Spinal vid Sectio

Riktlinje

Lisa Lundström

Bästa spinalen

- Vilken nål?
- Vilka doser och av vad?
- Utbredningsområde?
- Hur korrigera BT fall?
- Kontraindikationer SPA
- Postopsmärtlindring
- Övervakning postoperativt?

Spelar nålsort roll?

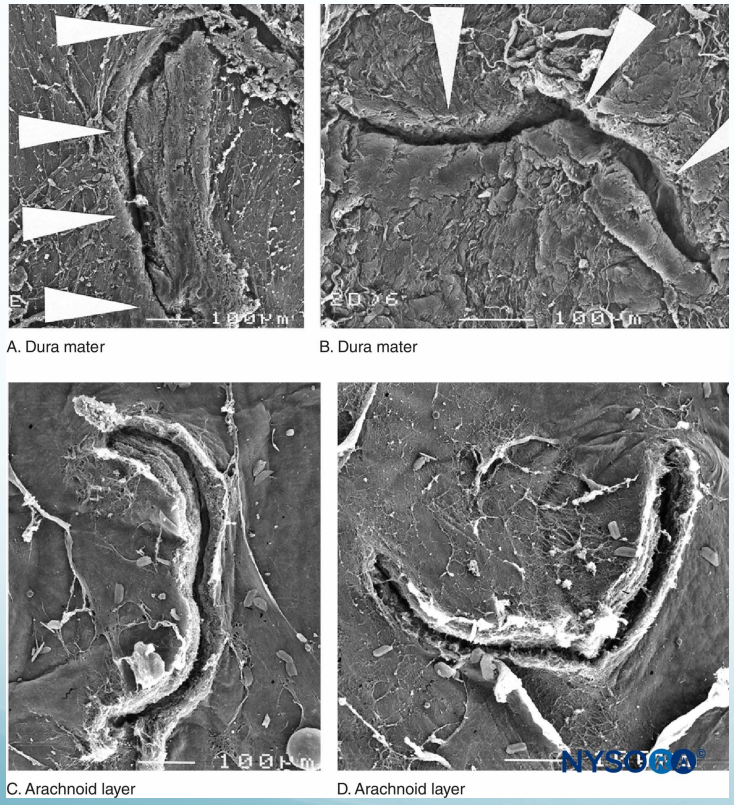
J Anesth (2016) 30:855–863
DOI 10.1007/s00540-016-2221-2

ORIGINAL ARTICLE

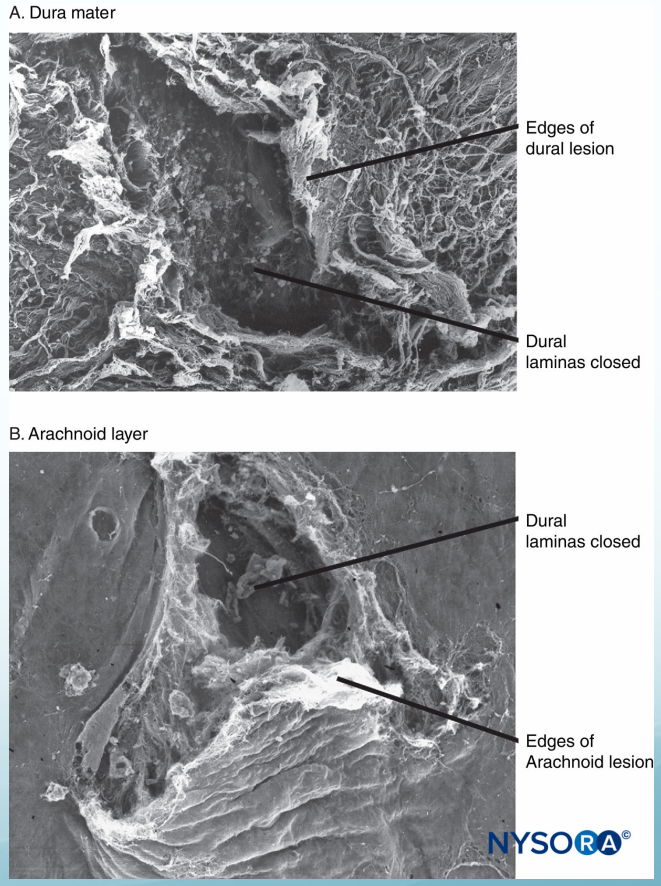
Finer gauge of cutting but not pencil-point needles correlate with lower incidence of post-dural puncture headache: a meta-regression analysis

Andres Zorrilla-Vaca[1,2] · Ryan Healy[1] · Carolina Zorrilla-Vaca[2]

Skärade nål



Pencil point nål



Skärande nålar ger mer PDPH

Table 1 Incidence of post-dural puncture headache in the group of patients receiving spinal anesthesia with cutting needles

