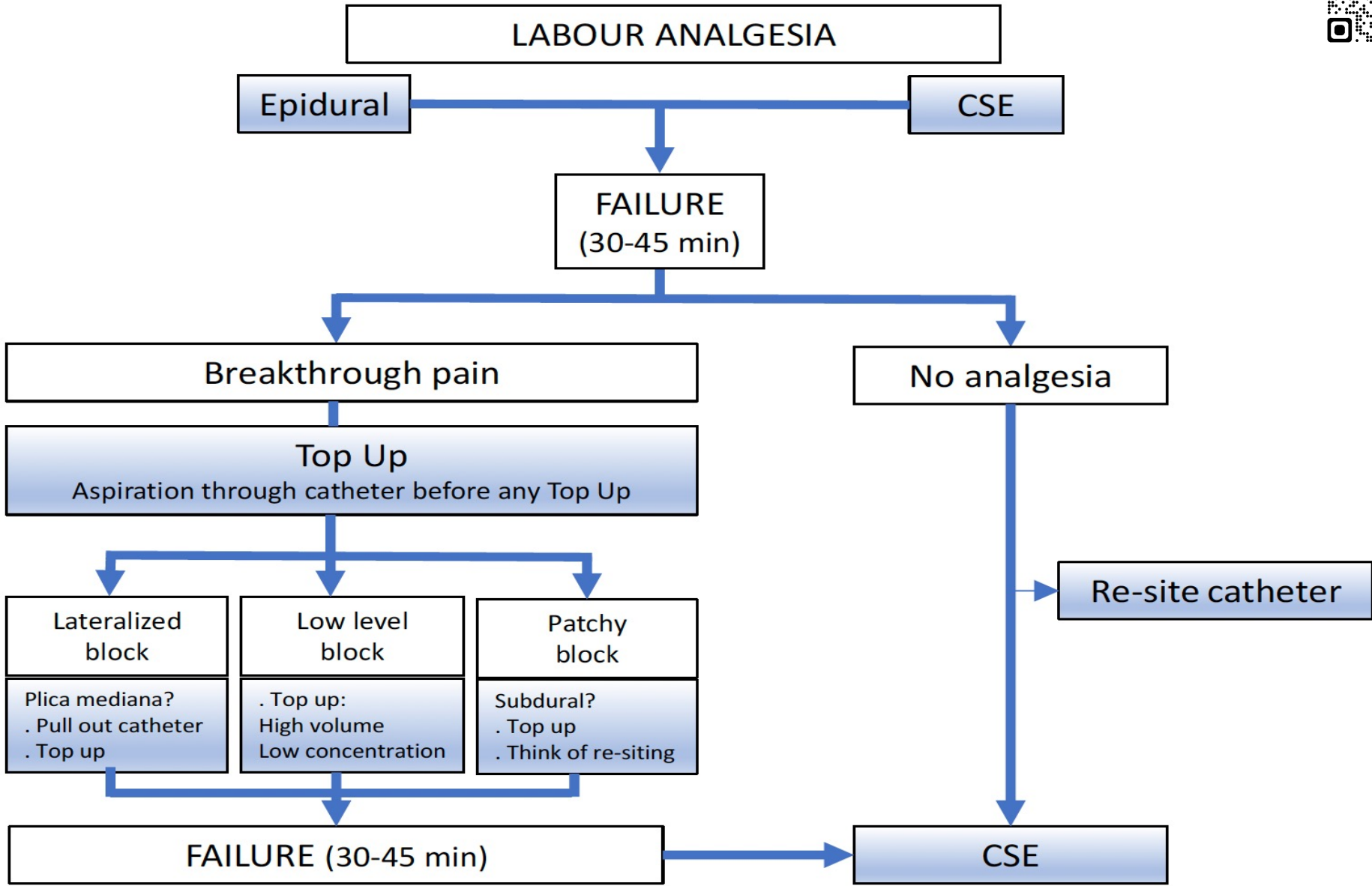
Perineal pain:

Low dose top up (10-20 ml).
Consider spinal or CSE

Failed epidural for labour: what now?

Emilia GUASCH, Fabrizio IANNUCELLI, Nicolas BROGLY, Fernando GILSANZ

Minerva Anestesiologica 2017 Jun 12



Take home messages



- **Goals and expectations: not only anesthesia**
- **Initiation: Labor as a Dynamic process**
- **Maintenance: Not continuous infusion, PIEB based regimes + PCEA**
- **Failure: Know what it may happen, and then solve it.**
- **Replace when needed (CSE seems reasonable)**
- **Research and future: individualization and tailoring analgesia**



Aitäh



emiguasch@hotmail.com