Césarienne sous rachianesthésie quel anesthésique local?

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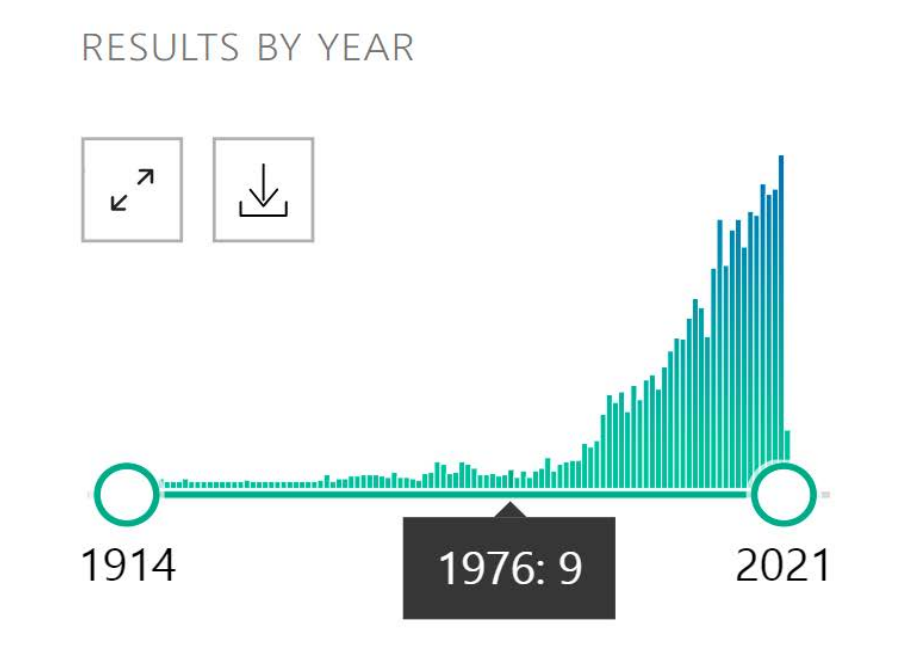
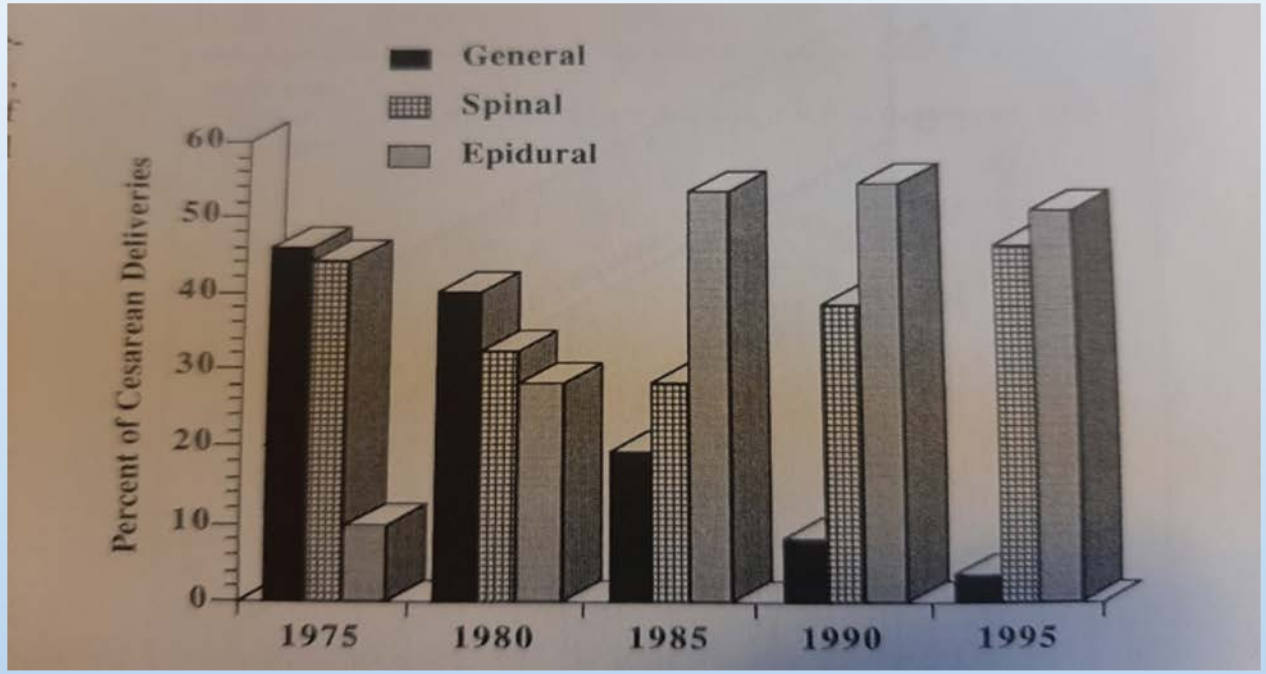
Conflits d’intêret: aucun

Rachianesthésie et césarienne…..au fil du temps





Hicks JS, Levinson G, Shnider SM. Obstetric anesthesia training centers in the U.S.A.--1975. Anesth Analg. **1976**;55(6):839-4

Tsen LC, Pitner R, Camann WR. General anesthesia for cesarean section at a tertiary care hospital 1990-1995: indications and implications. Int J Obstet Anesth. **1998**;7(3):147-52.

Quels AL sur une période d'un siècle?

- Tetracaine 7-9 mg (Amethocaine)
- Lidocaine 5% HB 50-75 mg
- Procaine, cinchocaine, pontocaine, polocaine
- Bupivacaine HB 12,5-15mg

The winner is: Bupivacaine HB

Résumé des Caractéristiques du Produit (RCP)

Anesthésie rachidienne avant interventions chirurgicales relevant de ce type d'anesthésie : chirurgie des membres inférieurs, chirurgie urologique par voie endoscopique ou par voie abdominale, chirurgie gynécologique, **interventions césariennes**, chirurgie abdominale sous ombilicale, chez les adultes et enfants de tous âges.

- **Mylan (ANSM - Mis à jour le : 24/04/2017)**

Grossesse: « Bradycardie, accompagnée éventuellement d'acidose fœtale, cyanose, baisse transitoire des réponses neurocomportementales néonatales (atonie, réflexe de succion) ont été retrouvées, essentiellement avec la lidocaïne et la mépivacaïne. Ces effets sont d'autant plus manifestes que l'anesthésie est proche de la délivrance. **En conséquence, on surveillera les fonctions vitales du nouveau-né** ».

Allaitement: **»Il est souhaitable d'interrompre transitoirement l'allaitement (une journée) en cas d'utilisation de ce médicament »**

- **Aguettant (ANSM - Mis à jour le : 07/09/2012)**

Grossesse: « par mesure de précaution, il est préférable de ne pas utiliser la bupivacaïne au cours du premier trimestre de la grossesse. **Néanmoins, à ce jour, lors de l'utilisation obstétricale de la bupivacaïne en fin de grossesse ou pour l'accouchement aucun effet foetotoxique particulier n'a été rapporté** »

Allaitement: « Comme tous les anesthésiques locaux, la bupivacaïne passe dans le lait maternel. C**ependant, compte tenu des faibles quantités excrétées dans le lait, l'allaitement est possible au décours d'une anesthésie régionale »**

Bupivacaine: les dernières décennies en résumé

- DE 95: 11-12mg

Ginosar Y, Mirikatani E, Drover DR, Cohen SE, Riley ET. ED50 and ED95 of intrathecal hyperbaric bupivacaine coadministered with opioids for cesarean delivery. Anesthesiology. 2004;100(3):676-82

- Hyperbare ou non: peu d'importance

Sng BL, Han NLR, Leong WL, Sultana R, Siddiqui FJ, Assam PN, Chan ES, Tan KH, Sia AT. Hyperbaric vs. isobaric bupivacaine for spinal anaesthesia for elective caesarean section: a Cochrane systematic review. Anaesthesia. 2018;73(4):499-511

- Low dose (< 10 mg) :
  -réduction des épisodes hypotensifs
  -risque analgésie insuffisante et conversion AG (RR: 5)
  -péri-rachi combinée recommandée

Rucklidge MW, Paech MJ. Limiting the dose of local anaesthetic for caesarean section under spinal anaesthesia--has the limbo bar been set too low? Anaesthesia. 2012;67(4):347-51.

