Neuraxial anesthesia for childbirth in patients with obesity class 3

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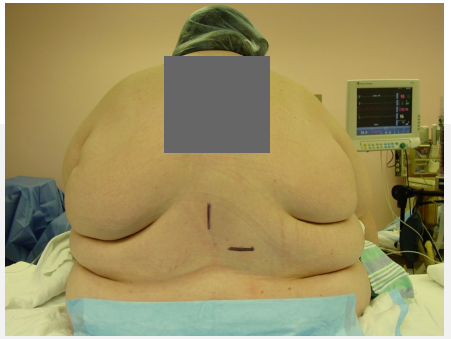
Planning
Preparedness
Teamwork
Time

Complications of Neuraxial Anesthesia for Cesarean Delivery in a Woman with BMI 70



26 y, G1P0, @38 weeks, BMI 70

Prophylactic ranitidine and metoclopramide

Arterial line (no cuff would adjust)

US-assisted epidural, L3/L4, needle @11 cm, catheter @ 18 cm

3 ml 2% lidocaine test dose with epi, negative

5 ml 2% lidocaine with epi, signs of IV injection, blood aspirated

2nd epidural, same space, unintentional dural puncture

catheter @14 cm, CSF aspirated, then…no more CSF…failed spinal

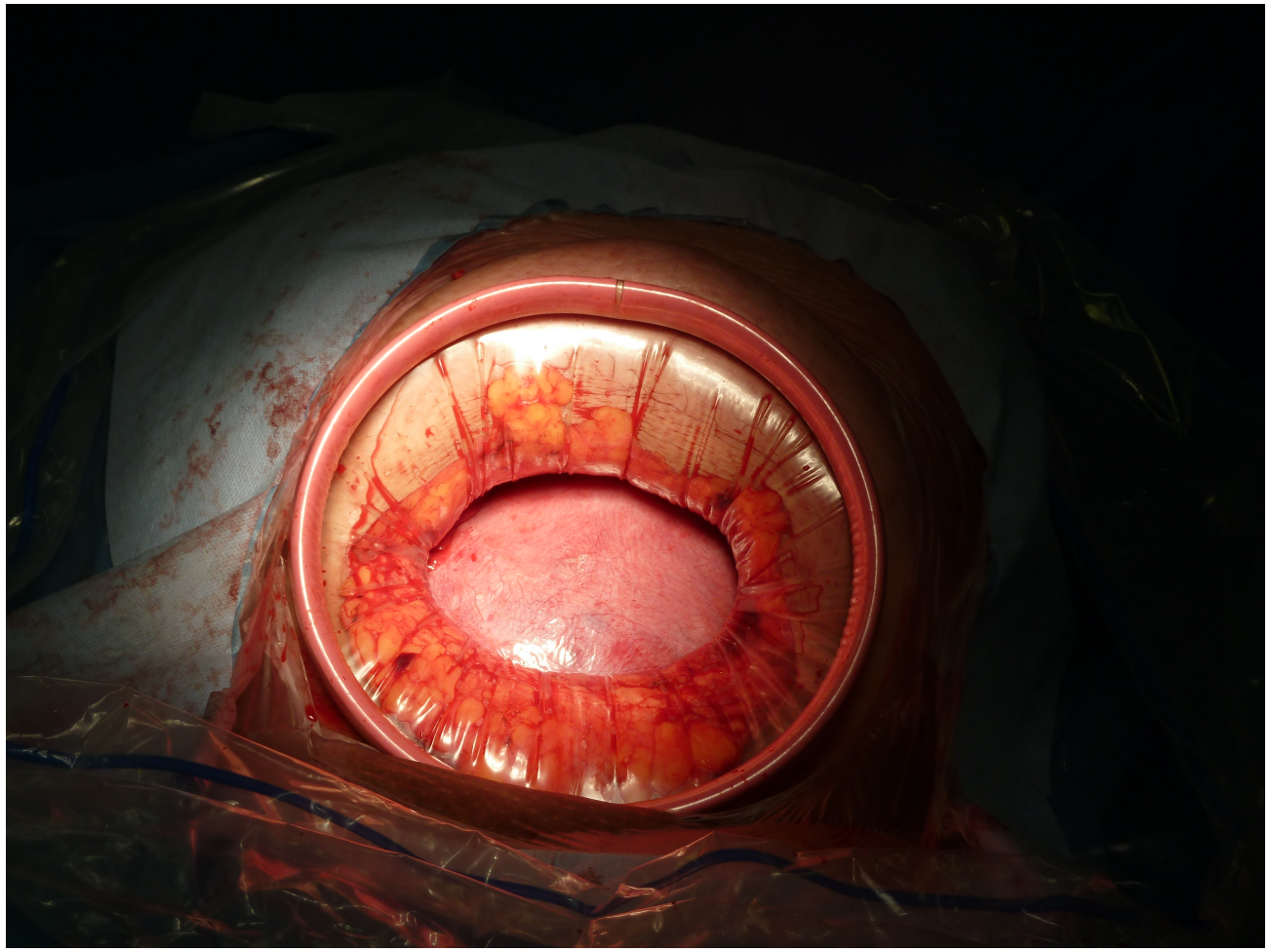
3rd epidural @ L2/L3, needle at 11 cm, catheter @18 cm

