Outcome of Locoregional Anesthesia

S Coppens
Locoregional Anesthesia
University Hospitals Leuven

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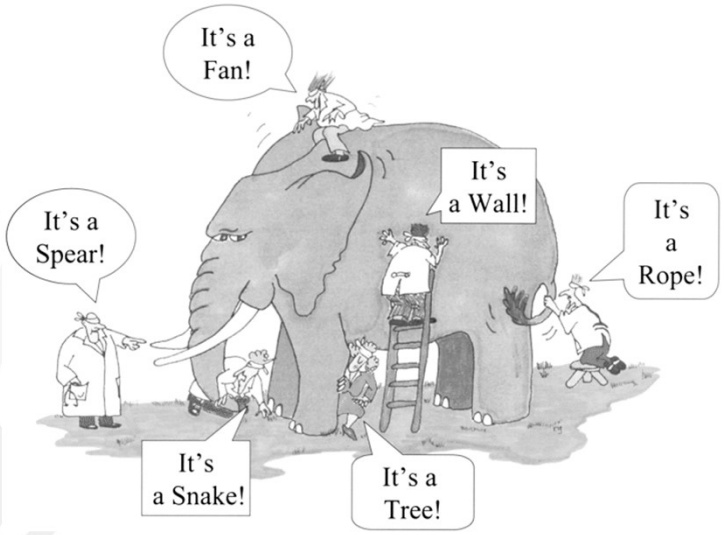
LRA vs GA
Different perspectives. Same goals



Benefits versus risks!

- Positive effects

- Better post-operative pain-control?
- Better patient satisfaction?
- Less opioids?
- Less PONV?
- Less POCD?
- Less morbidity?
- Less mortality?
- Faster recovery?
- Better ambulation?
- Better long-term functionality?
- Less cancer recurrence?

Less Cancer recurrence is A MYTH !!!

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Neuraxial Blocks

C-section : picture post-card for RA

- Difficult intubation
- Intracranial bleeding
- Maternal mortality
- Risk of awareness
- Not enough experience with GA and caesarean sections
- Patient satisfaction (mother/child relation)

International Journal of Obstetric Anesthesia (2015) 24, 356–374
0959-289X/$ - see front matter
http://dx.doi.org/10.1016/j.ijoa.2015.06.008
SPECIAL ARTICLE
ELSEVIER
www.obstetanesthesia.com

Failed tracheal intubation during obstetric general anaesthesia: a literature review

S.M. Kinsella,[a] A.L. Winton,[a] M.C. Mushambi,[b] K. Ramaswamy,[c] H. Swales,[d] A.C. Quinn,[e] M. Popat[f]

Neuraxial Blocks : Epidural

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THE OPEN MIND

CME **Does Regional Analgesia for Major Surgery Improve Outcome? Focus on Epidural Analgesia**

Fabian O. Kooij, MD, Wolfgang S. Schlack, MD, PhD, DEAA, Benedikt Preckel, MD, PhD, DEAA, and Markus W. Hollmann, MD, PhD, DEAA

Epidural analgesia is often considered the optimal technique for pain relief after major surgery and has been studied as a measure to improve outcome. Although conclusions from historical studies were promising, more recent studies show no relevant effect.

In the following discussion, we will assume regional analgesia does not make a difference in mortality and morbidity and will try to convince ourselves otherwise critically appraising the studies available.

Neuraxial Blocks : Epidural

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In conclusion, there is strong evidence that epidural analgesia or peripheral regional analgesic techniques improve neither perioperative mortality nor postoperative pulmonary and cardiovascular complications to a clinically significant extent for the general surgical population. If any, the advantages of epidural analgesia are limited to high-risk morbid patients undergoing high-risk procedures.[51,70] Analgesia is statistically, but not clinically, superior using epidural techniques. The marginal superiority is further offset by failure rates and analgesic alternatives such as (S)-ketamine, clonidine, and IV lidocaine. Epidural analgesia is associated with a small but relevant number of serious complications, especially in the presence of anticoagulant therapy. The risk/benefit balance should be discussed with the patient in the preoperative consultation.

In our opinion, epidural analgesia remains a valid option for postoperative analgesia, and all authors regularly use it for patients undergoing major surgery after careful individual risk assessment. However, given the arguments discussed above, epidural analgesia can no longer be considered the standard of care for a general surgical population.

Neuraxial Blocks : Epidural

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Research

JAMA Surgery | Original Investigation

Combined Epidural-General Anesthesia vs General Anesthesia Alone for Elective Abdominal Aortic Aneurysm Repair

Amit Bardia, MBBS; Akshay Sood, MD; Feroze Mahmood, MD; Vwaire Orhurhu, MD, MPH; Ariel Mueller, MA; Mario Montealegre-Gallegos, MD; Marc R. Shnider, MD; Klaas H. J. Ultee; Marc L. Schermerhorn, MD; Robina Matyal, MD

IMPORTANCE Epidural analgesia (EA) is used as an adjunct procedure for postoperative pain control during elective abdominal aortic aneurysm (AAA) surgery. In addition to analgesia, modulatory effects of EA on spinal sympathetic outflow result in improved organ perfusion with reduced complications. Reductions in postoperative complications lead to shorter convalescence and possibly improved 30-day survival. However, the effect of EA on long-term survival when used as an adjunct to general anesthesia (GA) during elective AAA surgery is unknown.