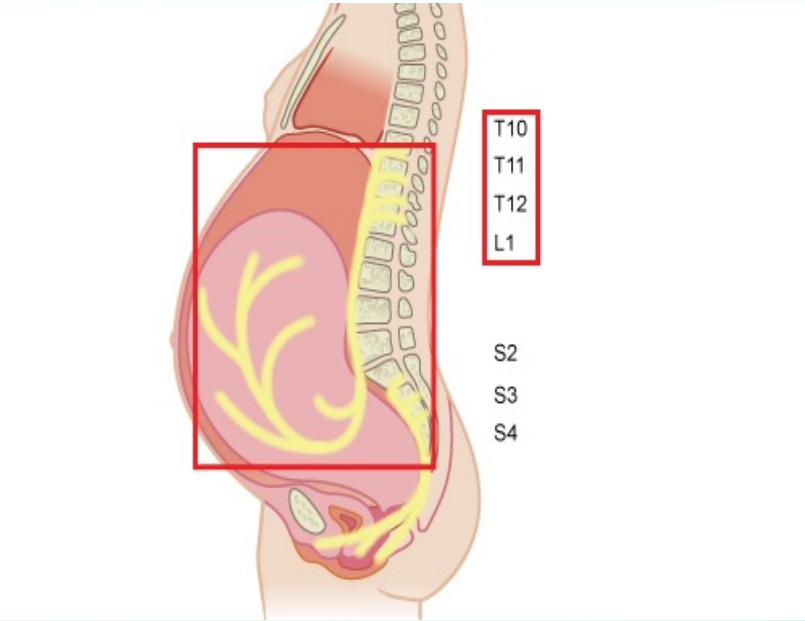
References	Needle gauge	Incidence of PDPH (%)	Covariates						Score[b]
			n	Age (years)[a]	Weight (kg)[a]	Local anesthetic	Surgery type	Female (%)	
Kang et al. [13]	26	9.6	322	38.3	77.6	Bup or Lid	Non-ob	50.9	4
Kang et al. [13]	27	1.5	336	38.6	77	Bup or Lid	Non-ob	51.8	
Corbey et al. [10]	26	4.7	87	32.6	NA	Bup or Lid	Elective	51.7	5
Corbey et al. [10]	27	8	99	31.6	NA	Bup or Lid	Elective	48.5	
Tarkkila et al. [19]	25	7.4	94	46	NA	Bup or Lid	Elective	44	5
Tarkkila et al. [19]	27	2.1	96	44	NA	Bup or Lid	Elective	47	
Tarkkila et al. [19]	29	0	92	43	NA	Bup or Lid	Elective	46.5	
Haffer et al. [11]	26	17.6	125	41.7	76.1	Mep	Ort	46.4	4
Haffer et al. [11]	27	6.4	125	39.1	74.6	Mep	Ort	44	
Chaudhry et al. [9]	22	25	52	50	NA	Bup	Elective	20	5
Chaudhry et al. [9]	23	11	128	50	NA	Bup	Elective	20	
Chaudhry et al. [9]	26	8	47	50	NA	Bup	Elective	20	
Vallejo et al. [20]	25	8.7	172	32.1	83.8	Bup	Ob	100	5
Vallejo et al. [20]	26	5	180	31.7	82.4	Bup	Ob	100	
Shaikh et al. [17]	25	8.3	168	25.8	59.9	Bup	Ob	100	5
Shaikh et al. [17]	27	3.75	160	26.4	61.7	Bup	Ob	100	
Shah et al. [16]	25	14	200	30	59.31	Bup	Urol	39	4
Shah et al. [16]	27	7	200	29	56.52	Bup	Urol	35	
Schmittner et al. [15]	29	19.1	110	45.5	79.3	Bup	Anorectal	41.8	5
Schmittner et al. [15]	25	17.0	106	51.6	82.7	Bup	Anorectal	37.7	
Srivastava et al. [18]	27	4	50	29.33	54.76	Bup	Ob	100	4
Srivastava et al. [18]	27	0	50	42.5	56.25	Bup	Non-ob	NA	
Kim et al. [14]	23	8	25	68.2	57.7	Bup	Ort	64	4
Kim et al. [14]	25	4.2	24	68.5	60.8	Bup	Ort	60	
Wadood et al. [21]	25	30	50	NA	NA	NA	Urol	50	3
Wadood et al. [21]	27	14	50	NA	NA	NA	Urol	48	
Hwang et al. [12]	25	3.65	NA	NA	NA	NA	Ob	100	5
Hwang et al. [12]	26	2.06	NA	NA	NA	NA	Ob	100	

Pencilpoint nålar ger mindre PDPH

Table 2 Incidence of post-dural puncture headache in the group of patients receiving spinal anesthesia with pencil-point needles

References	Needle gauge	Incidence of PDPH (%)	Covariates						Score[b]
			n	Age (years)[a]	Weight (kg)[a]	Local anesthetic	Surgery type	Female (%)	
Shutt et al. [27]	22	2.0	49	29.9	62.7	Bup	Ob	100	3
Shutt et al. [27]	25	0	47	28.8	63.9	Bup	Ob	100	
Campbell et al. [22]	25	0.66	150	32	73.5	Bup	Ob	100	4
Campbell et al. [22]	24	4	150	32	73.9	Bup	Ob	100	
Smith et al. [28]	25	1	104	NA	66.4	Bup	Ob	100	5
Smith et al. [28]	27	0	108	NA	66.7	Bup	Ob	100	
Hopkinson et al. [24]	25	0	170	28.5	74.2	Bup	Ob	100	4
Hopkinson et al. [24]	25	0.6	170	28.8	74.9	Bup	Ob	100	
Hopkinson et al. [24]	24	1.2	173	29.7	76.9	Bup	Ob	100	
Hopkinson et al. [24]	24	1.2	168	28.2	76.4	Bup	Ob	100	
Vallejo et al. [20]	25	3.1	201	31.2	81.6	Bup	Ob	100	5
Vallejo et al. [20]	24	2.8	211	31.6	82.1	Bup	Ob	100	
Shah et al. [16]	25	1	200	27.8	57.3	Bup	Urol	41	5
Shah et al. [16]	27	0.5	200	28.31	59.56	Bup	Urol	37.5	
Srivastava et al. [24]	27	2	50	26.63	52	Bup	Ob	100	5
Srivastava et al. [18]	27	0	50	38.43	57.46	Bup	Elective	NA	
Fama et al. [23]	25	4.6	109	31	NA	Bup	Ob	100	4
Fama et al. [23]	26	2.5	121	31	NA	Bup	Ob	100	
Fama et al. [23]	27	2	98	31	NA	Bup	Ob	100	
Sears et al. [26]	22	1.59	189	27.5	79.3	Bup or Lid	Ob	100	5
Sears et al. [26]	24	1.61	186	29.5	79.7	Bup or Lid	Ob	100	
Pittoni et al. [25]	22	0.8	117	39	75	Bup	Ort	26.5	4
Pittoni et al. [25]	24	0	117	37	73	Bup	Ort	33.3	

Utbredning



https://sfaianiva2021.backend.get-eureka.com/1051326/polling

Vilken nivå anser du räcka för sectio?

