Anesthésie Régionale et Pratique Ambulatoire

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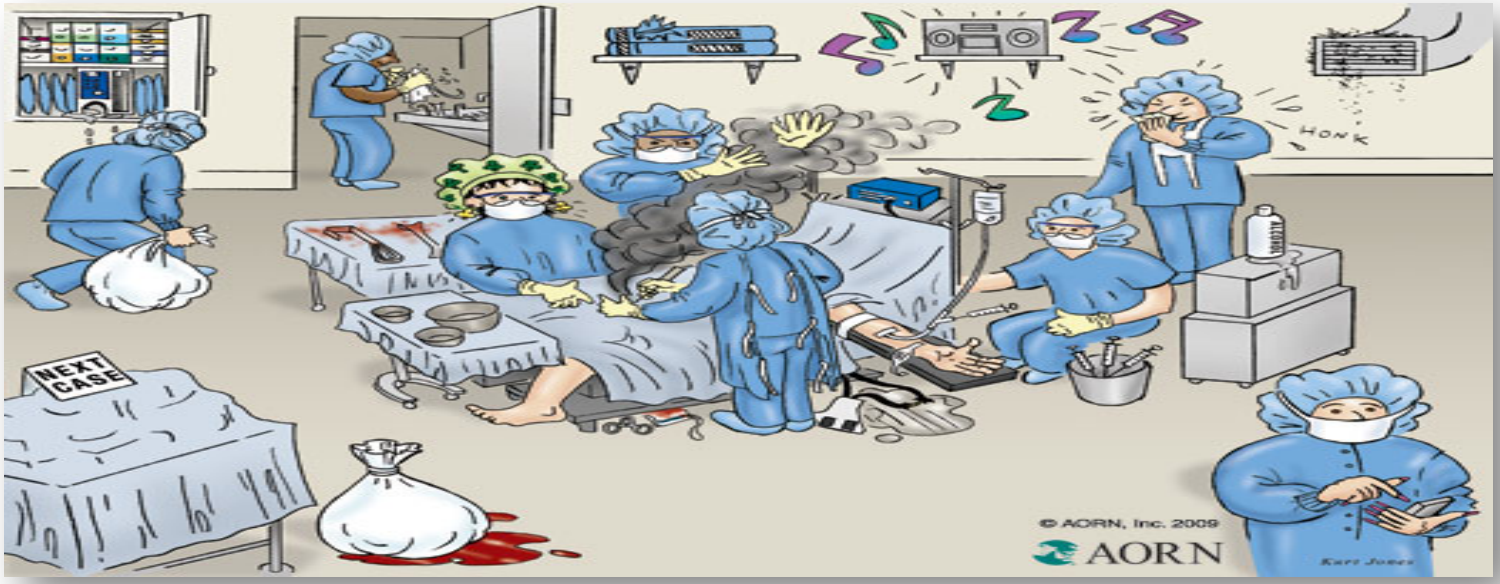
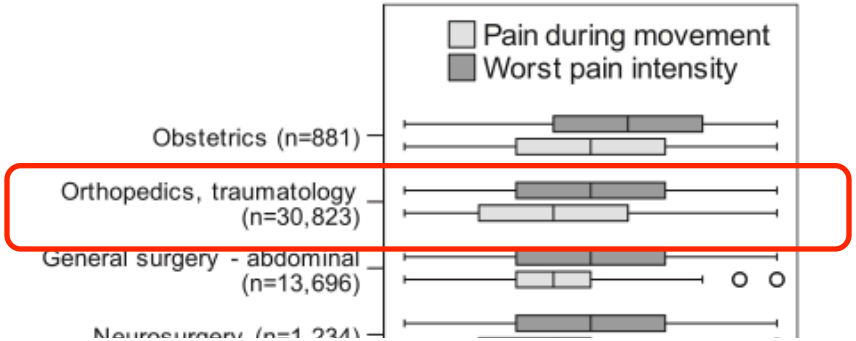


Anesthesiology 2013; 118:934-44

Pain Intensity on the First Day after Surgery

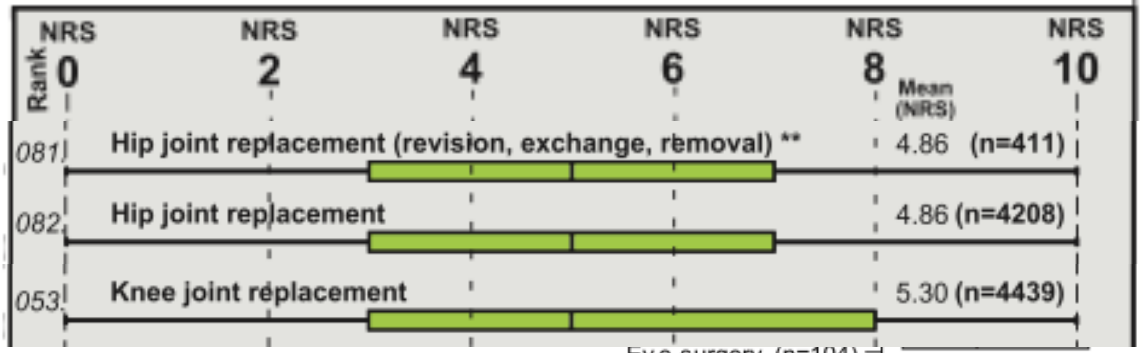
A Prospective Cohort Study Comparing 179 Surgical Procedures

Hans J. Gerbershagen, M.D., Ph.D.,* Sanjay Aduckathil, M.D.,† Albert J. M. van Wijck, M.D., Ph.D.,‡ Linda M. Peelen, Ph.D.,§ Cor J. Kalkman, M.D., Ph.D.,‖ Winfried Meissner, M.D., Ph.D.#



Worst pain since surgery (NRS 0-10)

All patients (general and regional anesthesia)



Rank	General anesthesia only: NRS Median (IQR)	n	General anesthesia only: Morphine equivalent mg (mean) (SD)	Regional-anesthesia w or w/o general anesthesia: NRS Median	n	No. of hospitals
84.	**5.0** (3-7)	329	**26** (36)	**5.0** (2-7.5)	44	60
82.	**5.0** (3-7)	2725	**26** (36)	**5.0** (2-7)	511	76
51.	**5.0** (4-8)	1233	**32** (33)	**5.0** (3-8)	1336	75

times averaged
reducing PACU
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A joint effor
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opposed to sin

*Associate Professor

Address reprint requests to Dr. Lubarsky at the Department of Anesthesiology, Box 3094 DUMC, Durham, NC 27710.

Received for publication December 22, 1995; revised manuscript accepted for publication January 11, 1996.

Journal of Clinical Anesthesia 8:70S–72S, 1996

655 Avenue of the Americas, New York, NY 10010

Functional impact of pain after ambulatory surgery

	D 1	D 2	D 7
Painfull Patients(n)	80	70	54
	Troubles for (%)		
Level of Activity	73	61	50
Walking	69	49	38
Work at home	81	68	47
Mood	22	23	15
Relationship with others	21	20	9
Sleep	47	34	24
Concentration	38	20	13

Beauregard et al. Can J Anaesth 1998;45:304-11

Postoperative patient complaints: a prospective interview study of 12,276 patients☆

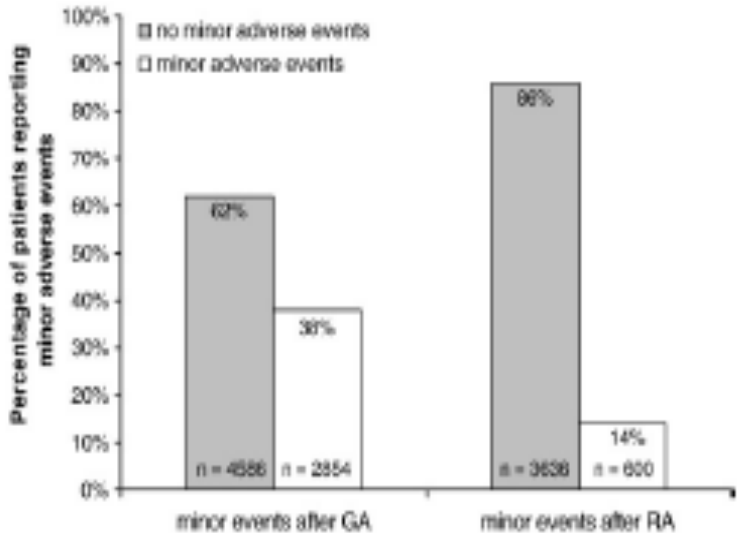
Journal of Clinical Anesthesia (2010) 22, 13–21

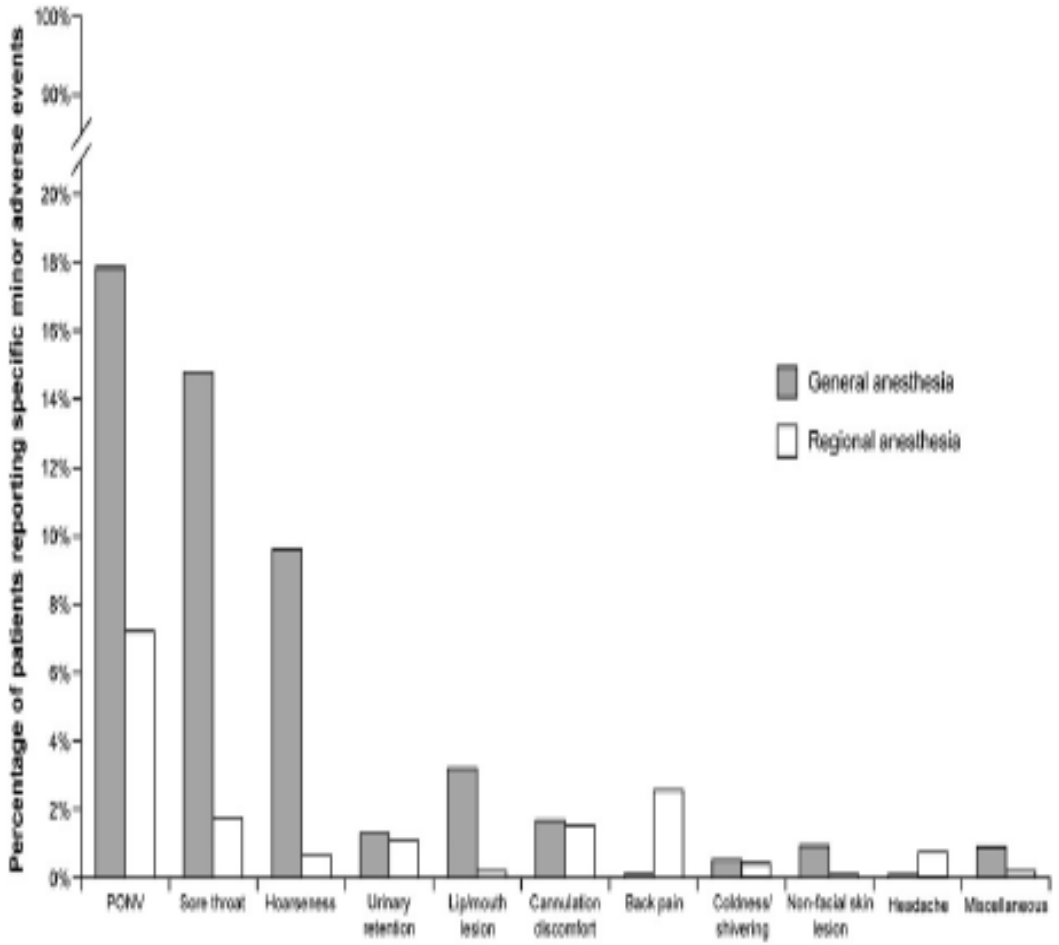
Journal of Clinical Anesthesia

Michael Lehmann MD (Resident in Anesthesia)[a],
Kai Monte CRNA (Certified Registered Nurse Anesthetist)[a],
Paul Barach MD, MPH (Associate Professor)[b,c],
Christoph H. Kindler MD (Professor)[d,*]

Table 4 Proportional odds logistic regression analysis for the probability that patient satisfaction increases/decreases as a function of the explanatory variables (left column) are presented together with *P*-values for a drop-one likelihood ratio test

Explanatory variable	df	LR statistic	*P*	Effect
"Minor event has occurred"	1	129.062	<0.001	– for "minor event has occurred"
Age	1	1.001	0.317	
Gender	1	0.161	0.688	
Surgery	7	10.930	0.142	
Anesthesia	2	10.381	0.006	+ for regional vs. general anesthesia
ASA physical status	3	99.000	<0.001	– for increasing ASA phys status





Epidemiology of musculoskeletal upper extremity ambulatory surgery in the United States

BMC Musculoskeletal Disorders

Nitin B Jain[1,2,3,6*], Laurence D Higgins[2,3], Elena Losina[2,5], Jamie Collins[2,5], Philip E Blazar[5] and Jeffrey N Katz[2,4]

Jain et al. BMC Musculoskeletal Disorders 2014, 15:4

Table 2 Demographic characteristics of patients undergoing ambulatory surgery for upper extremity in the United States, 2006

Characteristics	Rotator cuff repair	Shoulder arthroscopy†	Carpal tunnel release	Wrist arthroscopy†
Anesthesia‡‡				
General	85%	86%	20%	66%
Block	21%	22%	29%	32%
Topical/local	6%	6%	28%	16%
Intravenous sedation	10%	7%	33%	11%

Table 1 Estimates of upper extremity ambulatory surgery in the United States, 2006

Procedure	Number of procedures	95% confidence intervals
Rotator cuff repair	272,148	218,994, 325,302
Shoulder arthroscopy*	257,541	185,268, 329,814
Elbow arthroscopy	3,686	3,554, 3,818
Carpal tunnel release	576,924	459,239, 694,609
Wrist arthroscopy*	25,250	17,304, 33,196

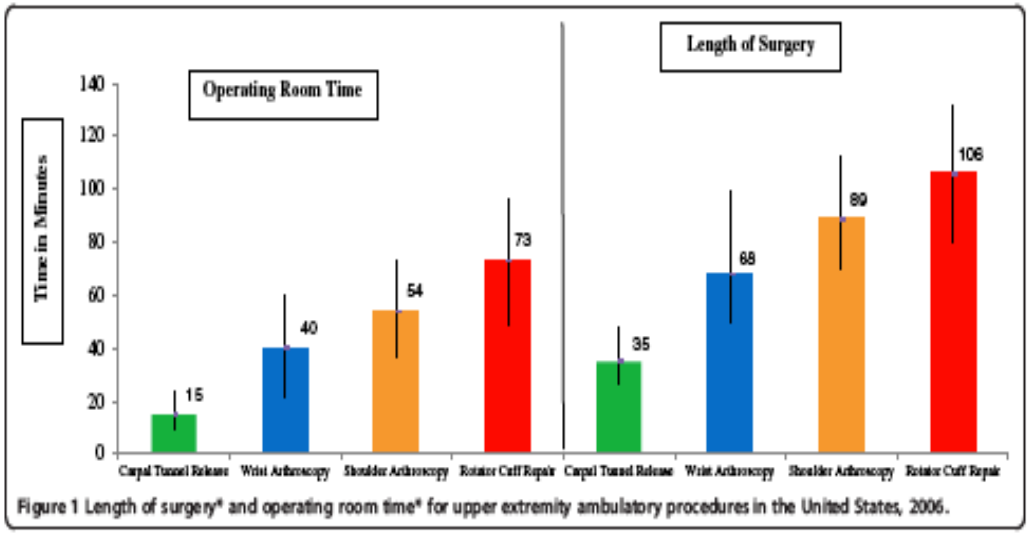


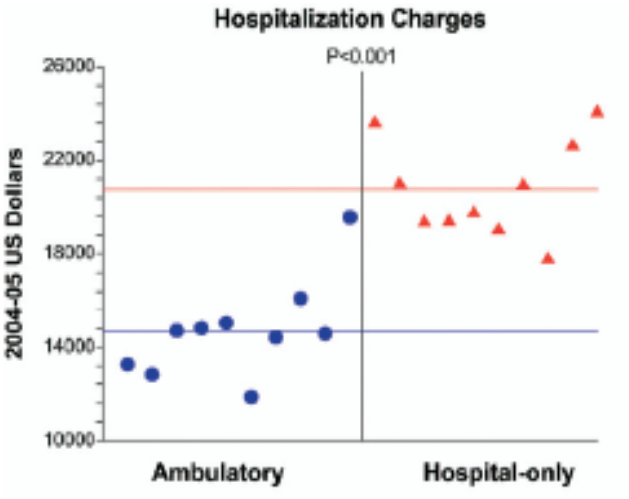
Figure 1 Length of surgery* and operating room time* for upper extremity ambulatory procedures in the United States, 2006.

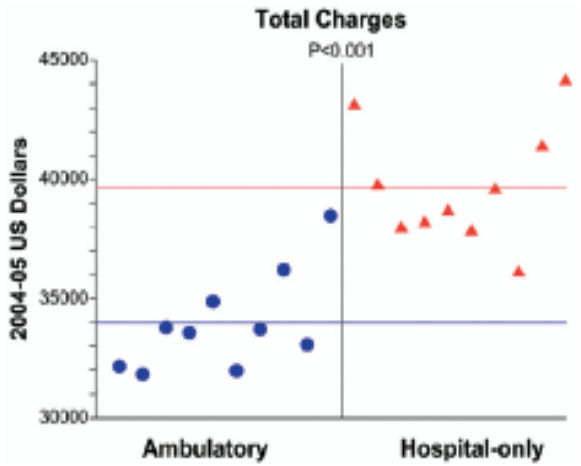
Hospitalization Costs of Total Knee Arthroplasty With a Continuous Femoral Nerve Block Provided Only in the Hospital Versus on an Ambulatory Basis: A Retrospective, Case-Control, Cost-Minimization Analysis

Reg Anesth Pain Med 2007;32:46-54.

Brian M. Ilfeld, M.D., M.S., Edward R. Mariano, M.D., Brian A. Williams, M.D., M.B.A., Jennifer N. Woodard, B.S., and Alex Macario, M.D., M.B.A.

« It is well established that "changing technology in medicine results in increased spending and accounts for one half to two thirds of the increase in healthcare spending in excess of general inflation. It is therefore notable that ambulatory CFNB may be a rare instance of a new technology holding the promise of both improving outcomes and reducing societal costs. »





A Comparison of Regional Versus General Anesthesia for Ambulatory Anesthesia: A Meta-Analysis of Randomized Controlled Trials

Anesth Analg 2005;101:1634–42

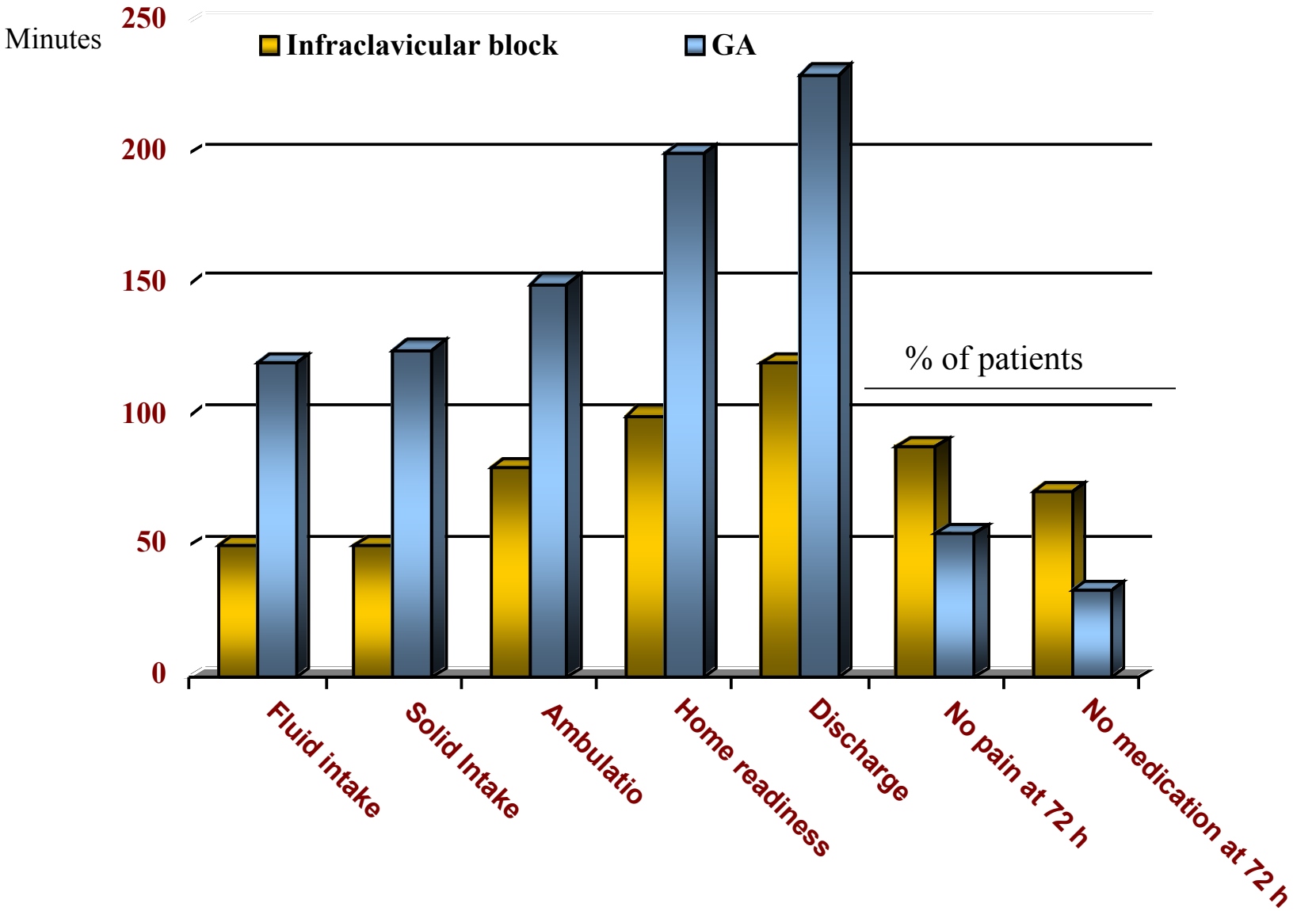
Spencer S. Liu, MD*, Wyndam M. Strodtbeck, MD*, Jeffrey M. Richman, MD†, Christopher L. Wu, MD†

