Pro Epidural Anesthesia

S Coppens
Locoregional Anesthesia
University Hospitals Leuven

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A few trips: Round 2

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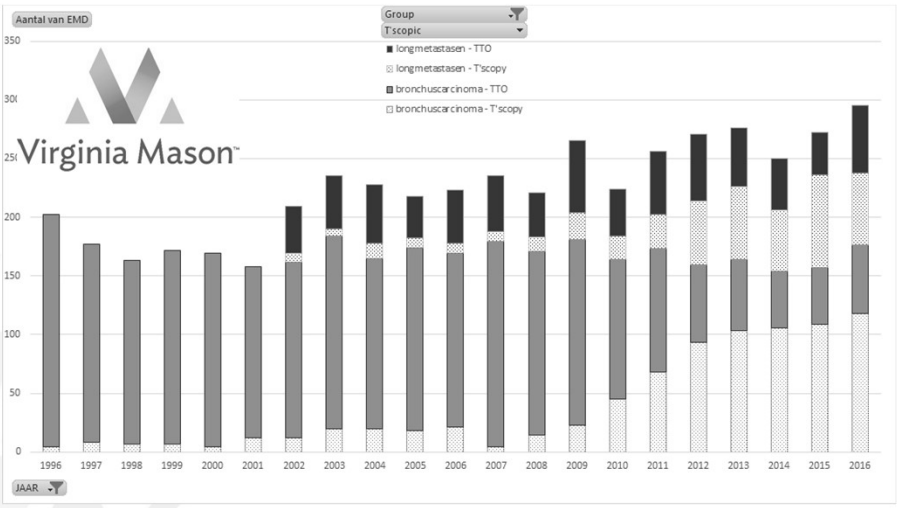
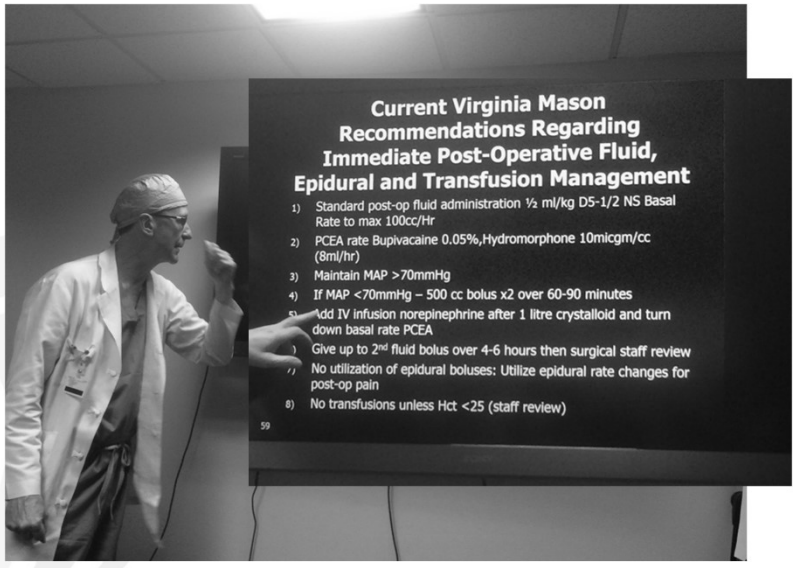


Virginia Mason



Does ERAS improve quality?

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DISEASES OF THE Esophagus

Diseases of the Esophagus (2015) **28**, 567–573
DOI: 10.1111/dote.12234

DISEASES OF THE ESOPHAGUS

Original article

The effect of formalizing enhanced recovery after esophagectomy with a protocol

J. M. Findlay,[1] E. Tustian,[1] J. Millo,[2] A. Klucniks,[2] B. Sgromo,[1] R. E. K. Marshall,[1] R. S. Gillies,[1] M. R. Middleton,[3] N. D. Maynard[1]

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In conclusion, in contrast to a recent comparable study, we found that there is no benefit in the introduction of a formal ERAS pathway framework alone, without also altering clinical care. While standardized pathways may certainly have a role to play (in standardizing care and clinical governance), we therefore conclude that any benefits seen from ERAS in esophagectomy (within a specialist high-volume center) are more likely to be due to improvements in the components of perioperative care themselves. We would, therefore, recommend that centers introducing ERAS pathways for esophagectomy (and those with established pathways) focus on optimizing and standardizing evidence-based care, in addition to providing a formal framework.

Does ERAS improve quality?