Quelques autres données…

1- Les TNS

SNT: syndrome neurologique transitoire

TNS (Transient Neurological Symptoms)
Tous types de chirurgie confondus

The risk of developing TNS after spinal anaesthesia is lower when **bupivacaine, levobupivacaine, prilocaine, procaine, and ropivacaine** are used compared to lidocaine.

The use of **2-chloroprocaine and mepivacaine had a similar risk to lidocaine** in terms of TNS development after spinal anaesthesia.

Forget P, Borovac JA, Thackeray EM, Pace NL. Transient neurological symptoms (TNS) following spinal anaesthesia with lidocaine versus other local anaesthetics in adult surgical patients: a network meta-analysis. Cochrane Database Syst Rev. 2019 Dec 1;12(12):CD003006.

TNS et césarienne: particularisme en obstétrique?

- **Aouad MT, Siddik SS, Jalbout MI, Baraka AS. Does pregnancy protect against intrathecal lidocaine-induced transient neurologic symptoms? Anesth Analg. 2001 ;92(2):401-4.**

The incidence of TNS was zero (95% confidence interval 0%--3%) in both the Lidocaine and the Bupivacaine Groups. Our results indicate that the frequency of postoperative TNS does not exceed 3% in patients undergoing cesarean delivery at term using hyperbaric lidocaine 5% or hyperbaric bupivacaine 0.75%.

- **Philip J, Sharma SK, Gottumukkala VN, Perez BJ, Slaymaker EA, Wiley J. Transient neurologic symptoms after spinal anesthesia with lidocaine in obstetric patients. Anesth Analg. 2001 ;92(2):405-9**

The incidence of transient neurologic symptoms with lidocaine was 3% (95% confidence interval = 0.1%--17.8%) and that with bupivacaine was 7% (95% confidence interval = 0.9%--23.5%), (P = not significant).

2-L’ ALLAITEMENT C EST QUOI?

- 48-72 heures colostrum : 40-60 ml par 24heures
- Au delà 72 h : montée laiteuse (lait-colostrum puis lait)

3-Pharmacocinétique et rachianesthésie

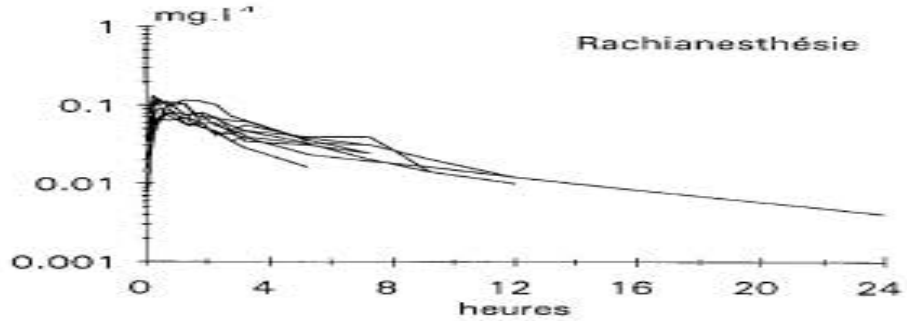


Fig. 1. — Courbes de concentrations plasmatiques de bupivacaïne en fonction du temps après rachianesthésie.

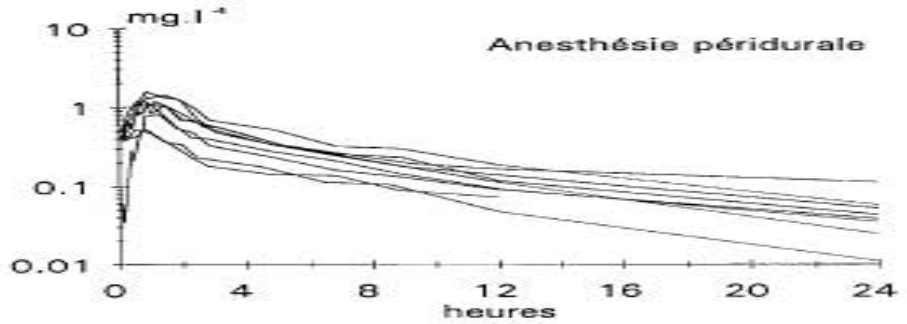


Fig. 2. — Courbes de concentrations plasmatiques de bupivacaïne en fonction du temps après anesthésie péridurale.

Tableau V. — Paramètres pharmacocinétiques de la bupivacaïne ($\bar{x} \pm SD$).

	Rachianesthésie	Anesthésie péridurale
Dose de bupivacaïne ($mg \cdot kg^{-1}$)	0,25 ± 0,02	2,31 ± 0,35
Tmax (h)	0,6 ± 0,29*	1,00 ± 0,29*
Cmax ($mg \cdot l^{-1}$)	0,1 ± 0,02	1,07 ± 0,33*
AUC ($mg \cdot l^{-1} \cdot h^{-1}$)	0,43 ± 0,11	5,89 ± 2,17
CL ($l \cdot h^{-1} \cdot kg^{-1}$)	0,6 ± 0,18	0,4 ± 0,10*
Vz ($l \cdot kg^{-1}$)	2,33 ± 0,66	4,49 ± 1,59*
T1/2 (h)	2,99 ± 1,18	8,31 ± 4,49*

* $p < 0,05$.
Cmax : concentration plasmatique maximale ; Tmax : temps d'apparition de Cmax ; AUC : aire sous la courbe ; CL . clairance plasmatique totale , Vz : volume de distribution ; T1/2 : demi-vie terminale.

Ledan C, Collet D, Vincelot A, Debord J, Lachatre G, Feiss P. Pharmacocinétique de la bupivacaïne administrée par voie péridurale ou sous-arachnoïdienne pour césarienne régleé . Ann Fr Anesth Reanim. 1993;12(6):552-9.

4-Césarienne: durée opératoire

De 10 à 60 minutes

- Selon l' opérateur
- Selon l'anatomie (IMC)
- Selon la technique chirurgicale (Pfannenstiel, Cohen, extrapéritoneal)
- Selon le contexte (urgence/itérative….)

USA: des durées régulièrement supérieures à 1h

A total of 205,332 cases were included .

The majority of these cases came from medium-sized community hospitals (50.8%).

Mean and median case duration were 115 and 79 minutes, respectively.

Mean duration was longest for cases performed **at university hospitals (143 min, standard deviation 136 min).**

Harris MJ, Gabriel RA, Dutton RP, Urman RD. A retrospective analysis of factors associated with anesthetic case duration for cesarean deliveries. Int J Obstet Anesth. 2018;34:42-49

LES AUTRES ANESTHESIQUES LOCAUX

…… Au travers de la littérature

1-Ceux qui n’ existent plus en France

…….mais encore récemment utilisés et qu' on trouve ailleurs

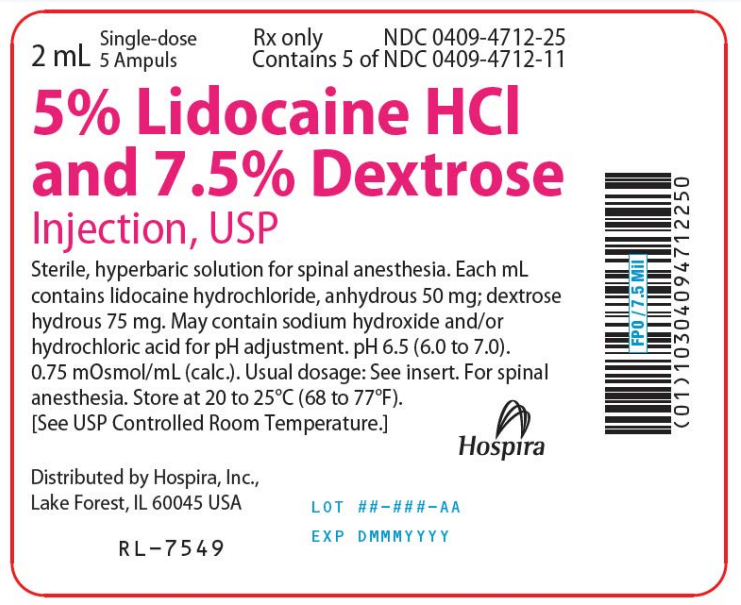
Tetracaine

introduction bupivacaine au Japon en 2000

10-12 mg

Nakagawa M, Kinouchi K, Miyagawa Y, Iura A, Shimizu T, Kitamura S. [7-year survey of anesthesia for cesarean section--comparison of tetracaine and bupivacaine as intrathecal anesthetic agents]. Masui. 2007 ;56(1):61-8.