incremental doses of 2% lidocaine, total 11 ml, block at T6

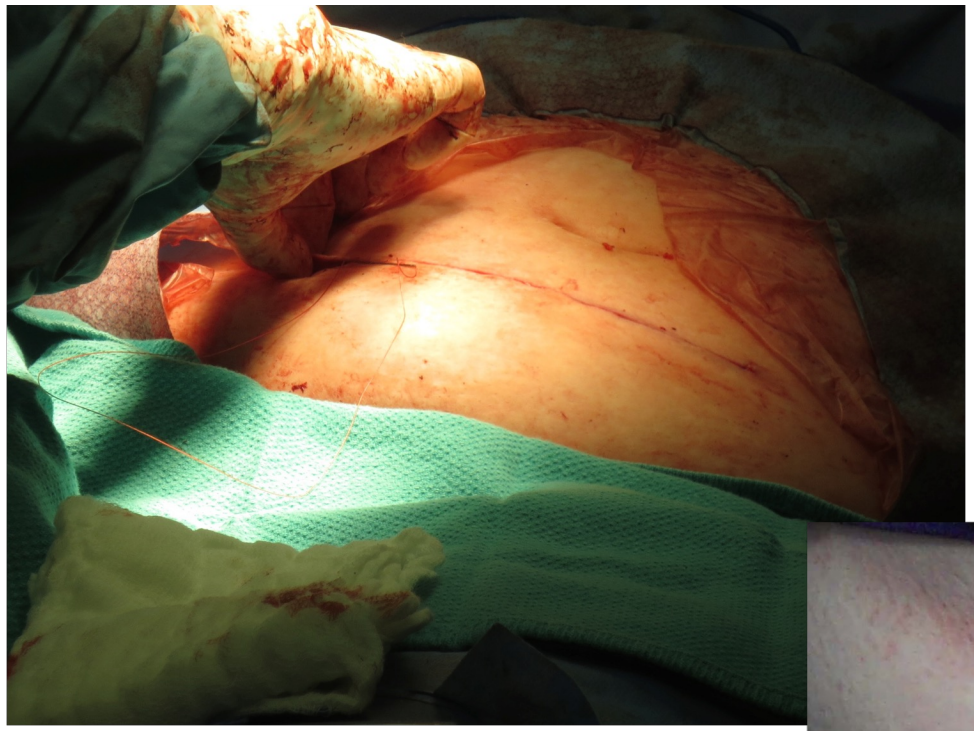
2 episodes of hypotension and SpO2 < 85% with abdominal splinting