Effects of Peripheral Nerve Block Versus General Anesthesia on Ambulatory Surgical Patients

Outcome	n	Number of trials	Peripheral nerve block* (mean)	General anesthesia* (mean)	OR or WMD** (95% confidence interval)	*P* value
Anesthesia induction time (min)	329	6	19.6	8.8	8.1 (2.6 to 13.7)	0.0001
PACU time (min)	308	6	45.2	72	−24.3 (−36.3 to −12)	0.0001
VAS in PACU (mm)	359	7	9.6	35.8	−24.5 (−35.7 to −13.3)	0.0001
Nausea	319	6	6.8%	30%	0.17 (0.08 to 0.33)	0.0001
Phase 1 bypass	329	6	81%	315	14.3 (7.5 to 27.4)	0.0001
Need for postoperative analgesics	259	6	6.2%	42.3%	0.11 (0.03 to 0.43)	0.001
Time until discharge from ASU (min)	328	6	133.3	159.1	−29.7 (−75.3 to 15.8)	0.2
Excellent patient satisfaction	158	4	88%	72%	4.7 (1.8 to 12)	0.001

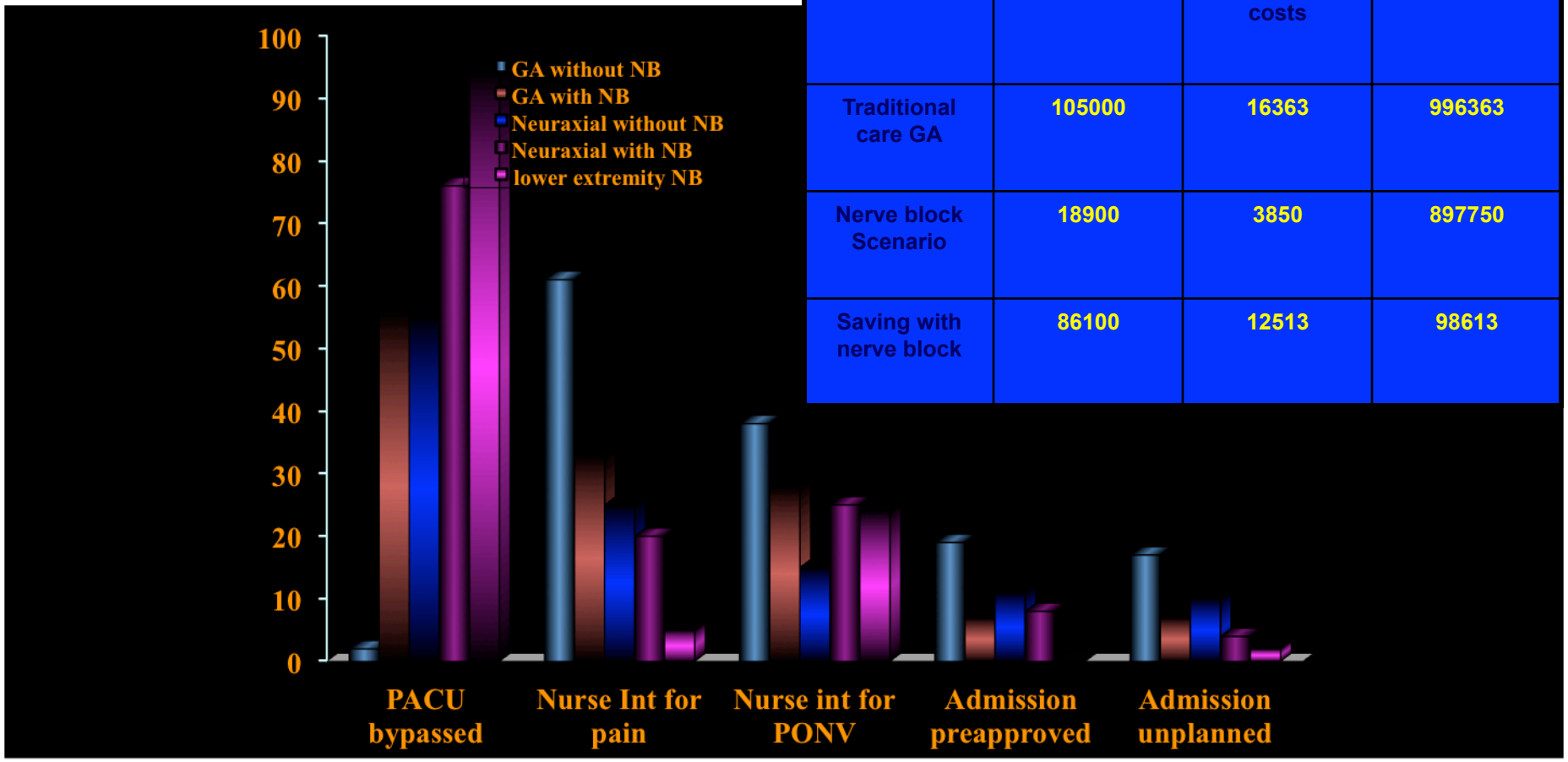
A comparison of infraclavicular nerve block versus general anesthesia for hand and wrist day-case surgeries *A Hadzic Anesthesiology 2004*

40 mL of 2-chloroprocaine + propofol sedation vs propofol-fentanyl GA



Economics of nerve block pain management after anterior cruciate ligament repair : Potential hospital cost savings via associated postanesthesia care unit bypass and same day discharge *B Williams Anesthesiology 2004*

Scenario	PACU costs	Hospital admission costs	Total costs
Traditional care GA	105000	16363	996363
Nerve block Scenario	18900	3850	897750
Saving with nerve block	86100	12513	98613

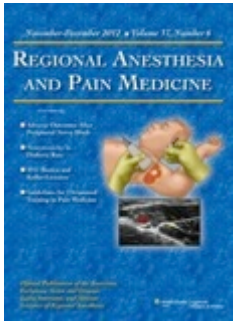


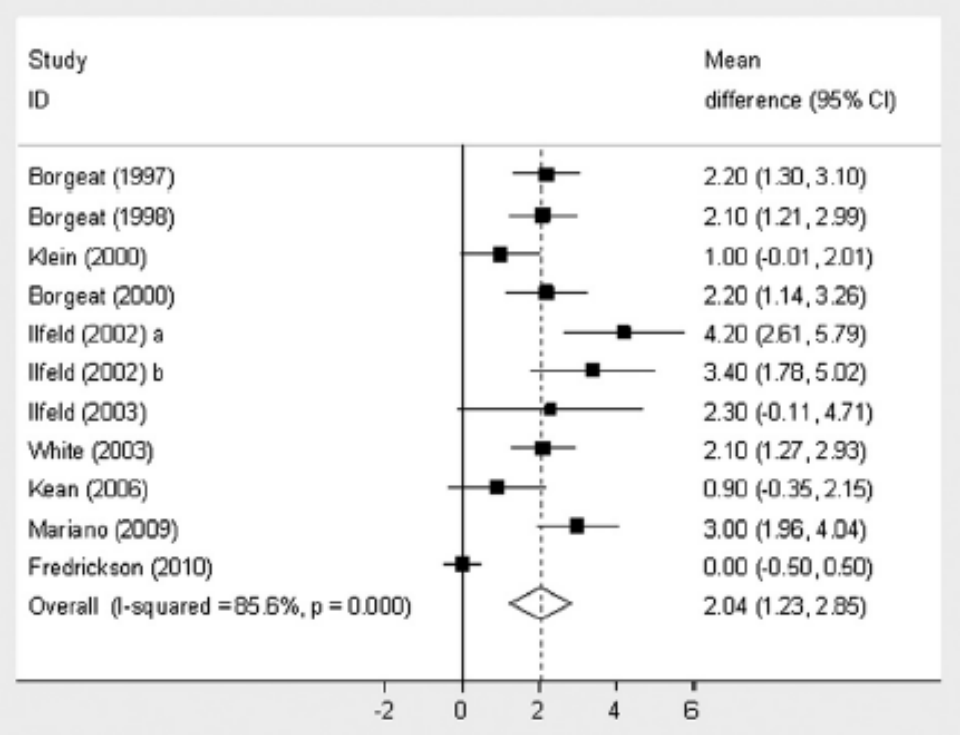
Regional Anesthesia and Pain Medicine • Volume 37, Number 6, November-December 2012

Continuous Peripheral Nerve Block Compared With Single-Injection Peripheral Nerve Block

A Systematic Review and Meta-Analysis of Randomized Controlled Trials

Ann E. Bingham, MD, Rochelle Fu, PhD,† Jean-Louis Horn, MD,† and Matthew S. Abrahams, MD†*



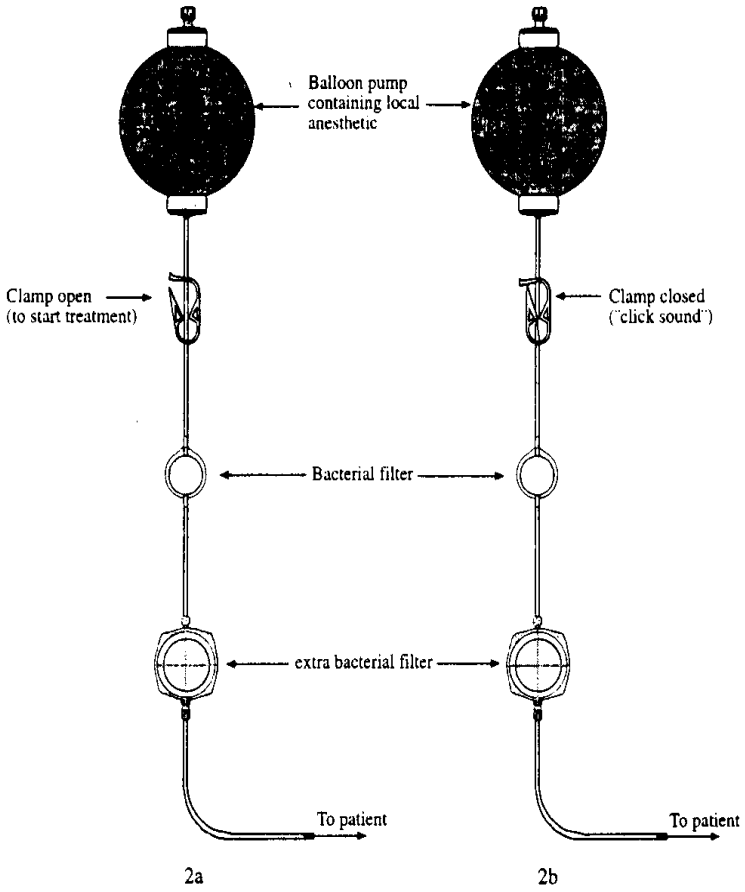


Patient Satisfaction

Conclusions: Compared with siPNBs, cPNBs were associated with improved pain control, decreased need for opioid analgesics, less nausea, and greater patient satisfaction. The effect of cPNBs on other clinically relevant outcomes, such as complications, long-term functional outcomes, or costs, remains unclear.

Perineural Catheters : the PCA concept in Ambulatory Surgery

PCA with perineural catheters at home



70 patients **Rawal Anesth Analg 1998**

- 2 to 8 h of analgesia after each injection

mean number of 4 injections/patient

- Excellent analgesia for 89% of patients
- No adverse events

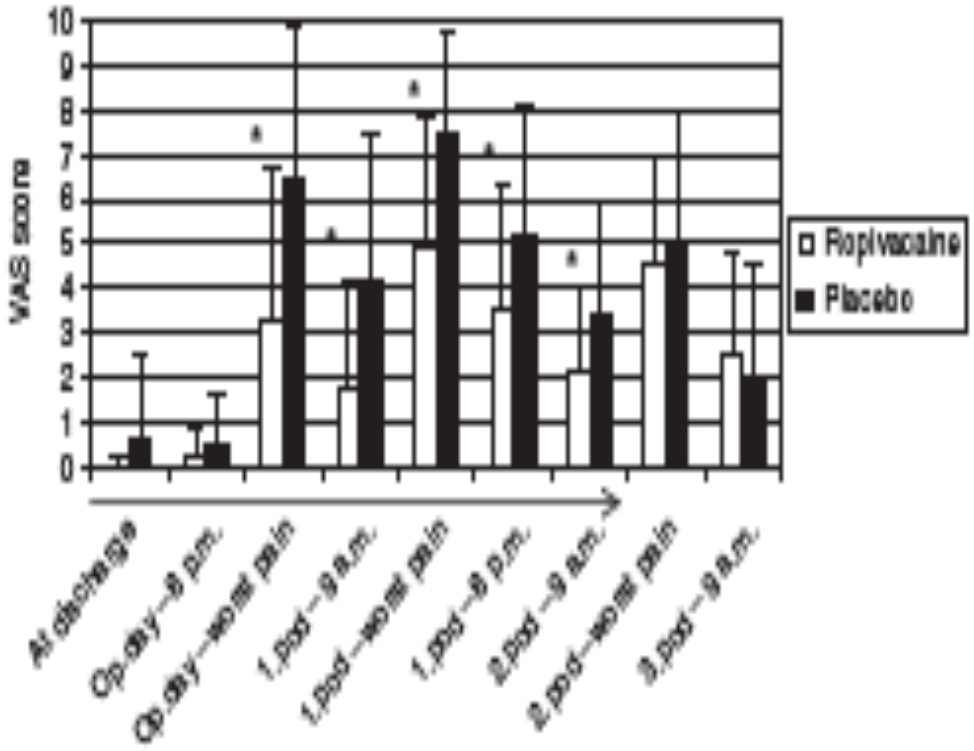
7 patients **Ganapathy Can J Anesth 2000**

- Two catheter disconnection requiring rescue analgesia
- Two patients with the entire content of the bulb delivered over several minutes
- One patient had to be admitted to the hospital (Breakthrough pain)

Continuous popliteal sciatic nerve block for outpatient foot surgery – a randomized, controlled trial

Acta Anaesthesiol Scand 2004; 48: 337–342

D. Zaric[1], K. Boysen[1], J. Christiansen[1], U. Haastrup[1], H. Kofoed[2] and N. Rawal[3]
Departments of [1]Anesthesiology and [2]Orthopedic Surgery, Frederiksberg Hospital, University of Copenhagen, Denmark, and [3]Department of Anesthesiology, Örebro Medical Center, Örebro, Sweden



Conclusion: This randomized, double-blind study shows that continuous blockade of the sciatic nerve in the popliteal fossa reduces postoperative pain and has no untoward effects in a patient group known to experience severe pain after ambulatory surgery.

Patient-controlled Regional Analgesia (PCRA) at Home

Controlled Comparison between Bupivacaine and Ropivacaine Brachial Plexus Analgesia

Anesthesiology 2002; 96:1290–6

Narinder Rawal, M.D., Ph.D., Renée Allvin, C.R.N.A., B.Sc.,† Kjell Axelsson, M.D., Ph.D.,* Jan Hallén, M.D.,* Gustav Ekbäck, M.D., Ph.D.,* Torbjörn Ohlsson, C.R.N., M.S.,‡ Anders Amilon, M.D.§*

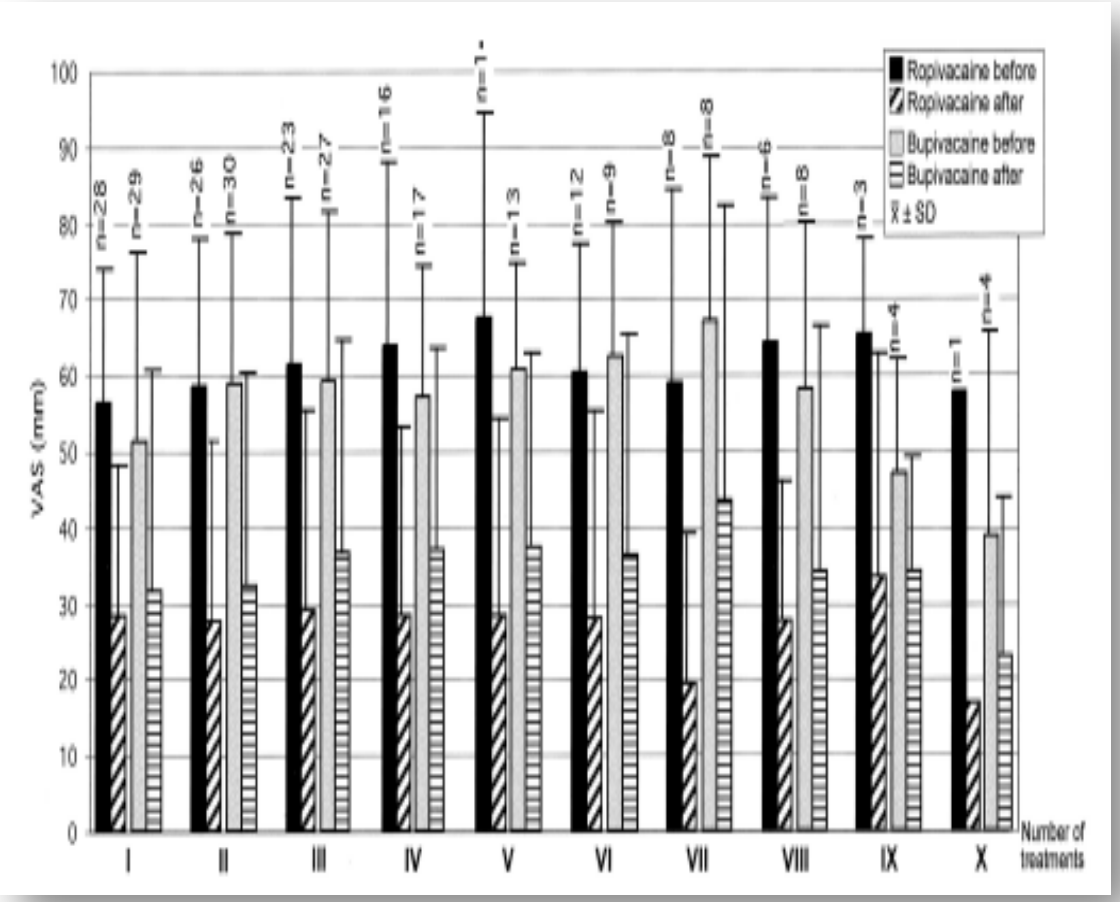


Table 2. Side Effects and Technical Problems

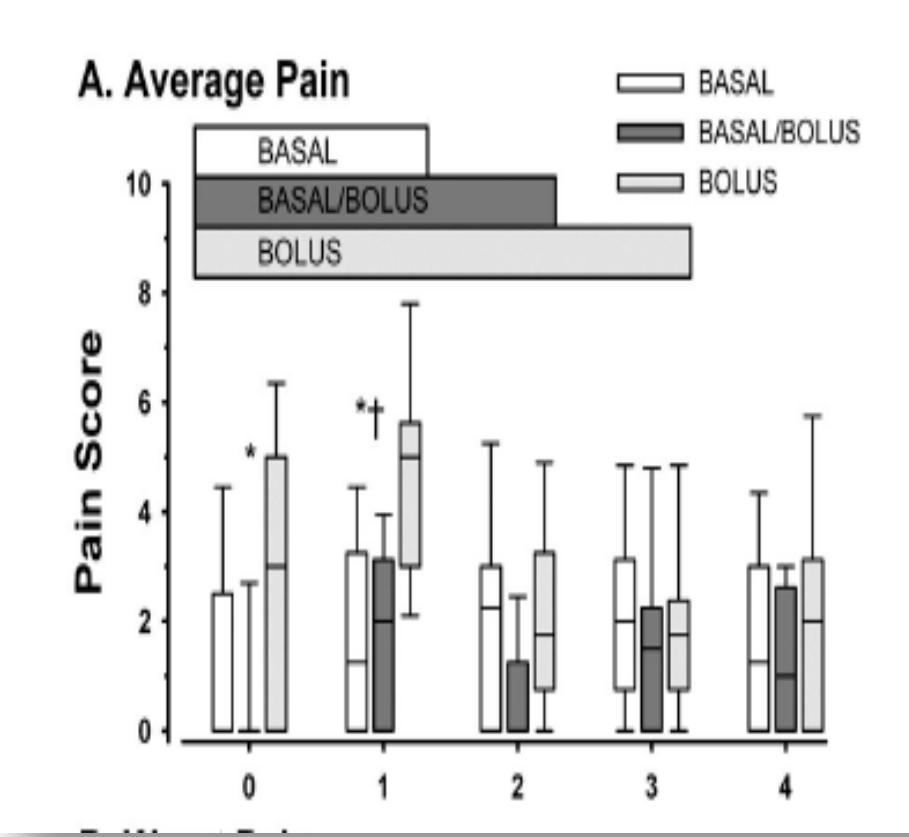
	Ropivacaine (n = 29)	Bupivacaine (n = 31)
Numbness of fingers	2 (6.9%)*	9 (29%)†
Motor block (poor arm control)	0	2 (6.5%)
Dizziness	1 (3.4%)	0
Nausea	0	1 (3.2%)
Technical problems		
Catheter out	1 (3.4%)	1 (3.2%)
Wet feeling in armpit	1 (3.4%)	0

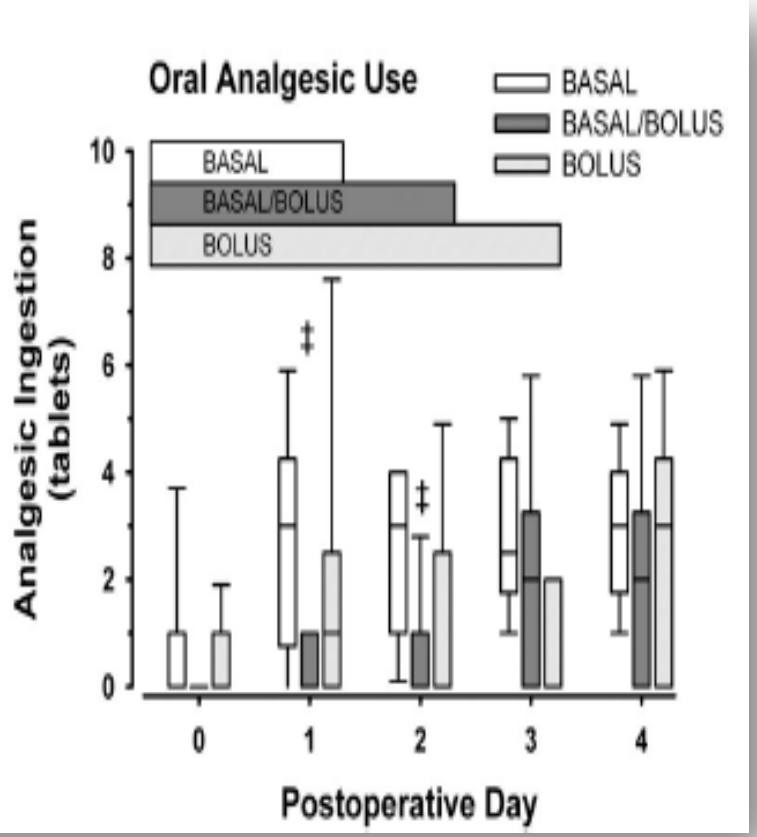
Conclusions: This double-blinded study has demonstrated the feasibility of self-administration of local anesthetic to manage postoperative pain outside the hospital. Ropivacaine and bupivacaine provided effective analgesia, and patient satisfaction with PCRA was high. Patient selection, follow-up telephone call, and 24-h access to anesthesiology services are prerequisites for PCRA at home.