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Table 7 Studies assessing ERAS and esophagectomy

	Design	Pathway	Primary findings
Blom *et al.* 2013[17]	Retrospective case control (n = 181) 90.5 cases/year	• Mixed open resections	• Reduction in LOS (1 day; baseline = 15) • NB – no correction for multiple comparisons • No change in morbidity (baseline 68%) and mortality (baseline 1%)
Preston *et al.* 2013[18]	Retrospective case control (n = 36) 72 cases/year	• Mixed single surgeon resections • Patients in control (non-ERAS) group had worse ASA grade • ERAS group comprised three groups of 12 patients, compared with 74 historical controls	• Reduction in LOS (10 days; baseline 17) • Reduction in critical care stay (1 day; baseline 4 days) • Reduction in complications (41.7%; baseline 69.2%) • NB – improvements based on final group of 12 patients only • Failure to correct for multiple comparisons
Cao *et al.* 2013[19]	Retrospective case-control (n = 112) 28 cases/year	• Mixed open resections • Exclusions: moderate-high risk patients (cardiac/respiratory disease, age >65 plus minor comorbidity), failure to fast-track	• Reduction in LOS (8 days; baseline = 14.8) • Reduction in complications (18%; baseline = 47.4%) • Failure to fast-track (27%) • NB – no correction for multiple comparisons
Li *et al.* 2012[20]	Retrospective case-control (n = 106) 42.4 cases/year	• Open and minimally invasive resections with new pathway	• Reduction in LOS (2 days; baseline 10 days) • NB – no correction for multiple comparisons
Munitiz *et al.* 2010[21]	Retrospective case-control (n = 148) 14.8 cases/year	• Open Ivor-Lewis resections • Pathway introduced to formalize existing practice	• Reduction in LOS (4 days; baseline = 14) • Reduction in pulmonary morbidity (by 9.5%; baseline = 23.0%) • Reduction in mortality (by 4.1%; baseline = 5.4%) • NB – no correction for multiple comparisons
Jiang *et al.* 2009[14]	Retrospective observational (n = 114) 21.2 cases/year	• Unspecified esophagectomy	• Favorable morbidity and mortality • Failure to fast-track (22%; greater in age >65 and preoperative comorbidities)
Low *et al.* 2007[21]	Retrospective observational (n = 340) 22.7 cases/year	• Single surgeon, evolving pathway	• Favorable morbidity and mortality
Cerfolio *et al.* 2004[15]	Retrospective observational (n = 90) 22.5 cases/year	• Single surgeon Ivor-Lewis resections • Standardized computerized pathway	• Favorable morbidity and mortality • Failure to fast track 23.7% (greater with neoadjuvant therapy and age)

ASA, American Society of Anesthesiologists; ERAS, enhanced recovery after surgery; LOS, length of stay.

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Does ERAS improve quality?

Component	Summary	Grade	Recommendation
Preoperative			
Counseling	Independent predictor of ERAS success, multimodal counseling is recommended	2−	D
Carbohydrate loading	Optimal fasting: 6 hours for solids (with caution if dysphagia) and 2 hours for clear fluids	1+	A
	Oral and intravenous carbohydrate loading attenuates insulin resistance and hyperglycemia	1+	B
Nutrition	Nutrition should be optimized before surgery; evidence for immunonutrients is conflicting	2−	D
IMT	Specific IMT improves inspiratory function after esophagectomy but not outcome	1−	B
Hemoglobin	Anemia predisposes to blood transfusion, with subsequent greater mortality and morbidity	2−	C
	Oral ferrous sulfate is recommended for iron-deficiency anemia	1−	C
Operative			
Preemptive analgesia	Preemptive epidural, NSAIDs, and local anesthetics are effective	1++	A
	NSAIDs may predispose to leaks in colorectal surgery, so they are not recommended	2++	C
Minimally invasive	Equivalent oncological operation, fewer pulmonary complications, less blood loss, and shorter stay	1+	A
Fluid therapy	Preoperative dehydration should be avoided	1+	B
	GDT or "balanced" therapy is recommended intraoperatively	1−	C
	Postoperative fluid balance should be at most neutral		
Pyloric drainage	There is insufficient evidence to recommend routine drainage procedures		
Postoperative			
Chest drains	Use should be minimized; a single drain is as effective as 2 drains but less painful	1−	C
	Drains can be removed when draining <200 mL/day	1−	C
Conduit decompression	Decompression reduces respiratory complications	1−	B
Nutrition	Nutrition should be commenced as soon as possible after surgery	1++	A
	Enteral routes are recommended over parenteral routes	1−	B
Oral intake	The optimum timing of oral intake is unclear		
	Delaying intake by routine anastomotic imaging is not recommended	2−	C
Analgesia	Thoracic epidural	1++	A
	PVB has potential benefits but has yet to be definitively assessed in esophagectomy		
Urinary catheter	Urinary catheters predispose to infection and may delay discharge	3	D
	They can be removed before epidurals in those with normal uroflowmetry (10% recatheterzation risk)	1−	C
Thromboprophylaxis	All patients should receive combined mechanical and pharmacological prophylaxis unless contraindicated, with pharmacological prophylaxis continued until POD31	1++	A
Mobilization	A structured regimen of early mobilization is recommended	4	D

ERAS indicates enhanced recovery after surgery; IMT, inspiratory muscle training; NSAIDs, nonsteroidal anti-inflammatory drugs; PVB, paravertebral block; POD, postoperative day; GDT, goal-directed therapy.