Whitty et al. IJOA 2007; 16:139-144

Self-Retaining Elastic Abdominal Retractor



Types of Incision for Cesarean Delivery in Women with Obesity



Survey of Obstetric Provider's Views on the Anesthetic Risks of Women with Obesity

	Associated (n=35)	Discussed (n=35)
Prenatal Obstetric (%)	51	48
Intra/post partum Obstetric (%)	61	40
Medical (%)	76	35
Neonatal (%)	70	22
Anesthetic (%)	69	13

Mhyre et al. Int J Obst Anesth 2007; 16:316-322

Pre-Anesthetic Consultation: Criteria for Referral

All BMI ≥ 50
BMI ≥ 40 and specific considerations

- Hypertension/Cardiac Disease (abnormal ECG/Echo)
- Asthma (Abnormal PFTs)
- Obstructive Sleep Apnea
- Other significant medical complication
- Previous difficult airway (or suspected)
- Previous difficult regional anesthesia (or suspected)
- Previous difficult venous access (or suspected)
- Special surgical planning (alternative incision)

Anesthetic and obstetric outcomes in women with obesity: a 20-year follow-up retrospective cohort study

Table 2 Comparison of key outcomes between original and current study

	Hood & Dewan data[1]		Current data	
	Morbidly obese	Control	Morbidly obese	Control
Body mass index (kg/m^2)	52.6 ± 6.0	27.8 ± 5.8*	53.4 ± 6.6	31.1 ± 5.4*
Cesarean delivery rate	72/117 (62%)	28/117 (24%)	116/230 (50%)	74/230 (32%)
Cesarean delivery in labor	41/86 (48%)	9/98 (9%)	56/170 (33%)	25/181 (14%)
Failed labor analgesia requiring repeat procedure	33/79* (42%)	4/67 (6%)	28/163* (17%)	4/147 (3%)
GA required for cesarean delivery	17/72* (24%)	8/28 (29%)	3/116* (3%)	5/74 (7%)

Data are mean ± SD or number (%). *P <0.01. GA: general anesthesia comparisons were made between morbidly obese (or matched controls) at the two different time frames.

Tonidandel et al. In J Obstet Anesth 2014; 23:357-64

Neuraxial Labor Analgesia in Patients with BMI > 50 kg/m2

233 patients 2012-2019, single center

- 153 epidural with CSE/DPE
- 63 epidural only
- 17 intrathecal catheter (7 intentional)