Infraclavicular Perineural Local Anesthetic Infusion

A Comparison of Three Dosing Regimens for Postoperative Analgesia

Brian M. Ilfeld, M.D., Timothy E. Morey, M.D.,† F. Kayser Enneking, M.D.* Anesthesiology 2004; 100:395–402





Infraclavicular Perineural Local Anesthetic Infusion

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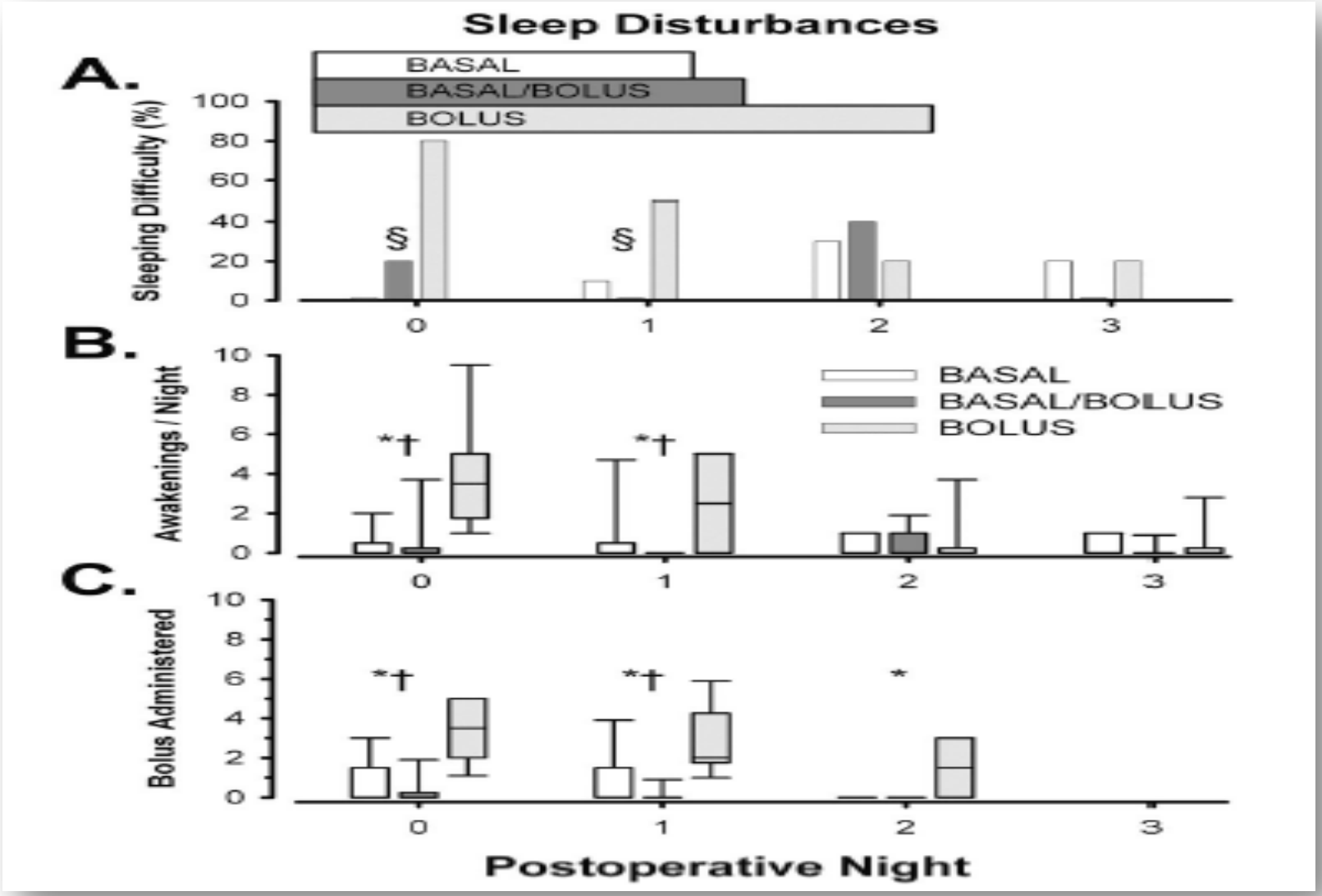
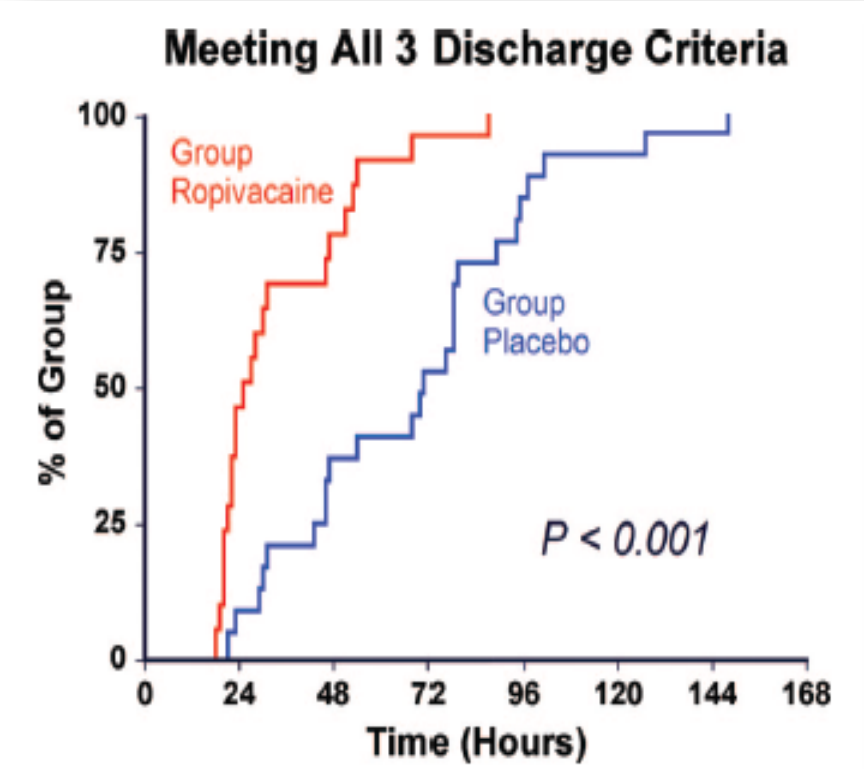
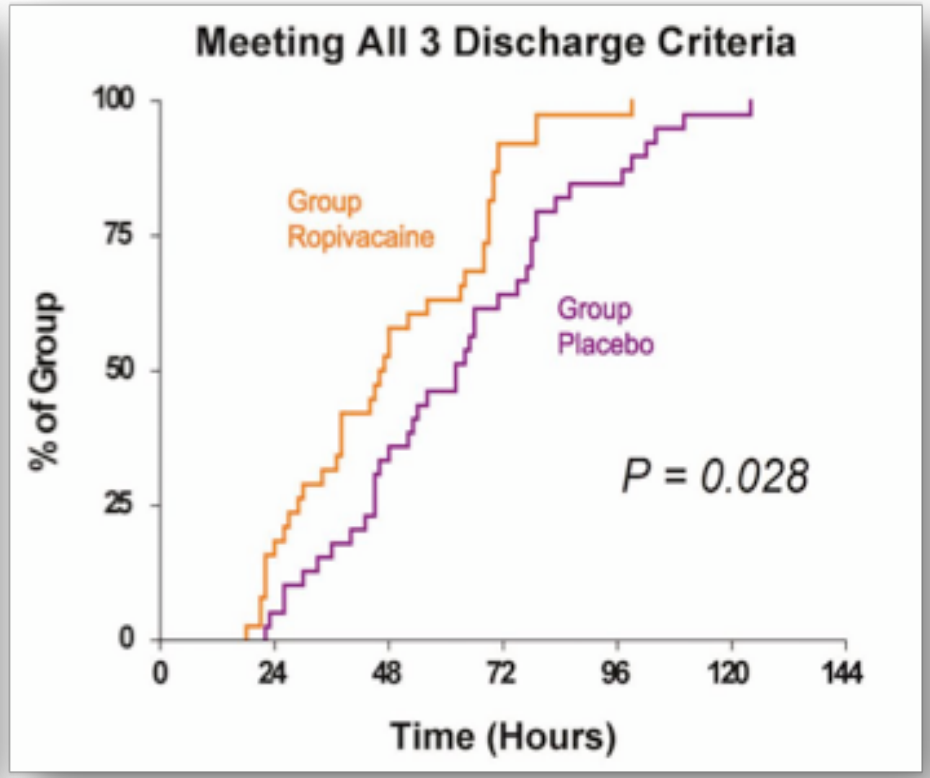




Ilfeld et al Anesthesiology 2008

Patients given 4 days of perineural ropivacaine attained the 3 discharge criteria in a median (25th-75th centiles) of 25 (21-47)h compared with 71 (46-89)h in **the selected center**. Decrease in time until discharge readiness **of 46h**



Ilfeld et al Pain 2010

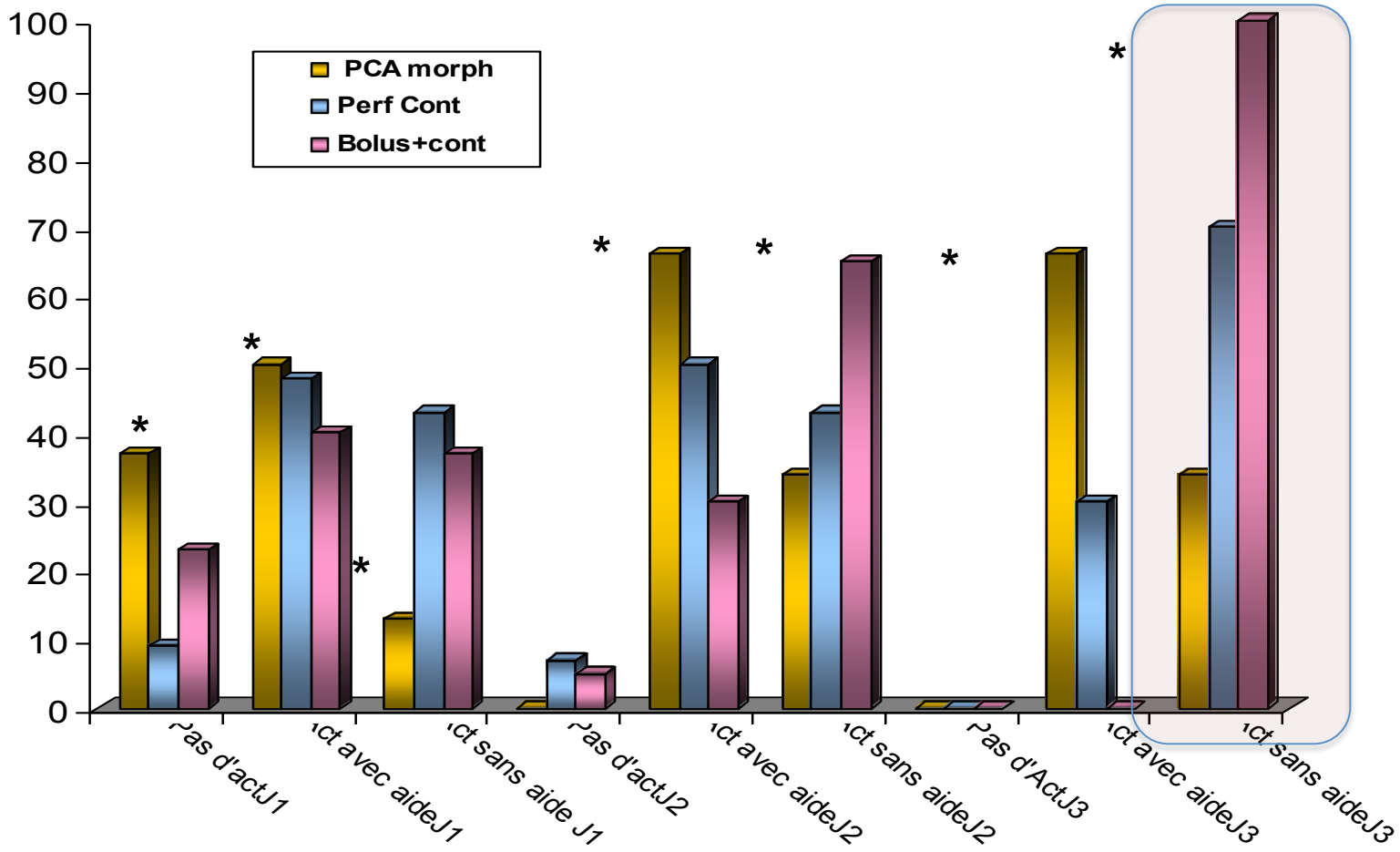
Patients given 4 days of perineural ropivacaine attained the 3 discharge criteria in a median (25th-75th centiles) of 47 (29-69)h compared with 62 (45-79)h in **that multicentric trial**. Decrease in time until discharge readiness **of 15h**

Effect of Patient-controlled Perineural Analgesia on Rehabilitation and Pain after Ambulatory Orthopedic Surgery

Anesthesiology 2006; 105:566–73

A Multicenter Randomized Trial

Xavier Capdevila, M.D., Ph.D., Christophe Dadure, M.D.,† Sophie Bringuier, Pharm.D., M.Sc.,‡ Nathalie Bernard, M.D.,† Philippe Biboulet, M.D.,† Elisabeth Gaertner, M.D.,§ Philippe Macaire, M.D.‖*



The time for the 10-minutes walking test: PCA morphine group: 40.5(16-44) h, continuous infusion group: 20.5 (17-42)h, and basal-bolus group: 12.5 (4.5-20)h respectively

Continuous Interscalene Block in Patients Having Outpatient Rotator Cuff Repair Surgery: A Prospective Randomized Trial

Anesth Analg 2013;117:1485–92

Emine Aysu Salviz, MD,* Daquan Xu, MD,* Ashton Frulla,* Kwesi Kwofie, MD, FRCPC,*
Uma Shastri, MD, FRCPC,* Junping Chen, MD,* Ali Nima Shariat, MD,* Sanford Littwin, MD,*
Emily Lin, MD, PhD,* Jason Choi, MD,* Paul Hobeika, MD,† and Admir Hadzic, MD, PhD*

Table 2. PACU Bypass, Length of Stay, Analgesia, and Incidence of PONV

	CISB (*n* = 20)	SISB (*n* = 23)	GA (*n* = 20)
Fast-tracked PACU bypass rate[a]	19 (95%)	20 (87%)	0
Length of stay in PACU (min)[b]	20 ± 31	30 ± 42	165 ± 118
Time to discharge home after surgery completed (min)[c]	94 ± 55	115 ± 109	302 ± 249
Time-to-first pain (h)[d]	26 ± 24	11 ± 5	2 ± 3
≥1 dose of analgesics[e]	0	1 (4%)	17 (89%)
NRS ≥1[f]	0	0	17 (94%)
Incidence of PONV	0	3 (13%)	4 (20%)
Day 1 NRS			
0–3	11 (55%)	1 (4%)	2 (10%)
4–7	6 (30%)	4 (17%)	10 (50%)
8–10	3 (15%)	18 (78%)	8 (40%)
Day 2 NRS			
0–3	11 (55%)	2 (9%)	3 (15%)
4–7	7 (35%)	13 (56%)	10 (50%)
8–10	2 (10%)	8 (35%)	7 (35%)
Day 3 NRS			
0–3	7 (35%)	4 (17%)	4 (20%)
4–7	9 (45%)	14 (61%)	11 (55%)
8–10	4 (20%)	5 (22%)	5 (25%)
Day 7 NRS[e]			
0–3	14 (74%)	4 (17%)	8 (42%)
4–7	4 (21%)	16 (70%)	7 (37%)
8–10	1 (5%)	3 (13%)	4 (21%)

CONCLUSION: The analgesic benefits of CISB found in the PACU and immediately after discharge extend through the intermediate recovery period ending on postoperative day 7.

Treatment of Postmastectomy Pain With Ambulatory Continuous Paravertebral Nerve Blocks

A Randomized, Triple-Masked, Placebo-Controlled Study

Brian M. Ilfeld, MD, MS, Sarah J. Madison, MD,* Preetham J. Suresh, MD,* NavParkash S. Sandhu, MD, MS,* Nicholas J. Kormylo, MD,* Nisha Malhotra, MD,* Vanessa J. Loland, MD,* Mark S. Wallace, MD,* James A. Proudfoot, MSc,† Anya C. Morgan, MA, CCRC,‡ Cindy H. Wen, BS,‡ and Anne M. Wallace, MD§*

Regional Anesthesia and Pain Medicine • Volume 39, Number 2, March-April 2014

	4		8		28	
POD	Ropivacaine	Placebo	Ropivacaine	Placebo	Ropivacaine	Placebo
Pain (0–10 NRS)						
Worst	4 (1–6)	5 (2–6)	3 (1–5)	3 (1–5)	1 (0–4)	2 (0–3)
Average	3 (0–3)	2 (0–4)	2 (0–3)	2 (0–3)	0 (0–2)	0 (0–1)
Least	0 (0–3)	0 (0–2)	0 (0–2)	0 (0–2)	0 (0–0)	0 (0–0)
Current	2 (0–3)	2 (0–4)	1 (0–3)	1 (0–3)	0 (0–1)	0 (0–0)
Pain subscale total (0–40)	10 (2–13)	8 (3–15)	6 (1–12)	7 (2–12)	1 (0–9)	3 (0–5)
Relief provided by analgesics (%)	80 (50–100)	70 (50–100)	90 (55–100)	85 (60–100)	100 (90–100)	100 (85–100)
Interference with (0–10)						
General activity	3 (0–6)	3 (0–7)	1 (0–4)	3 (0–6)	0 (0–2)	0 (0–3)
Mood	1 (0–3)	0 (0–4)	0 (0–3)	0 (0–4)	0 (0–1)	0 (0–1)
Walking	0 (0–2)	0 (0–3)	0 (0–1)	0 (0–2)	0 (0–0)	0 (0–0)
Work (inside/outside of home)	3 (0–7)	1 (0–6)	1 (0–4)	0 (0–4)	0 (0–2)	0 (0–3)
Relationships	0 (0–2)	0 (0–3)	0 (0–2)	0 (0–2)	0 (0–1)	0 (0–0)
Sleep	0 (0–4)	0 (0–5)	0 (0–5)	0 (0–4)	0 (0–2)	0 (0–1)
Enjoyment of life	3 (0–5)	0 (0–5)	0 (0–3)	0 (0–5)	0 (0–1)	0 (0–2)
Subscale total (0–70)	14 (0–26)	12 (0–32)	6 (0–22)	3 (0–22)	0 (0–12)	0 (0–11)
Brief Pain Inventory total (0–120)	31 (2–40)	24 (4–53)	15 (2–40)	20 (3–43)	0 (0–11)	3 (0–12)