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Why they attack: Round 3

Epidural Gold Standard no more?

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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.

Gold standard no more ?!

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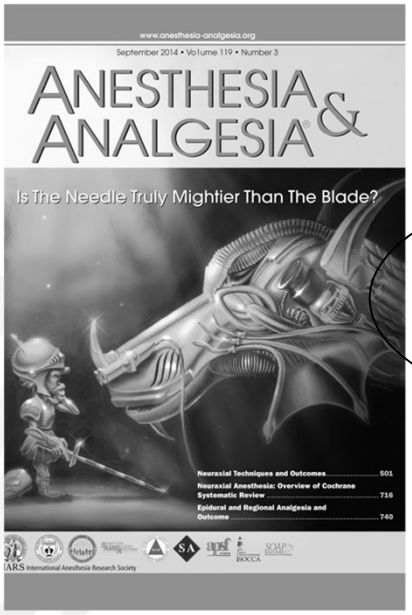

In conclusion, there is strong evidence that epidural analgesia or peripheral regional analgesic techniques improve neither perioperative mortality nor postoperative pulmonary and cardiovascular complications to a clinically significant extent for the general surgical population. If any, the advantages of epidural analgesia are limited to high-risk morbid patients undergoing high-risk procedures.[51,78] 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.

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The probable attack: Round 4

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Failure rates

Ready et al = 32% (26000 cases teaching hospital) ⇦ Retrospective, unclear data and criteria
Dislodgement prematurely 17%
Unilateral block 7%
Leakage 7%

Tran et al = 23-24% (2 RCT's of conventional LOR vs waveform analysis, teaching hospital)

⇦

Test dose 2% lido after 10 minutes and sensory test decided failure or succes, only 100 patients

Williams et al 26-32% (RCT of different catheter depths teaching hospital)

⇦ Not powered for failure rates, small RCT

Auyong et al = 21,6% (RCT of conventional vs US-assisted, teaching hospital)

⇦ Not powered for failure rates, small RCT

Ready et al. RAPM 1999;24:499-505
Tran et al. RAPM 2016;41:309-13
Williams et al. CJA 2016;63:691-700
Auong et al. RAPM 2017 Epub,

Failure rates

Audit:
- 12% difficult procedures*
- 4% failures **
- 6% needing extra care***
- <0,01% catheter dislodgements
- No catheter failures for leakage

*Defined as > 3 attempts at 2 levels.
**No block whatsoever, or procedure impossible
***Catheter withdrawal for unilateral block, or low dose opioid for adjuvant therapy
In comparison PVB in UZ Leuven : Stopped after audit with 40% failure rate

Serious Complications

Potentially disastrous
BUT VERY VERY rare !
Over the course of 15 years in leuven. 30000 Thoracic epidurals. (40000 Lumbar epidurals)

In both groups
One hematoma (of lumbar region, after removal catheter)
No epidural abscesses

In the Thoracic epidural group
15 subdural catheters with swift diagnostic and removal
28 perceived spinal catheters without any catastrophic spinal event

Side-effects

Hypotension :
- level at which epidural is placed
- PCA regiment, bolus
- Modest and clinical significance?

Urinary retention
- DOGMAS !
- You do NOT need a bladder catheter when you have a TEA !

Pruritus
- Depends on PCA regiment
- Easily remedied
- Very small problem

Analgesic efficiency

TEA is at least as efficient as any other technique ever described, including the PVB
And at least superior to much of the novel techniques as TAP, ESP, Serratus Plane, pleural cat heters…you name it.

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The alternatives: Round 5

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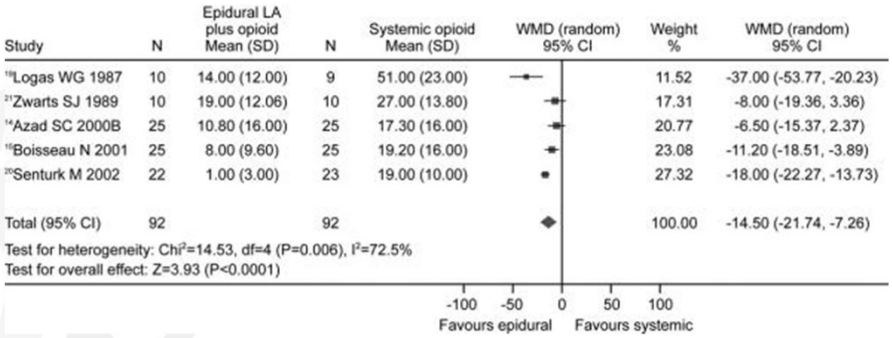
A Systematic Review of Randomized Trials Evaluating Regional Techniques for **Postthoracotomy** Analgesia.