OBJECTIVE To evaluate the association between combined EA-GA vs GA alone and long-term survival and postoperative complications in patients undergoing elective, open AAA repair.

CONCLUSIONS AND RELEVANCE Combined EA-GA was associated with improved survival and significantly lower HRs and ORs for mortality and morbidity in patients undergoing elective AAA repair. The survival benefit may be attributable to reduced immediate postoperative adverse events. Based on these findings, EA-GA should be strongly considered in suitable patients.

Invited Commentary page 1123

Supplemental content at jamasurgery.com

JAMA Surg. 2016;151(12):1116-1123. doi:10.1001/jamasurg.2016.2733
Published online September 7, 2016.

Neuraxial Blocks : Epidural, PVB

UZ LEUVEN

British Journal of Anaesthesia **111** (5): 711–20 (2013)
Advance Access publication 28 June 2013 · doi:10.1093/bja/aet213

BJA

CME

Regional anaesthesia to prevent chronic pain after surgery: a Cochrane systematic review and meta-analysis†

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Editor's key points

- This co-publication of a Cochrane review addresses the role of regional anaesthesia in preventing persistent postoperative pain (PPP).
- Randomized controlled trials, which had pain at 6 and 12 months as the outcome measure, were reviewed.
- Results show that epidural anaesthesia and paravertebral block may prevent chronic postoperative pain after thoracotomy and breast surgery.
- Importantly, one out of every four to five treated patients could benefit.

Background. Regional anaesthesia may reduce the risk of persistent (chronic) pain after surgery, a frequent and debilitating condition. We compared regional anaesthesia *vs* conventional analgesia for the prevention of persistent postoperative pain (PPP).

Methods. We searched the Cochrane Central Register of Controlled Trials, PubMed, EMBASE, and CINAHL from their inception to May 2012, limiting the results to randomized, controlled, clinical trials (RCTs), supplemented by a hand search in conference proceedings. We included RCTs comparing regional *vs* conventional analgesia with a pain outcome at 6 or 12 months. The two authors independently assessed methodological quality and extracted data. We report odds ratios (ORs) with 95% confidence intervals (CIs) as our summary statistic based on random-effects models. We grouped studies according to surgical interventions.

Results. We identified 23 RCTs. We pooled data from 250 participants in three trials after thoracotomy with outcomes at 6 months. Data favoured epidural anaesthesia for the prevention of PPP with an OR of 0.33 (95% CI 0.20–0.56). We pooled two studies investigating paravertebral block for breast cancer surgery; pooled data of 89 participants with outcomes ~6 months favoured paravertebral block with an OR of 0.37 (95% CI 0.14–0.94). Adverse effects were reported sparsely.

Conclusions. Epidural anaesthesia and paravertebral block, respectively, may prevent PPP after thoracotomy and breast cancer surgery in about one out of every four to five patients treated. Small numbers, performance bias, attrition, and incomplete outcome data especially at 12 months weaken our conclusions.

Keywords: chronic pain; meta-analysis; prevention; regional anaesthesia; systematic review

Accepted for publication: 17 April 2013

Neuraxial Blocks : Spinal

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Cochrane Library

Cochrane Database of Systematic Reviews

Anaesthesia for hip fracture surgery in adults (Review)

Guay J, Parker MJ, Gajendragadkar PR, Kopp S

Authors' conclusions

We did not find a difference between the two techniques, except for deep venous thrombosis in the absence of potent thromboprophylaxis. The studies included a wide variety of clinical practices. The number of participants included in the review is insufficient to eliminate a difference between the two techniques in the majority of outcomes studied. Therefore, large randomized trials reflecting actual clinical practice are required before drawing final conclusions.

Neuraxial Blocks : Spinal

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Anaesthesia 2016, 71, 506–514 doi:10.1111/anae.13415

Original Article

CPD available at http://www.learnataagbi.org

Secondary analysis of outcomes after 11,085 hip fracture operations from the prospective UK Anaesthesia Sprint Audit of Practice (ASAP-2)

S. M. White,[1] I. K. Moppett,[2] R. Griffiths,[3] A. Johansen,[4] R. Wakeman,[4] C. Boulton,[4] F. Plant,[5] A. Williams,[6] K. Pappenheim,[7] A. Majeed,[8] C. T. Currie[9] and M. P. W. Grocott[10]

Summary

We re-analysed prospective data collected by anaesthetists in the Anaesthesia Sprint Audit of Practice (ASAP-1) to describe associations with linked outcome data. Mortality was 165/11,085 (1.5%) 5 days and 563/11,085 (5.1%) 30 days after surgery and was not associated with anaesthetic technique (general vs. spinal, with or without peripheral nerve blockade). The risk of death increased as blood pressure fell: the odds ratio (95% CI) for mortality within five days after surgery was 0.983 (0.973–0.994) for each 5 mmHg intra-operative increment in systolic blood pressure, p = 0.0016, and 0.980 (0.967–0.993) for each mmHg increment in mean pressure, p = 0.0039. The equivalent odds ratios (95% CI) for 30-day mortality were 0.968 (0.951–0.985), p = 0.0003 and 0.976 (0.964–0.988), p = 0.0001, respectively. The lowest systolic blood pressure after intrathecal local anaesthetic relative to before induction was weakly correlated with a higher volume of subarachnoid bupivacaine: r^2 −0.10 and −0.16 for hyperbaric and isobaric bupivacaine, respectively. A mean 20% relative fall in systolic blood pressure correlated with an administered volume of 1.44 ml hyperbaric bupivacaine. Future research should focus on refining standardised anaesthesia towards administering lower doses of spinal (and general) anaesthesia and maintaining normotension.