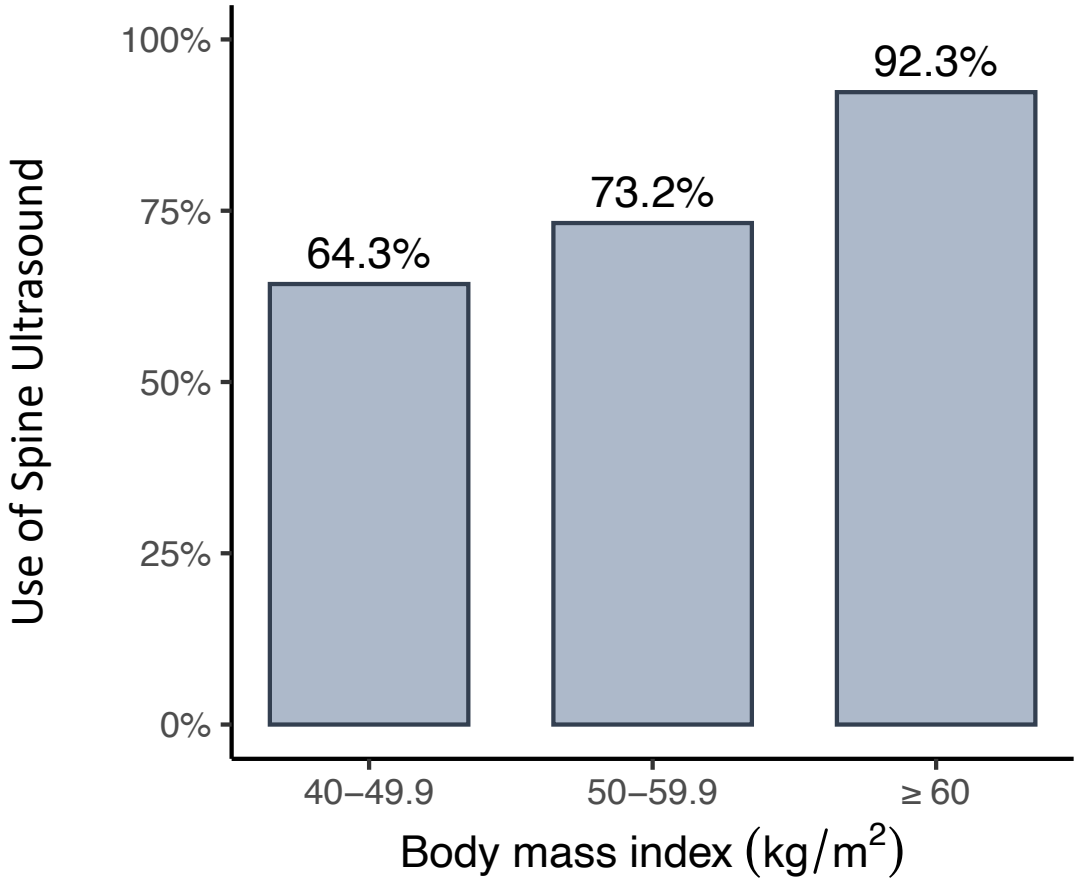
Failure of first catheter

all patients	13.7% (95% CI 9.9 to 18.7)
epidural plus CSE/DPE	9.2% (95% CI 5.5 to 14.7
epidural only	28.6 (95% CI 18.9 to 40.7)

Catheter migration 29.4% (95CI 16.8 to 46.2%)

Arnolds & Scavone. IJOA 2021

Use of Pre-Procedural Spine Ultrasound for Neuraxial Anesthesia for Elective Cesarean Delivery in Patients with Obesity Class 3
Mount Sinai Hospital 2014-2020