Lidocaine 5% HB (Moyen orient/Asie)



80 mg of 5% lidocaine +/- fentanyl
Duration of complete analgesia (140.2 +/- 29.06 minutes vs 77.90 +/- 20.21 minutes: P < 0.001)
and effective analgesia (195.50 +/- 34.06 minutes vs 98.05 +/- 23.48 minutes: P < 0.001) were prolonged in fentanyl group

Shahriari A, Khooshideh M. Intrathecal fentanyl added to lidocaine for Cesarean delivery under spinal anesthesia--a randomised clinical trial. Middle East J Anaesthesiol. 2007 ;19(2):397-406.

Meperidine (Dolosal) vs Lidocaine: 1mg/kg vs 1,2-1,5 ml

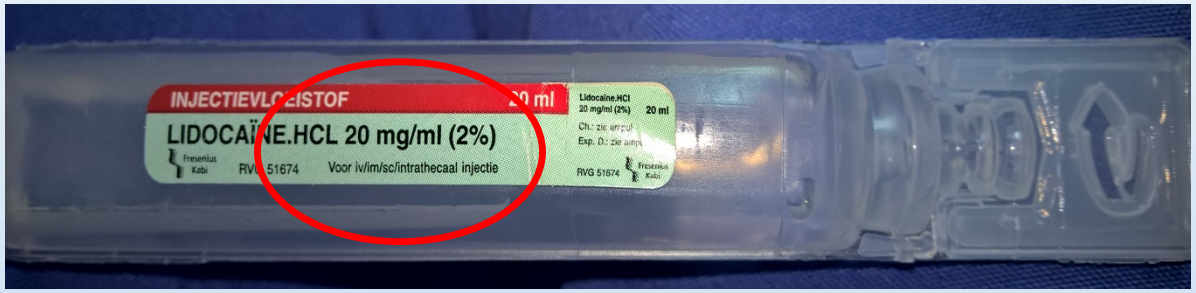
The sensory block lasted a mean of 60 min (range 55-70 min) in the meperidine group and 50 min (range 45-60 min) in the lidocaine group The motor block lasted a mean of 50 min in the meperidine group, and 45 min in the lidocaine group.

Kafle SK. Intrathecal meperidine for elective caesarean section: a comparison with lidocaine. Can J Anaesth. 1993 ;40(8):718-21.

2-Les AL commercialisés en France

……..et qui sont ou ont été utilisés pour la césarienne

A- LIDOCAINE 2% (pas d AMM en France)



Spinal anaesthesia with 2, 2.5 or 3 ml of glucose-free lidocaine 2% was studied in 50 patients undergoing Caesarean section. Onset time, cephalad spread of analgesia, quality of analgesia, muscle relaxation, the cardiovascular effects and duration of analgesia and motor block were assessed.

Reliable anaesthesia was provided with 2.5 and 3 ml …..while 2 ml of 2% lidocaine was insufficient.

Onset time varied between 5.5 to 6 min and maximum cephalad spread was achieved in 10-15 min.

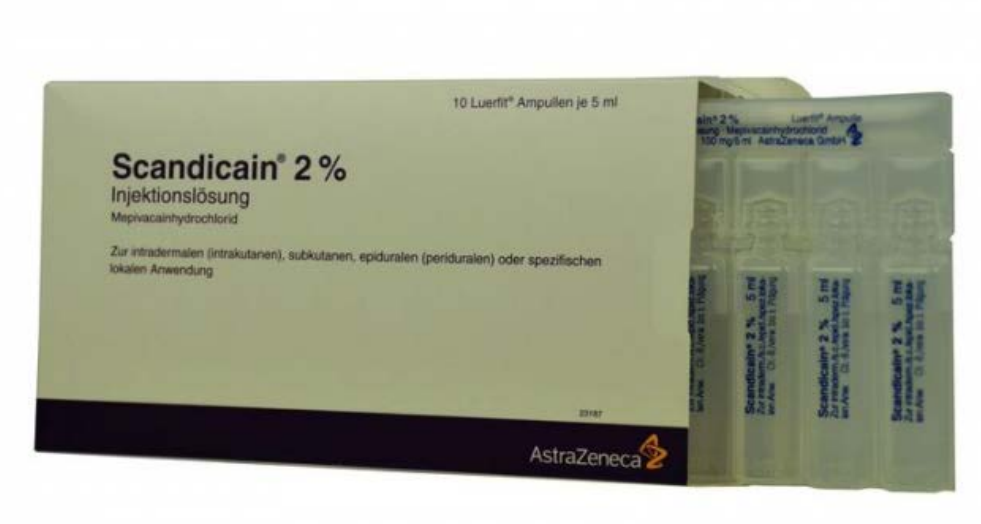
The mean maximum extent of sensory analgesia was higher after 2.5 ml (T4.1) and 3 ml (T3.6) than after 2 ml (T7) ($P < 0.001$).

Complete motor block was achieved in all the patients.

The mean duration of sensory block was 123 +/- 6.23 min (2 ml) to 126 +/- 7.53 min (2.5 and 3 ml).

Kumar A, Bala I, Bhukal I, Singh H. Spinal anaesthesia with lidocaine 2% for caesarean section. Can J Anaesth. 1992;39(9):915-9.

B- MEPIVACAINE



pas d'AMM pour la rachianesthésie

…….1953: polocaine

Mépivacaine et césarienne…….

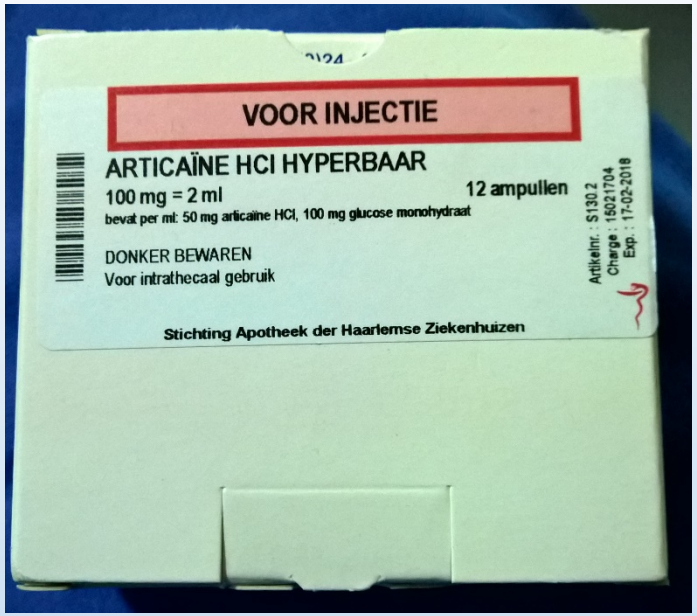
- In a randomized, prospective, and double-blinded study (n = 100, 20 parturients per group, singleton pregnancy, >37 wk of gestation).
- The aim was to evaluate the effects of **60 mg 2% hyperbaric mepivacaine** alone, or combined with either intrathecal fentanyl (5 and 10 microg), or sufentanil (2.5 and 5 microg), on sensory, motor, and analgesic block characteristics, hemodynamic variables, and neonatal outcome
- No parturient experienced intraoperative pain.
- **The average duration of motor block Bromage 3 in all groups was 68 min, and resolution time to Bromage 0 was 118 min.**
- Maximal cephalad sensory block level was T3-6 and could be established within 6 min.
- Complete analgesia was significantly prolonged in all groups receiving intrathecal opioids, yet, with sufentanil 5 microg, even the duration of effective analgesia was significantly extended.