Sedation, high doses, not standardising care is that why you fail

Peripheral Nerve Blocks

British Journal of Anaesthesia **114** (5): 728–45 (2015)
Advance Access publication 17 February 2015 · doi:10.1093/bja/aeu559

BJA

REVIEW ARTICLES

Peripheral regional anaesthesia and outcome: lessons learned from the last 10 years

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Peripheral Nerve Blocks

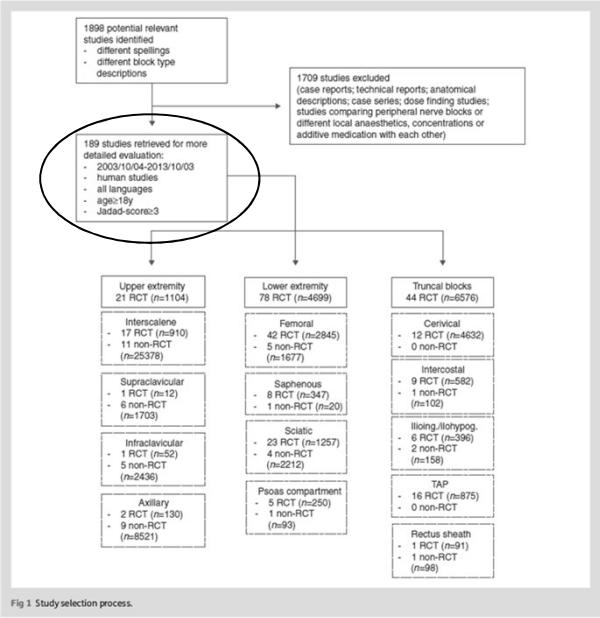


Fig 1 Study selection process.

Peripheral Nerve Blocks

Editor's key points

- The authors reviewed the extensive literature regarding outcome following peripheral regional anaesthetic techniques.
- Improvements in postoperative pain and surgical pathway efficiency were noted. Complications were rare.
- Long-term effects were not apparent, although further work is needed in this area.

Background. Our aim was to review the recent evidence for the efficacy of peripheral regional anaesthesia.

Methods. Following a systematic literature search and selection of publications based on prospectively agreed upon criteria, we produced a narrative review of the most commonly performed peripheral regional anaesthetic blocks for surgery on the upper limb, the lower limb, and the trunk. We considered short-term and longer-term benefits and complications among the outcomes of interest.

Results. Where good quality evidence exists, the great majority of the blocks reviewed were associated with one or any combination of reduced postoperative pain, reduced opioid consumption, or increased patient satisfaction. For selected surgical procedures, the use of blocks avoided general anaesthesia and was associated with increased efficiency of the surgical pathway. The exceptions were supraclavicular block, where there was insufficient evidence, and transversus abdominis plane block, where the evidence for efficacy was conflicting. The evidence for the impact of the blocks on longer-term outcomes was, in general, inadequate to inform clinical decision making. Permanent complications are rare.

Conclusions. The majority of peripheral regional anaesthetic techniques have been shown to produce benefits for patients and hospital efficiency. Further interventional trials are required to clarify such benefits for supraclavicular block and transversus abdominis plane block and to ascertain any longer-term benefits for almost all of the blocks reviewed. Permanent complications of peripheral regional anaesthetic blocks are rare but accurate estimates of their incidence are yet to be determined.

Keywords: nerve block; outcome studies; postoperative complications; postoperative pain

BJA

British Journal of Anaesthesia, 118 (1): 105–11 (2017)

doi: 10.1093/bja/aew383
Clinical Practice

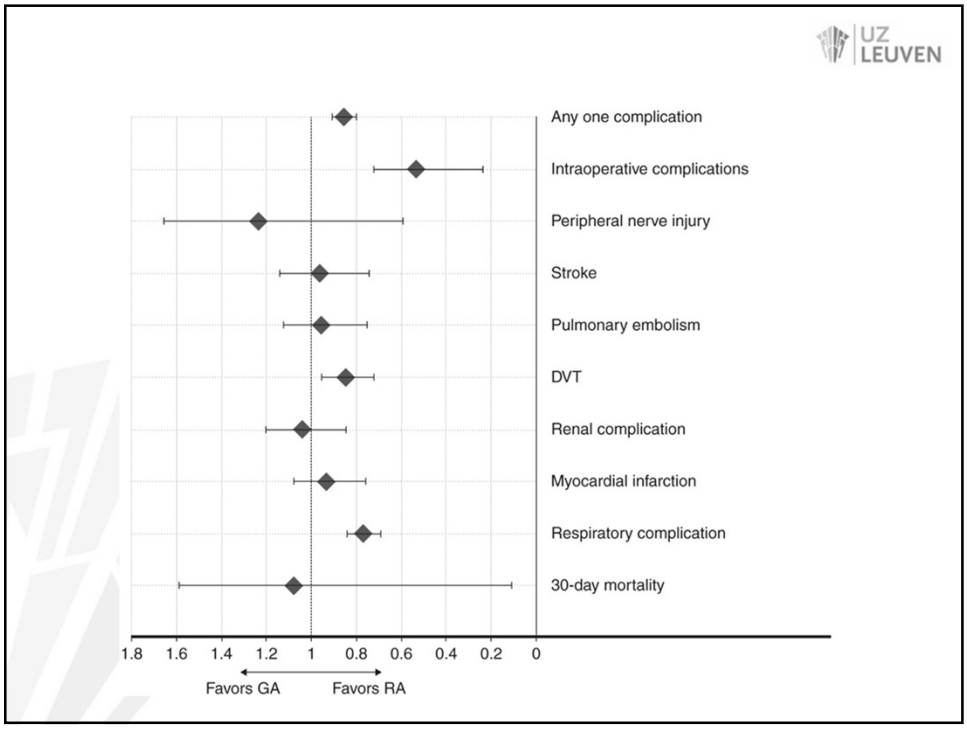
Effect of anaesthesia type on postoperative mortality and morbidities: a matched analysis of the NSQIP database