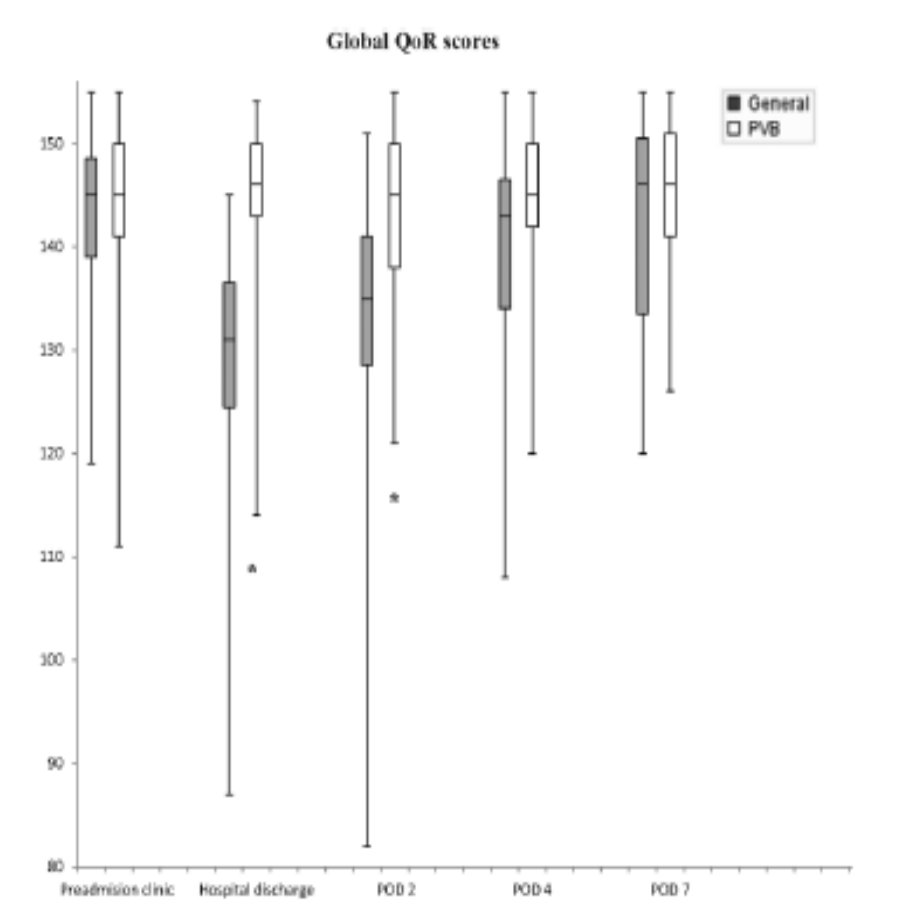
Brief Pain Inventory total (0–120)	14 (4–31)	37 (8–61)	0.012

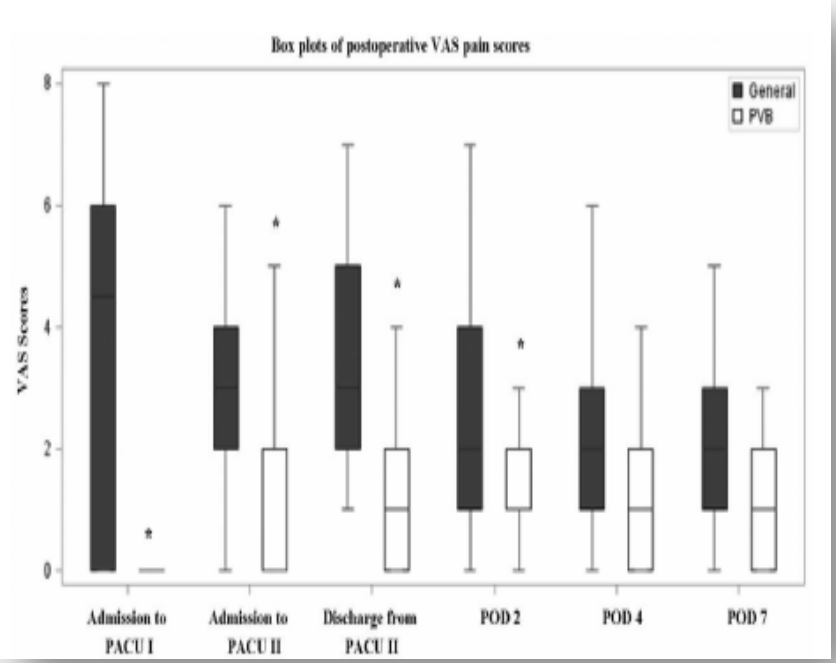
Ultrasound-guided Multilevel Paravertebral Blocks and Total Intravenous Anesthesia Improve the Quality of Recovery after Ambulatory Breast Tumor Resection

PAIN MEDICINE

Anesthesiology 2014; XX:00-00

Faraj W. Abdallah, M.D.,* Pamela J. Morgan, M.D., F.R.C.P.C.,† Tulin Cil, M.D., F.R.C.S.C.,‡
Andrew McNaught, M.D., F.R.C.P.C.,§ Jaime M. Escallon, M.D., F.R.C.S.C.,‖
John L. Semple, M.D., F.R.C.S.C.,# Wei Wu, M.Sc.,** Vincent W. Chan, M.D., F.R.C.P.C.††





The effect of continuous popliteal sciatic nerve block on unplanned postoperative visits and readmissions after foot surgery - a randomised, controlled study comparing day-care and inpatient management.

Anaesthesia
Journal of the Association of Anaesthetists of Great Britain and Ireland

Anaesthesia. 2014 Jun 6

Saporito A, Sturini E, Borgeat A, Aguirre J.

- 120 randomly allocated patients undergoing unilateral foot surgery to either inpatient (two-day postoperative stay) or day-care management under continuous regional anaesthesia
- Impact on unscheduled postoperative outpatient visits, readmissions to hospital and the associated costs.
- A perineural catheter was inserted before surgery and removed from all patients on the third postoperative day.
- No significant difference in the incidence of outpatient visits (3.3% day-care vs 5.0% inpatient), readmissions (6.7% day-care vs 3.3% inpatient) or complications between the two groups.
- Costs were also significantly lower in the day-care group (net difference €8011 (6684-10 986) per patient, $p < 0.001$).

Ambulatory Perineural Infusion: The Patients' Perspective

Brian M. Ilfeld, M.D., Dasia E. Esener, M.S., Timothy E. Morey, M.D., and F. Kayser Enneking, M.D.

Reg Anesth Pain Med 2003;28:418-423.

Age range in years	8-19	20-39	40-59	60+	Total
Patients consenting to survey	8	24	64	35	131
Feel safe during infusion?	8 (100%)	24 (100%)	62 (97%)	34 (97%)	128 (98%)
Comfortable changing pump program?	2 (25%)	10 (42%)	23 (36%)	11 (31%)	46 (35%)
Nightly phone contact inconvenient?	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Comfortable removing catheter?	7 (88%)	24 (100%)	62 (97%)	35 (100%)	128 (98%)
Easy catheter removal?	8 (100%)	21 (88%)	62 (97%)	34 (97%)	125 (95%)
Average catheter removal?	0 (0%)	3 (12%)	0 (0%)	1 (3%)	4 (3%)
Difficult catheter removal?	0 (0%)	0 (0%)	2 (3%)	0 (0%)	2 (2%)
Preferred to return for removal?*	0 (0%)	0 (0%)	4 (6%)	1 (3%)	5 (4%)
Comfortable with written instructions?†	4 (50%)	10 (42%)	25 (39%)	17 (49%)	56 (43%)

The infusion can be tailored to provide a minimum basal rate allowing maximum infusion duration and minimal motor block, yet allow bolus dosing for physical therapy.

- **ADAPTABILITY**
- **SIMPLICITY**
- **SAFETY**

2011

Current Opinion in Anesthesiology

Current Opinion in Anesthesiology 2011, 24:459–462

Telemedicine in anesthesia: an update

Jorge A. Galvez[a] and Mohamed A. Rehman[b]

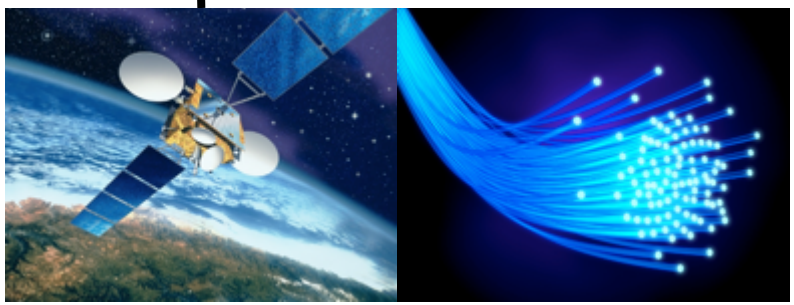
Summary

Anesthesiologists have the opportunity to develop telemedicine programs that can improve the delivery of care to patients. Current programs offer services ranging from remote preoperative evaluation to international collaboration for intraoperative management and consultation. Simulation using telemedicine services can provide educational opportunities and test the effectiveness of institutions' communications systems.


U.S. Robotics
56K Message Modem


Wi Fi


ADSL




09:41

Interests

- **Decreasing time and … costs of patients management:**
  - Inpatients vs ambulatory patients
  - Nurse needs and work decreased

- Gornall J. Does telemedicine deserve the green light? BMJ 2012;345:e4622.

- Tilleul P, Aissou M, Bocquet F, Thiriat N, le Grelle O, Burke MJ, et al. Cost-effectiveness analysis comparing epidural, patient-controlled intravenous morphine, and continuous wound infiltration for postoperative pain management after open abdominal surgery. Br J Anaesth 2012;108: 998–1005.

- Chung M, Akahoshi M. Reducing home nursing visit costs using a remote accces infusion pump system. J Intraven Nurs 1999;22:309–14.

Annales Françaises d'Anesthésie et de Réanimation 33 (2014) e1–e7

Internet remote control of pump settings for postoperative continuous peripheral nerve blocks: A feasibility study in 59 patients

P. Macaire [a,*], M. Nadhari [a], H. Greiss [a], A. Godwin [a], O. Elhanfi [a], S. Sainudeen [a], M. Abdul [a], X. Capdevila [b]

CPNB adjustments are essentials to optimize the patient outcome management and the concept of functional analgesia without side effects (excessive numbness or motor blockade). Physicians turns and nurse networks are time consuming and not cost effective.

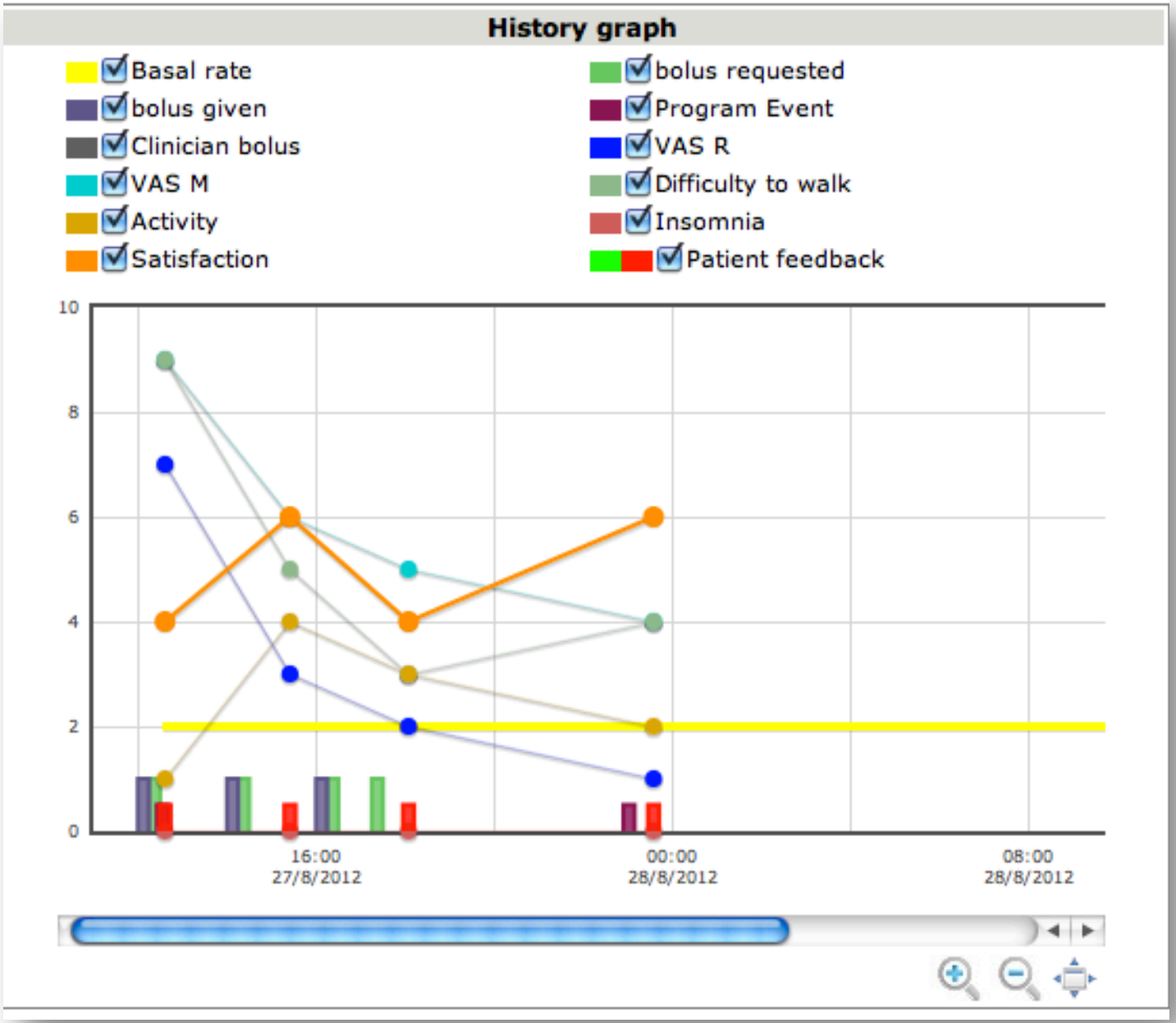
We hypothesized that we can manage patients using telemedicine transmission of pump feedbacks, settings and patient's data allowing a remote control adjustment of the LA infusion.

Indicators	value
VAS at rest	0-10
VAS at mobilization	0-10
Excessive numbness (Yes, when it is uncomfortable for the patient)	Yes/ No
Motor blockade (Yes, when the patient was unable to move his limb or the extremities (fingers or toes) due to the block)	Yes/ No
Physiotherapy	Yes /No
Difficulty to walk	Yes/No
Activity	0-10
Insomnia (the number of time the patient woke up between 11 pm to 6 am)	
Swelling dressing	Yes /No
Satisfaction	0-10

Indicators	If value
Pain VAS value at rest	≥4
Pain VAS value during mobilization	≥4
Motor blockade or numbness	Yes
Sensory blockade or insensate limb	Yes
Swelling dressing	Yes
Patient's Satisfaction	<4
Any Remote titration success or fail	+
Occlusion	+
End of infusion and near end of infusion	+
Battery low and depleted	+
Technical alarms	+
Pump on hold	+
Dose limit reached	+

Anaesthetic reality

Macaire P, Nadhari M, Greiss H et al. Internet remote control of pump settings for postoperative continous peripheral nerve blocks: A feasibility study in 59 patients. Ann Fr Anesth Rea 2014;33:e1-e7.



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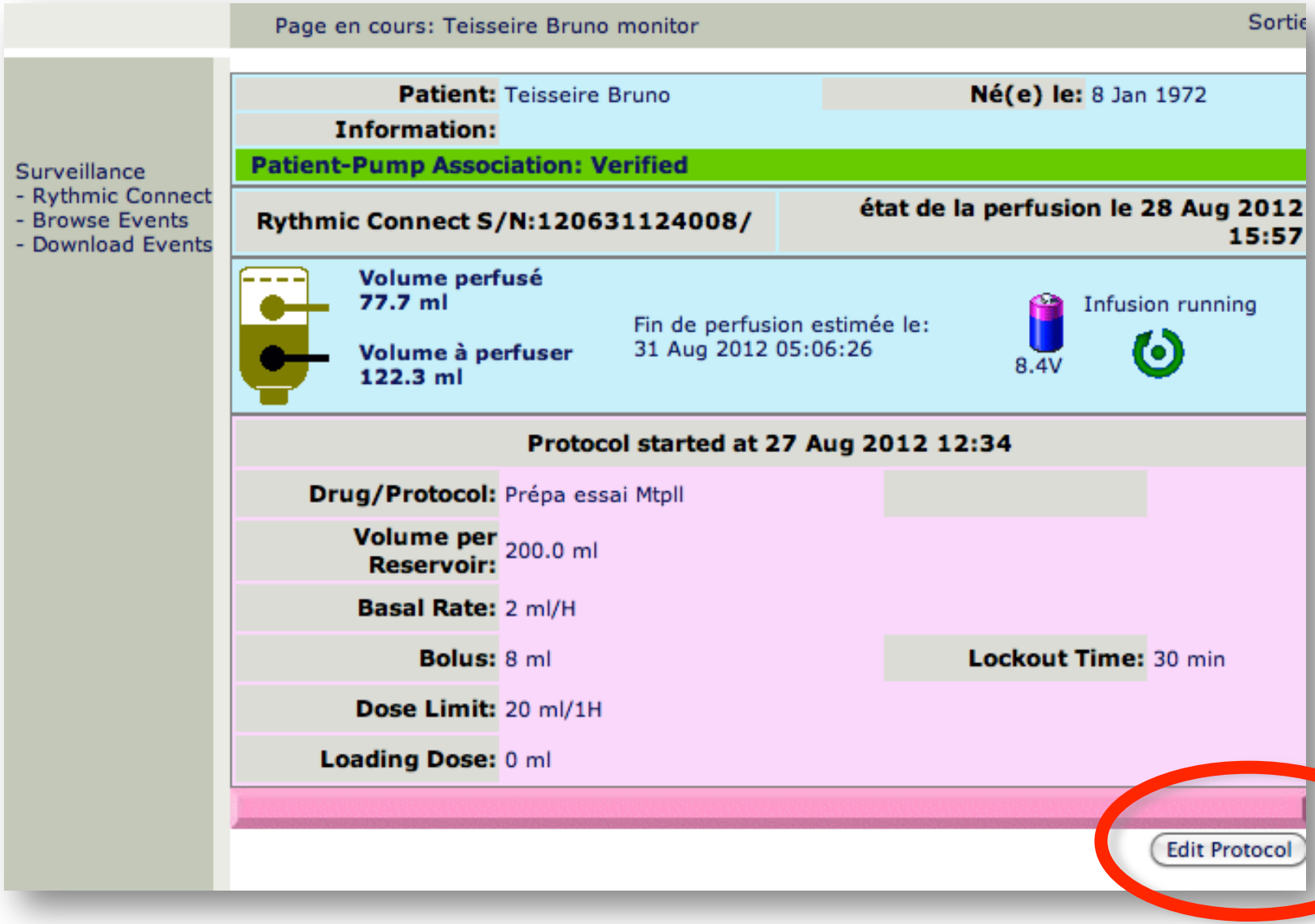

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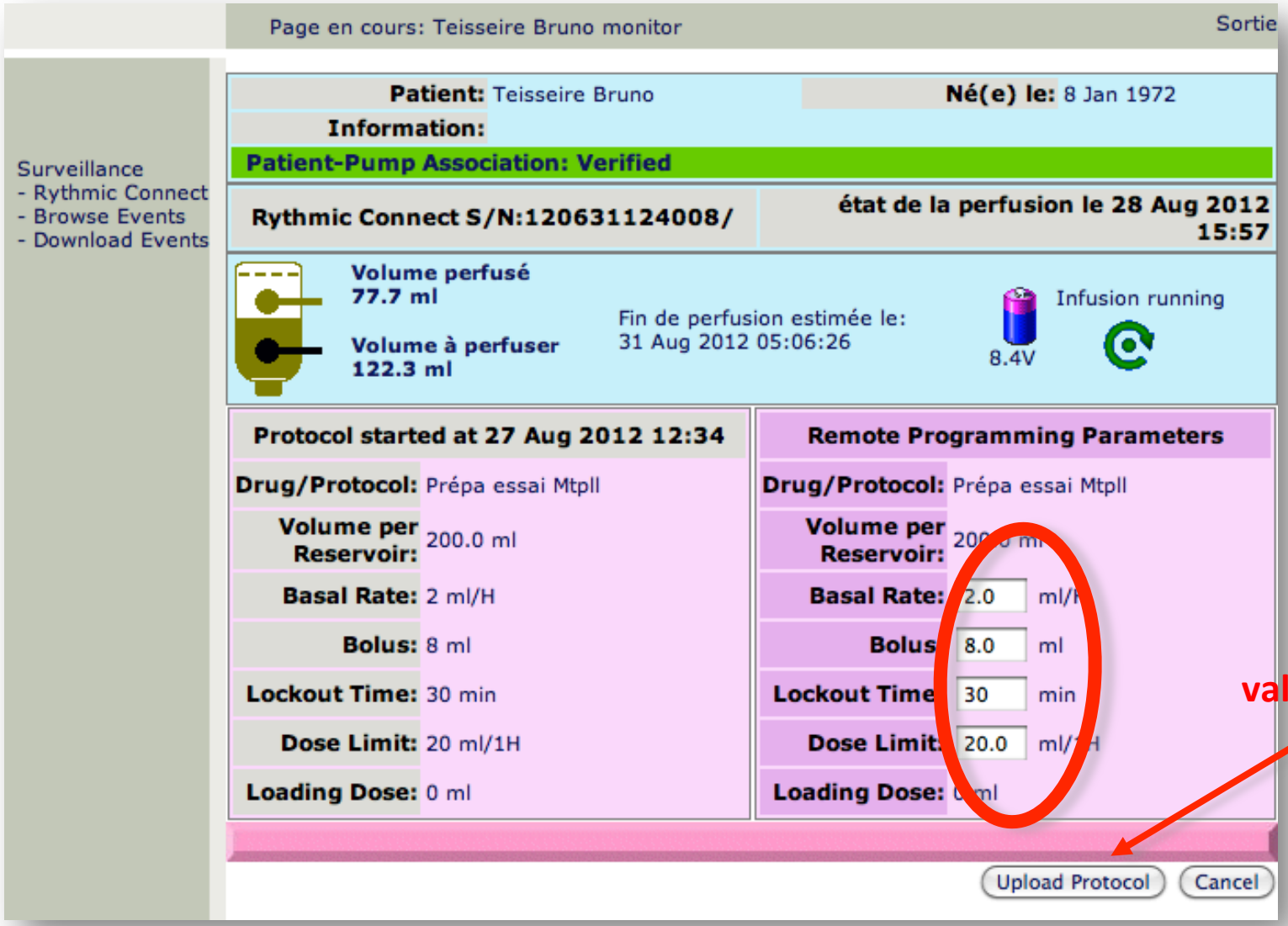