Anesthesia-related Admission orders for Nursing

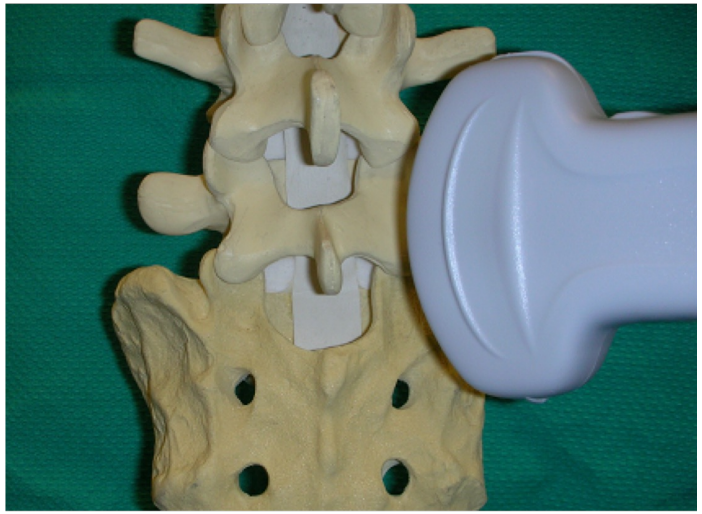
Notify Anesthesia team on admission

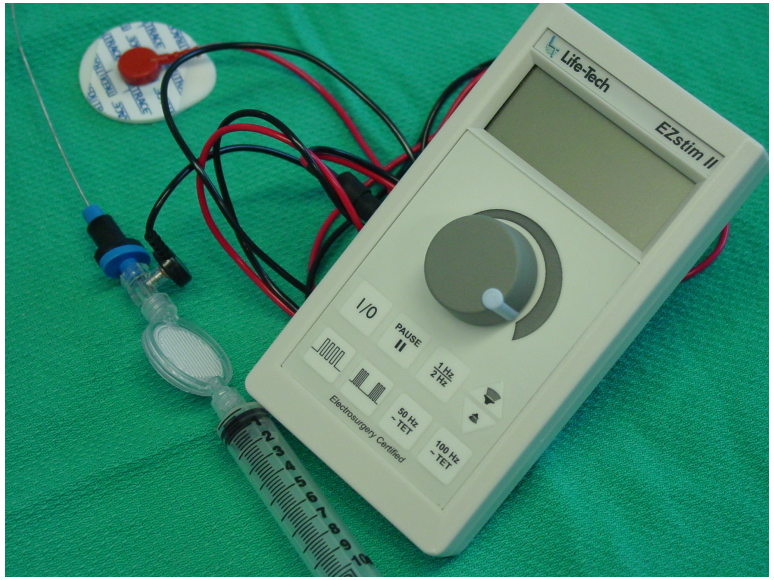
Baseline vital signs on admission (including SpO_2) x3 sets
- Determine adequate BP cuff
- Consider forearm assessment
- Consider arterial line (rare)

1-2 fully functional IV lines (consider PICC line placement)

If laboring/induction
- Early epidural catheter placement
- Clear fluids only, NPO if potential CS

If planned CS
- Metoclopramide 10 mg IV
- Famotidine 20 mg IV
- Sodium citrate 30 ml *en route* to OR
- Cefazolin 3 g IV

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Epidural Catheter Placement - Recommendations

Optimize positioning of the patient (sitting is preferred)

Ultrasound and Tsui test may improve success

Consider placing epidural at a higher spinal level (T12-L1 or L1-L2)
- easier punctures
- normal length needles
- less catheter movement (6 cm lateral movement drags 2 cm of catheter)
- better anesthetic level if CS is required

Leave more epidural catheter in (7 cm)