N. N. Saied[1,*], M. A. Helwani[2], L. M. Weavind[1], Y. Shi[1,3], M. S. Shotwell[1,3] and P. P. Pandharipande[1]

Abstract

Background. The anaesthetic technique may influence clinical outcomes, but inherent confounding and small effect sizes makes this challenging to study. We hypothesized that regional anaesthesia (RA) is associated with higher survival and fewer postoperative organ dysfunctions when compared with general anaesthesia (GA).
Methods. We matched surgical procedures and type of anaesthesia using the US National Surgical Quality Improvement database, in which 264,421 received GA and 64,119 received RA. Procedures were matched according to Current Procedural Terminology (CPT) and ASA physical status classification. Our primary outcome was 30-day postoperative mortality and secondary outcomes were hospital length of stay, and postoperative organ system dysfunction. After matching, multiple regression analysis was used to examine associations between anaesthetic type and outcomes, adjusting for covariates.
Results. After matching and adjusting for covariates, type of anaesthesia did not significantly impact 30-day mortality. RA was significantly associated with increased likelihood of early discharge (HR 1.09; P< 0.001), 47% lower odds of intraoperative complications, and 24% lower odds of respiratory complications. RA was also associated with 16% lower odds of developing deep vein thrombosis and 15% lower odds of developing any one postoperative complication (OR 0.85; P < 0.001). There was no evidence of an effect of anaesthesia technique on postoperative MI, stroke, renal complications, pulmonary embolism or peripheral nerve injury.
Conclusions. After adjusting for clinical and patient characteristic confounders, RA was associated with significantly lower odds of several postoperative complications, decreased hospital length of stay, but not mortality when compared with GA.

Key words: general anaesthesia; patient outcome; regional anaesthesia; registry



Benefits versus risks!

- Negative effects

- All complications of regional anesthesia
- Potential risks are same as general anesthesia

- Cost
- Learning curve
- Infrastructure
- Time consuming

Complications!

- Neurological complications
- Inpatient falls
- Local anesthetic toxicity
- Hematoma
- Infections
- Mechanical injuries
- Failed blocks
  and patient dissatisfaction

Neurological complications

Neurological Complications After Regional Anesthesia: Contemporary Estimates of Risk

Richard Brull, MD, FRCPC

Colin J. L. McCartney, MBChB, FRCA, FFARCSI, FRCPC

Vincent W. S. Chan, MD, FRCPC

Hossam El-Beheiry, MBBCh, PhD, FRCPC

BACKGROUND: Regional anesthesia (RA) provides excellent anesthesia and analgesia for many surgical procedures. Anesthesiologists and patients must understand the risks in addition to the benefits of RA to make an informed choice of anesthetic technique. Many studies that have investigated neurological complications after RA are dated, and do not reflect the increasing indications and applications of RA nor the advances in training and techniques. In this brief narrative review we collate the contemporary investigations of neurological complications after the most common RA techniques.

METHODS: We reviewed all 32 studies published between January 1, 1995 and December 31, 2005 where the primary intent was to investigate neurological complications of RA.

RESULTS: The sample size of the studies that investigated neurological complications after central and peripheral (PNB) nerve blockade ranged from 4185 to 1,260,000 and 20 to 10,309 blocks, respectively. The rate of neuropathy after spinal and epidural anesthesia was 3.78:10,000 (95% CI: 1.06–13.50:10,000) and 2.19:10,000 (95% CI: 0.88–5.44:10,000), respectively. For common PNB techniques, the rate of neuropathy after interscalene brachial plexus block, axillary brachial plexus block, and femoral nerve block was 2.84:100 (95% CI 1.33–5.98:100), 1.48:100 (95% CI: 0.52–4.11:100), and 0.34:100 (95% CI: 0.04–2.81:100), respectively. The rate of permanent neurological injury after spinal and epidural anesthesia ranged from 0–4.2:10,000 and 0–7.6:10,000, respectively. Only one case of permanent neuropathy was reported among 16 studies of neurological complications after PNB.

CONCLUSIONS: Our review suggests that the rate of neurological complications after central nerve blockade is <4:10,000, or 0.04%. The rate of neuropathy after PNB is <3:100, or 3%. However, permanent neurological injury after RA is rare in contemporary anesthetic practice.