- A: Th 2-4
- B: Th 4-6
- C: Th 6-8
- D: Th 8-10

Vilken nivå anser du räcka för sectio?

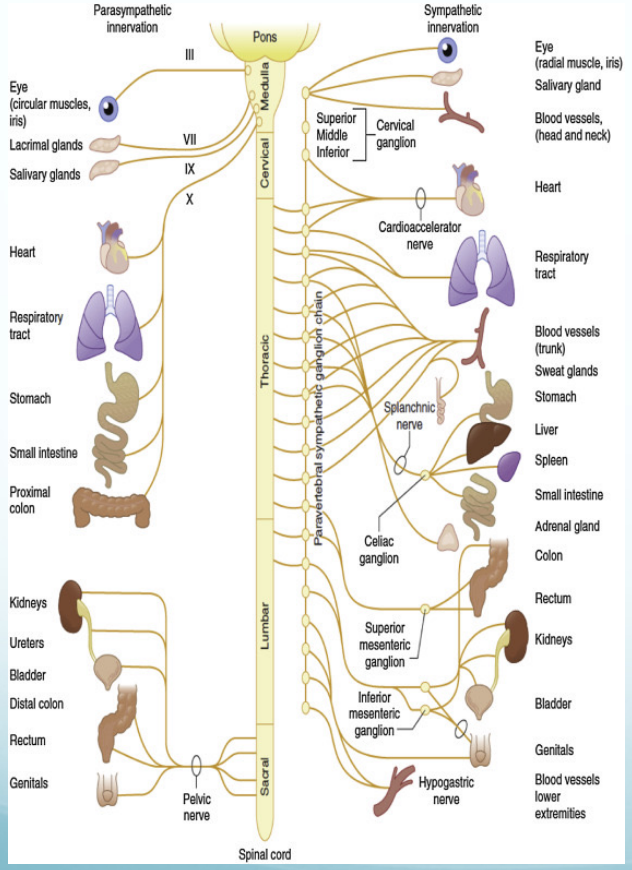
SAMJ, S. Afr. med. j. vol.107 n.7 Pretoria Jul. 2017

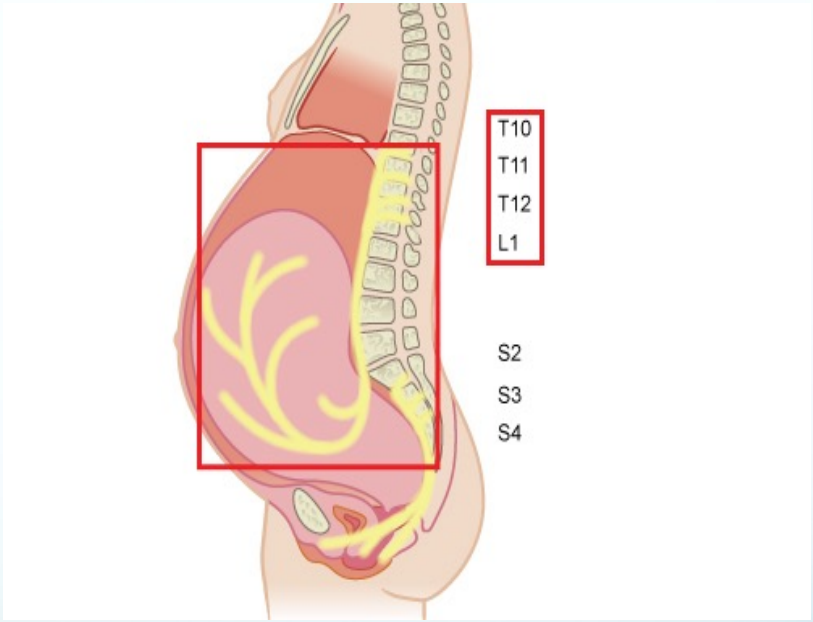
Table 3. Reported acceptable spinal anaesthesia block levels for caesarean section

Level	*n* (%)
Not reported	4 (1.9)
T2 - 4	4 (1.9)
T4 - 6	66 (31.1)
T6 - 8	87 (41.0)
T8 - 10	51 (24.1)
Total	212 (100)