Meininger D, Byhahn C, Kessler P, Nordmeyer J, Alparslan Y, Hall BA, Bremerich DH. Intrathecal fentanyl, sufentanil, or placebo combined with hyperbaric mepivacaine 2% for parturients undergoing elective cesarean delivery. Anesth Analg. 2003;96(3):852-8

Bremerich DH, Schlösser RL, L'Allemand N, Brandes RP, Ahr A, Piorko D, Kaufmann M, Kessler P. Mepivacaine for spinal anesthesia in parturients undergoing elective cesarean delivery: maternal and neonatal plasma concentrations and neonatal outcome. Zentralbl Gynakol. 2003;125(12):518-21.

C- ARTICAINE

pas d’AMM pour rachianesthésie



Néanmoins proposée dans la rachianesthésie ambulatoire

Förster JG. Short-acting spinal anesthesia in the ambulatory setting. Curr Opin Anaesthesiol. 2014 ;27(6):597-604.

Articaïne vs Levo bupivacaine……

TABLE 2. Sensory and motor block characteristics

	Group A (n=50)	Group L (n=50)
Puncture level L3–4/L4–5 (n)	32/18	30/20
Maximal extension of sensory block	T4 [3–5]	T3 [2-3]
Time to maximal sensory block (min)	10 [4-10]	10 [3-15]
Time T10 (min)	4 [3-5]	5 [4-6]*
Time (max-2) (min)	70 [50-90]	90 [69-120]*
Time to regression to L1 (min)	189 [103-237]	238 [185-288]*
Time to maximum motor blockade (min)	5 [5-10]	10 [5–15]*
Time to complete regression of motor blockade (min)	140 [120-165]	215 [180-270]*
First analgesic request (min)	110 [65-135]*	183 [136-205

Data are median [range] or count; time max: time taken for sensory block to reach maximum; time T10: time taken for sensory block to reach T10; time(max-2): time taken for two-segment regression of sensory block from its highest level. *P < 0.05 compared to Group A and Group L

100 Patients undergoing Caesarean section received in random order **plain articaine 40 mg** (Group A, n=50) or **plain levobupivacaine 10 mg** (Group L, n=50) mixed with fentanyl 20 µg intrathecally. T.

Results: Onset times of maximum motor block were longer in Group L than Group A (P=0,001). Time to two-segment regression of sensory block were 70 min for Group A and 90 min group L (P=0.001). Times to complete regression of motor blockade were significantly longer in group L than group A (P =0,001).

Demircioglu RI, Gozdemir M, Usta B, Sert H, Karabayirli S, Muslu B, Keskin EA. Comparison of intrathecal plain articaine and levobupivacaine with fentanyl for Caesarean section. Clin Invest Med. 2016 Dec 1;39(6):27516

D- Levo-BUPIVACAINE

- AMM en France pour rachianesthésie (5mg/ml):
- Posologie: 15 mg (ANSM - Mis à jour le : 02/01/2014)

- Grossesse: « Les solutions de lévobupivacaïne sont contre-indiquées pour l'utilisation en bloc paracervical en obstétrique. En se basant sur l'expérience acquise avec la bupivacaïne, il est possible qu'une bradycardie fœtale survienne après un bloc paracervical. Pour la lévobupivacaïne, il n'y a pas de données cliniques sur les grossesses exposées au premier trimestre. Les études conduites chez l'animal, au cours desquelles l'exposition systémique était de même ordre que celle obtenue en clinique, n'ont pas mis en évidence d'effet tératogène mais ont révélé une toxicité embryo-fœtale (voir rubrique 5.3). Les conséquences dans l'espèce humaine ne sont pas connues. Par conséquent, la lévobupivacaïne ne doit pas être utilisée en début de grossesse sauf en cas de nécessité absolue. **Toutefois, à ce jour, les données cliniques relatives à l'utilisation de la bupivacaïne en chirurgie obstétricale (au terme de la grossesse ou pour l'accouchement) sont nombreuses et n'ont pas mis en évidence de fœtotoxicité**. »
- Allaitement: « Il n'y a pas de données disponibles sur l'excrétion de la lévobupivacaïne dans le lait maternel. Cependant, **la lévobupivacaïne est probablement faiblement excrétée dans le lait maternel, comme la bupivacaïne**. Par conséquent, **l'allaitement est possible après une anesthésie locale** »

Lévo-Bupivacaine vs Bupivacaine

Réduction très modérée de la durée du bloc moteur (10aine min)

Bremerich DH, Fetsch N, Zwissler BC, Meininger D, Gogarten W, Byhahn C. Comparison of intrathecal bupivacaine and levobupivacaine combined with opioids for Caesarean section. Curr Med Res Opin. 2007 Dec;23(12):3047-54.

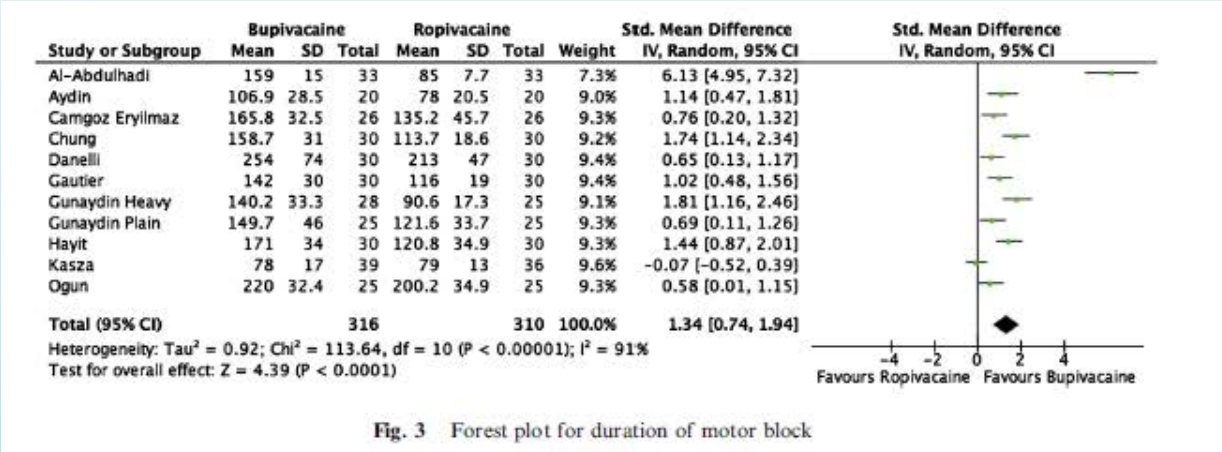
E- ROPIVACAINE

- AMM en France pour rachianesthésie (5mg/ml)
- Posologie: 5-25mg (ANSM - Mis à jour le : 08/09/2016)

- Grossesse: « **En dehors de son utilisation en obstétrique, il n'y a pas de données précises sur l'utilisation du chlorhydrate de ropivacaïne chez la femme enceinte**. Les études expérimentales chez l'animal n'ont pas montré d'effets nocifs directs ou indirects sur la grossesse, le développement embryonnaire et fœtal, l'accouchement ou le développement post-natal »
- Allaitement: « Il n'y a **pas de données disponibles sur le passage de la ropivacaïne dans le lait maternel** »

Ropivacaine vs Bupivacaine (méta analyse)

- Posologie: 10-15 mg



Study or Subgroup	Bupivacaine Mean	SD	Total	Ropivacaine Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Al-Abdulhadi	159	15	33	85	7.7	33	7.3%	6.13 [4.95, 7.32]
Aydin	106.9	28.5	20	78	20.5	20	9.0%	1.14 [0.47, 1.81]
Camgoz Eryilmaz	165.8	32.5	26	135.2	45.7	26	9.3%	0.76 [0.20, 1.32]
Chung	158.7	31	30	113.7	18.6	30	9.2%	1.74 [1.14, 2.34]
Danelli	254	74	30	213	47	30	9.4%	0.65 [0.13, 1.17]
Gautier	142	30	30	116	19	30	9.4%	1.02 [0.48, 1.56]
Gunaydin Heavy	140.2	33.3	28	90.6	17.3	25	9.1%	1.81 [1.16, 2.46]
Gunaydin Plain	149.7	46	25	121.6	33.7	25	9.3%	0.69 [0.11, 1.26]
Hayit	171	34	30	120.8	34.9	30	9.3%	1.44 [0.87, 2.01]
Kasza	78	17	39	79	13	36	9.6%	-0.07 [-0.52, 0.39]
Ogun	220	32.4	25	200.2	34.9	25	9.3%	0.58 [0.01, 1.15]
Total (95% CI)			**316**			**310**	**100.0%**	**1.34 [0.74, 1.94]**

Heterogeneity: $Tau^2 = 0.92$; $Chi^2 = 113.64$, df = 10 ($P < 0.00001$); $I^2 = 91\%$
Test for overall effect: $Z = 4.39$ ($P < 0.0001$)

Fig. 3 Forest plot for duration of motor block

- Thirteen trials comprising 743 spinal anaesthetics were included. Intrathecal ropivacaine resulted in a **reduced duration of motor block, regressing 35.7min earlier** compared with intrathecal bupivacaine (P<0.00001).