(Anesth Analg 2007;104:965–74)

Neurological complications

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Table 4. Aggregate Estimated Rate of Occurrence of Neuropathy After Peripheral Nerve Blockade

	Estimated rate of occurrence (n = 100)	Lower CI (n = 100)	Upper CI (n = 100)	Heterogeneity (Q value)	
Brachial plexus blockade					
Interscalene block (7 studies)	2.84	1.33	5.98	90.71	$P < 0.01$
Supraclavicular block (1 study)	0.03	0.00	0.42	NA	NA
Axillary block (10 studies)	1.48	0.52	4.11	315.57	$P < 0.01$
Midhumeral block (2 studies)	0.02	0.00	0.09	0.28	NS
Lumbar plexus blockade					
Lumbar plexus block (3 studies)	0.19	0.02	1.93	6.18	$P < 0.05$
Femoral nerve block (4 studies)	0.34	0.04	2.81	57.51	$P < 0.01$
Sacral plexus blockade					
Sciatic nerve block (3 studies)	0.41	0.02	9.96	38.71	$P < 0.01$
Popliteal nerve block (4 studies)	0.24	0.10	0.61	0.96	NS

The estimated rate of occurrence was calculated using a random effects general linear model (see text).

CI = 95% confidence interval; NA = not applicable; NS = nonsignificant (nonsignificance indicates the absence of heterogeneity between studies).

970 Complications of Regional Anesthesia ANESTHESIA & ANALGESIA

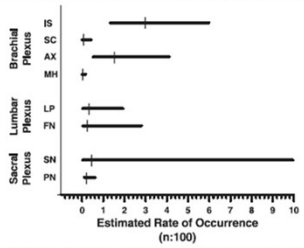

Figure 2. Aggregate estimated rate of occurrence and corresponding 95% confidence intervals (CI) for neuropathy after peripheral nerve blockade techniques.

Neurological complications

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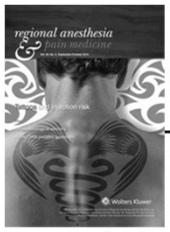

SPECIAL ARTICLE

The Second ASRA Practice Advisory on Neurologic Complications Associated With Regional Anesthesia and Pain Medicine

Executive Summary 2015

Joseph M. Neal, MD, Michael J. Barrington, MBBS, FANZCA, PhD,† Richard Brull, MD,‡ Admir Hadzic, MD,§ James R. Hebl, MD,|| Terese T. Horlocker, MD,|| Marc A. Huntoon, MD,** Sandra L. Kopp, MD,|| James P. Rathmell, MD,†† and James C. Watson, MD||*

Regional Anesthesia and Pain Medicine • Volume 40, Number 5, September-October 2015

Peripheral Nerve Blocks

frequency of adverse effects

TABLE 3. *(Continued)*

Author, Year	PNB Type	Technique Used	N	Neurologic Outcome	Incidence (%) (time)*	Potential Risk Factors	Comment
Fredrickson and Kilfoyle, 2009[87]	BP, FNB, SNB	US	1010	PNI	0.6 (6 mo)	Paresthesia during PNB	Most PNI unrelated to PNB
Liu et al, 2009[88]	ISB	US	230*	PONS	0.8–1.1 (1 wk)	—	No difference in PONS, US compared with NS
Welch et al, 2009[73]	All		380,680*	PNI	0.03	EA, GA, hypertension, diabetes mellitus, tobacco use, surgical specialty	Retrospective study using 3 databases including QI database
Barrington et al, 2009[22]	All	US, NS, LM	8189	Neurologic complication‡	0.02 (6 mo)	Comorbidities: vascular disease, lumbar stenosis, radiculopathy, neuropathy	Systematic postoperative follow-up. No significant difference: US vs NS techniques
Davis et al, 2009[89]	ISB	US	200	Neurologic deficits	0	—	Transient neurological deficits (1%)
Perlas et al, 2009[90]	SCB	US	510	Neurologic deficits	0	—	0.4% reported transient numbness in fingers
Sharma, 2010[91]	FNB	NS	729*	Femoral neuropathy/neuritis	0.14 (12 mo)	Neuropathy: 0.7% with FNB, 0.4% with no FNB	1 patient after FNB had residual sensory symptoms at 12 mo
Ecoffey et al, 2010[56]	UL, LL, Trunk	Not stated	20, 576	Neurologic complication	0	Pediatric study	Femoral distribution hypoesthesia (iliofascial block) resolved <48 h
Liu et al, 2010[92]	ISB, SCB	US	1169	PONS	0.4	—	No permanent injuries
Jacob et al, 2011[71]	LL	NS, LM	12,329*	PNI	0.79 (3 mo)	Tourniquet time and bilateral surgery	PNI was not associated with PNB or type of anesthesia
Jacob et al, 2011[70]	LL	NS, LM	12,998*	PNI	0.72 (3 mo)	Age, female, surgical duration, posterior approach	PNI was not associated with PNB or type of anesthesia
Misamore et al, 2011[93]	ISB	NS	910	Neurologic complication‡	0.8 (6 mo)	Diffuse mild brachial plexopathy confirmed on EMG	Radial nerve palsy (n = 1), mild forearm/hand paresthesias (n = 5), Horner syndrome (n = 2)
Singh et al, 2012[94]	ISB	US	1319	Neurological complication	0 (4 mo)	Brachial plexitis (3 cases) related to underlying comorbidities	Digital numbness (0.6%), all resolved by 4 mo, ulnar neuropathy (1 case) resolved
Sviggum et al, 2012[72]	ISB	NS, LM	1569	PNI	2.2 (3 mo)	ISB did not increase the risk of PNI. GA used as primary anesthetic in 1569 patients	Complete resolution of symptoms in 97% of patients after TSA
Sites et al, 2012[33]	All	US	12,668	PONS	0.09 (6 mo)	ISB and shoulder surgery	PONS defined as sensory/motor dysfunction >5 d
Orebaugh et al, 2012[24]†	UL, LL	US, NS	9069	Neurologic complication‡	0.04 (6 mo)	No significant difference: US vs NS techniques	1 sensorimotor deficit persisted >1 y after FNB
Polaner et al, 2012[30]	All	US, NS	5761	Neurologic complication	0 (3 mo)	Possible exacerbation of preoperative symptoms after LPB	Pediatric regional anesthesia
Hara et al, 2012[95]	SNB	US	325	Neurologic complication‡	0	Unintentional intraneural injection occurred in 16.3%	No clinical evidence of nerve injury
Henningsen et al, 2013[96]	SNB	US	97	Neurologic complication	0 (6 mo)	Infrapatellar branch involved in 84% (surgical etiology)	Neurologic examination of patients after TKA
Lecours et al, 2013[97]	ICB	US	627	Neurologic complication‡	0.2 (1 y)	1 patients had biceps weakness >1 y	4 patients with features potentially related to ICB