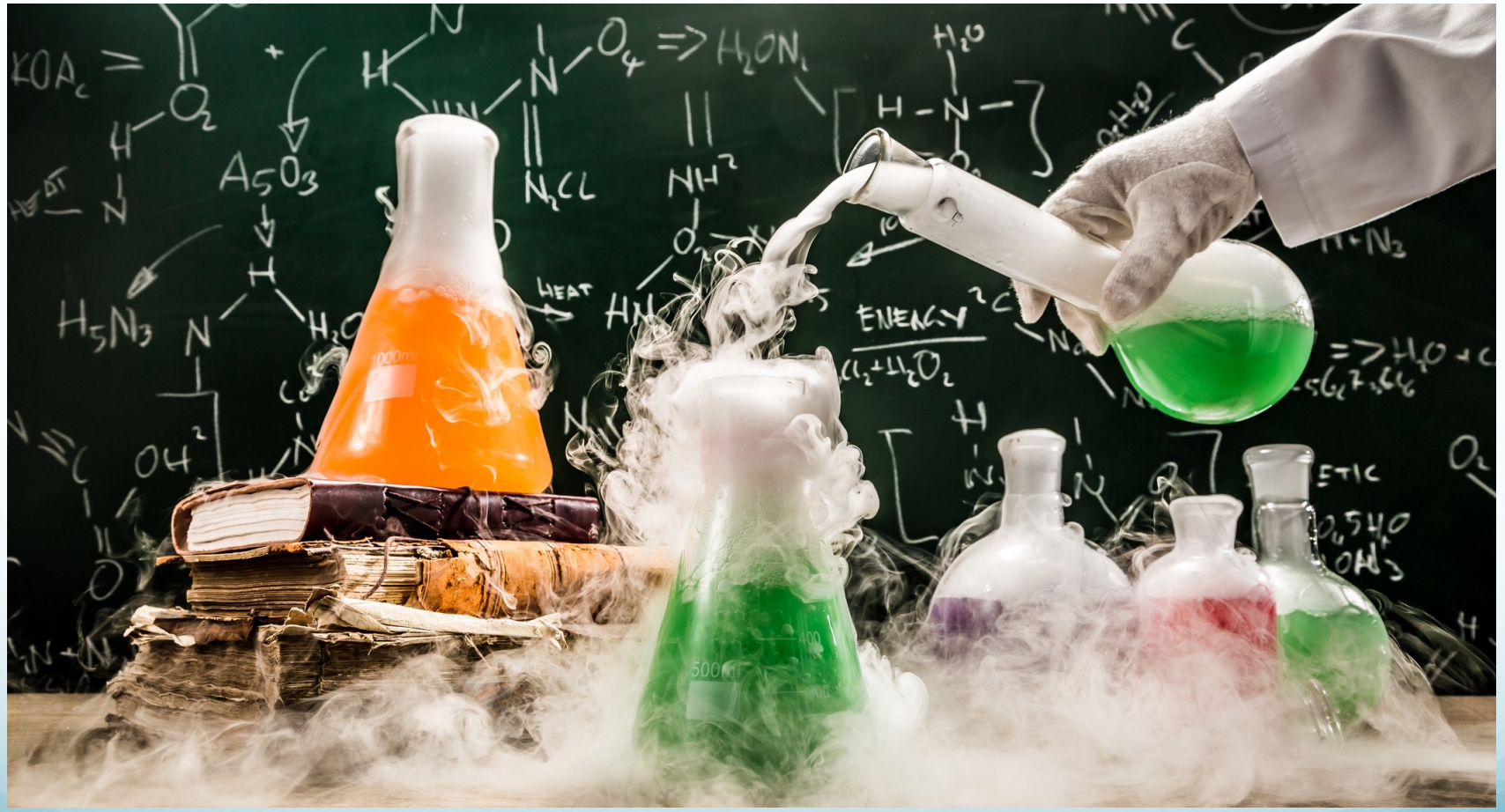
Utbredning

- Th4- sakralt





Doser



https://sfaianiva2021.backend.get-eureka.com/1051326/polling

Vad har ni i era spinaler?

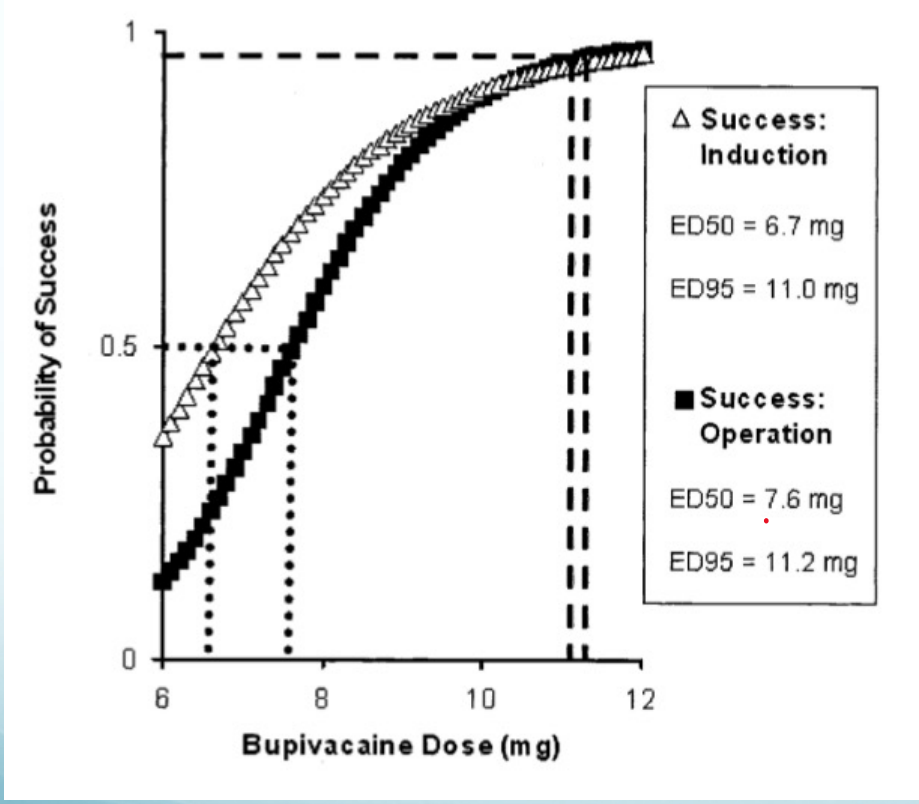
- 1: LA
- 2: LA och kortverkande opioid
- 3: LA, kortverkande opioid och morfin
- 4: LA och annat tillägg