Malhotra R, Johnstone C, Halpern S, Hunter J, Banerjee A. Duration of motor block with intrathecal ropivacaine versus bupivacaine for caesarean section: a meta-analysis. Int J Obstet Anesth. 2016;27:9-16

F- CHLOROPROCAINE

- AMM en France pour rachianesthésie (10 mg/ml):

« Anesthésie intrathécale chez l'adulte avant intervention chirurgicale programmée ne devant pas excéder 40 minutes »

- Posologie: max 50mg

- Grossesse: «Les études effectuées chez l'animal ne permettent pas de conclure sur d'éventuels effets sur la grossesse et le développement fœtal . **CLOROTEKAL ne doit pas être administré durant la grossesse ni chez les femmes en âge de procréer et qui n'utilisent pas de méthode contraceptive.** »
- Allaitement: « On ne sait pas si la chloroprocaïne et/ou ses métabolites sont éliminés dans le lait maternel. »

Chloroprocaine et césarienne (20mg/ml)

Sixty ASAI/II patients, planned for elective singleton Caesarean section, were equally randomised to three groups.

All patients received a combined spinal-epidural anaesthesia.

- first group (n=20) received 2-chloroprocaine (40 mg) without sufentanil,
- second group (n=20) received 2-chloroprocaine (40 mg) with sufentanil (1 µg)
-third group (n=20) received hyperbaric bupivacaine **(7.5 mg)** with sufentanil (1 µg) .

There was no difference between the three groups regarding the time to regression of the motor block. However, at 5 min post spinal injection, the level of sensory block was higher for both groups with 2-chloroprocaine, in comparison with the bupivacaine group.

Three patients in the 2-CP group reported a VAS above 3 after 40 and 50 min respectively. Two patients reported a VAS of 3 after 20 min, respectively in the C+S and B+S group. After 40 min, seven patients reported a VAS above 1.

Two of those patients belong to the C group and reported the highest VAS scores of 4 and 5. One in the same group described a VAS of 5, 50 min after injection. VAS scores were lower in both sufentanil groups.

Maes S, Laubach M, Poelaert J. Randomised controlled trial of spinal anaesthesia with bupivacaine or 2-chloroprocaine during caesarean section. Acta Anaesthesiol Scand. 2016;60(5):642-9.

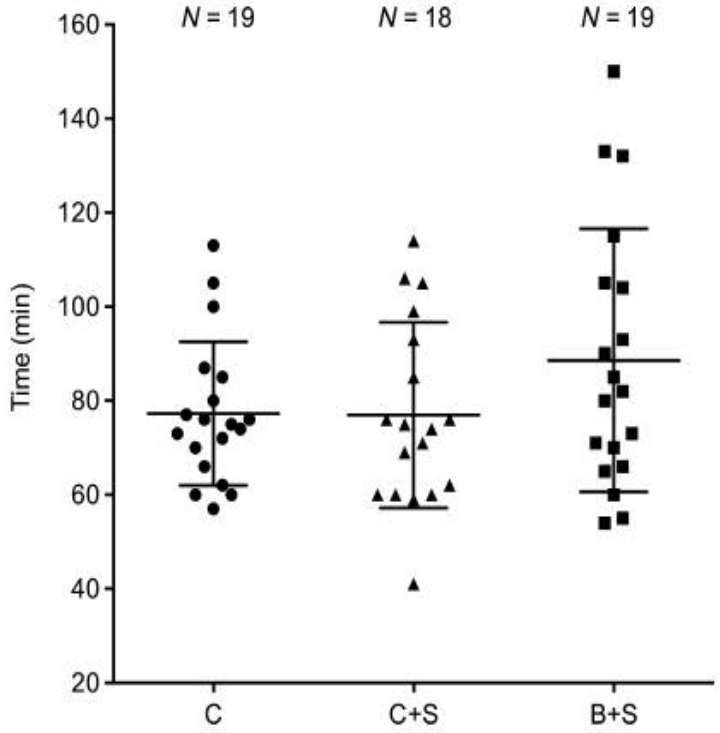


Fig. 2. Time to achieve resolution of motor block in women receiving one of three anaesthetic drugs. C, 2-chloroprocaine; C+S, 2-chloroprocaine + sufentanil; B+S, bupivacaine + sufentanil. Middle horizontal line represents mean value, with standard deviations (upper and lower horizontal lines).

Chloroprocaine et césarienne (10mg/ml)

- 150 parturientes
- 30 mg CP +/- 25µg fentanyl
- N=5 et 3 analgésie insuffisante
- Durée d'intervention +/- 40 min

Spinal block characteristics

	Group CS (*n*=70)	Group CF (*n*=72)	*P* from independent
Mean time to achieve T10 sensory block (min)	4.23±0.92	4.13±1.13	0.78
Mean time to achieve T6 sensory block (min)	5.16±1.05	5.39±1.34	0.15
Mean time to achieve maximum cephalad spread (min)	5.97±0.87	6.22±2.09	0.22
Maximum cephalad sensory level (Median)	T6 (T4-T8)	T6 (T4-T8)	
Mean time for two segment regression (min)	57.96±6.48	57.83±8.52	0.99
Mean duration of sensory block (min)	72.13±10.33	101.1±14.61	<0.0001
Mean onset of motor block (min)	4.5±0.74	4.4±1.12	0.55
Mean duration of motor block (min)	69.8±13.66	70.4±14.44	0.33
Mean duration of analgesia (min)	79.59±10.74	115.2±25.54	<0.0001

P<0.05 is indicative of significant difference between the two groups

Singariya G, Choudhary K, Kamal M, Bihani P, Pahuja H, Saini P. Comparison of analgesic efficacy of intrathecal 1% 2-chloroprocaine with or without fentanyl in elective caesarean section: A prospective, double-blind, randomised study. Indian J Anaesth. 2021 Feb;65(2):102-107

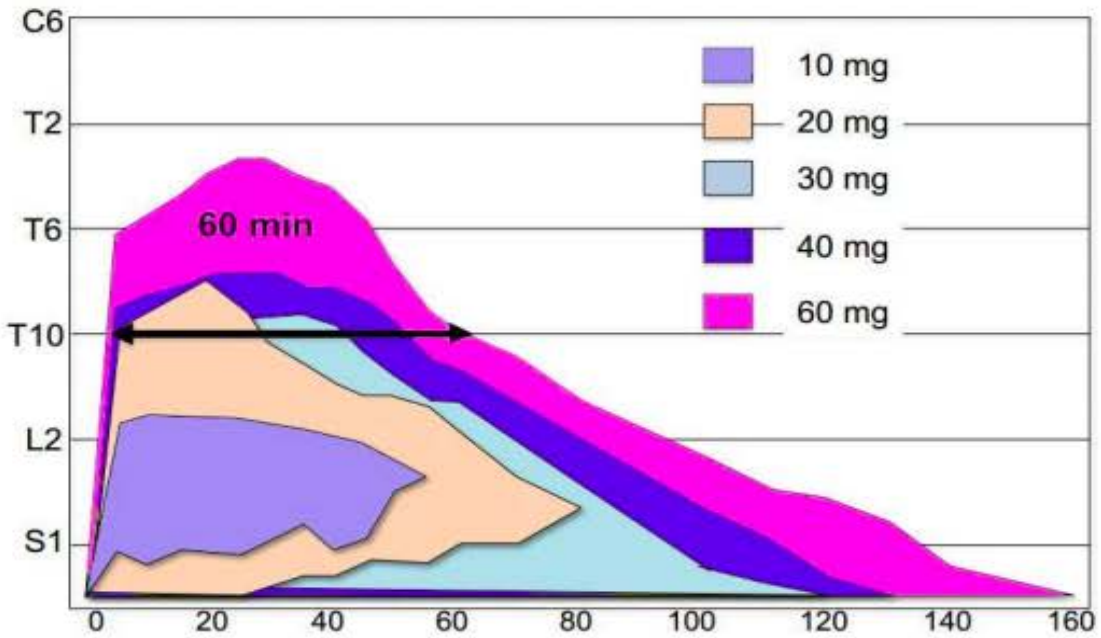


Figure 7: Evolution temporo-spatiale du bloc moteur induit avec différentes doses de chloroprocaïne en intrathécal

Chlorprocaine 3% en cours de grossesse

Table 1 Demographic and anesthetic variables.