Peripheral Nerve Blocks

frequency of adverse effects

TABLE 3. Incidence of Neurologic Outcomes Associated With Peripheral Nerve Blockade—As Reported Since 1997

Author, Year	PNB Type	Technique Used	N	Neurologic Outcome	Incidence (%) (time)*	Potential Risk Factors	Comment
Giaufré et al, 1996[64]	UL, LL	-	4090		0	-	No complication reported after PNB
Auroy et al, 1997[25]	All	-	21,278	Radiculopathy	0 (3 mo)	Paresthesia during puncture, pain during injection	Transient radiculopathy in 0.02%
Fanelli et al, 1999[69]	UL, LL	NS	3996	Neurological complication	0.03 (3 mo)	Tourniquet inflation pressure >400 mm Hg	Transient neurologic dysfunction in 1.7%. All resolved by 6 mo
Borgeat et al, 2001[74]	ISB	NS	521	Plexus lesion	0.2 (9 mo)	Bilateral ulnaris and carpal tunnel syndromes	Neurologic features present in 7.9%, 3.9%, and 0.9% at 1, 3, and 6 mo; serial EMGs performed
Hebl et al, 2001[75]	Ax	NS, LM	100	PONS	6	Bupivacaine (0.375%): an independent risk factor	Anesthetic (GA or Ax block) did not affect neurological outcome after UT
Weber and Jain, 2002[76]	ISB	NS	218	Neurologic complication‡	0.5 (2 y)	Pain during ISB	Retrospective chart review, permanent injury in 1 patient
Auroy et al, 2002[26]	All	NS, LM	50,223	Neurologic complication‡	0.014 (6 mo)	Popliteal SNB (0.3%), paresthesia during PNB	50,223 PNB, 12 complications in total, 7 present at 6 mo
Bergman et al, 2003[77]	Ax, CPNB	NS, LM	405	Neurologic complication‡	0.5	Profound sensorimotor deficits–poor recovery (1 patient)	2 of 4 patients with new deficits were related to anesthesia
Capdevila et al, 2005[78]	CPNB	NS	1416	Neurologic complication‡	0 (3 mo)	Anesthetized during PNB	Incidence 0.21% in early postoperative period. All resolved by 3 mo
Candido et al, 2005[79]	ISB	NS	693	Neurologic sequelae	0.1 (3 mo)	Paresthesia at needle insertion, ISB site pain or bruising at 24 h	Neurologic sequelae present in 3.3%, 0.1% at 1, 3 mo
Liguori et al, 2006[80]	ISB	NS, MP	218	PONS	0 (12 mo)	PONS: 10.1% with NS, 9.3% with MP	Median duration of PONS, 2 mo. Resolved within 1 y
Bishop et al, 2006[81]	ISB	NS	277	Neuropathy	0	—	Transient sensory neuropathies all resolved (5 wk)
Ben-David et al, 2006[82]	Ax	TA	336	Neurologic complication‡	0.3	Nerve injury: 7.5% with PNB performed under GA vs 2.6% with sedation	All complications resolved except for 1 permanent injury
Faryniarz et al, 2006[83]	ISB	NS	133	Neuropraxia	0 (2 mo)	—	Detailed perioperative neurological assessment, all events transient (1.4%)
DeVera et al, 2006[48]	UL, LL	NS	1529	PONS	0 (1 mo)	Duration of tourniquet inflation	Persistent paresthesia after FNB, resolved by 1 mo
Wiegel et al, 2007[84]	CPNB	NS	1398	Neurologic complication‡	0.07	—	Retroperitoneal hematoma led to long-term femoral neuropathy
Lenters et al, 2007[85]	ISB	NS, MP	3172	Neurologic complication‡	0.2–0.4 (6 mo)	Volume of practice	Incidence of serious, long-term PNB-related injury higher than other studies
Pöpping et al, 2008[54]	CPNB	—	3111	Neurologic complication	0 (4 wk)	Incidence 0.06%, complete recovery within 4 wk	Difficulty distinguishing anesthetic from nonanesthetic etiology after ISB
Christ et al, 2009[86]	ISB	NS	273	Neurologic complication‡	0 (6 mo)	Superficial cervical plexus involvement: 7.7% at 24 h, 1.8% at 1 mo	All deficits resolved by 6 mo

Continued next page

Complications!