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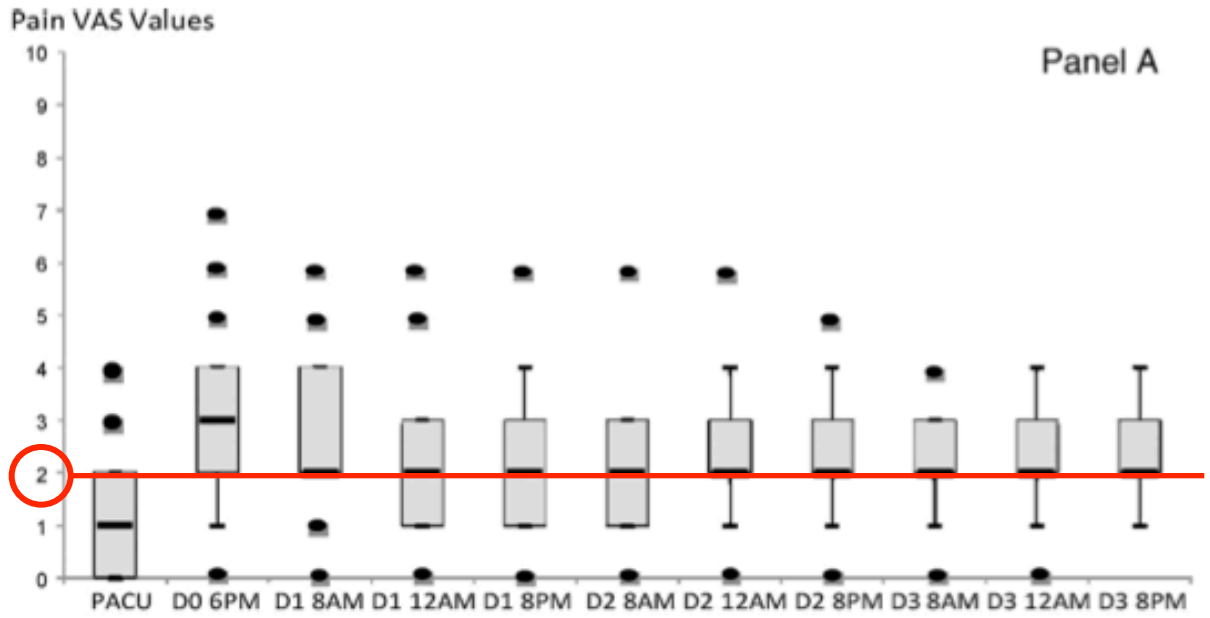

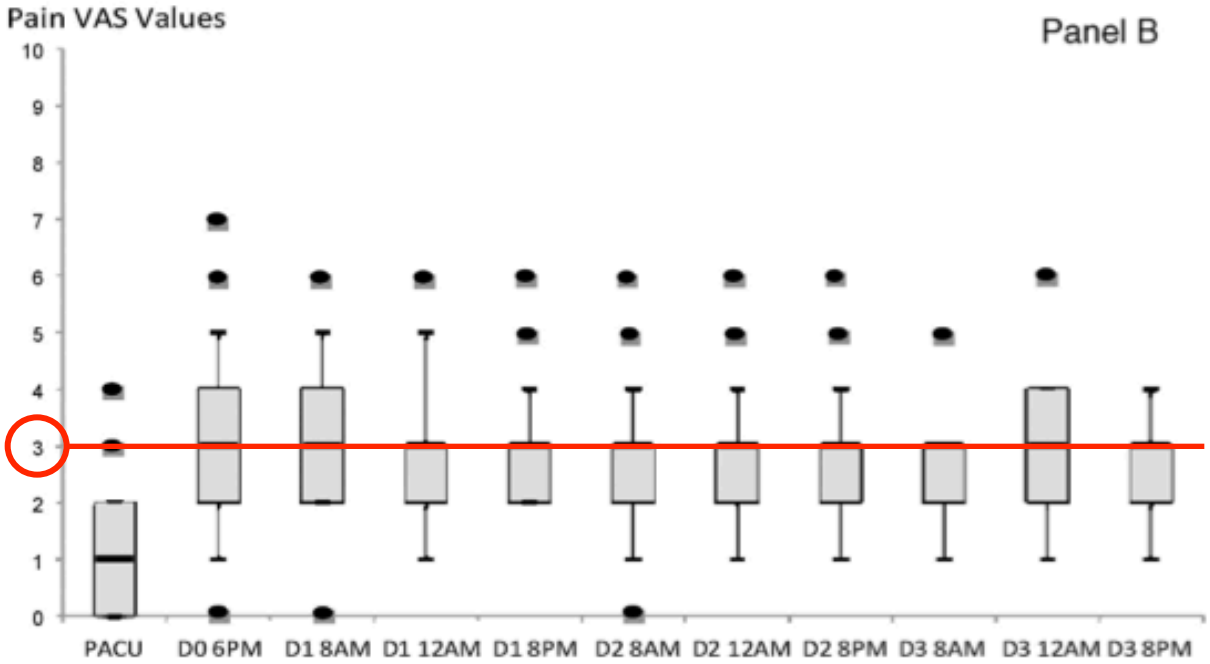

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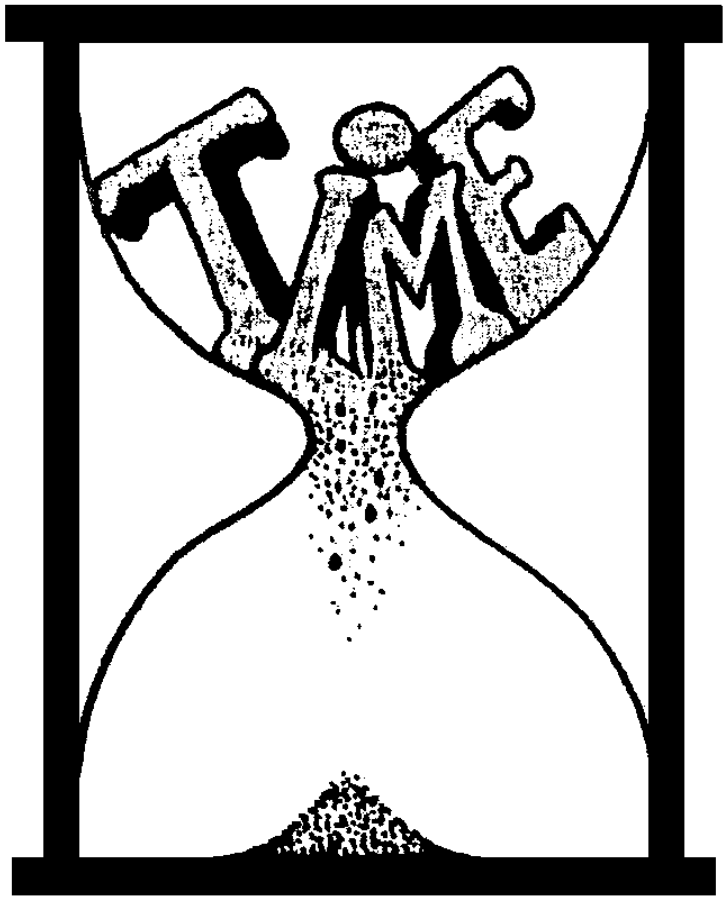


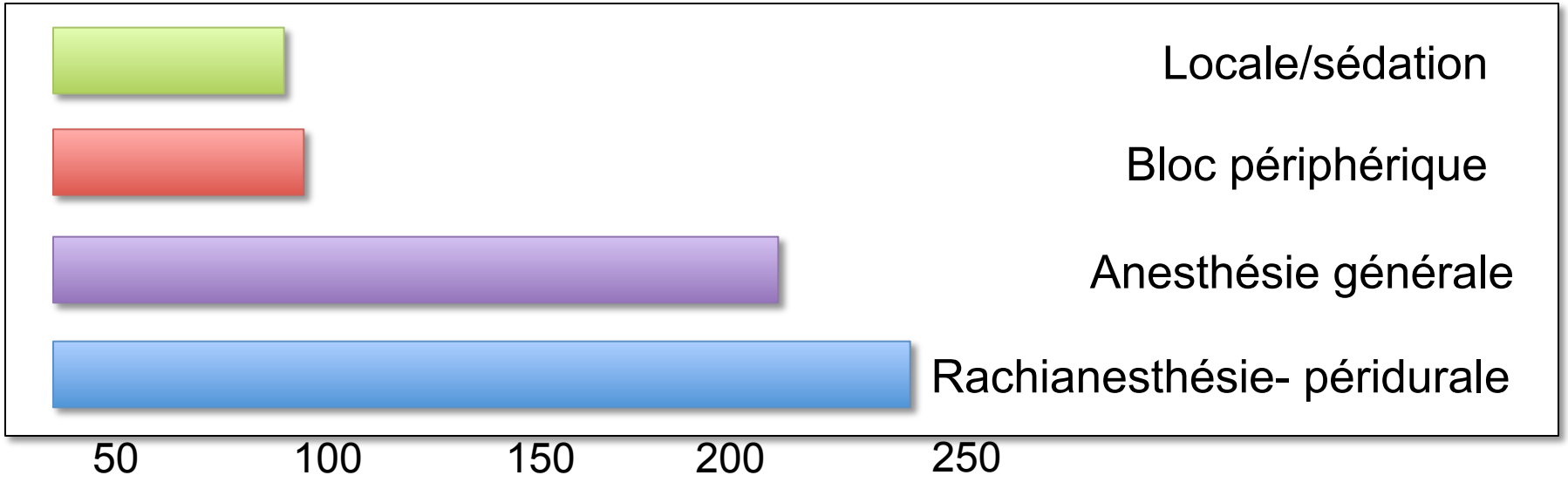
The mean time of pump settings modification after response to questionnaire or voluntarily patient's alert was 15 (13–16.9) minutes. All changes finally resolved the patients' complains.

Macaire P, Nadhari M, Greiss H et al. Internet remote control of pump settings for postoperative continous peripheral nerve blocks: A feasibility study in 59 patients. Ann Fr Anesth Rea 2014;33:e1-e7.

La rachianesthésie en ambulatoire

Anesthésie de courte durée

Pourquoi la rachianesthésie est-elle si peu utilisée pour des interventions de courte durée?



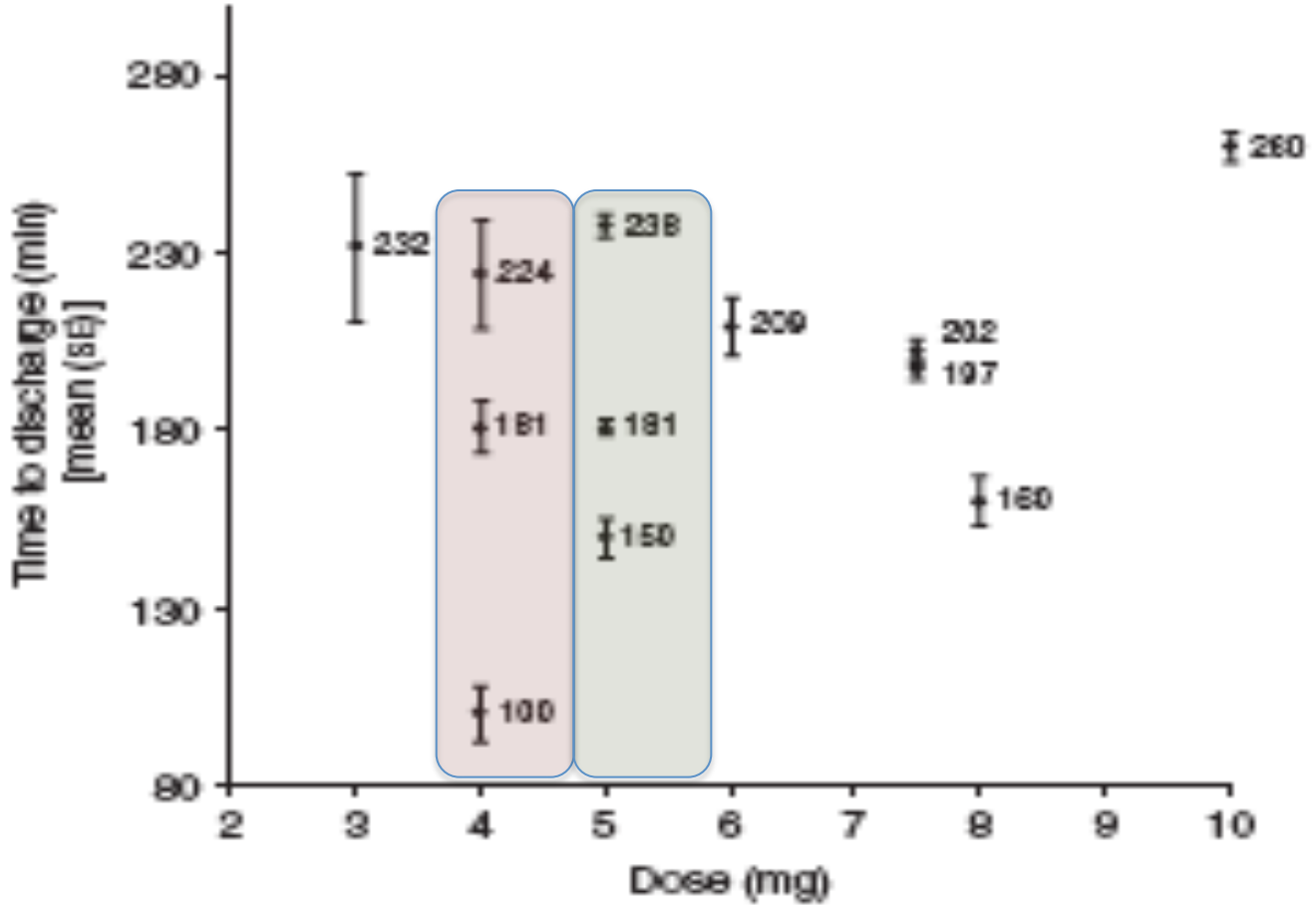
La rachianesthésie prolonge la durée de séjour dans le centre de chirurgie ambulatoire par rapport aux autres techniques
La dysfonction vésicale est la principale cause de séjour prolongé

Pavlin et al.1997

Systematic review of spinal anaesthesia using bupivacaine for ambulatory knee arthroscopy

G. S. Nair, A. Abrishami, J. Lermitte and F. Chung*

British Journal of Anaesthesia 102 (3): 307–15 (2009)



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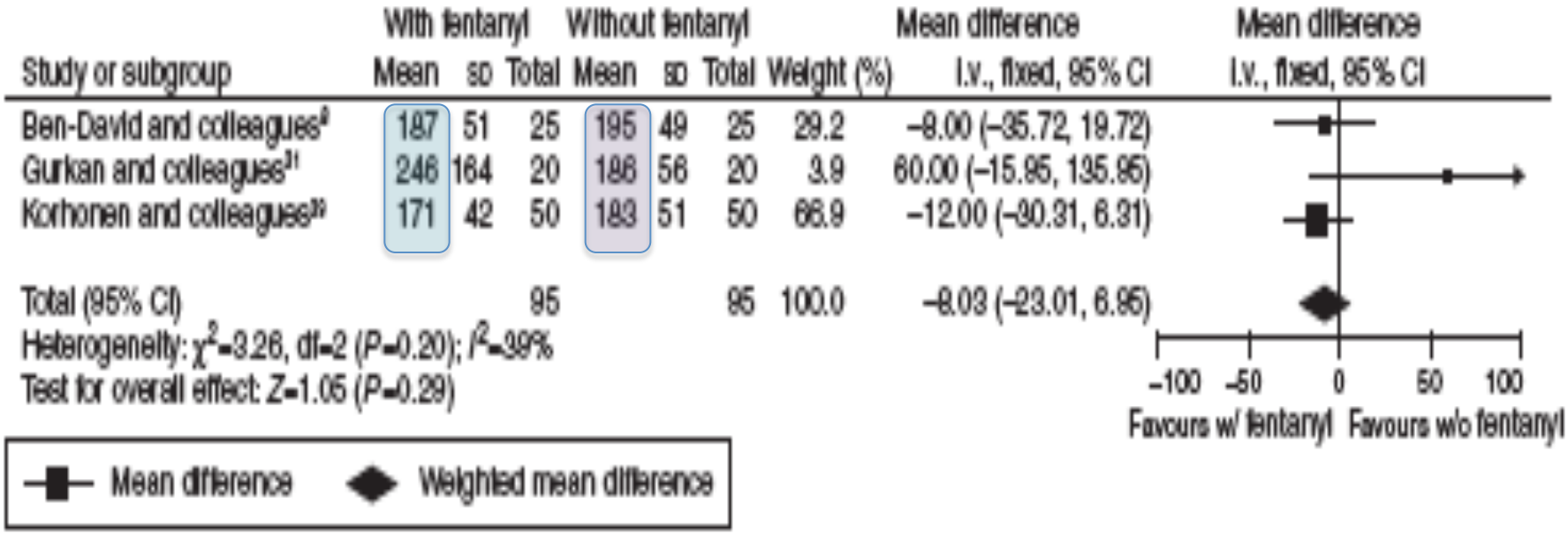
Discharge times



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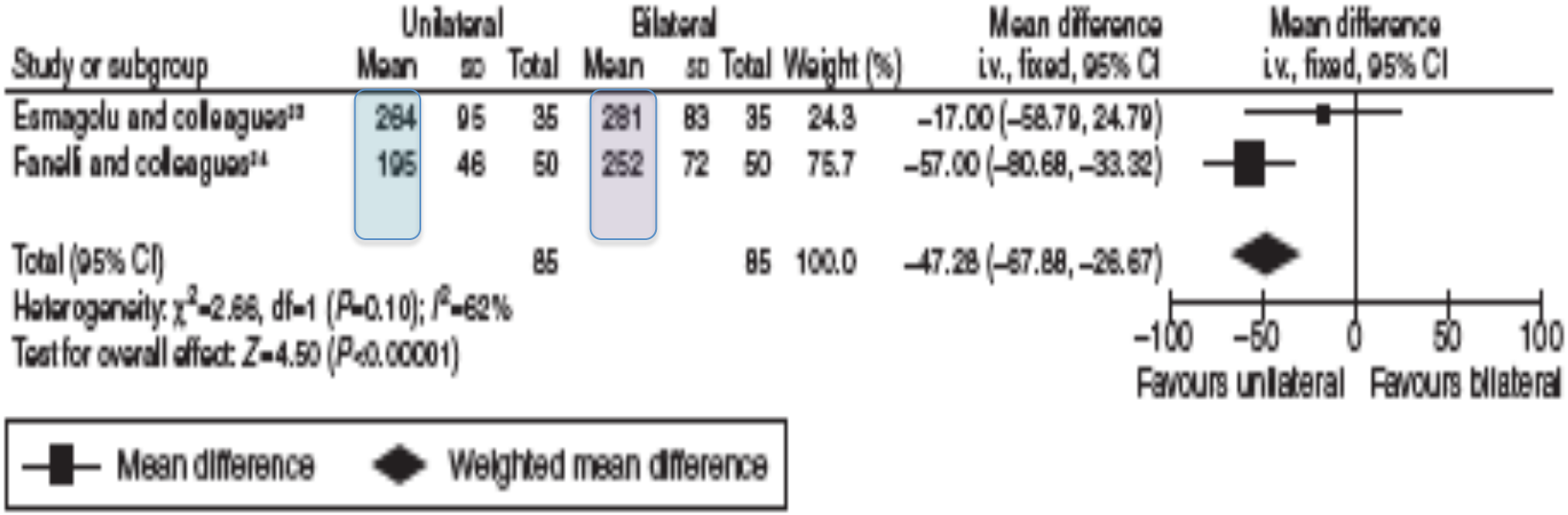
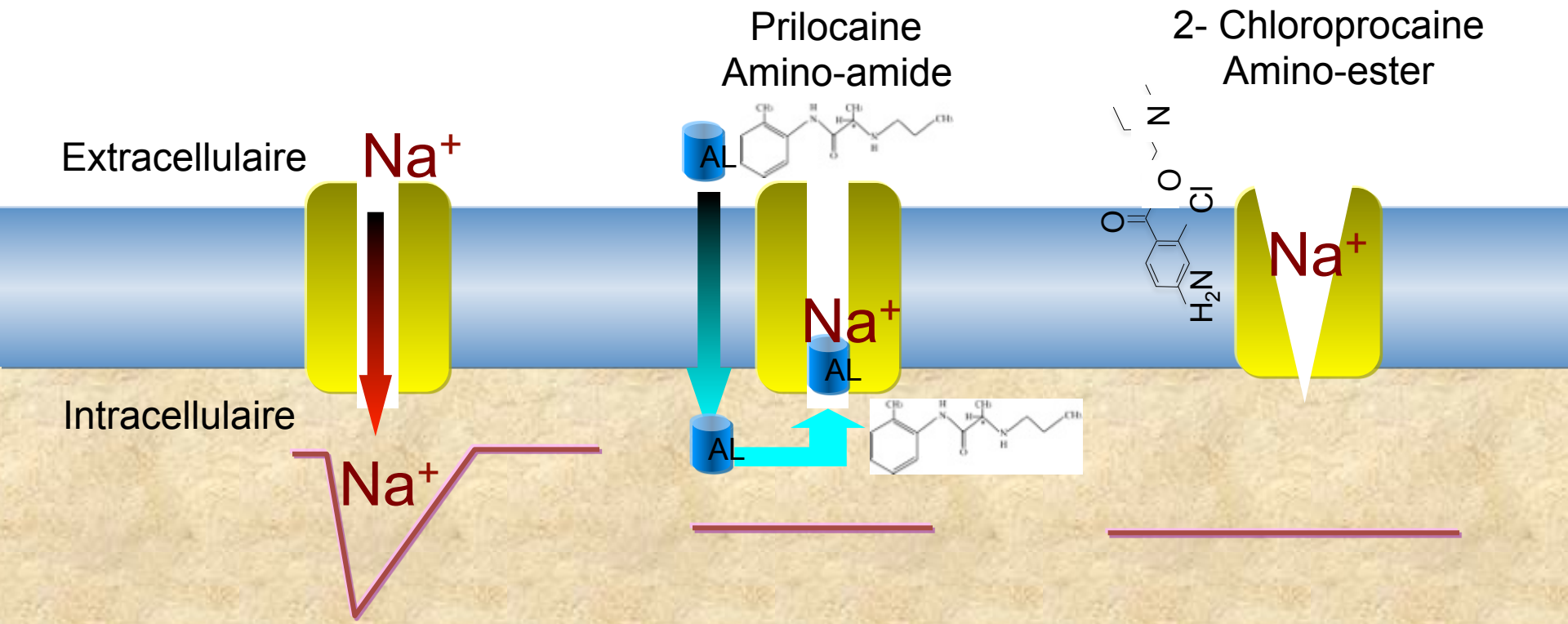