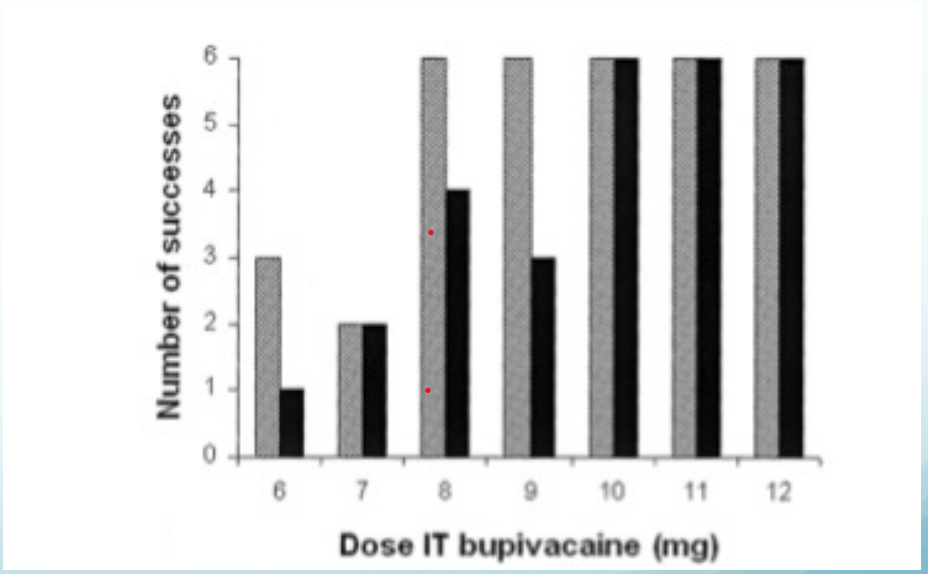
ED 95 bupivakain tung

Anesthesiology 2004; 100:676–82

ED_{50} and ED_{95} of Intrathecal Hyperbaric Bupivacaine Coadministered with Opioids for Cesarean Delivery

Yehuda Ginosar, B.Sc., M.B.B.S., Edward Mirikatani, M.D.,† David R. Drover, M.D.,‡ Sheila E. Cohen, M.B.Ch.B., F.R.C.A.,§ Edward T. Riley, M.D.‖*


1
0.5
0
Probability of Success
6
8
10
12
Bupivacaine Dose (mg)
Δ Success: Induction
ED50 = 6.7 mg
ED95 = 11.0 mg
■ Success: Operation
ED50 = 7.6 mg
ED95 = 11.2 mg


Number of successes
0
1
2
3
4
5
6
6
7
8
9
10
11
12
Dose IT bupivacaine (mg)

isobar

Anesthesiology 2005; 103:606–12

The ED_{50} and ED_{95} of Intrathecal Isobaric Bupivacaine with Opioids for Cesarean Delivery

Brendan Carvalho, M.B.B.Ch., F.R.C.A., Marie Durbin, M.D.,† David R. Drover, M.D.,**
Sheila E. Cohen, M.B., Ch.B., F.R.C.A.,‡ Yehuda Ginosar, B.Sc., M.B.B.S.,§ Edward T. Riley, M.D.‖

BMI>40

ED_{50} and ED_{95} of Intrathecal Bupivacaine in Morbidly Obese Patients Undergoing Cesarean Delivery

Brendan Carvalho, M.B.B.Ch., F.R.C.A.,* Jeremy Collins, M.B.Ch.B., F.R.C.A.,†
David R. Drover, M.D.,‡ Lindsey Atkinson Ralls, M.D.,§ Edward T. Riley, M.D.‖

Opioid

- Fentanyl/sufenta- för operationen, LA sparande
- Morfin special/epidural- postoperativ smärtlindring

Opioid- doser

Kortverkande

- Fentanyl 10-12 mikrog
- Sufenta 3-5 mikrog

Långverkande

- Morfin: 100-120 mikrog,

Bästa Spinalen

Lokalbedövningsmedel + opioid, både kort och långverkande

- Bupivacain tung 5mg/ml : 2.0-2.4ml, 10-12mg
- Fentanyl 50 mikrog/ml: 0.2-0.3 ml = 10-15mikrog

  alt Sufentanil 5mikrog/ml: 0.6-1ml=3-5mikrog
- Morfin spec 0.4mg/ml: 0.25-0.3ml= 100-120mikrog

Blodtryckskontroll

- Mål:90% av ursprungs BT

Anaesthesia 2017 doi:10.1111/anae.14080

Guidelines

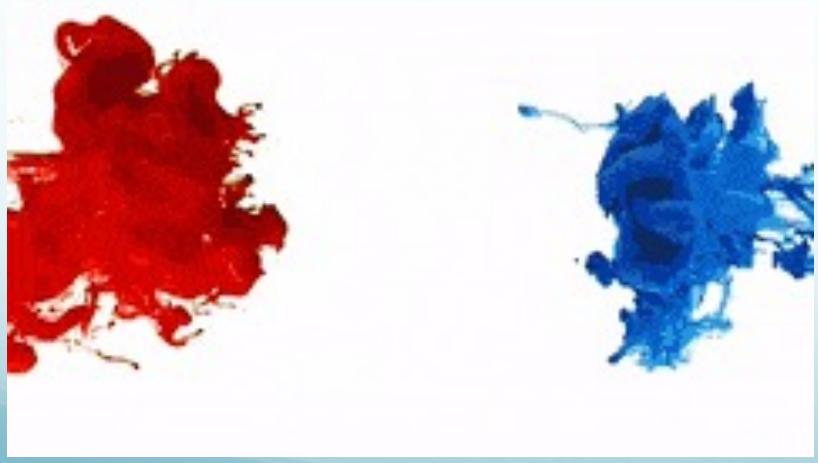
International consensus statement on the management of hypotension with vasopressors during caesarean section under spinal anaesthesia

S. M. Kinsella,[1] B. Carvalho,[2] R. A. Dyer,[3] R. Fernando,[4] N. McDonnell,[5] F. J. Mercier,[6] A. Palanisamy,[7] A. T. H. Sia,[8] M. Van de Velde[9,10] and A. Vercueil[11]

Vätska

Preload

- Sen 60 talet.
- ineffektivt



Coload

- Verkar vara mer effektivt men inga stora skillnader
- Kolloid mer effektivt än kristalloid

Vasopressor

- Efedrin
  - Högre transferering över placenta, stora doser är associerat med lägre pH hos barnet.
  - Pga sympaticus stimulering.
  - Långsammare anslag, längre duration
- Fenylefrin
  - Mer data. Påverkar barnet gynnsammare.
  - α1 effekt
  - Kan ge baroreceptormedierad bradycardi vid höga doser

Noradrenalin då?