Joshi, G; Bonnet, F; Shah, R; et al. Anesthesia & Analgesia. 2008.107:1026-40

Weighted mean difference for **Visual Analog Scale Pain Scores recorded at rest on day 1**: thoracic epidural combining local anesthetic plus opioid versus systemic opioid.

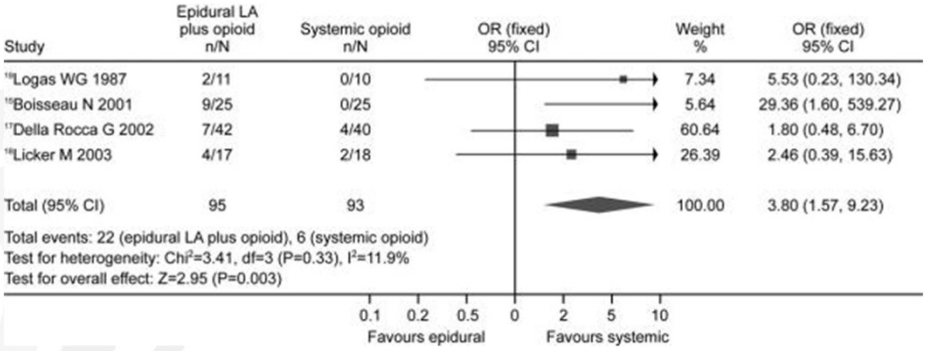


2

A Systematic Review of Randomized Trials Evaluating Regional Techniques for Postthoracotomy Analgesia.

Joshi G; Bonnet F; Shah R; et al. Anesth & Analg. 2008.107:1026-40

Odds ratio for the **incidence of hypotension**: thoracic epidural combining local anesthetic plus opioid versus systemic opioid



2

British Journal of Anaesthesia Page 1 of 9
doi:10.1093/bja/ael020

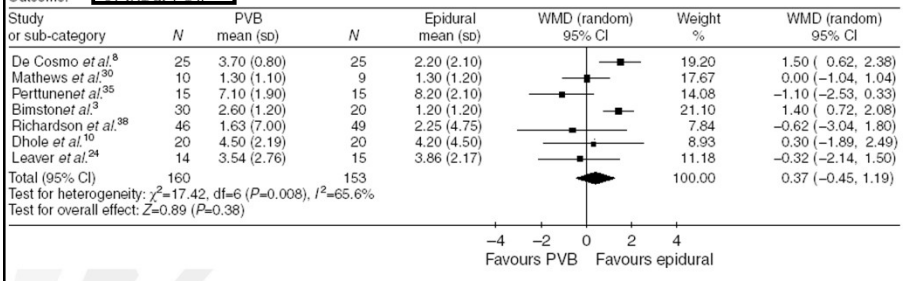
BJA

A comparison of the analgesic efficacy and side-effects of paravertebral *vs* epidural blockade for thoracotomy—a systematic review and meta-analysis of randomized trials

R. G. Davies[1], P. S. Myles[1 2 3]* and J. M. Graham[4]

At 4–6 h

Review: Paravertebral block
Comparison: 11 VAS 4–8 h
Outcome: 01 VAS at 4–8 h



PAIN QUALITY COMPARABLE

British Journal of Anaesthesia Page 1 of 9
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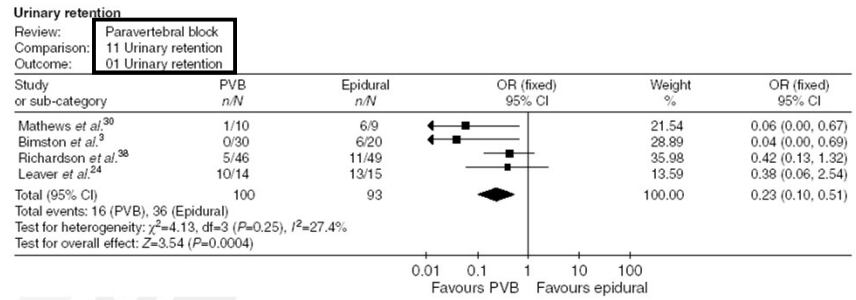

LESS URINE RETENTION

British Journal of Anaesthesia Page 1 of 9
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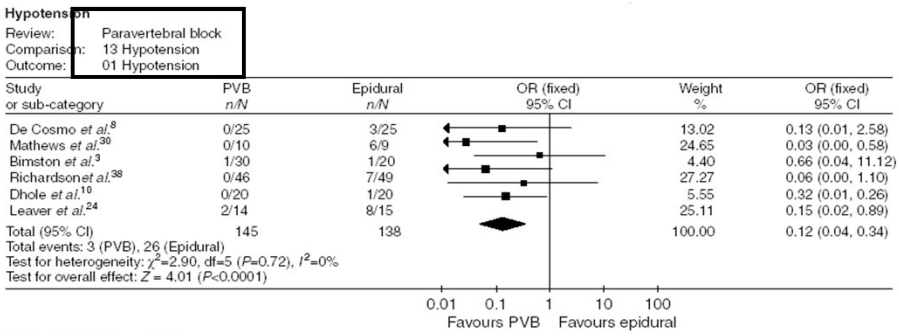