If laboring, choose appropriate fixation device/dressing for catheter

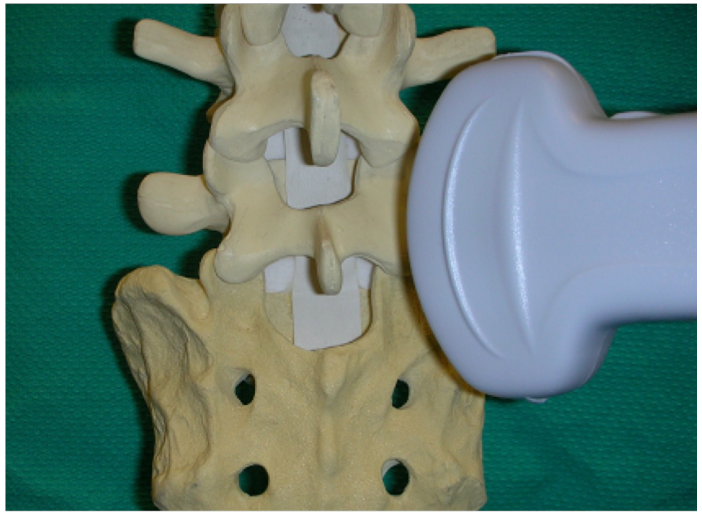
Preparation for Cesarean Delivery

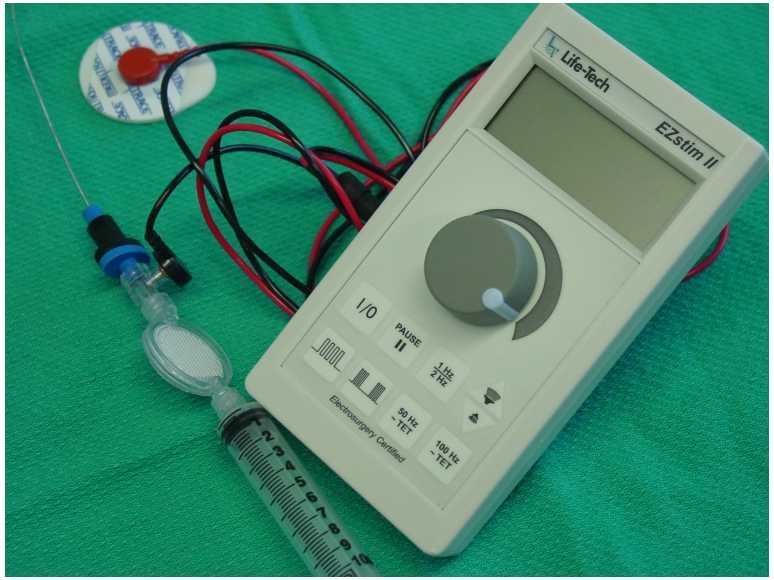
Equipment:

- Operating tables with proper extensions
- Elevation pillow (troop pillow)
- Airway equipment
  - Short handle laryngoscopes
  - Mac 3 and 4 blades
  - Glidescope
  - Fiberoptic bronchoscope
  - Laryngeal mask airway