- Få studier

Noradrenalin då?

Anaesthesia 2019, 74, 850–855 doi:10.1111/anae.14675

Original Article

A randomised controlled trial of phenylephrine and noradrenaline boluses for treatment of postspinal hypotension during elective caesarean section*

M. Mohta,[1] **A. Garg,**[2] **G. T. Chilkoti**[3] and **R. K. Malhotra**[4]

1 Director Professor, 2 Post-graduate Student, 3 Professor, Department of Anaesthesiology and Critical Care, University College of Medical Sciences and Guru Teg Bahadur Hospital, Delhi, India
4 Scientist (Statistics), Delhi Cancer Registry, Dr. BRA IRCH, All India Institute of Medical Sciences, Delhi, India

- Få studier
- 2 RCT visar mindre bradycardi utan påverkan på fetal syrabas
- Mohta el al visar sign sämre fetalt pH

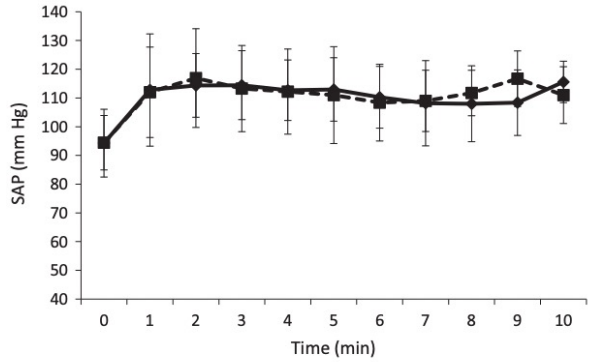


Figure 2 Changes in systolic arterial pressure (SAP) after spinal anaesthesia in women administered phenylephrine (··■··) or noradrenaline (–◆–). Error bars are SD.

Anaesthesia 2019, 74, 850–855 doi:10.1111/anae.14675

Original Article

A randomised controlled trial of phenylephrine and noradrenaline boluses for treatment of postspinal hypotension during elective caesarean section*

M. Mohta,[1] **A. Garg,**[2] **G. T. Chilkoti**[3] and **R. K. Malhotra**[4]

1 Director Professor, 2 Post-graduate Student, 3 Professor, Department of Anaesthesiology and Critical Care, University College of Medical Sciences and Guru Teg Bahadur Hospital, Delhi, India
4 Scientist (Statistics), Delhi Cancer Registry, Dr. BRA IRCH, All India Institute of Medical Sciences, Delhi, India

Table 3 Neonatal outcome variables in women who received phenylephrine or noradrenaline. Values are mean (SD), number (proportion) or median (IQR [range]).

	Phenylephrine n = 45	Noradrenaline n = 45	p value
Umbilical artery			
pH	7.29 (0.07)	7.25 (0.10)	0.03
pO_2; mmHg	20.4 (23.3)	17.5 (14.4)	0.49
pCO_2; mmHg	52.2 (10.6)	53.7 (11.8)	0.52
Bicarbonate; $mmol.l^{-1}$	24.3 (3.7)	22.5 (3.8)	0.04
Base excess; $mmol.l^{-1}$	−2.8 (4.3)	−5.2 (5.4)	0.02
Umbilical vein			
pH	7.33 (0.08)	7.29 (0.11)	0.85
pO_2; mmHg	26.4 (28.2)	33.4 (35.1)	0.30
pCO_2; mmHg	45.9 (7.2)	45.0 (14.5)	0.69
Bicarbonate; $mmol.l^{-1}$	23.7 (3.6)	21.2 (4.7)	0.006
Base excess; $mmol.l^{-1}$	−2.1 (4.4)	−5.1 (5.9)	0.008
Neonatal acidosis (umbilical artery pH < 7.2)	7 (15.6%)	6 (13.3%)	0.77
Apgar score at 1 min	9 (9–9 [8–9])	9 (9–9 [7–9])	1.00
Apgar score at 5 min	9 (9–9 [9–10])	9 (9–9 [8–10])	0.54
Birth weight; kg	2.9 (0.3)	2.9 (0.4)	0.62

Noradrenalin jmf Fenylefrin

- Bra blodtryckskontroll
- Bättre på att undvika bradycardi hos mamman
- I dagsläget osäkert utfall fetalt pH