Rachianesthésie de courte durée

Donc un vaste espace pour la rachianesthésie de courte durée
Si l'on pouvait disposer d'AL de plus courte durée d'action

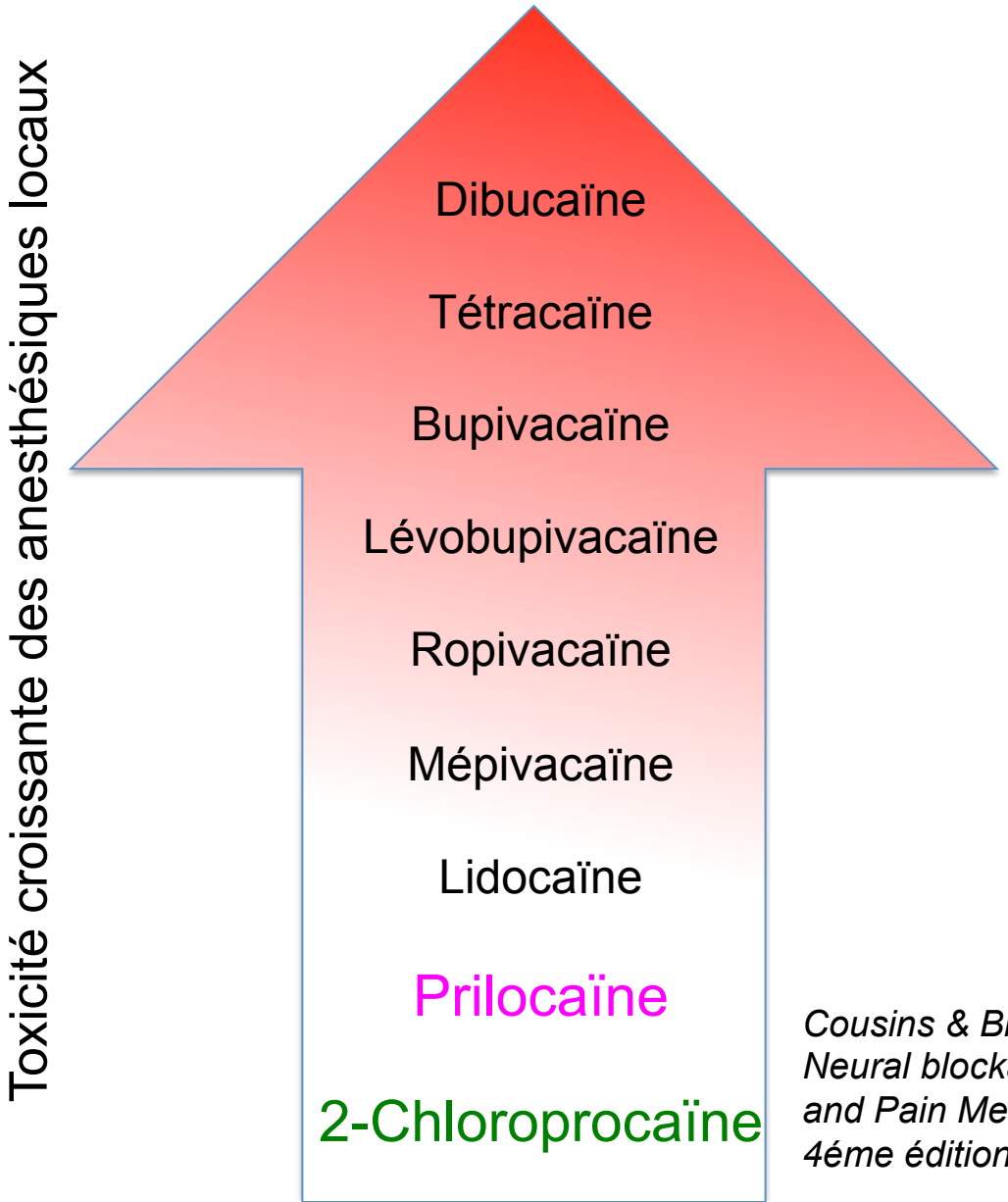
Les contraintes d'un anesthésique local adapté à ce contexte

- Délai d'action court
- Extension du bloc prévisible
- Durée courte et prévisible
- Délai de déambulation court et prévisible
- Récupération rapide de la dysfonction vésicale



Mécanisme d'action from *Cousins & Bridenbaugh.*
Neural blockade in Clinical Anesthesiaand Pain Medicine. 4éme édition

Toxicité systémique des 2 nouveaux AL



Cousins & Bridenbaugh.
Neural blockade in Clinical Anesthesia and Pain Medicine.
4éme édition page 104

Hyperbaric Prilocaine : 20 mg/ml

Transient Neurologic Symptoms after Spinal Anesthesia

A Lower Incidence with Prilocaine and Bupivacaine than with Lidocaine

	Lidocaine 2% HB, 50 mg	Prilocaïne 2% HB, 50 mg	Bupivacaïne 0.5% HB, 12,5 mg
Max metamer	T6	T6	T5
Motor blockade	4	4	4
Sen block at S2, min	127 ± 33 (76-190)	128 ± 38 (66-213)	172 ± 42 (85-230)
Deambulation, min	155 ± 40 (91-260)	165 ± 37 (66-235)	200 ± 48 (125-365)
Voiding, min	238 ± 57 (125-420)	253 ± 55 (138-405)	299 ± 85 (150-465)

Pas de différence entre lidocaine HB et prilocaïne HB

Diapo: P Zetlaoui

Hampl KH et al. Anesthesiology 1998

Neurotoxicité

Tous les anesthésiques locaux peuvent induire des IRT

2-Chloroprocaïne

Des publications évoquaient la toxicité neurologique de la chloroprocaïne

- cette toxicité était liée au conservateur, le bisulfite de sodium
- La présentation actuelle ne contient pas de conservateur

La chloroprocaïne sans conservateur ne parait pas plus toxique en rachianesthésie que la bupivacaïne

Prilocaïne

La prilocaïne hyperbare ne parait pas plus toxique en rachianesthésie que la bupivacaïne

Et présente un risque d'IRT 5 à 6 fois moins élevé que celui de la lidocaïne

Toxicité – métabolisme

Prilocaïne

La prilocaïne peut induire une méthémoglobinémie
Responsable d'une cyanose qui peut apparaître pour
    une dose totale supérieure à 600 mg ou
    supérieure à 8 mg/kg (doses maximales autorisées)
Soit 8 à 10 fois les doses utilisées en rachianesthésie

Signe clinique pour concentration de méthémoglobinémie supérieure à 15%
(8% chez le sujet insuffisant cardiaque ou respiratoire)

Pour 100 mg dose contenue dans une ampoule,
elle ne peut pas dépasser 1%

donc toxicité purement théorique en rachianesthésie

Pharmacologie de la prilocaïne

	Prilocaïne	Lidocaïne
Puissance relative	2	2
pKa	7,7	7,7
Liaison protéique %	55	65
Vdss, l/kg	2,73	1,30
Clairance, l/kg/h	2,3	0,85
½ élimination, h	1,6	1,6
Délai d'action	Court	Court
Durée d'action, min	120-240	90-200

Procaïne= puissance 1

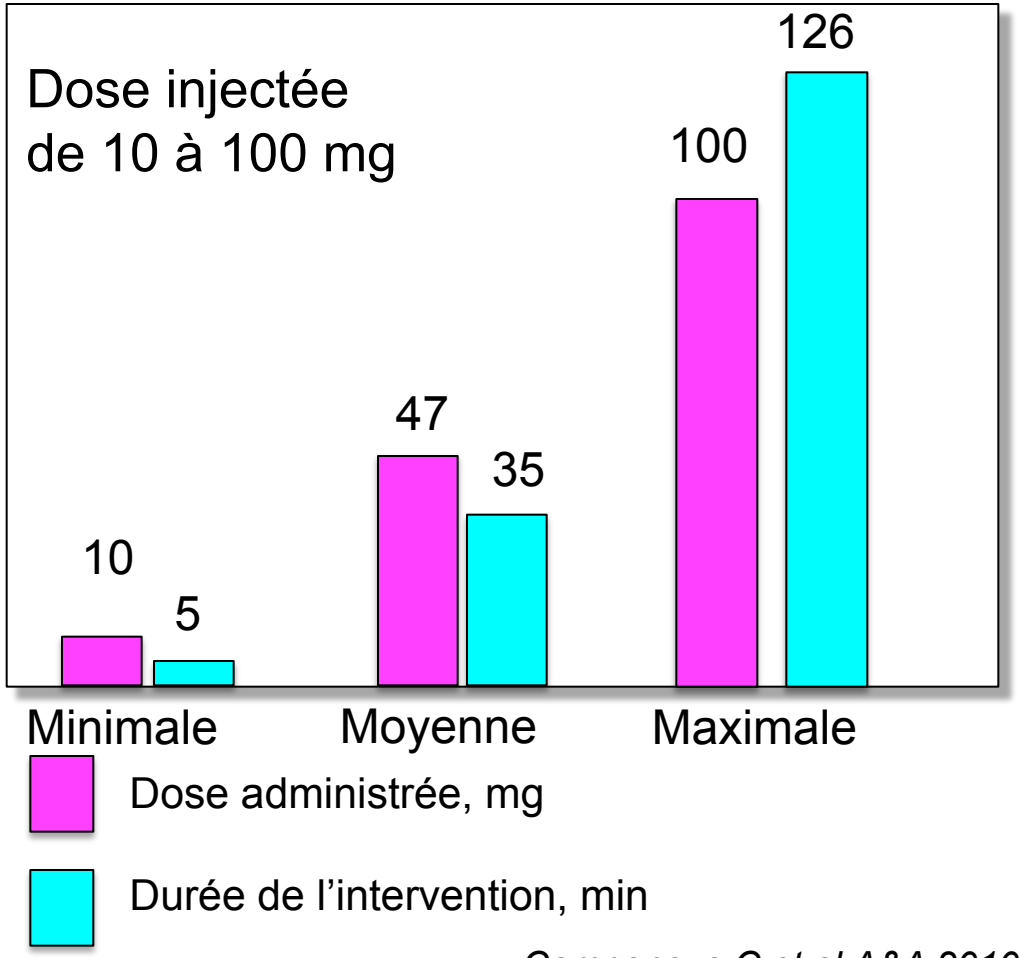
Pharmacologie comparable à celle de la lidocaïne

La prilocaïne HB en anesthésie ambulatoire

Relation dose injectée et durée de l'anesthésie

Possibilité de moduler les doses administrées pour moduler la durée d'action

Rachianesthésies pour
des interventions très courtes de 5 à 10 minutes
ou
pour des interventions de 120 minutes



Camponovo C et al.A&A 2010

Prilocaine: Hyperbaric versus Plain

	Plain Prilocaine 60 mg	HB Prilocaine 40 mg	HB Prilocaine 60 mg
Metameric Level T10	24/30 ◆	30/30	30/30
Onset time motor block, min	12 ± 5 ◆	8 ± 5	8 ± 3 ★
Max level sensory block, min	25 ± 18 ◆	15 ± 7	18 ± 5 ★
Deambulation, min	157 ± 41 ◆	92 ± 36	118 + 37 ★
Anesthesia duration, min	163 ± 42 ◆	100 ± 35	132 ± 34 ★
Urinary Voiding, min	277 ± 45 ◆	195 ± 60	218 ± 56 ★
ASU stay , min	299 ± 101 ◆	208 ± 68	256 ± 55 ★

◆ Statistically significant plain 60 vs HB 40

★ Statistically significant plain 60 vs HB 60

Hyperbaric solutions are more predictable, with less interpatient variability, therefore promoting fast onset and better adequate anesthesia for ambulatory surgery.

Camponovo C et al. A&A 2010

La prilocaïne en rachianesthésie

Prilocaïne iB vs lidocaïne iB en rachianesthésie en urologie
Dose équivalente de 80 mg dans les groupes

	Lidocaine iB 80 mg	Prilocaïne iB 80 mg
Délai d'installation, min	14,5 (6)	13,4 (4)
2SRT, min	106 (26)	123 (42) *
Durée du bloc moteur	153 (46)	197 (42) *
Durée du bloc en S1	181 (48)	221 (49) *
Bloc moteur 1/2/3	1/3/45	3/0/47

Dans les formes isobares, la prilocaïne est équivalente à la lidocaïne, avec un bloc légèrement plus prolongé

Ostgaard G et al. AAS 2000

La prilocaïne hyperbare 20 mg/ml

Comparaison de la rachianesthésie réalisée avec de la lidocaïne HB, de la prilocaïne HB et de la bupivacaïne HB

Rapport théorique de puissance prilocaïne/bupivacaïne = 1/4

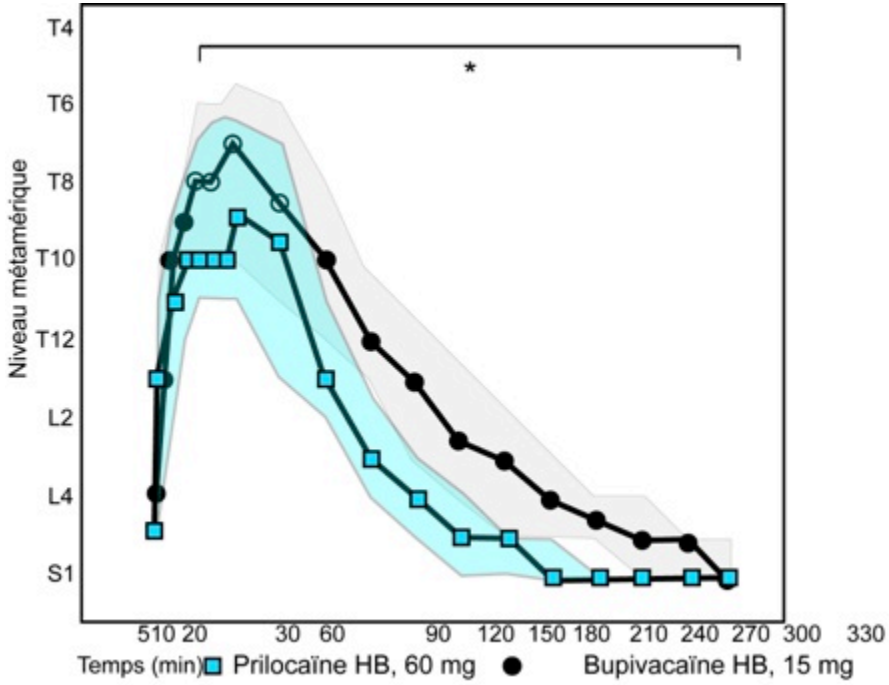
	Prilocaïne 2% HB, 50 mg		Bupivacaïne 0,5% HB, 12,5 mg
Niveau max	T6		T5
Bloc moteur	4		4
Bloc en S2, min	128 ± 38 (66-213)	*	172 ± 42 (85-230)
Déambulation, min	165 ± 37 (66-235)		200 ± 48 (125-365)
Miction, min	253 ± 55 (138-405)		299 ± 85 (150-465)

La durée d'action de la prilocaïne HB est plus courte que celle de la bupivacaïne HB

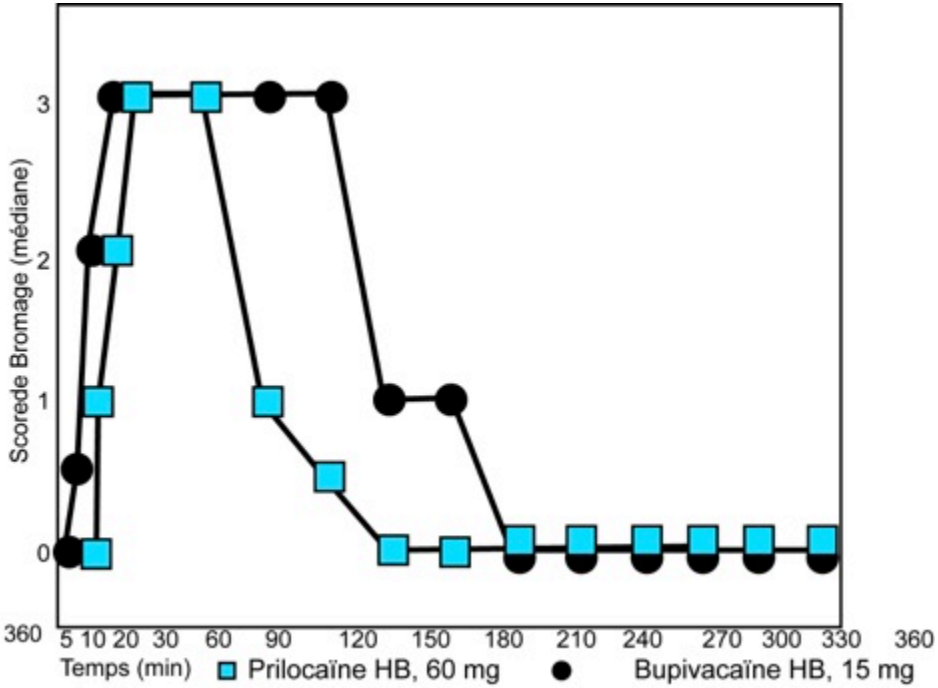
Hampl KH et al. Anesthesiology 1998

Hyperbaric Prilocaine in spinal block

Prilocaïne HB 60 mg vs. Bupivacaïne HB 15 mg
2 groups of 44 patients, procedure in sitting position



Metameric level



Motor blockade

Rätsch G et al Anaesthesist 2007

Diapo: P Zetlaoui

Spinal anaesthesia for ambulatory arthroscopic surgery of the knee: a comparison of low-dose prilocaine and fentanyl with bupivacaine and fentanyl

Black AS et al Brit J Anaesth 2011

- 50 patients admis pour chirurgie arthroscopique du genou
- Prilocaine 20 mg et fentanyl 20 µg (Group P) P
- Bupivacaine iso 7.5 mg et fentanyl 20 µg (Group B)

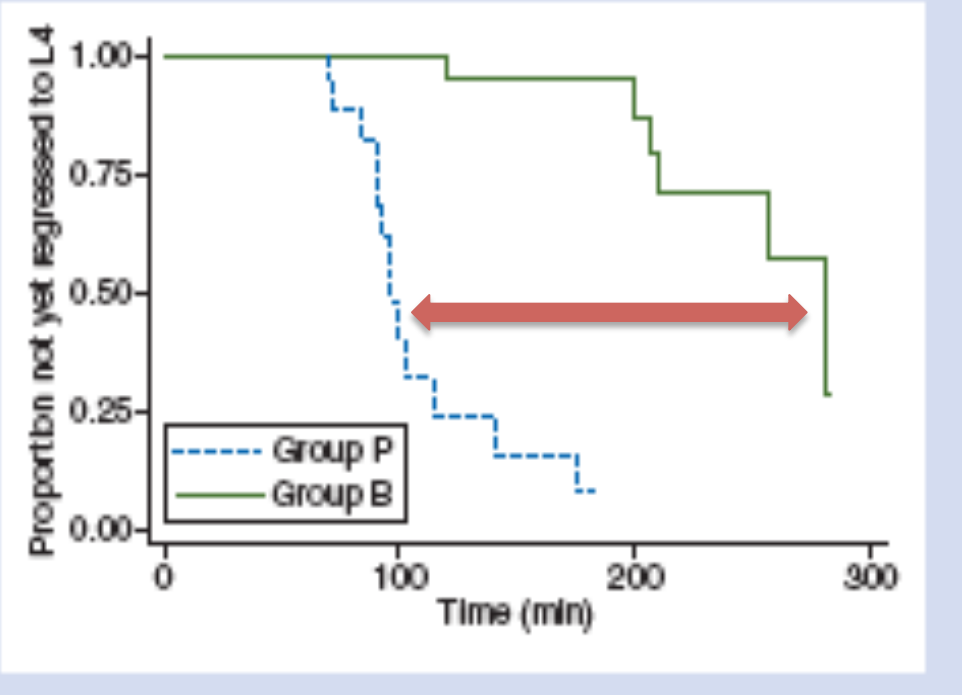


Table 3 Median times (in minutes) to first void

Group	No. of subjects	Median time (95% confidence intervals)
P	22	205 (185–220)
B	26	275 (250–300)

Hémodynamique

Diminution significative de la PAS> 20% notée chez 7/22 (32%) des patients du Groupe P et 19/26 (73 %) dans le groupe B.