LESS HYPOTENSION

British Journal of Anaesthesia Page 1 of 9
doi:10.1093/bja/ael020

BJA

A comparison of the analgesic efficacy and side-effects of paravertebral *vs* epidural blockade for thoracotomy—a systematic review and meta-analysis of randomized trials

R. G. Davies[1], P. S. Myles[1 2 3]* and J. M. Graham[4]

At 24 h

Review: Paravertebral block
Comparison: 02 VAS 24 h
Outcome: 01 VAS at 24 h

Study or sub-category	N	PVB mean (SD)	N	Epidural mean (SD)	WMD (random) 95% CI	Weight %	WMD (random) 95% CI
De Cosmo *et al.*[8]	25	3.60 (1.00)	25	3.70 (2.50)		13.29	−0.10 (−1.16, 0.96)
Luketich *et al.*[28]	47	2.60 (1.50)	44	2.40 (1.50)		17.41	0.20 (−0.42, 0.82)
Mathews *et al.*[30]	7	0.60 (0.60)	9	1.20 (0.80)		16.77	−0.60 (−1.29, 0.09)
Perttunen *et al.*[35]	15	7.00 (1.60)	15	6.80 (2.00)		11.24	0.20 (−1.10, 1.50)
Kaiser *et al.*[17]	13	4.00 (5.28)	13	4.25 (4.73)		2.45	−0.25 (−4.10, 3.60)
Bimston *et al.*[3]	30	3.30 (1.90)	20	1.30 (1.90)		13.11	2.00 (0.92, 3.08)
Richardson *et al.*[38]	46	1.50 (1.50)	49	2.38 (2.06)		16.44	−0.88 (−1.60, −0.16)
Leaver *et al.*[24]	14	4.07 (1.82)	15	4.13 (2.45)		9.30	−0.06 (−1.62, 1.50)
Total (95% CI)	197		190			100.00	0.05 (−0.59, 0.69)

Test for heterogeneity: χ^2=22.29, df=6 (P=0.002), I^2=68.6%
Test for overall effect: Z=0.15 (P=0.88)

−4 −2 0 2 4
Favours PVB Favours epidural

A Systematic Review of Randomized Trials Evaluating Regional Techniques for Postthoracotomy Analgesia.

Joshi, Girish; MB, BS; Bonnet, Francis; MD, FRCA; Shah, Rajesh; Wilkinson, Roseanne; Camu, Frederic; Fischer, Barrie; Neugebauer, Edmund; Rawal, Narinder; Schug, Stephan; FANZCA, FFP; Simanski, Christian; Kehlet, Henrik Anesthesia & Analgesia. 2008;107:1026-1040

Odds ratio for the incidence of pulmonary complications: **thoracic paravertebral block** with local anesthetic versus paravertebral saline or no paravertebral block (systemic analgesia was available to all patients).

Study	Paravertebral block n/N	Control n/N	OR (fixed) 95% CI	Weight %	OR (fixed) 95% CI
[32]Berrisford RG 1990	2/25	11/21		21.80	0.08 (0.01, 0.42)
[29]Sabanathan S 1990	2/29	9/27		17.20	0.15 (0.03, 0.77)
[31]Eng J 1992	4/40	14/40		24.97	0.21 (0.06, 0.70)
[34]Deneuville M 1993	0/26	5/26		10.70	0.07 (0.00, 1.41)
[26]Carretta A 1996	1/10	1/10		1.78	1.00 (0.05, 18.57)
[33]Barron DJ 1999	3/22	5/20		8.97	0.47 (0.10, 2.31)
[33]Bilgin M 2003	0/25	7/25		14.58	0.05 (0.00, 0.90)
Total (95% CI)	177	169		100.00	0.17 (0.09, 0.33)

Total events: 12 (paravertebral block), 52 (control)
Test for heterogeneity: Chi²=4.97, df=6 (P=0.55), I²=0%
Test for overall effect: Z=5.31 (P<0.00001)

0.01 0.1 0 10 100
Favours paravertebral Favours control

2

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BUT who is really proficient in PVB?