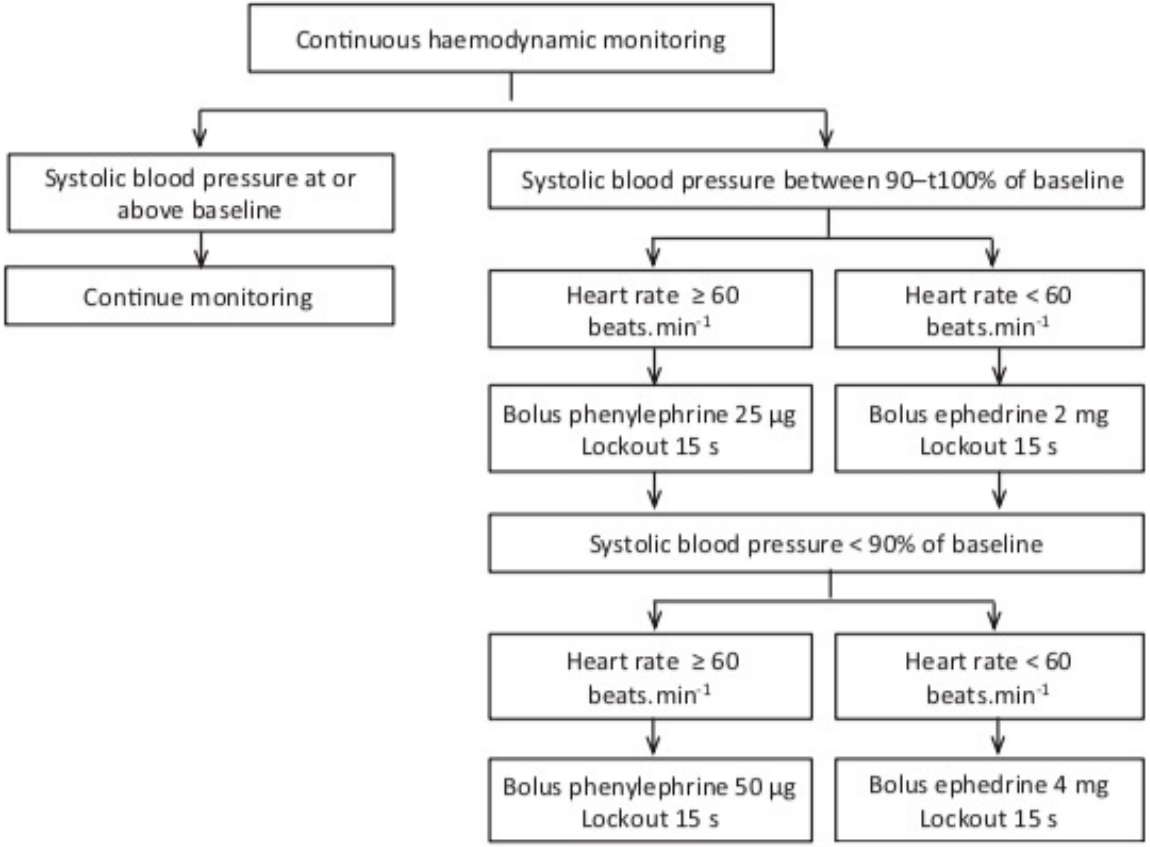
Noradrenalin jmf Fenylefrin

- Bra blodtyckskontroll
- Bättre på att undvika bradycardi hos mamman
- I dagsläget osäkert utfall fetalt pH

Lättast och bäst

- **Fenylefrin infusion 0.1mg/ml 15ml/h (=25ug/min)**

Om du vill vara din egen infusor: ge 25-50ug åt gången



Sammanfattning blodtryckskontroll

- **Fenylefrin infusion 0.1mg/ml 15ml/h (=25ug/min)**

- Mål: Syst BT >90%
- Ta BT ofta, (1-)2 min intervall initialt.
- Om låg puls, komplettera med efedrin alt atropin
- Funkar även vid preeklampsi, men oftast lägre dos

Kontraindikationer

2019-03-19

Riktlinje för obstetrisk spinal/epidural anestesi vid hemostasrubbning och antikoagulantiabehandling

Antagen: SFOAI styrelse, februari 2019, reviderad 190319
Antagen: SFAI styrelse, februari 2019

Författare: Ove Karlsson, Birgitta Birgisdottir, Anette Hein, Susanne Ledin-Eriksson, Vibeke Moen, Håkan Rolfsson, Michael Rådström, Siv Törnell

Riskbedömning för regionalanestesi hos obstetriska patienter med påverkad hemostas

Riskfaktor	Normal risk	Ökad risk	Hög risk	Mycket hög risk
LMH, profylax	>10 t	6-10 t	<6 t	
LMH, 2-dos profylax	>6 t	<6 t		
LMH, högdosprofylax	>24 t	12-24 t	6-12 t	
LMH, behandling	Anti-Xa <0,1			
Heparin inf. avslutad	>4 t	<4 t		
NSAID, ASA profylax	Ej LMH	+ LMH 12-24 t	+ LMH <12 t	
PK(INR), EDA	≤1,2	1,3-1,5	1,6-1,8	>1,9
PK(INR), spinal	≤1,4	1,5-1,7	1,8-2,0	>2,0
Preeklampsi, TPK <6 t	>100 x 10^9/l	75-100 x 10^9/l	<75 x 10^9/l	
Svår preeklampsi, TPK <2 t	>100 x 10^9/l	75-100 x 10^9/l	<75 x 10^9/l	
ITP, TPK	>75 x 10^9/l	50-75 x 10^9/l	20-50 x 10^9/l	
IUFD, prover*	<6 t	>6 t		Ablatio
Kolestas, prover*	<24 t	>24 t		
Generell anestesi för operation	Fasta vid elektivt snitt	Förlossning	Full magsäck och förlossning	**Preeklampsi**

LMH, låg molekylärt heparin; NSAID, non-steroid anti-inflammatory drug; ITP, idiopatisk trombocytopen purpura; IUFD, intrauterin fosterdöd; Prover*, TPK, APTT, PK(INR) och fibrinogen.

Att notera

Dessa riktlinjer gäller ***obstetriska patienter*** med behov av operation eller smärtlindring. ***Risken för komplikationer till regional anestesi ska vägas mot riskerna med generell anestesi.*** Dessa riktlinjer baseras på svensk klinisk erfarenhet, SFOAI riktlinjer, Nordiska riktlinjer från SSAI samt internationella riktlinjer [1, 2, 3]. Riktlinjerna är vägledande och ersätter inte den individuella riskbedömningen som utföres i varje enskilt fall.