- Ultrasound (regional anesthesia, vascular access, airway)
- Appropriate needles for neuraxial anesthesia
- Nerve stimulator for Tsui test

Anesthetic team:

- 1-2 Anesthetists plus 1 Anesthesia Assistant

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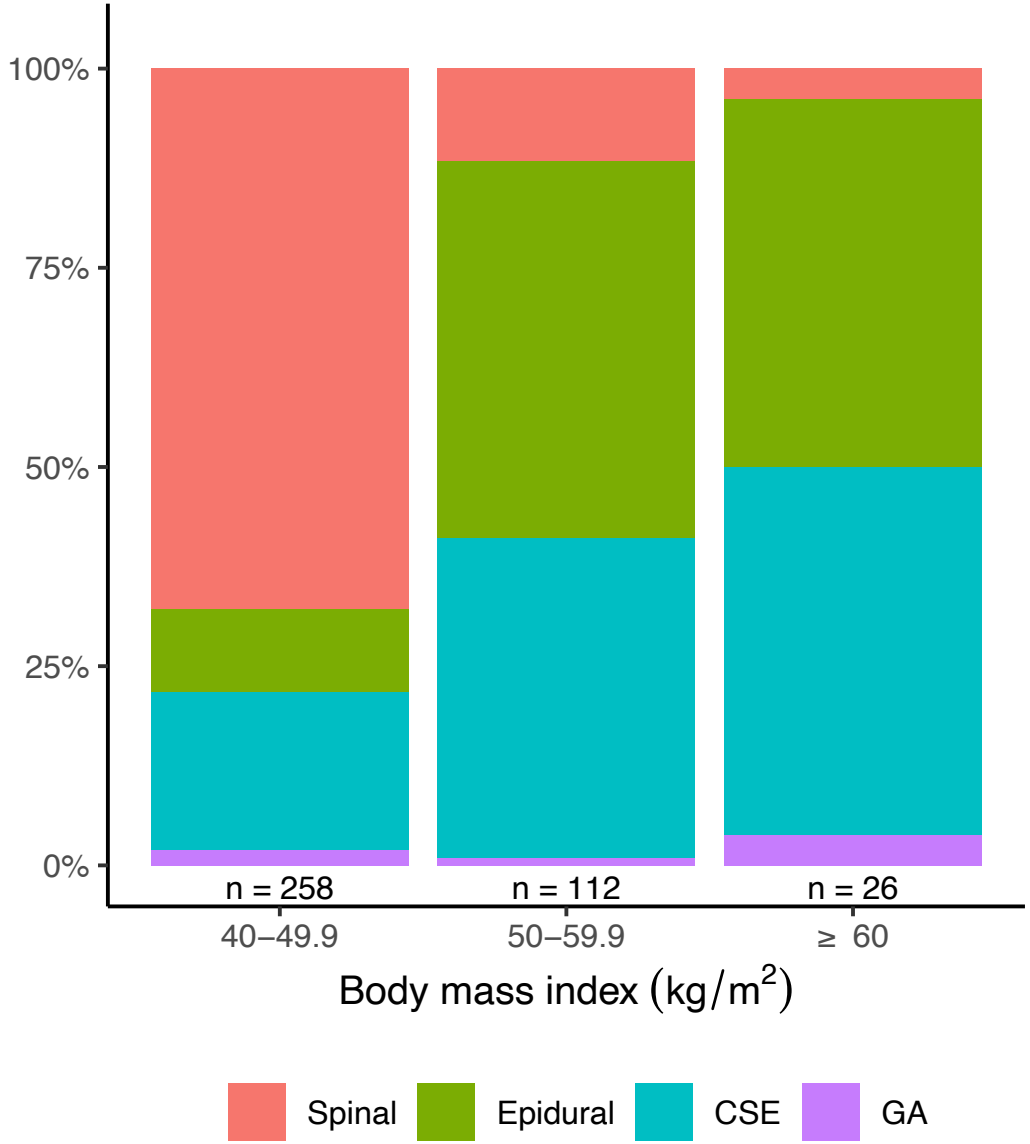
Procedural Times at Elective Cesarean Delivery in Patients with Obesity Class 3 Mount Sinai Hospital 2014-2020