- Maybe surgeons….
- Unilateral
- Complication rate
- Catheter failures
- Multiple injections?
- Most written about block, leased performed ever

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The evidence

Pain Management Following Thoracic Surgery

Brett Elmore, MD, Van Nguyen, MD, Randall Blank, MD, Kenan Yount, MD, Christine Lau, MD*

KEYWORDS

• Postoperative pain • Thoracic surgery • Pain management • Chronic pain

KEY POINTS

- Managing postoperative pain is critical in reducing postoperative respiratory.
- Postoperative pain results from multiple etiologic factors. There is no one modality that addresses each contributing factor.
- Optimizing pain control while minimizing sedation and respiratory depression are challenging and competing goals, and neuraxial or regional techniques are strongly preferred over primary parenteral analgesia in the immediate postoperative period.
- Epidural anesthesia is the gold standard for treatment; paravertebral nerve blocks are gaining popularity, but can be technically difficult to perform for an inexperienced anesthesiologist.
- Chronic pain complicates all types of thoracic procedures; once established, chronic postthoracotomy pain is difficult to treat. Preventive approaches include regional and neuraxial analgesia and careful surgical technique.

Thorac Surg Clin 25 (2015) 393–409
http://dx.doi.org/10.1016/j.thorsurg.2015.07.005
1547-4127/15/$ – see front matter

The evidence

Table 1
Nonopioid analgesics

Systemic Analgesics	Benefits	Risks	Recommendations
Acetaminophen	Safe, effective analgesic and antipyretic Reduces pain scores and opioid requirements No increased incidence in hemorrhage, gastric ulceration, cardiovascular, and renal adverse effects Has "ceiling effect"	Liver toxicity	Recommended in combination with other analgesics
NSAIDs	Improves pain relief Reduces opioid consumption by 30% and decreases opioid-related adverse effects	Impaired coagulation, gastric irritation, renal dysfunction, and cardiovascular adverse effects	Recommended in combination with other analgesics
COX-2 inhibitors	Improves pain scores, decreases opioid consumption, and reduces opioid-related adverse effects Similar efficacy as NSAIDs No effects on platelet function and perioperative bleeding	Potential gastric irritation, renal dysfunction, and cardiovascular adverse effects	Recommended in combination with other analgesics
Glucocorticoids (dexamethasone)	Reduces inflammation, improves pain relief, prolongs time to first analgesic, and modest reduction in opioid requirements	Increase blood glucose levels up to 24 h, but may not be clinically relevant	Recommended as an adjunct
Ketamine	Analgesic properties without respiratory depressive effects, reduces pain scores, and opioid consumption, and prolongs time to first analgesic Optimal dose and duration of administration remain controversial	Sympathomimetic and neurocognitive side effects	Not recommended for routine use
Gabapentinoids (gabapentin and pregabalin)	Reduced pain scores and opioid requirements Optimal dose and duration of administration remain controversial	Sedation, dizziness, and visual disturbances	Not recommended for routine use

The evidence

Technical

REALLY ??

Table 2
Regional analgesia techniques for thoracic surgery

Regional Anesthesia Techniques	Benefits	Risks	Recommendations
Thoracic paravertebral analgesia	Superior dynamic analgesia during coughing and physical therapy Improved postoperative outcome Equally effective as TEA Trend toward lower incidence of major complications compared with TEA and lower block failure rate Limited value with single-shot injection	Epidural spread of local anesthetic with associated risks, vascular injury, and pleural injury Potential for catastrophic neurologic complications is remote	Recommended
TEA	Superior analgesia during coughing and physical therapy, and improved postoperative outcome	High (15%) failure rate, complicates postoperative anticoagulation, hypotension, nausea, urinary retention, pruritus, accidental intrathecal spread, epidural hematoma, and epidural abscess	Recommended
Intrathecal opioid analgesia	Better static and dynamic pain scores compared with systemic opioid analgesia specifically in first 24 h postoperatively	Risk of respiratory depression, pruritus, urinary retention, nausea, and vomiting	Recommended, if paravertebral block or TEA is contraindicated or not possible
Intercostal analgesia	Simple and easy to perform, superior pain scores, reduced opioid requirements, and improved postoperative outcome	Systemic local toxicity, better pain scores with continuous catheter, or multiple injections	Recommended in combination with nonopioid analgesics, such as acetaminophen and NSAIDs or COX-2-specific inhibitors, if paravertebral block or TEA is contraindicated or not possible
Interpleural analgesia	Easy to perform but not efficacious	Potential of local anesthetic toxicity	Not recommended
Intercostal nerve cryoanalgesia	Effective in perioperative period in improving pain scores compared with placebo	Implicated in increasing incidence of chronic pain	Not recommended

The alternatives: TAP

- First anterior blind TAP
- Then posterior blind TAP
- Then US TAP
- Then Quadratus Lumborum 1 block
- Then QL 2
- Then QL 3

- The evidence….
- It does NOT blocks visceral pain
- Dangerous : UZ Leuven experience:

ID	Mcg/ml
UZ ROPI2 staal001	1,95
UZ ROPI2 staal006	1,26
UZ ROPI2 staal011	1,65
UZ ROPI2 staal019	0,65
UZ ROPI2 staal020	1,31
UZ ROPI2 staal021	1,40
UZ ROPI2 staal022	1,13
UZ ROPI2 staal023	1,31
UZ ROPI2 staal024	0,68
UZ ROPI2 staal025	0,87
UZ ROPI2 staal027	0,55
UZ ROPI2 staal029	0,78
UZ ROPI2 staal030	0,75
UZ ROPI2 staal031	0,57
UZ ROPI2 staal033	0,62
UZ ROPI2 staal035	2,50
UZ ROPI2 staal038	0,70
UZ ROPI2 staal041	0,23
UZ ROPI2 staal044	0,32
UZ ROPI2 staal045	0,52
UZ ROPI2 staal054	0,59
UZ ROPI2 staal058	0,46
UZ ROPI2 staal060	0,60
UZ ROPI2 staal061	0,32
UZ ROPI2 staal065	0,34
UZ ROPI2 staal066	0,21
UZ ROPI2 staal071	0,27
UZ ROPI2 staal073	0,11
UZ ROPI2 staal074	0,23
UZ ROPI2 staal075	0,15
UZ ROPI2 staal077	0,14
UZ ROPI2 staal079	0,10
UZ ROPI2 staal085	0,13
UZ ROPI2 staal087	0,06
UZ ROPI2 staal091	0,29
UZ ROPI2 staal093	0,31
UZ ROPI2 staal097	0,26
UZ ROPI2 staal099	0,18
UZ ROPI2 staal100	0,20

Novel (?) techniques: ICNB

Original Article

Management of acute postoperative pain with continuous intercostal nerve block after single port video-assisted thoracoscopic anatomic resection

Ming-Ju Hsieh[1*], Kuo-Cheng Wang[2*], Hung-Pin Liu[3], Diego Gonzalez-Rivas[4], Ching-Yang Wu[1], Yun-Hen Liu[1], Yi-Cheng Wu[1], Yin-Kai Chao[1], Ching-Feng Wu[1]

Novel techniques: SPB

Ultrasound-Guided Serratus Anterior Plane Block Versus Thoracic Epidural Analgesia for Thoracotomy Pain

Asmaa Elsayed Khalil, MB, BCh,* Nasr Mahmoud Abdallah, MD,*† Ghada M. Bashandy, MD,* and Tarek Abdel-Haleem Kaddah, MD*†

Objective: Thoracotomy is one of the most painful surgical procedures. The aim of this study was to assess the efficacy and safety of ultrasound-guided serratus anterior plane block (SAPB) compared with thoracic epidural analgesia (TEA) for controlling acute thoracotomy pain.

Design: A prospective, randomized, observer–blinded, controlled study.

Setting: The study was performed as a single-institution study in the National Cancer Institute, Cairo University, Egypt.

Participants: All participants were cancer patients scheduled for thoracotomy.

Interventions: This study was conducted from February to December 2015. Forty patients scheduled for thoracotomy under general anesthesia were allocated randomly into 1 of 2 groups with 20 patients each. SAPB was performed before extubation with an injection of 30 mL of 0.25% levobupivacaine followed by 5 mL/hour of 0.125% levobupivacaine. In the TEA group, thoracic epidural catheters were inserted preoperatively to be activated before extubation using a lower dose regimen to the SAPB group. Heart rate, mean arterial pressure, and the visual analog pain score (VAS) measurements were recorded for 24 hours. Rescue analgesia using intravenous morphine, 0.1 mL/kg, was administered if the VAS was >3.

Measurements and Main Results: Compared with preoperative values, the mean arterial pressure in the SAPB group did not change significantly ($p = 0.181$), whereas it decreased significantly ($p = 0.006$) in the TEA group. VAS scores and the total dose of morphine consumed were comparable in the 2 groups.

Conclusions: SAPB appeared to be a safe and effective alternative for postoperative analgesia after thoracotomy.

KEY WORDS: thoracotomy, acute pain, thoracic epidural analgesia, serratus anterior plane block, postoperative pain

ICNB

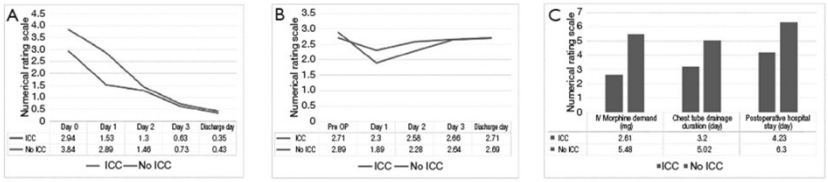

Figure 5 Patients with ICC had less pain, less postoperative analgesia drug demand, better triflow performance, shorter drainage duration and hospitalization compared with patients without ICC. (A) Pain score for patients who received continuous intercostal nerve block (ICC) or single shot intercostal nerve analgesia (No ICC) on postoperative day 0, 1, 2, 3, discharge day (P=0.023, 0.001, 0.481, 0.594, 0.531); (B) triflow rehabilitation performance for patients who received continuous intercostal block or single shot intercostal nerve analgesia (no ICC) on pre op, day 1, 2, 3, discharge day (P=0.175, 0.015, 0.032, 0.815, 0.864); (C) postoperative IV form morphine demand, chest tube drainage duration, hospital stay on ICC and no ICC group (P=0.017, 0.001, 0.005). ICC, intercostal catheter.