Vid akuta, brådskande kejsarsnitt kan spinalanestesi övervägas efter dokumenterad riskbedömning utan hänsyn till senaste dos lågmolekylärt heparin (LMH), (motsvarande dygnsdosen dalteparin 2500 enheter var 12:e timme) och TPK >50 x 10^9/l. Inga vetenskapliga studier ligger till grund för rekommendationen [1].

Kontraindikationer

Riskbedömning för regionalanestesi hos obstetriska patienter med påverkad hemostas				
Riskfaktor	**Normal risk**	**Ökad risk**	**Hög risk**	**Mycket hög risk**
LMH, profylax	>10 t	6-10 t	<6 t	
LMH, 2-dos profylax	>6 t	<6 t		
LMH, högdosprofylax	>24 t	12-24 t	6-12 t	
LMH, behandling	Anti-Xa <0,1			
Heparin inf. avslutad	>4 t	<4 t		
NSAID, ASA profylax	Ej LMH	+ LMH 12-24 t	+ LMH <12 t	
PK(INR), EDA	≤1,2	1,3-1,5	1,6-1,8	>1,9
PK(INR), spinal	≤1,4	1,5-1,7	1,8-2,0	>2,0
Preeklampsi, TPK <6 t	>100 x 10^9/l	75-100 x 10^9/l	<75 x 10^9/l	
Svår preeklampsi, TPK <2 t	>100 x 10^9/l	75-100 x 10^9/l	<75 x 10^9/l	
ITP, TPK	>75 x 10^9/l	50-75 x 10^9/l	20-50 x 10^9/l	
IUFD, prover*	<6 t	>6 t		Ablatio
Kolestas, prover*	<24 t	>24 t		
Generell anestesi för operation	Fasta vid elektivt snitt	Förlossning	Full magsäck och förlossning	**Preeklampsi**

LMH, låg molekylärt heparin; NSAID, non-steroid anti-inflammatory drug; ITP, idiopatisk

Postopsmärtlindring

- Morfin effekt 12-24 h
- Dexamteason/Betapred 8 mg iv

Anaesthesia 2020 doi:10.1111/anae.1533

Guidelines

PROSPECT guideline for elective caesarean section: updated systematic review and procedure-specific postoperative pain management recommendations

E. Roofthooft,[1,2] G. P. Joshi,[3] N. Rawal,[4] M. Van de Velde,[5] and on behalf of the PROSPECT Working Group* of the European Society of Regional Anaesthesia and Pain Therapy and supported by the Obstetric Anaesthetists' Association

PROSPECT guidelines

Summary

Caesarean section is associated with moderate-to-severe postoperative pain, which can influence postoperative recovery and patient satisfaction as well as breastfeeding success and mother-child bonding. The aim of this systematic review was to update the available literature and develop recommendations for optimal pain management after elective caesarean section under neuraxial anaesthesia. A systematic review utilising procedure-specific postoperative pain management (PROSPECT) methodology was undertaken. Randomised controlled trials published in the English language between 1 May 2014 and 22 October 2020 evaluating the effects of analgesic, anaesthetic and surgical interventions were retrieved from MEDLINE, Embase and Cochrane databases. Studies evaluating pain management for emergency or unplanned operative deliveries or caesarean section performed under general anaesthesia were excluded. A total of 145 studies met the inclusion criteria. For patients undergoing elective caesarean section performed under neuraxial anaesthesia, recommendations include intrathecal morphine 50–100 μg or diamorphine 300 μg administered pre-operatively; paracetamol; non-steroidal anti-inflammatory drugs; and intravenous dexamethasone administered after delivery. If intrathecal opioid was not administered, single-injection local anaesthetic wound infiltration; continuous wound local anaesthetic infusion; and/or fascial plane blocks such as transversus abdominis plane or quadratus lumborum blocks are recommended. The postoperative regimen should include regular paracetamol and non-steroidal anti-inflammatory drugs with opioids used for rescue. The surgical technique should include a Joel-Cohen incision; non-closure of the peritoneum; and abdominal binders. Transcutaneous electrical nerve stimulation could be used as analgesic adjunct. Some of the interventions, although effective, carry risks, and consequentially were omitted from the recommendations. Some interventions were not recommended due to insufficient, inconsistent or lack of evidence. Of note, these recommendations may not be applicable to unplanned deliveries or caesarean section performed under general anaesthesia.

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Postoperativ övervakning efter intratekalt morfin

De första 6 (sufentanil, fentanyl) respektive 12 (morfin) timmarna
efter såväl intratekal injektion som under kontinuerlig epidural opioidbehandling bör följande parametrar kontrolleras:

- Puls och blodtryck.
- Benrörlighet (Bromage 0-3) var 4:e timme
- Smärtintensitet och sederingsgrad 1 gång/ timme med undantag för sovande patient nattetid.
- Andningsfrekvens räknas 1 gång/ timme hos sederad eller sovande patient (sederingsgrad 2-S enligt tabell).

Då en större läkemedelsdos ges epiduralt för att starta eller ”toppa upp” behandlingen bör tätare kontroller göras under 6 (fentanyl, sufentanil) till 12 (morfin) timmar för att oönskade effekter ska detekteras.

Take home message

En bra nål:

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En bra blandning:

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En bra blandning:

Bupivacain tung 5mg/ml :	2.0-2.4ml, 10-12mg
Fentanyl 50 mikrog/ml:	0.2-0.3 ml = 10-15mikrog
alt Sufentanil 5mikrog/ml:	0.6-1ml=3-5mikrog
Morfin spec 0.4mg/ml:	0.25-0.3ml= 100-120mikrog

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En bra BT kontroll:.

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En bra övervakning postop: 12 h pga it morfin


SFOAI