Variable		
Age (years)		32 (±6)
Height (cm)		163 (±6)
Body mass index (kg/m^2)		31 (±7)
Gestational age (weeks), n=22		21 (±9)
Type of procedure	Cerclage (n, %)	18 (72%)
	Dilation and curettage (n, %)	3 (12%)
	Other[a] (n, %)	4 (16%)
2-chloroprocaine dose (mg)		47 (±14)
Spinal anesthesia to incision time (min)		18 (15–21)
Surgery duration (min)		26 (20–37)
Intra-operative sedation/analgesia (n, %)		6 (24%)
Intra-operative hypotension (n, %)		5 (20%)
Intra-operative bradycardia (n, %)		1 (4%)
Failed anesthetic (n, %)		2 (8%)
Spinal anesthesia to block regression time (min), n=13		119 (9–140)
Spinal anesthesia to ambulation time (min), n=19		188 (170–218)
Spinal anesthesia to discharge time (min), n=15		208 (172–272)
Postoperative paresthesia (n)		0
Cauda equina syndrome symptoms (n)		0
Back pain (n, %)		1 (4%)

Results are expressed as mean (±SD), median (IQR), or n (%).
[a]Retained placenta extraction and perineal laceration repair, external cephalic version, Pfannenstiel wound incision and drainage, perineal reconstruction.

Mandalia S, Dinges E, Bollag L, Delgado C. Spinal chloroprocaine for obstetrical non-delivery procedures: a retrospective analysis at a single academic center. Int J Obstet Anesth. 2021;45:158-159.

G- PRILOCAINE

- AMM en France pour rachianesthésie (20mg/ml):

  « Anesthésie intrathécale chez l'adulte avant intervention chirurgicale de courte durée »

- Posologie: 20-80 mg

- **Grossesse**: « **Aucune donnée adéquate n'est disponible sur l'utilisation de la prilocaïne durant une grossesse**. La prilocaïne peut passer la barrière placentaire. **Des cas de méthémoglobinémie néonatale nécessitant un traitement ont été rapportés après utilisation de la prilocaïne dans le cadre d'une utilisation obstétrique afin d'effectuer un bloc paracervical ou une anesthésie pudendale.** Des cas de bradycardies fœtales entrainant un décès sont survenus avec d'autres anesthésiques locaux de type amide suite à un bloc paracervical. **Les études effectuées chez l'animal ont montré une toxicité sur le développement** (voir rubrique 5.3). BARITEKAL ne peut par conséquent être administré qu'en cas d'indication absolue à son utilisation. L'utilisation de la prilocaïne dans le cadre d'un bloc paracervical ou d'une anesthésie pudendale doit être évitée ».

- **Allaitement:** « **On ignore si la prilocaïne est éliminée dans le lait maternel. Si son utilisation est requise durant la lactation, l'allaitement peut être repris environ 24h après le traitement** »

2015: début de l'histoire en France

Tableau 1 Niveau supérieur d'anesthésie en fin d'intervention.

	PH60 mg	PH70 mg
Th2		••
Th3	••	•
Th4	•••••••	••••
Th5	••••••	•
Th6	••••	
Th7		
Th8	•	•

La durée du bloc moteur (Bromage 0) est significativement différent (p = 0,049) entre les groupes 60 et 70 mg, respectivement 133 ± 27 et 154 ± 29 min.

Sleth JC, Saizy C, Prilocaïne hyperbare et césarienne : étude prospective de faisabilité (R232)
Anesthésie & Réanimation Volume 1, Supplément 1, September 2015; A152-A153

ED95: 65mg

2015 ESA Berlin

Estimation of the ED95 of intrathecal hyperbaric prilocaine for scheduled cesarean delivery: a dose-finding study based on the continual reassessment method

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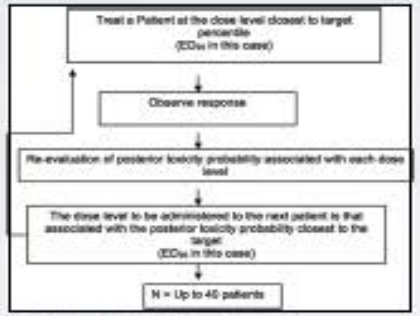
[1]Department of Anaesthesiology, Department of Obstetrics, Saint-Pierre University Hospital, Université Libre de Bruxelles (ULB), Brussels, Belgium

Introduction:

Prilocaine is an intermediate-acting amide-type local anesthetic which has recently showed its efficacy when applied for spinal anesthesia in various day surgery procedures. As a **hyperbaric 2% prilocaine** (HP) provides fast onset with a few side-effects. Proposed doses of HP for various operations vary largely, suggesting that **targeted studies are required**[1]. For cesarean section hyperbaric bupivacaine, coadministered with opioids, is routinely used[2]. HP has not yet been investigated in this context. We used the **continual reassessment method** (CRM)[3] to **find the ED95** of 2% HP for scheduled cesarean delivery under spinal anesthesia.



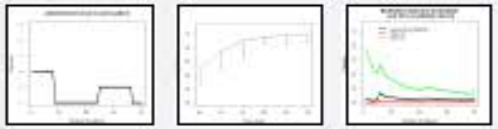
Rosche-Rigon et al. (1990) and Zohar et al. (2011)

Materials and Methods:

After approval by the local Ethics Committee and signed informed consent, term parturients were enrolled in a dose-finding, prospective, observational study. The statistical model used is the CRM, using a **Bayesian estimation of the dose.** Four patients per cohort were recruited for each dose. The **starting dose of 60 mg** was determined by preliminary results, corresponding to the ED95. Subsequent doses were set by the previous patient's response and were allocated by the CRM : 45, 50, 55, 60, 65 and 70 mg, a priori corresponding respectively to ED50, 75, 90, 95, 98 and 99 of HP. Morphine (100 mcg) was added to each dose. As success was considered a bilateral T4 sensory level attained within 15 min after the spinal HP dose. Otherwise, we had a failure and epidural supplementation was given. The following variables were also recorded: onset/duration of sensory block, onset/duration of motor block, side effects (hypotension, bradycardia), baby's parameters (Apgar and ombilical pH, methemoglobinemia), maternal satisfaction.

Results:

40 patients were included, and, under the conditions of our study, the HP ED95 is **65 mg** with a credibility interval lower than 5%. The sensory block had a good quality and lasted 3.31±0.7 h and decrease of the systolic arterial pressure of 6% from baseline was noticed. All newborns were in good health (Apgar 9.25±0.5, pH 7.24±0.1, methemoglobinemia 1.26±0.6%).



			Prilocaine Dose, mg					
			45	50	55	60	65	70
			Working model					
			0.5	0.75	0.90	0.95	0.98	0.99
Cohort	Administered dose, mg	Clinical response	Updated Estimated Probability of Response					
1	60	S,S,S,S	0.46	0.89	0.97	0.99	1.00	1.00
2	60	F,F,S,S	0.30	0.51	0.70	0.79	0.87	0.91
3	70	S,S,S,S	0.34	0.56	0.75	0.83	0.90	0.94
4	70	S,S,S,S	0.36	0.60	0.78	0.86	0.92	0.95
5	70	S,S,S,S	0.38	0.63	0.80	0.88	0.93	0.96
6	70	S,S,S,S	0.40	0.64	0.81	0.89	0.94	0.97
7	65	S,S,S,S	0.42	0.66	0.83	0.90	0.95	0.98
8	65	S,S,S,S	0.43	0.67	0.84	0.91	0.96	0.98
9	65	S,S,S,F	0.38	0.62	0.80	0.87	0.93	0.96
10	70	S,S,S,S	0.39	0.63	0.81	0.88	0.94	0.96

Fig. Cohort results: In bold is the estimated posterior probability of the dose level considered to be the currently best estimate of the ED95 after the inclusion of the cohort.
F =Failure, S = Success.