- Neurological complications
- Inpatient falls
- Local anesthetic toxicity
- Hematoma
- Infections
- Mechanical injuries
- Failed blocks
  and patient dissatisfaction

Inpatient falls

Inpatient Falls after Total Knee Arthroplasty

The Role of Anesthesia Type and Peripheral Nerve Blocks

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ABSTRACT

Background: Much controversy remains on the role of anesthesia technique and peripheral nerve blocks (PNBs) in inpatient falls (IFs) after orthopedic procedures. The aim of the study is to characterize cases of IFs, identify risk factors, and study the role of PNB and anesthesia technique in IF risk in total knee arthroplasty patients.

Methods: The authors selected total knee arthroplasty patients from the national Premier Perspective database (Premier Inc., Charlotte, NC; 2006–2010; n = 191,570, >400 acute care hospitals). The primary outcome was IF. Patient- and healthcare system–related characteristics, anesthesia technique, and presence of PNB were determined for IF and non-IF patients. Independent risk factors for IFs were determined by using conventional and multilevel logistic regression.

Results: Overall, IF incidence was 1.6% (n = 3,042). Distribution of anesthesia technique was 10.9% neuraxial, 12.9% combined neuraxial/general, and 76.2% general anesthesia. PNB was used in 12.1%. Patients suffering IFs were older (average age, 68.9 *vs.* 66.3 yr), had higher comorbidity burden (average Deyo index, 0.77 *vs.* 0.66), and had more major complications, including 30-day mortality (0.8 *vs.* 0.1%; all $P < 0.001$). Use of neuraxial anesthesia (IF incidence, 1.3%; n = 280) had lower adjusted odds of IF compared with adjusted odds of IF with the use of general anesthesia alone (IF incidence, 1.6%; n = 2,393): odds ratio, 0.70 (95% CI, 0.56–0.87). PNB was not significantly associated with IF (odds ratio, 0.85 [CI, 0.71–1.03]).

Conclusions: This study identifies several risk factors for IF in total knee arthroplasty patients. Contrary to common concerns, no association was found between PNB and IF. Further studies should determine the role of anesthesia practices in the context of fall-prevention programs. (ANESTHESIOLOGY 2014; 120:551-63)

Complications!

- Neurological complications
- Inpatient falls
- Local anesthetic toxicity
- Hematoma
- Infections
- Mechanical injuries
- Failed blocks
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J Anesth
DOI 10.1007/s00540-014-1904-9

SHORT COMMUNICATION

An assessment of the awareness of local anesthetic systemic toxicity among multi-specialty postgraduate residents

Afrin Sagir · Rakhee Goyal

Abstract Local anesthetics (LAs) are extensively used in clinical practice by both anesthesiologists and non-anesthesiologists and are often associated with systemic toxicity. We hypothesize that this awareness is inadequate among medical specialists and entails a risk of misdiagnosis and underreporting of such events. We therefore conducted a cross-sectional questionnaire-based study to assess the level of understanding of LA use and effective management of systemic toxicity among 200 postgraduate residents of various specialties (with the exception of anesthesiology) in a tertiary care hospital in India from October to December 2013. Among those residents who had used LAs (193/200), 27 and 25 % of responders correctly identified the toxic doses of lidocaine and of lidocaine + adrenaline, respectively. Of the responders, 70 % always performed a negative aspiration of blood before injecting the drug, 27 % sometimes aspirated and the remaining 3 % never aspirated. The majority of the responders (93 %) were unaware of the toxic dose of bupivacaine. Only 70 % of responders believed that LAs could be toxic [95 % confidence interval (CI) 65.5–74.5 %], and 81 % of these correctly identified the signs and symptoms of cardiotoxicity. Only 2 % of responders knew that lipid emulsion is a part of its treatment (95 % CI 0.6–3.4 %). Based on these results, there is

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UZ LEUVEN

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QUESTIONS	ANSWERS
1. Have you used any local anesthetic?	Yes/No
2. If yes, which one?	Lidocaine/Bupivacaine
3. Have you used adrenaline with it?	Yes/No
4. Routes of administration?	Intradermal/lesional/subcutaneous/topical/nerve block
5. Site of injection?	Face/Oral cavity/Scalp/Trunk/Limbs/Perineum
6. % of drug/ volume you have used maximum?	----------
7. Do you aspirate before injecting?	Yes/ always/Sometimes/Never
8. Do you think that local anesthetics could be toxic?	Yes/No
9. If yes, what do you think is the maximum safe dose you could use?	Without adrenaline ---------- With adrenaline ----------
10. What symptoms/signs would you look for in a case of suspected LA toxicity?	
11. How would you treat local anesthetic toxicity?	Supportive/Specific therapy/Don't know
12. Have you heard of lipid rescue?	Yes/No
13. Which drug can you use as lipid rescue and what is the dose?	