Urinary retention after spinal anaesthesia with hyperbaric prilocaine 2% in an ambulatory setting

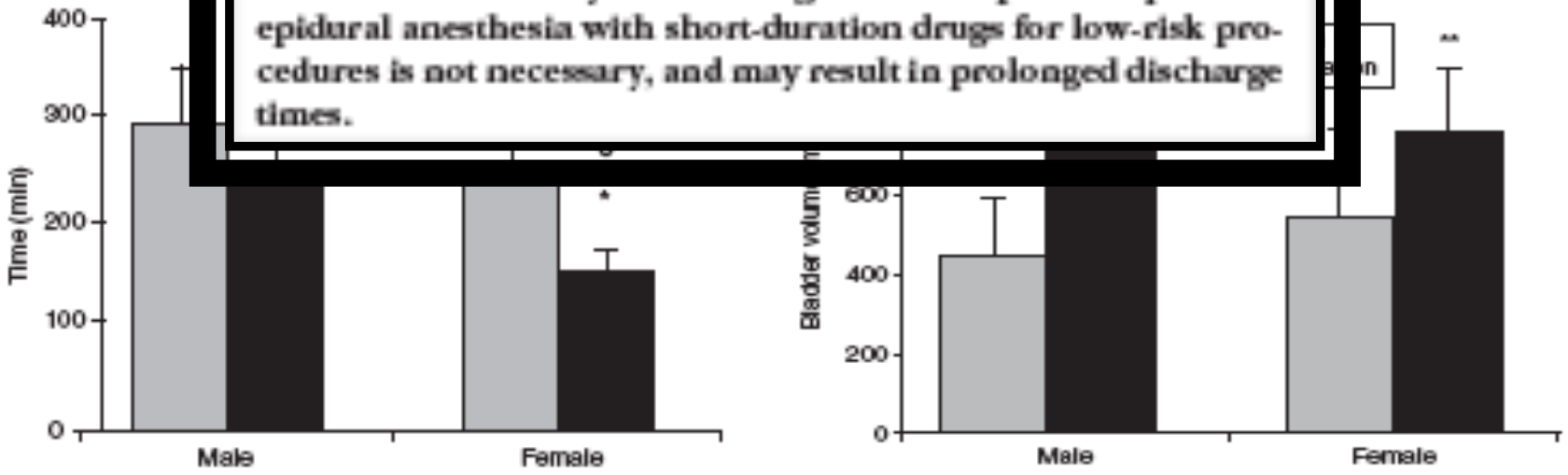
Kreutziger J et al Brit J Anaesth 2010

- [redacted]
- [redacted]
- Surgery Unit.
- On the other hand, it has been suggested that low-risk patients undergoing appropriate spinal block for ambulatory anesthesia may be safely discharged before urinary voiding

Ambulatory Surgery Patients May Be Discharged before Voiding after Short-acting Spinal and Epidural Anesthesia

Michael F. Mulroy, M.D., Francis V. Salinas, M.D.,† Kathleen L. Larkin, M.D.,† Nayak L. Polissar, Ph.D.‡*

Conclusions: **Delay of discharge after outpatient spinal or epidural anesthesia with short-duration drugs for low-risk procedures is not necessary, and may result in prolonged discharge times.**



Rachianesthésie de courte durée

En comparaison à la bupivacaïne HB,
la prilocaïne HB permet une
récupération plus rapide de la dysfonction vésicale,
ce qui lui confère un avantage particulier pour
l'anesthésie de courte durée,
particulièrement en ambulatoire

Chloroprocaïne en rachianesthésie

Présentation

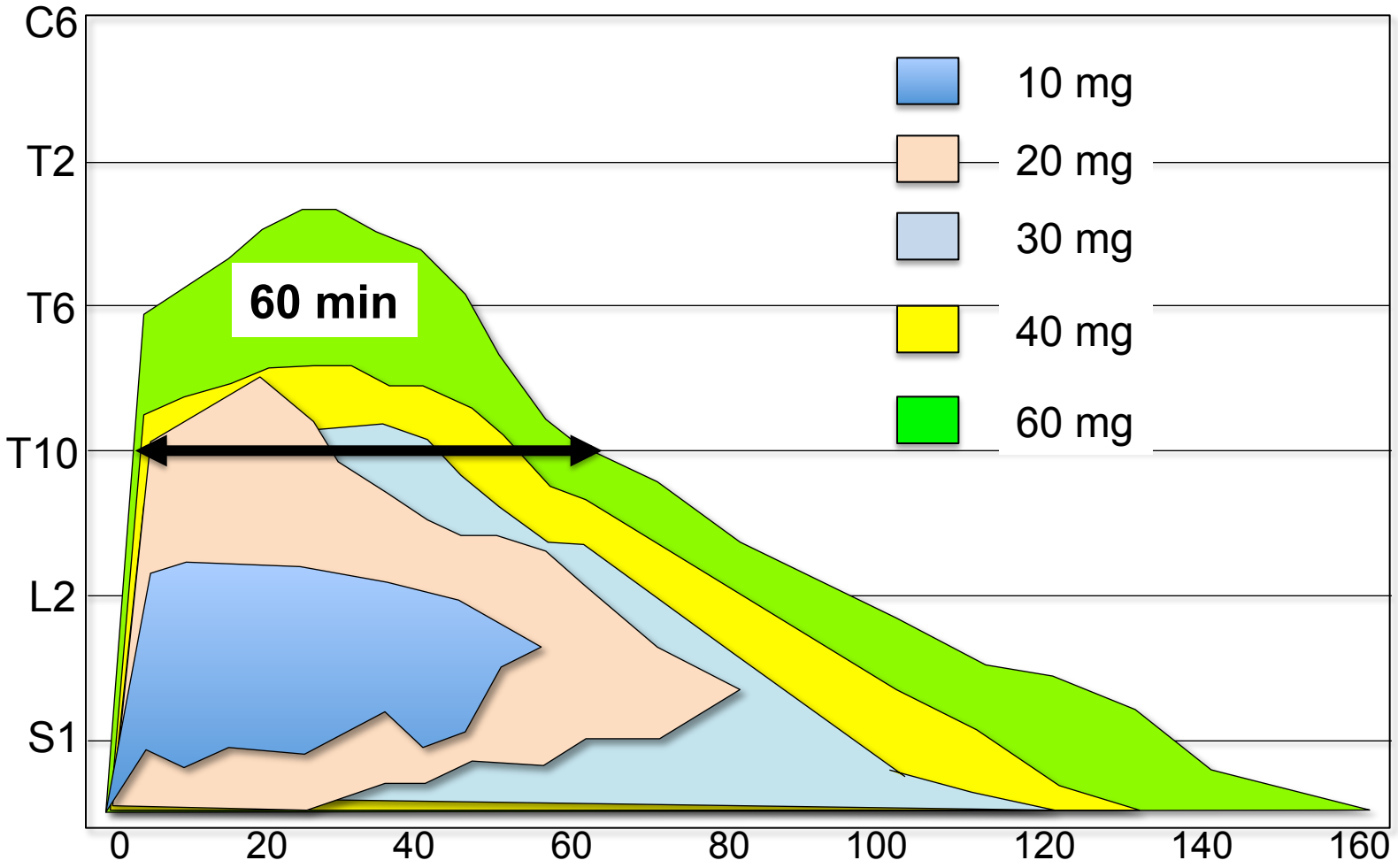
Ampoule de 5 ml contenant 50 mg
de chlorhydrate de 2-chloroprocaïne (10 mg/ml),
sans conservateur
isobare

Indication de l'AMM et avis de la commission de transparence (17 avril 2013)

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

Chloroprocaïne: recherche de dose

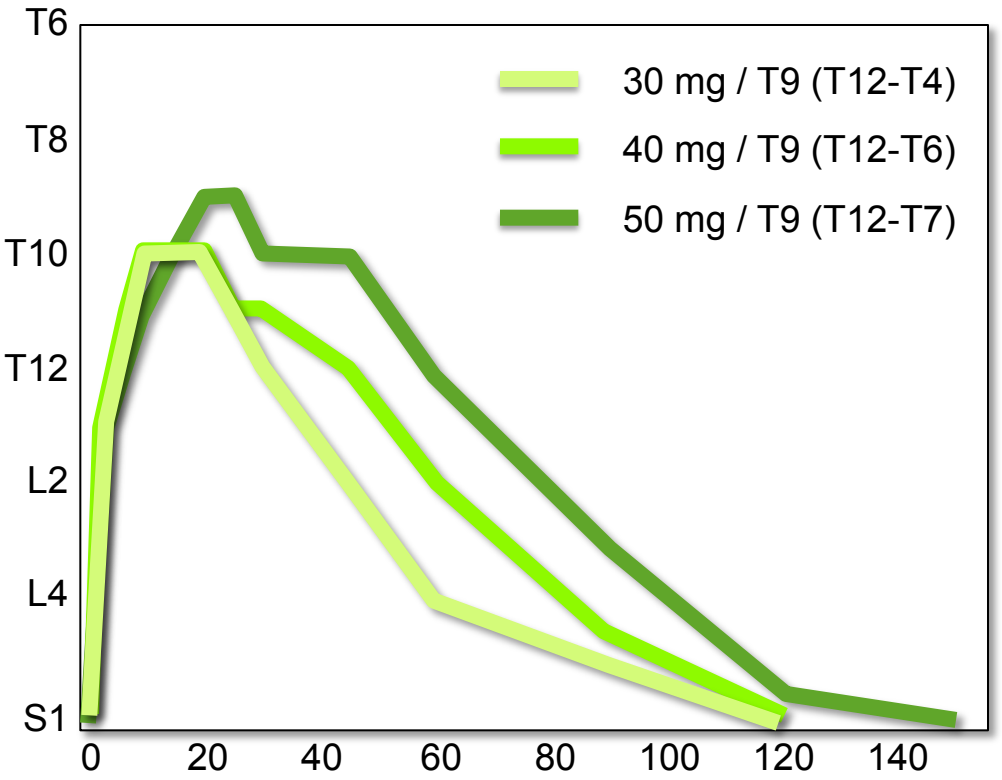
Evolution temporo-spatiale de la rachianesthésie induite avec différentes doses de chloroprocaïne



Chloroprocaïne

Etude de recherche de dose, 3 groupes de 15 patients ambulatoires

- chloroprocaïne 10 mg/ml isobare, sans conservateur
- rachianesthésie
- comparaison 30 mg *vs.* 40 mg *vs.* 50 mg



Cassati A et al. A&A 2006

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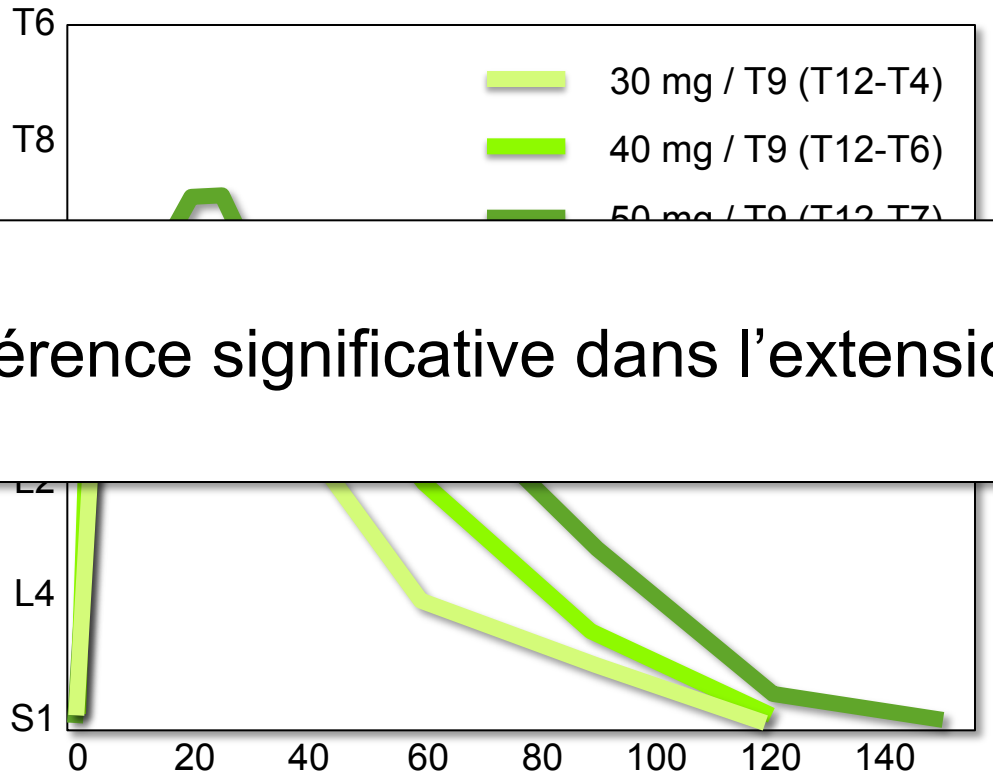
- comparaison 30 mg *vs.* 40 mg *vs.* 50 mg



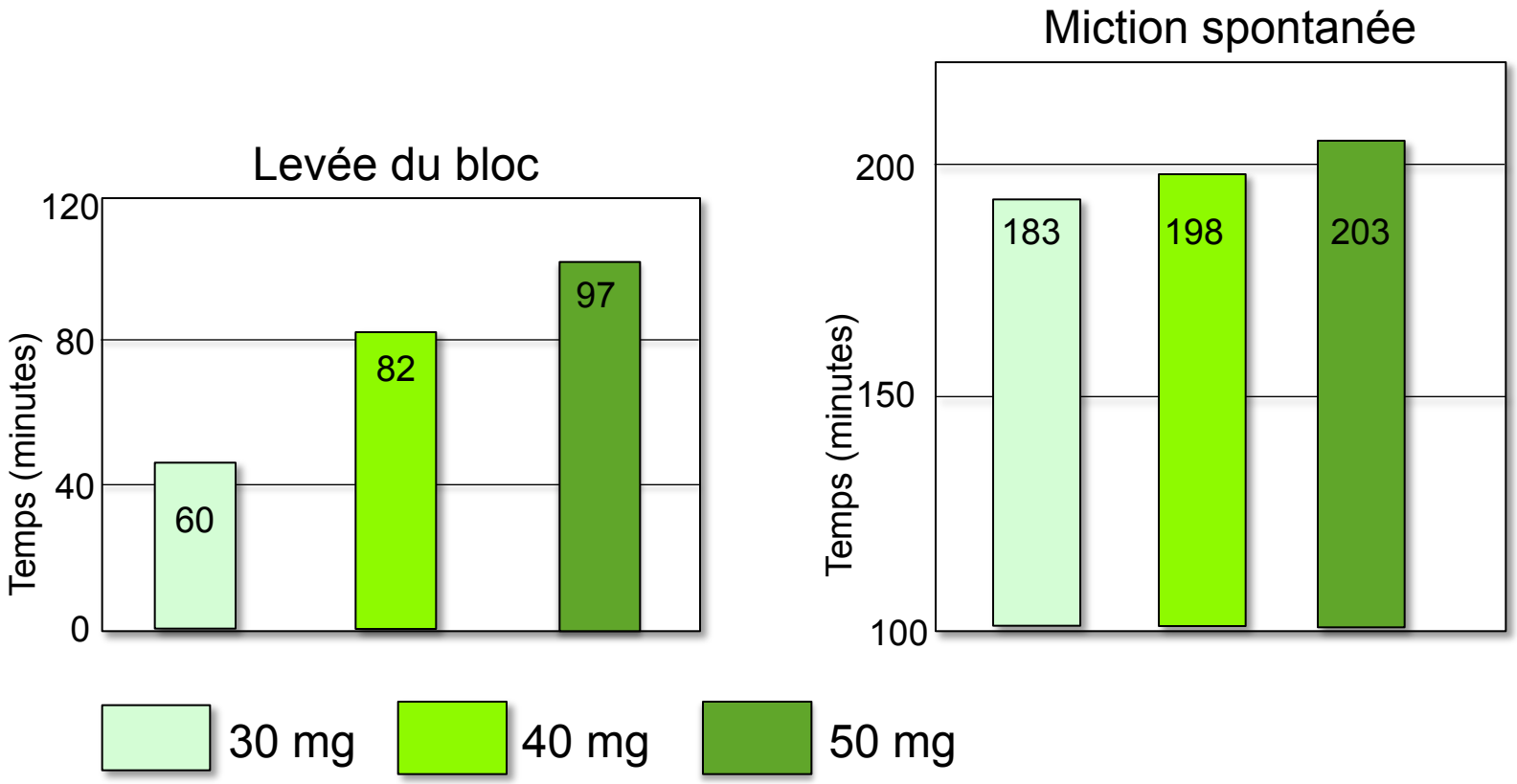
Pas de différence significative dans l'extension du bloc

Cassati A et al. A&A 2006

Chloroprocaïne

Etude de recherche de dose, 3 groupes de 15 patients ambulatoires

- chloroprocaïne 10 mg/ml isobare, sans conservateur
- rachianesthésie
- comparaison 30 mg *vs.* 40 mg *vs.* 50 mg



Cassati A et al. A&A 2006

Chloroprocaïne

Etude de recherche de dose, 3 groupes de 15 patients ambulatoires

- chloroprocaïne 10 mg/ml isobare, sans conservateur
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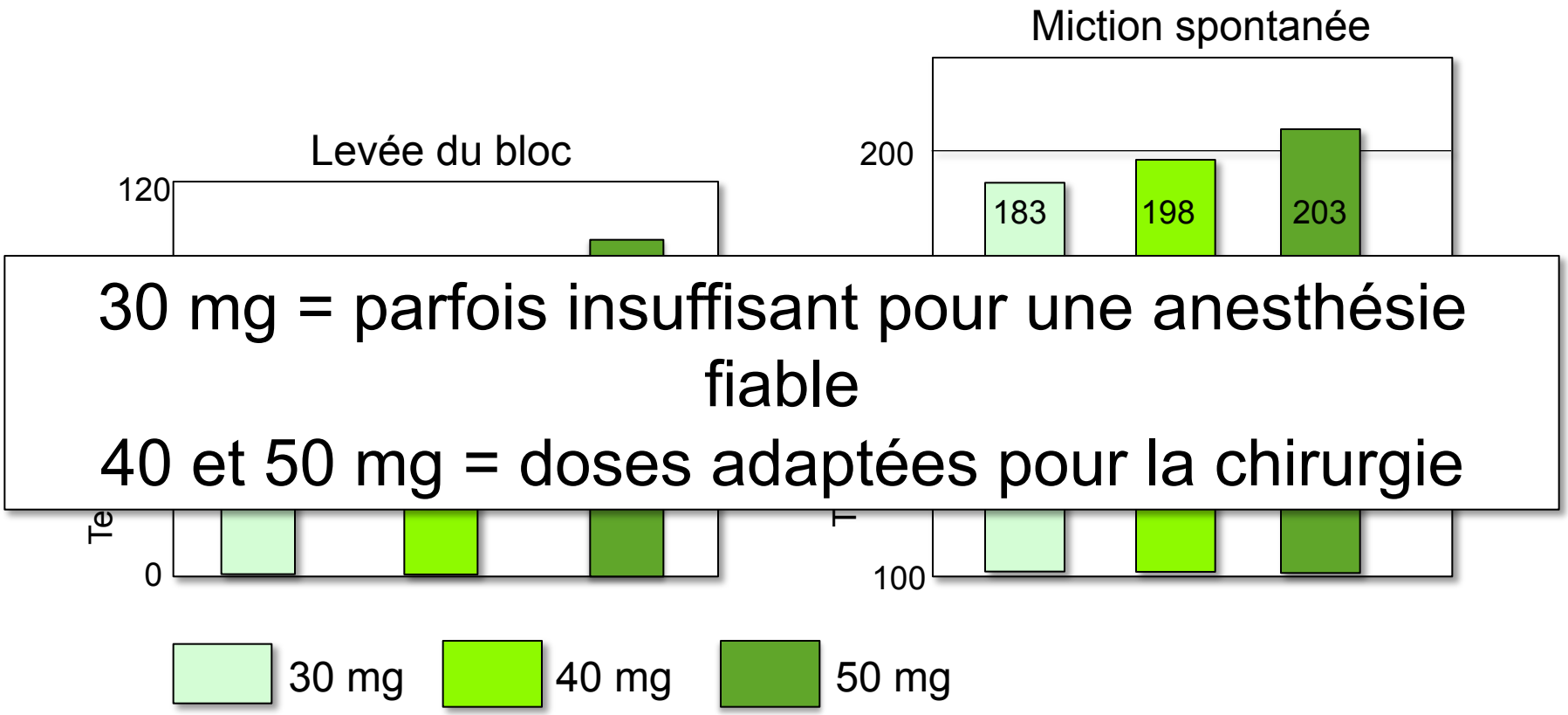


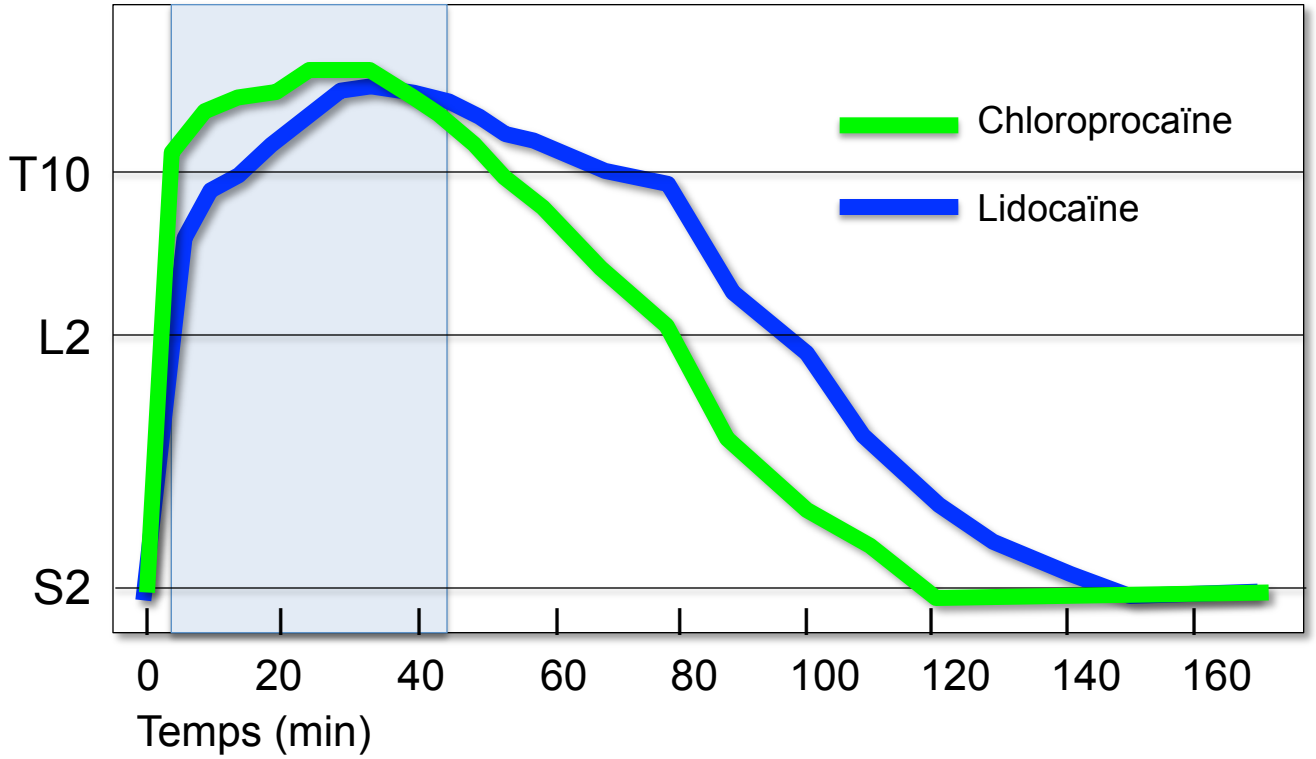
30 mg = parfois insuffisant pour une anesthésie fiable