Conclusions:

The ED95 of intrathecal HP, associated with morphine, for cesarean section was estimated to be **65 mg**. HP provide a **good quality sensory block** with **no major hemodynamic disorders**, neither bad newborns outcome.

References:

[1]Förster J. G. Current Opinion in Anesthesiology 2011; 24:633-637
[2]Ginosar Y. Anesthesiology 2004; 100(3):676-82.
[3]Kant A. Anesthesiology 2013; 119:29-35

RCT PRILOCAINE VS BUPIVACAINE
Prilo 60 mg vs bupi 12,5mg

Fifty patients were included, with 25 randomly allocated to each group.

Median (IQR [range]) motor block duration was significantly shorter in the prilocaine group, 158 (125-188 [95-249]) vs. 220 (189-250 [89-302]) min, $p < 0.001$.

Median length of stay in the post-anaesthetic care unit was significantly shorter in the prilocaine group, 135 (120-180 [120-230]) vs. 180 (150-195 [120-240]) min, $p = 0.009$.

No difference was found between the two groups for maternal hypotension during caesarean section,

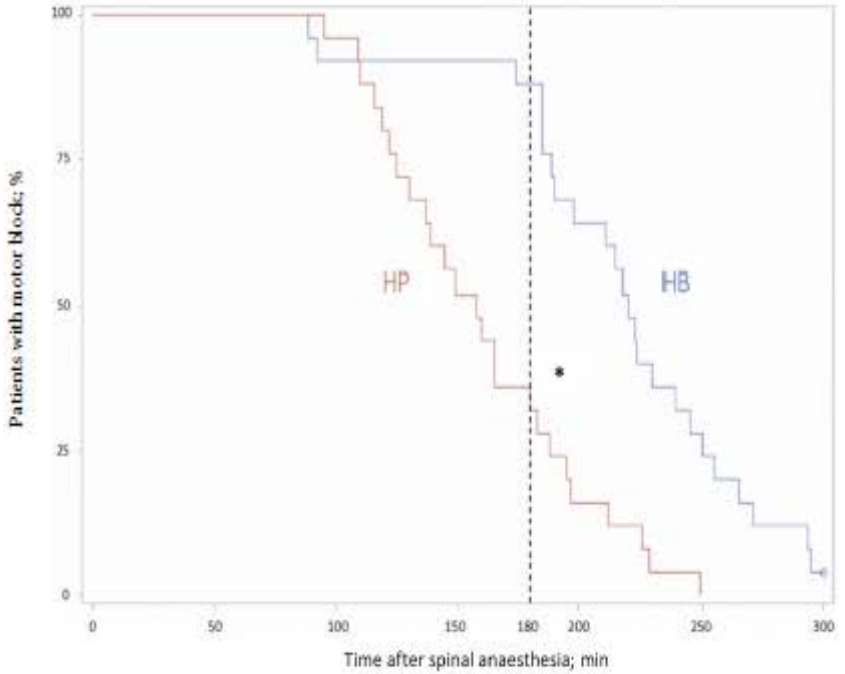


Figure 3 Persistence of motor block depending on the local anaesthetic (Kaplan-Meier curves) of patients receiving intrathecal prilocaine (red) or hyperbaric bupivacaine (blue) for caesarean section. The 180 min line corresponds to the mean time between spinal anaesthesia and arrival to PACU (60 min) plus the 120 min of postoperative monitoring. There is a statistical difference between groups at 180 min ($p < 0.001$).

Chapron K, Sleth JC, Capdevila X, Bringuier S, Dadure C. Hyperbaric prilocaine vs. hyperbaric bupivacaine for spinal anaesthesia in women undergoing elective caesarean section: a comparative randomised double-blind study. Anaesthesia. 2021 Jun;76(6):777-784.

Prilocaine: DE95 pour la césarienne

The ED95 of intrathecal hyperbaric prilocaine with sufentanil 2.5 µg and morphine 100 µg for elective cesarean delivery was found to be between 45 and 50 mg.

Goffard P, Vercruysse Y, Leloup R, Fils JF, Chevret S, Kapessidou Y. Determination of the ED95 of intrathecal hyperbaric prilocaine with sufentanil for scheduled cesarean delivery: a dose-finding study based on the continual reassessment method. BMC Anesthesiol. 2020 Nov 26;20(1):293

RCT PRILOCAINE VS BUPIVACAINE
Prilo 50 mg vs bupi 10mg

- Median motor block was significantly shorter in the hyperbaric prilocaine group (110 [104 to 150] min versus 175 [135 to 189] min, P = 0.001).
- First unassisted ambulation was achieved earlier after prilocaine (204.5 [177 to 46.5] min versus 314 [209.25 to 400] min, P = 0.007),
- The incidence of maternal hypotension was significantly higher with bupivacaine : 80% vs 60% (P = 0.033).
- No supplementary epidural analgesia was needed.

Table 2 Characteristics of motor and sensory blocks

	Bupivacaine group ($n=20$)	Prilocaine group ($n=20$)	P
Motor block			
Onset of motor block (min)	16 [10 to 16]	10 [10 to 16]	0.296
Time for motor block regression (min)	175 [135 to 189]	110 [104 to 150]	0.001
Sensory block			
Time to T4 (min)	9.75 ± 3.43	11.25 ± 2.69	0.132
Time to maximum sensory level (min)	16 [16 to 20]	16 [15.5 to 20]	1.000
Time to regression to T12 (min)	186 [142.25 to 219.75]	136 [126.5 to 153.5]	0.002
Time to regression to L2 (min)	212.3 ± 50.19	166.68 ± 32.25	0.002

Values are mean ± SD or median [IQR].

Goffard P, Leloup R, Vercruysse Y, Fils JF, Gautier PE, Kapessidou Y. Comparison of equipotent doses of intrathecal hyperbaric prilocaine 2% and hyperbaric bupivacaine 0.5% for elective caesarean section: A prospective, randomised, controlled, two-centre clinical trial. Eur J Anaesthesiol. 2021 May 18. doi: 10.1097/EJA.0000000000001548

Etude University Hospital Anvers Prilocaine 50mg vs Bupi 7,5mg (+Sufentanyl 2,5µg)

U.S. National Library of Medicine
ClinicalTrials.gov

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Spinal Prilocaine for Caesarian Sections

The safety and scientific validity of this study is the responsibility of the study sponsor and investigators. Listing a study does not mean it has been evaluated by the U.S. Federal Government. Know the risks and potential benefits of clinical studies and talk to your health care provider before participating. Read our disclaimer for details.

ClinicalTrials.gov Identifier: NCT03219086

Recruitment Status : Recruiting
First Posted : July 17, 2017
Last Update Posted : November 5, 2020

See Contacts and Locations

Sponsor:
University Hospital, Antwerp

Collaborators:
AZ Klina
AZ Middelheim

Information provided by (Responsible Party):
Dr M. B. Breebaart, University Hospital, Antwerp

Study Design Go to

Study Type :	Interventional (Clinical Trial)
Estimated Enrollment :	400 participants
Allocation:	Randomized
Intervention Model:	Parallel Assignment
Intervention Model Description:	prospective double blind randomised
Masking:	Triple (Participant, Investigator, Outcomes Assessor)
Masking Description:	The spinal solution will be prepared by an independent anaesthetist, anaesthetist trainee or research nurse on a sterile table after opening the sealed envelope with the appointed study group. The patient, the anaesthetist performing the CSE and the observer are not aware of the local anaesthetic solution administered.
Primary Purpose:	Other
Official Title:	A Prospective Randomized Double Blind Comparison of 7,5 mg Hyperbaric Bupivacaine With 2,5mcg Sufentanyl or 50 mg Hyperbaric Prilocaine With 2,5 mcg Sufentanyl for Caesarean Sections
Actual Study Start Date :	August 1, 2017
Estimated Primary Completion Date :	October 1, 2021
Estimated Study Completion Date :	October 1, 2021