Table 2 Postgraduate specialities and year of residency of medical residents sent a questionnaire ($n = 200$)

Speciality	Year			
	First	Second	Third	Total
Anatomy	5	3	4	12
Physiology	3	3	5	11
Biochemistry	4	5	3	12
Pathology	2	2	4	8
Microbiology	3	5	5	13
Pharmacology	4	3	5	12
Forensic medicine	5	3	1	9
Preventive social medicine	3	5	2	10
Radiology	3	2	3	8
Hospital administration	1	2	2	5
General medicine	4	4	4	12
General surgery	5	4	2	11
Obstetrics gynecology	4	4	4	12
Pediatrics	3	3	2	8
Orthopedics	3	2	4	9
Psychiatry	4	2	3	9
Ophthalmology	2	3	3	8
Ear nose throat	3	2	3	8
Dentistry	2	4	4	10
Neurosurgery	2	2	1	5
Cardiac surgery	2	1	1	4
Plastic surgery	1	1	2	4
Total	68	65	67	200

UZ LEUVEN

IMMEDIATELY

Give an initial intravenous bolus injection of 20% lipid emulsion **1.5 ml.kg^{-1}** over 1 min

AND

Start an intravenous infusion of 20% lipid emulsion at **15 ml.kg^{-1}.h^{-1}**

AFTER 5 MIN

Give **a maximum of two** repeat boluses (same dose) if:
- cardiovascular stability has not been restored **or**
- an adequate circulation deteriorates

Leave **5 min** between boluses

A maximum of **three** boluses can be given (including the initial bolus)

AND

Continue infusion at same rate, but:
Double the rate to **30 ml.kg^{-1}.h^{-1}** at any time after 5 min, if:
- cardiovascular stability has not been restored or
- an adequate circulation deteriorates

Continue infusion until stable and adequate circulation restored or maximum dose of lipid emulsion given

Do not exceed a maximum cumulative dose of 12 ml.kg^{-1}

An approximate dose regimen for a 70-kg patient would be as follows:

IMMEDIATELY

Give an initial intravenous bolus injection of 20% lipid emulsion 100 ml over 1 min

AND

Start an intravenous infusion of 20% lipid emulsion at 1000 ml.h^{-1}

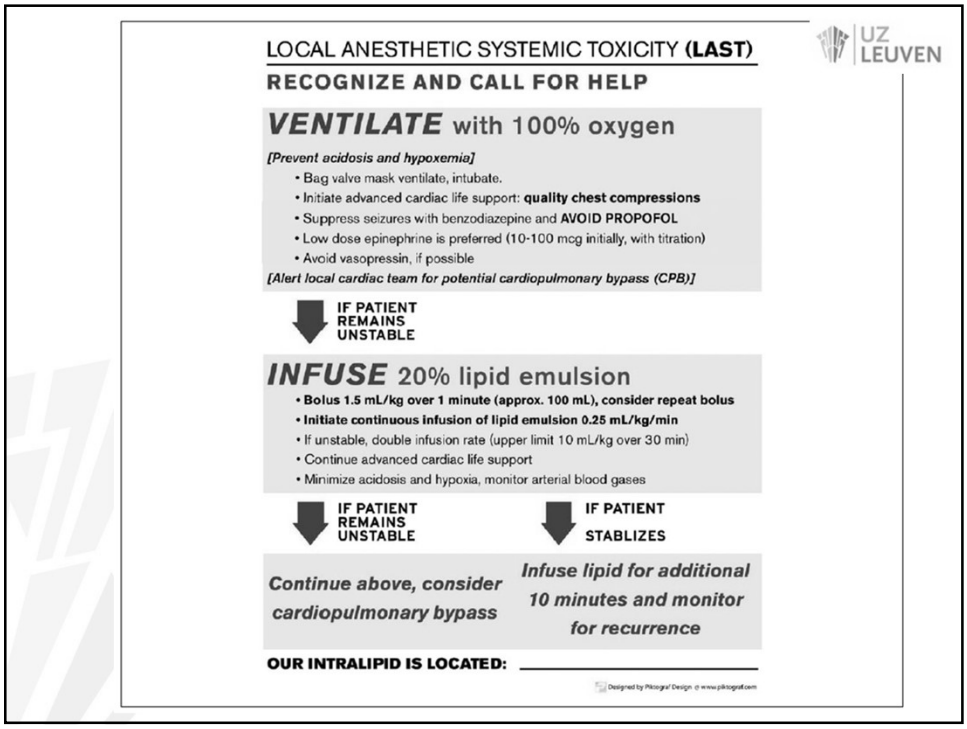
AFTER 5 MIN

Give **a maximum of two** repeat boluses of 100 ml

AND

Continue infusion at same rate but **double** rate to 2000 ml.h^{-1} if indicated at any time

Do not exceed a maximum cumulative dose of 840 ml



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Take home messages

- Cancer recurrence: forget about it (at least untill RCT)
- No long term functionality improvement, only short term benefit (but I would define better post-op pain as a good outcome)
- Persistent pain in thoracotomy and breast surgery robust data
- Mortality unclear
- Morbidity some data
- POCD maybe, not enough evidence
- Regional anesthesia as a society fails miserably in designing RCT's and standardising care