40 et 50 mg = doses adaptées pour la chirurgie

Cassati A et al. A&A 2006

Comparaison chloroprocaïne-lidocaïne

8 Volontaires en cross-over
Recevant tous les 2 protocoles, ponction en L2-L3
40 mg de xylocaïne à 20 mg/ml vs. 40 mg de chloroprocaïne à 20 mg/ml



Kouri ME, Kopacz DJ. A&A 2004; 98:75-80

Comparaison chloroprocaïne-lidocaïne

8 Volontaires en cross-over
Recevant tous les 2 protocoles, ponction en L2-L3
40 mg de xylocaïne à 20 mg/ml vs. 40 mg de chloroprocaïne à 20 mg/ml

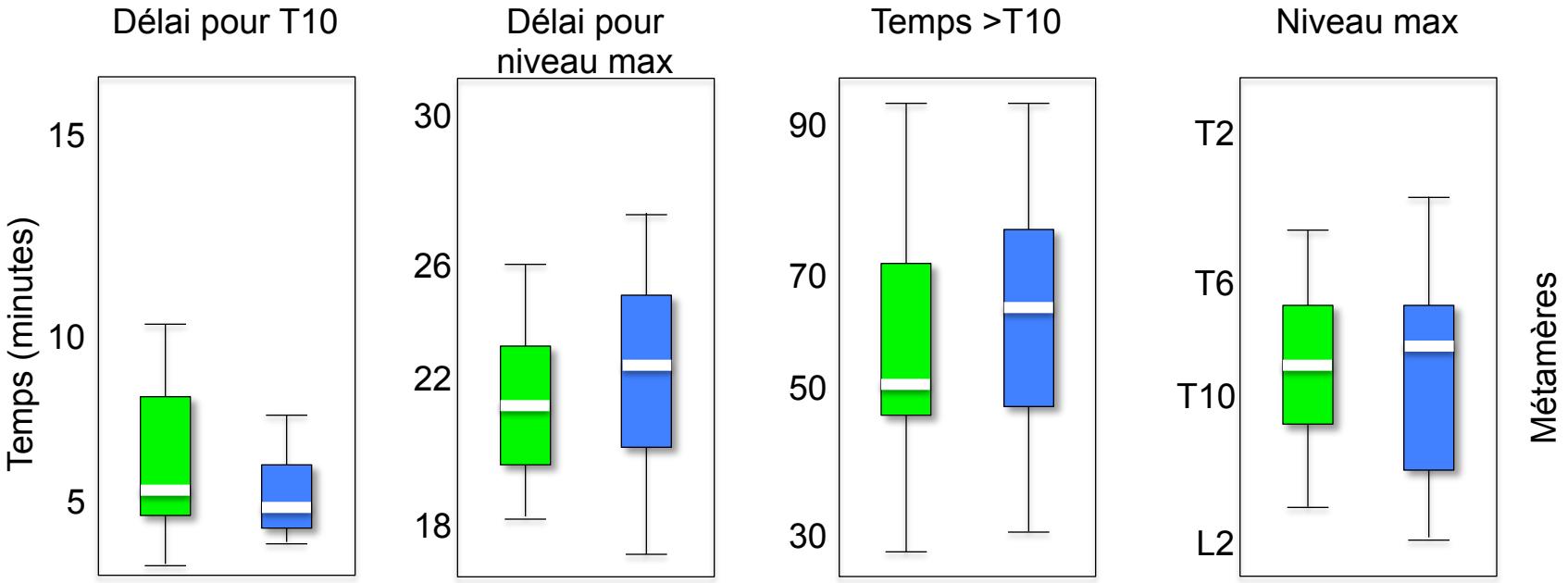
	Chloroprocaïne	Lidocaïne	p
Bloc en S2 (min)	103 ± 13	126 ± 16	<0,004
Marche (min)	104 ± 12	134 ± 14	<0,0009
Miction (min)	104 ± 12	134 ± 14	0,0007
IRT	0/8	7/8	

Kouri ME, Kopacz DJ. A&A 2004; 98:75-80

Comparaison chloroprocaïne-lidocaïne

Etude randomisée, en double aveugle, 40 patients adultes

- chloroprocaïne, 40 mg + 12,5 µg de fentanyl : n = 20
- lidocaïne, 40 mg + 12,5 µg de fentanyl : n = 20
- chirurgie : RTUP



Vaghadia H et al. AAS 2012

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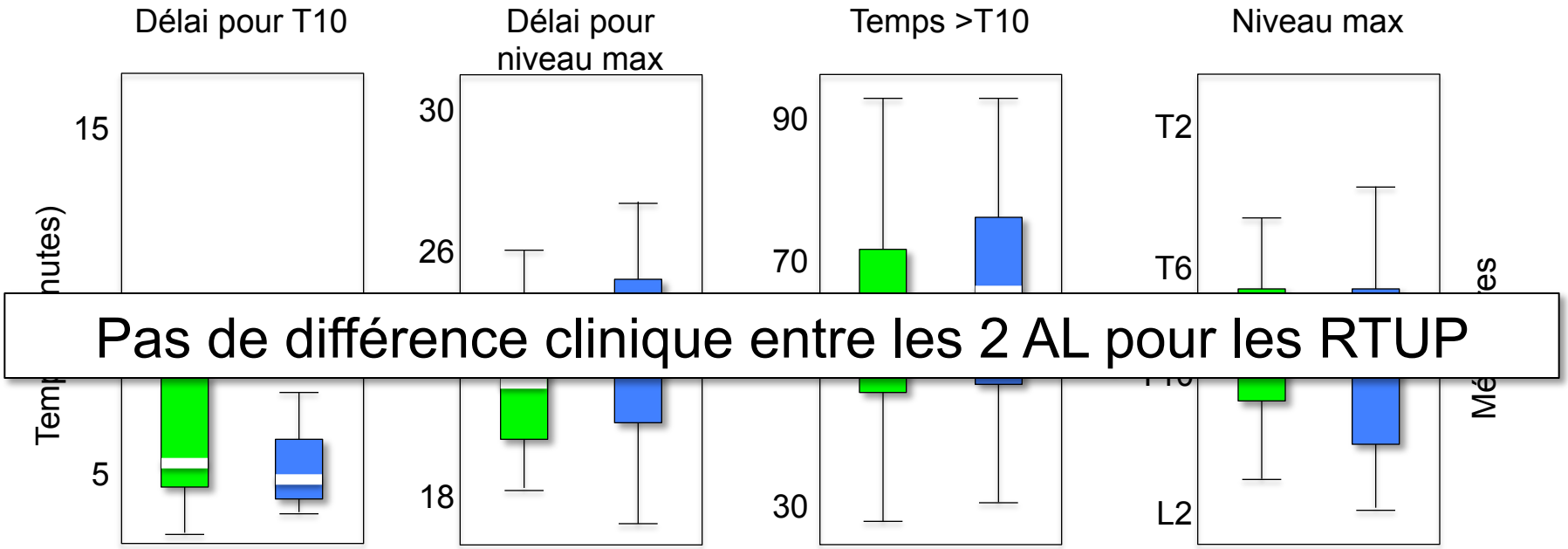


Pas de différence clinique entre les 2 AL pour les RTUP

Vaghadia H et al. AAS 2012

Comparaison chloroprocaïne-lidocaïne

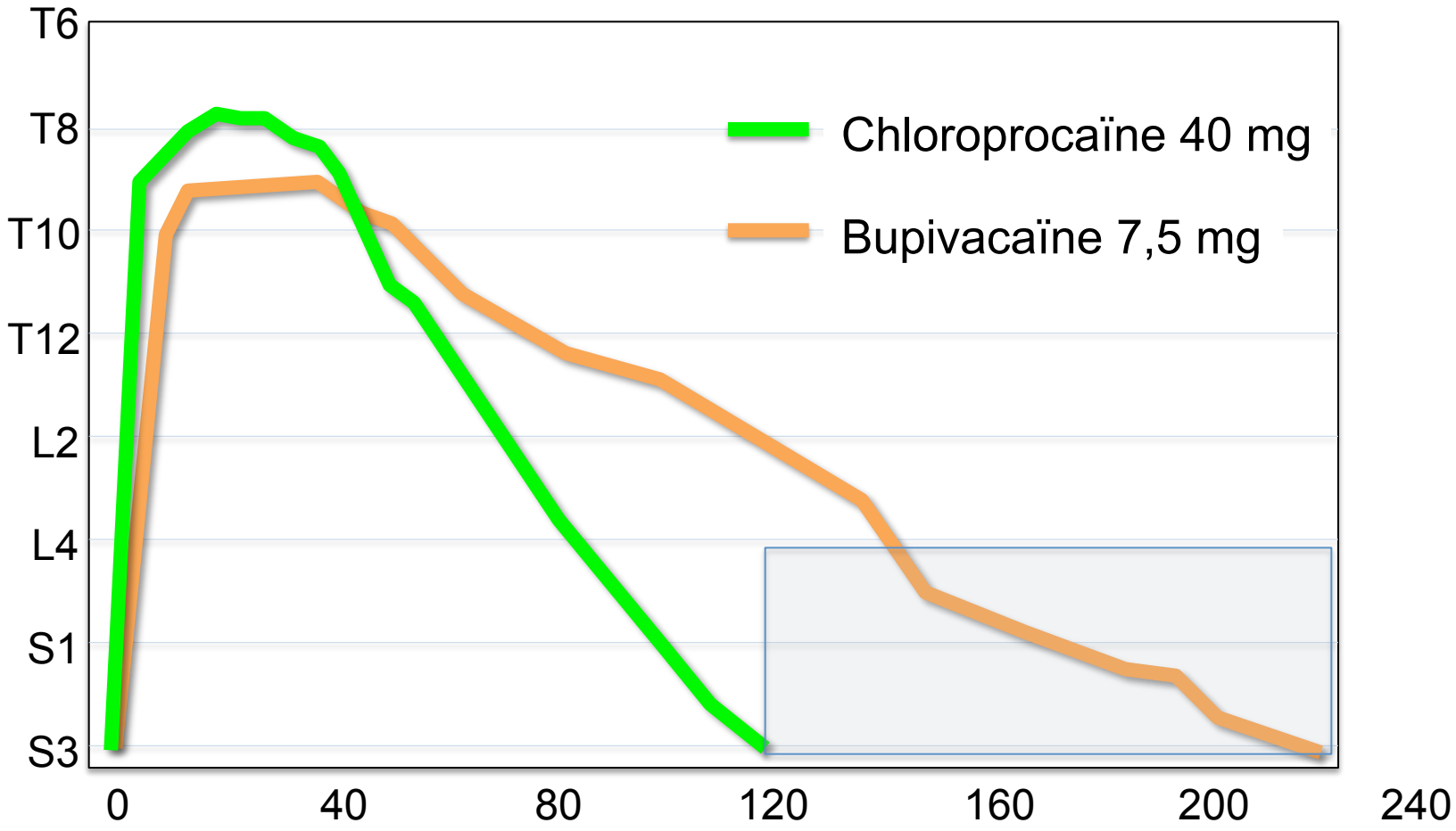
La 2-chloroprocaïne est une alternative possible à la lidocaïne en rachianesthésie ambulatoire

Avec l'avantage d'une absence de toxicité neurologique

Comparaison bupivacaïne-chloroprocaïne

Etude randomisée, en cross-over, 8 volontaires

- chloroprocaïne, 40 mg
- bupivacaïne HB, 7,5 mg



Yoos J et Kopacz D. A&A 2005

Comparaison bupivacaïne-chloroprocaïne

Etude randomisée, en cross-over, 8 volontaires

- chloroprocaïne, 40 mg
- bupivacaïne HB, 7,5 mg

	Chloroprocaïne	Bupivacaïne	p
Marche (min)	113 ±14	191 ± 30	< 0,01
Délai pour miction (min)	113 ±14	191 ± 30	< 0,01
Résiduel vésical (ml)	1 ±2	123 ± 221	< 0,014

Persistance d'une dysfonction vésicale plus de 3 heures après le bloc

Yoos J et Kopacz D. A&A 2005

Comparaison bupivacaïne-chloroprocaïne

Etude randomisée, en double aveugle, 130 patients adultes

- chloroprocaïne n = 66 = 50 mg
- bupivacaïne n = 64 = 10 mg

chirurgies sous-ombilicales

d'une durée prévue de moins de 40 minutes

d'un niveau supérieur nécessaire inférieur à T10

Non infériorité

Délai d'installation du bloc

	Chloroprocaïne	Bupivacaïne	différence
Délai pour T10 (min)	5,7 ± 4	7,6 ± 6	2
Délai niveau supérieur (min)	9,7 ± 6	16,5 ± 12	7

Comparaison bupivacaïne-chloroprocaïne

Etude randomisée, en double aveugle, 130 patients adultes

- chloroprocaïne n = 66 = 50 mg
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chirurgies sous-ombilicales

d'une durée prévue de moins de 40 minutes

d'un niveau supérieur nécessaire inférieur à T10

Non infériorité

Délai d'installation du bloc

Temps en minutes	Chloroprocaïne n = 56	Bupivacaïne n = 55	différence
Délai de levée du bloc moteur (Bromage = 0)	100,3 (± 27,7)	220,3 (± 57)	- 120 min
Délai de levée du bloc sensitif	109,2 (± 25,7)	235,5 (± 63,9)	- 126 min
Délai avant déambulation sans assistance	163,6 (± 74,8)	307,4 (± 70,6)	- 144 min
Délai avant 1e demande d'antalgique	211,8 (± 242,4)	332,3 (± 121,1)	- 120 min
Délai avant sortie (chirurgie ambulatoire)	190,3 (± 95,4)	324,1 (± 77,2)	- 134 min

Comparaison bupivacaïne-chloroprocaïne

Etude randomisée, en double aveugle, 130 patients adultes

- chloroprocaïne n = 66 = 50 mg
- bupivacaïne n = 64 = 10 mg

chirurgies sous-ombilicales

d'une durée prévue de moins de 40 minutes

d'un niveau supérieur nécessaire inférieur à T10

Non infériorité

Délai d'installation du bloc

Différence de 2heures

Temps en minutes	Chloroprocaïne n = 56	Bupivacaïne n = 55	différence
Délai de levée du bloc moteur (Bromage = 0)	100,3 (± 27,7)	220,3 (± 57)	- 120 min
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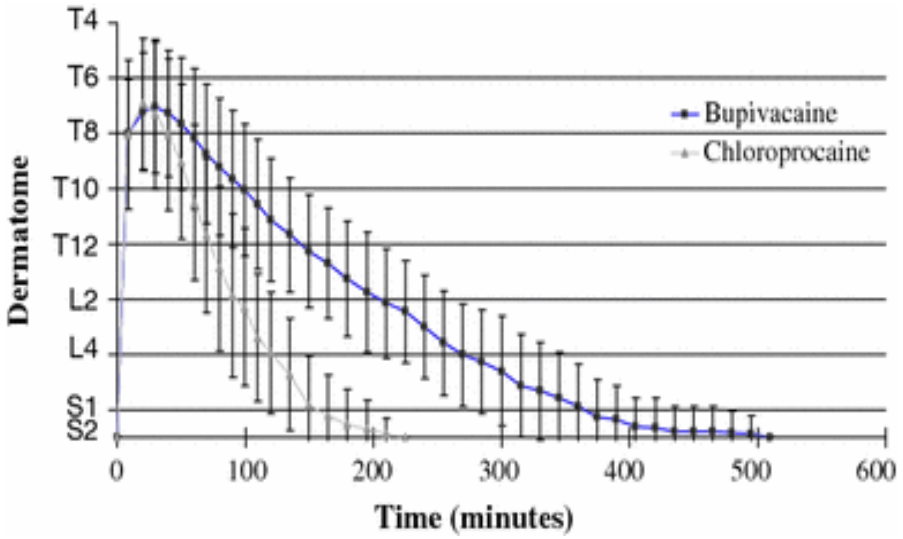
Comparison of bupivacaine and 2-chloroprocaine for spinal anesthesia for outpatient surgery: a double-blind randomized trial

Can J Anaesth. 2011;58:384-91

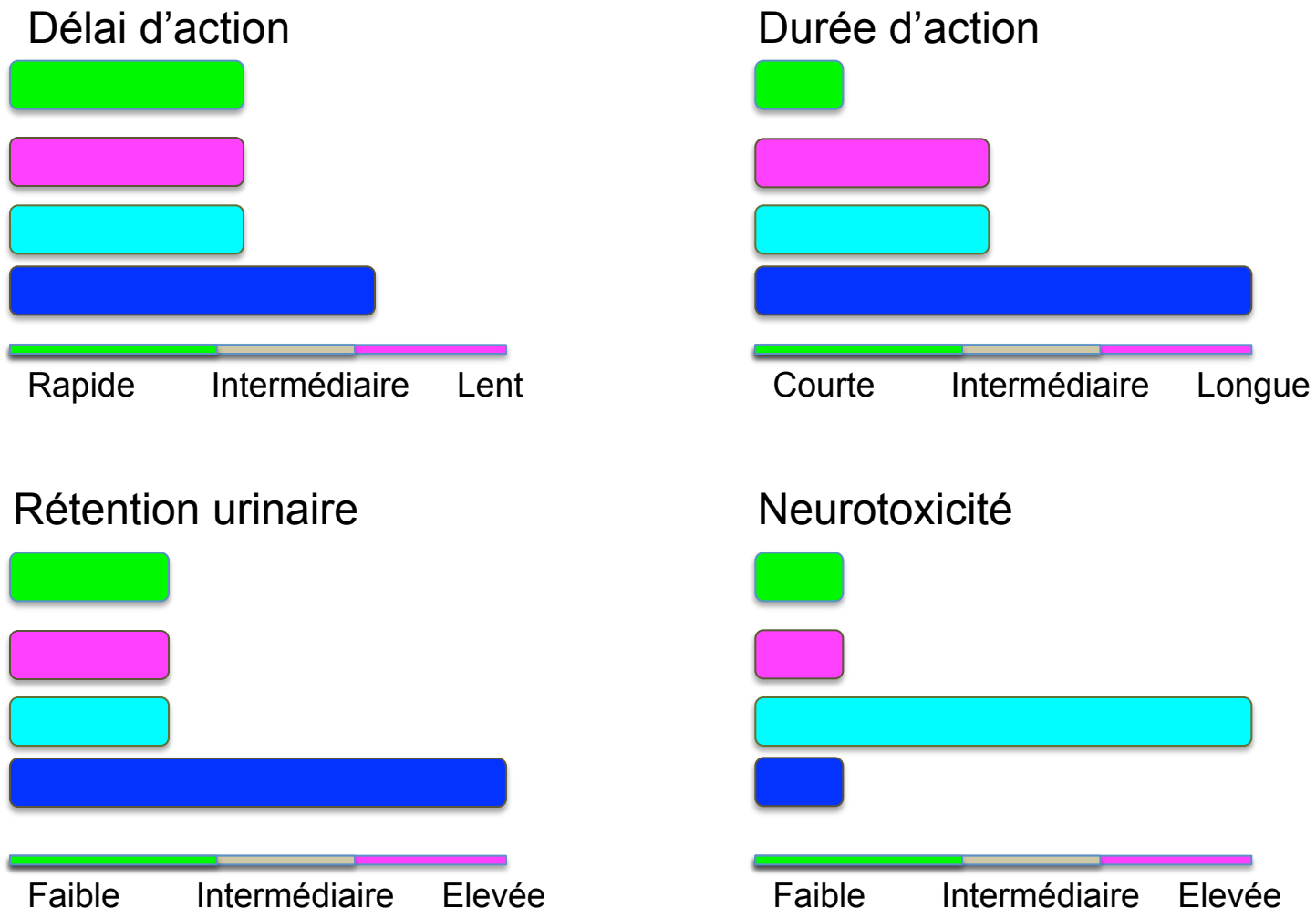
M-A Lacasse, J-D Roy, J Forget, F Vandenbroucke, R F. Seal, D Beaulieu, M McCormack and L Massicotte

A total of 106 patients were enrolled in this randomized double-blind study. Spinal anesthesia was achieved with 0.75% hyperbaric bupivacaine 7.5 mg (n = 53) or 2% preservative-free 2-CP 40 mg (n = 53)

Discharge	CP 40 mg	Bupi 0.75%		
Length of stay in PACU (min)	67 (16)	68 (14)	0.66	1.3 (−4.6 to 7.2)
Time to ambulation (min)	225 (56)	265 (65)	0.001	40.0 (16.3 to 63.7)
Time to micturition (min)	271 (96)	338 (99)	0.001	67.7 (27.3 to 108.1)
Interval from first try to successful voiding (min)	9 (26)	29 (51)	0.02	20.6 (3.8 to 37.4)



Les nouveaux AL en rachianesthésie de courte durée



“ The best way to predict the future is to create it.”

Peter Drucker