CONCLUSION:

Des alternatives à la bupivacaine existent

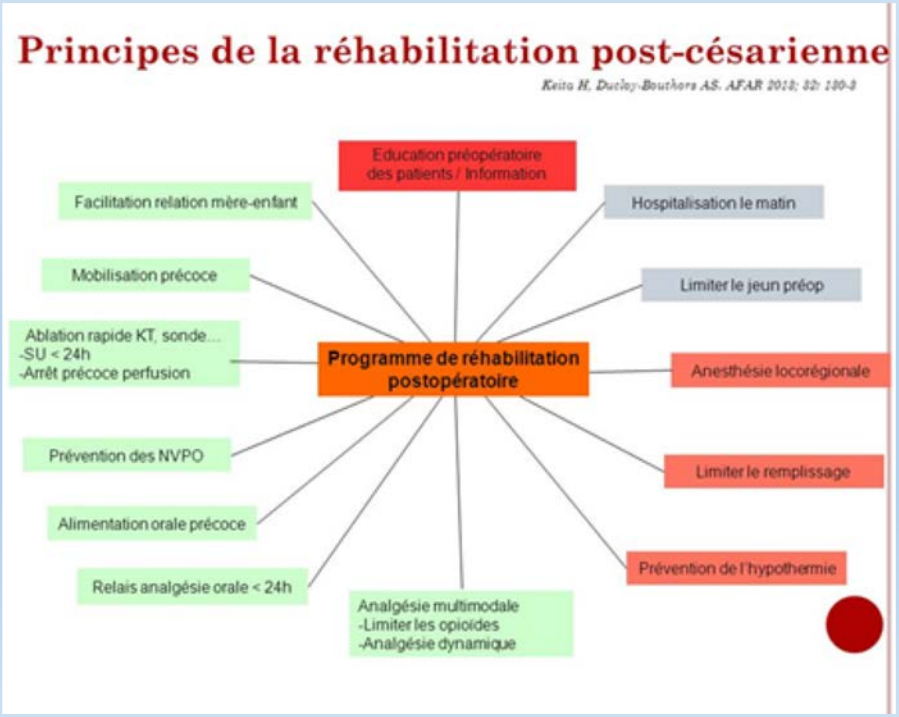
Malgré des RCP et des AMM confuses pour la rachianesthésie en obstétrique

Principal gain: Réduction de la durée du bloc moteur par rapport à la Bupivacaine (sauf si low dose)

ERAC/RAAC césarienne:

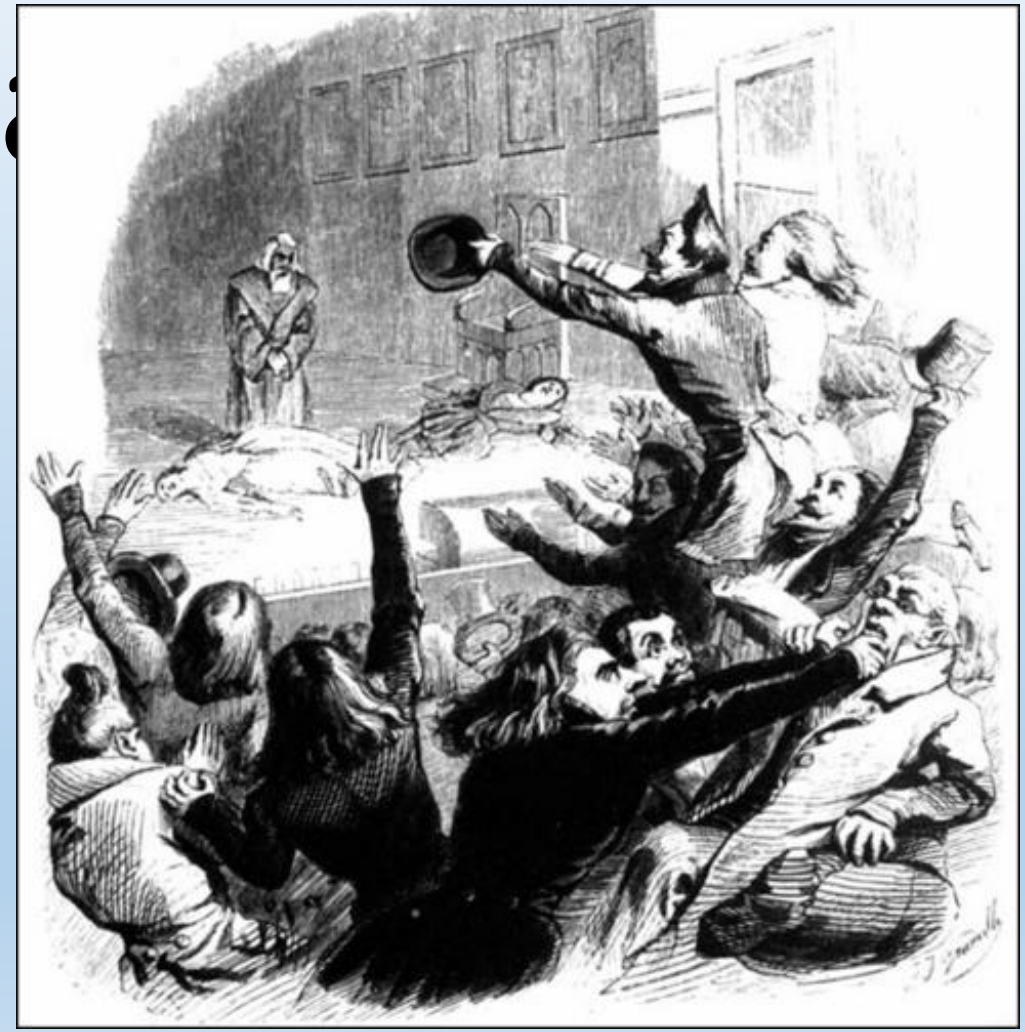
-Le choix de l'AL devrait être un des items

-Ainsi que la technique chirurgicale (Cohen; césarienne extra péritonéale)



Sleth JC. Enhanced recovery after cesarean section. Int J Obstet Anesth. 2021;45:160

Prêt pour une nouvelle bataille d'Herna



Carvalho B, Sultan P. Spinal prilocaine for caesarean section: walking a fine line. Anaesthesia. 2021 Jun;76(6):740-742

5-Niveau sensitif idéal? T4….et pourquoi pas T6?

Etude réalisée avec bupi 11-12 mg

Assessment of block height for satisfactory spinal anaesthesia for caesarean section

R. Ousley, [1] C. Egan, [1] K. Dowling[2] and A. M. Cyna[3,4]

1 Registrar, 3 Senior Consultant Anaesthetist, Department of Women's Anaesthesia, 2 Statistician, Department of Public Health, Women's & Children's Hospital, Adelaide, Australia
4 Clinical Senior Lecturer, University of Adelaide, Adelaide, SA, Australia

Summary

We investigated block heights that anaesthetists considered adequate for caesarean section to proceed under spinal anaesthesia. During 3 months, 15 obstetric anaesthetists recorded block height to touch, pinprick or cold when spinal anaesthesia was considered satisfactory for caesarean section to proceed. Median (IQR [range]) block height for touch, pinprick, first cold and icy were: T10 (T7–T12 [T3–L1]); T5 (T4–T6 [C7–L1]); T5 (T4–T6 [C7–L1]); and T3 (T2–T4 [C7–L1]), respectively. Modalities were significantly correlated for: touch and cold, $p = 0.0001$; touch and icy, $p = 0.0007$; touch and pinprick, $p = 0.0018$; cold and icy, $p < 0.0001$; cold and pinprick, $p = 0.0001$; icy and pinprick, $p < 0.0001$. Pairwise comparisons showed differences between all modalities ($p < 0.001$) apart from pinprick and first cold ($p = 0.94$). All women had satisfactory anaesthesia despite 76 (81%) having a block to touch below T6. Single modality assessment of block height, particularly using touch, may erroneously indicate inadequate anaesthesia for caesarean section.

Ousley R, Egan C, Dowling K, Cyna AM. Assessment of block height for satisfactory spinal anaesthesia for caesarean section. Anaesthesia. 2012 Dec;67(12):1356-63