	BMI 40.0 - 49.9 (n = 258)	**BMI 50.0 - 59.9 (n = 112)**	**BMI ≥ 60.0 (n = 26)**	**P-value**
Anesthetic time, mins, median [IQR]	20.0 [15.0, 28.0]	33.0 [25.0, 49.8]	38.0 [27.0, 50.8]	<0.001
Surgical time, mins, median [IQR]	53.0 [43.0, 66.0]	75.5 [61.2, 88.0]	95.5 [81.8, 114.2]	<0.001
OR time, mins, median [IQR]	92.0 [77.5, 110.5]	136.0 [119.2, 162.2]	157.5 [139.2, 188.2]	<0.001

Anesthetic Technique for Cesarean Delivery

- Spinal
  - single shot
  - continuous (rare)
- Combined spinal epidural
- Epidural
- General anesthesia (with/without epidural)

Choice of Neuraxial Anesthesia for Elective Cesarean Delivery in Patients with Obesity Class 3
Mount Sinai Hospital 2014-2020



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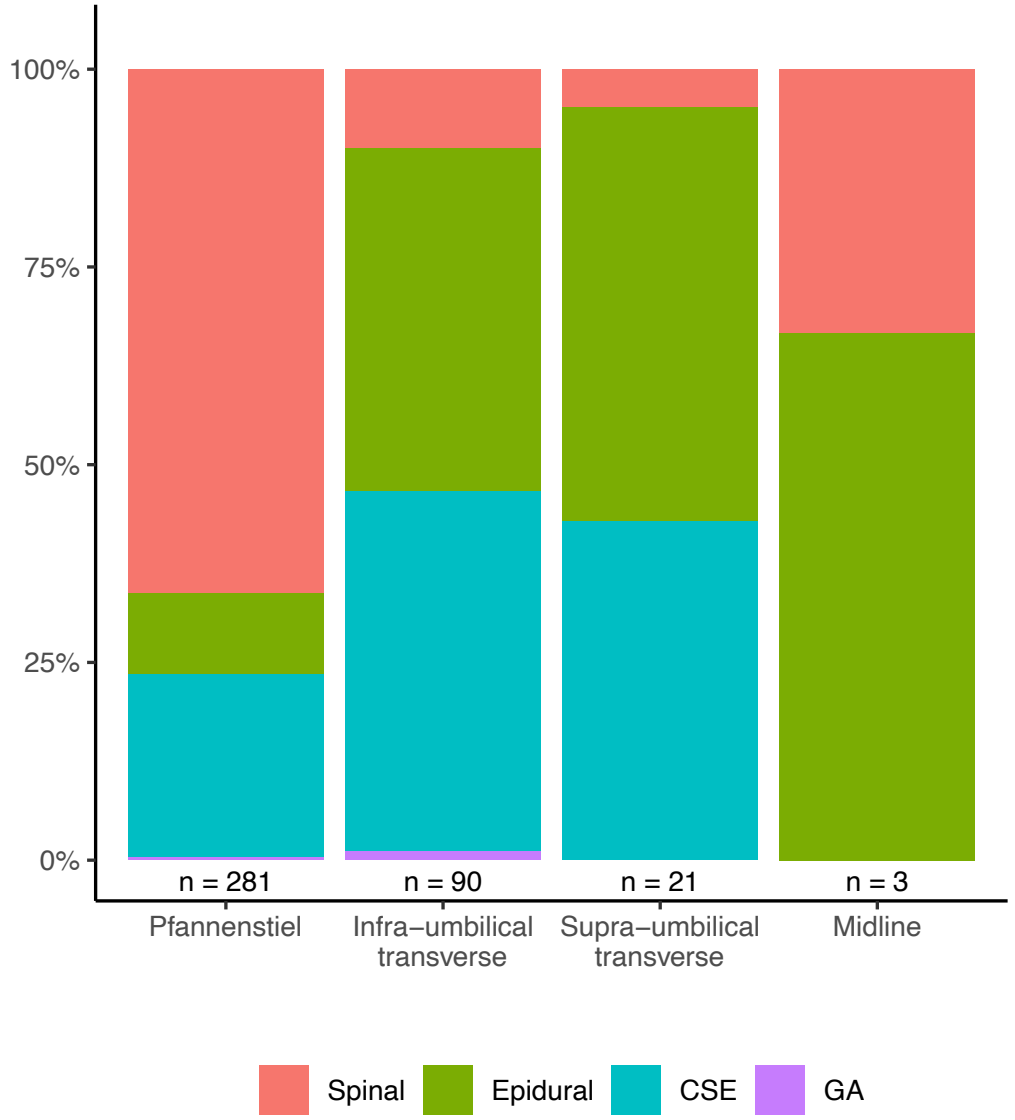

Bupivacaine Requirements during Spinal Anesthesia for Cesarean Delivery

40 women, 24 normal weight and 16 obese

Pre pregnancy BMI 21 versus 38 (range 16.9 to 52.5)

Up-down sequential allocation study

Narayana rule to determine ED95

doses 9 to 12 mg

ED 95:

All women	12.9 mg (95% CI: 11.5 to 34.7)
Normal weight	12.8 mg (95%CI: 10.7 to + infinity)
Obese	11.8 mg (95%CI: 11.3 to 15.6)

Lee et al. Rev Bras Anesthesiol 2009;59:674-83

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Postpartum Management of the Obese Women

Encourage early ambulation

Anticoagulation
- 12 h after spinal or epidural placement or
- 6 h after removal of epidural catheter
- whatever comes later

Additional postpartum antibiotics

Negative pressure dressing

24 h monitoring on monitored bed (L&D or other)
- Sleep apnea plus neuraxial opioids/GA
- BMI ≥ 50 plus neuraxial opioids/GA

Uterotonic Requirements in Women With Obesity

In vitro:

Myometrium less responsive to oxytocin
Luca et al. Can J Anesth 2020; 67: 836-846

Elective cesarean deliveries:

Carbetocin requirements approximately 4 times higher
Drew et al. Anaesthesia 2020; 75:1-7

Oxytocin requirements approximately 2 times higher
Peska et al. Anaesthesia 2021;76:918-23