Novel technique Subpleural (ICBN several levels)

Original Article

Efficacy of subpleural continuous infusion of local anesthetics after thoracoscopic pulmonary resection for primary lung cancer compared to intravenous patient-controlled analgesia

Joonho Jung, Seong Yong Park, Seokjin Haam

Department of Thoracic and Cardiovascular Surgery, Ajou University School of Medicine, Suwon, Republic of Korea

Contributions: (I) Conception and design: All authors; (II) Administrative support: All authors; (III) Provision of study materials or patients: All authors; (IV) Collection and assembly of data: All authors; (V) Data analysis and interpretation: All authors; (VI) Manuscript writing: All authors; (VII) Final approval of manuscript: All authors.

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Conclusions: The ON-Q system was equivalent to the IV-PCA for postoperative pain control after thoracoscopic pulmonary resection for primary lung cancer, and it also had fewer effects and early discontinuations.

Subpleural

Journal of Thoracic Disease, Vol 8, No 7 July 2016

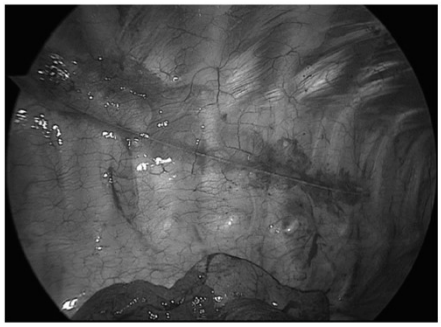

Figure 1 The placement of the subpleural continuous infusion of local anesthetic (ON-Q system) catheter in the subpleural space from the level below the lowest trocar port [the 9th ICS] to the level above the utility window (the 3rd ICS). ICS, intercostal space.

Subpleural

Journal of Thoracic Disease, Vol 8, No 7 July 2016

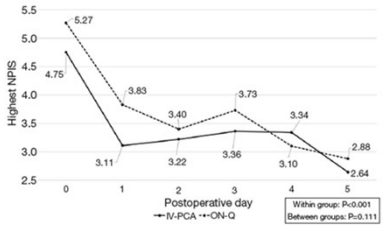

Figure 2 The changes of the highest NPIS scores according to the postoperative days. NPIS, numeric pain intensity scale.

Table 2 Side effects and cause of early discontinuation

Events	IV-PCA (n=36)	ON-Q (n=30)	P
Side effects			
Nausea	6 (16.7%)	1 (3.4%)	0.116
Dizziness	4 (11.1%)	1 (3.3%)	0.366
Drowsiness	3 (8.3%)	1 (3.3%)	0.620
Total	13 (36.1%)	3 (10.0%)	0.020
Early discontinuation	12 (33.3%)	2 (6.7%)	0.014

IV-PCA, intravenous patient-controlled analgesia.

Novel technique ESPB

CHRONIC AND INTERVENTIONAL PAIN

BRIEF TECHNICAL REPORT

The Erector Spinae Plane Block
A Novel Analgesic Technique in Thoracic Neuropathic Pain

Mauricio Forero, MD, FIPP, Sanjib D. Adhikary, MD,† Hector Lopez, MD,‡ Calvin Tsui, BMSc,§ and Ki Jinn Chin, MBBS (Hons), MMed, FRCPC||*

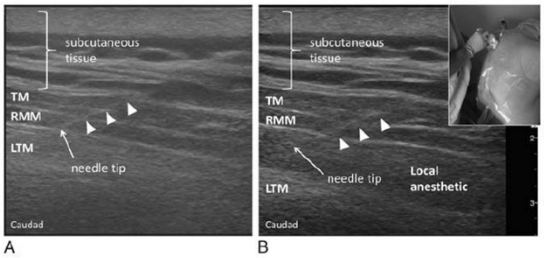

FIGURE 1. The ultrasound-guided ESP block performed superficial to erector spinae muscle (ESM) in the first patient of the case series. Inset picture shows patient in seated position with probe placed in a parasagittal plane 3 cm lateral to the midline at the level of the fifth thoracic vertebra. A, The needle (arrowheads) is inserted in a cephalad-to-caudad direction to place the tip between the rhomboid major muscle (RMM) and ESM. B, Injection here creates a linear pattern of local anesthetic spread that displaces the ESM downward.

The alternatives: Opioids

- Respiratory depression
- Hypotension
- Addiction
- PONV
- Ileus
- …

- Everybody avoids opioids these days (although like epidurals the story is much more nuanced…)

The alternatives: Voodoo

- Non-opioid believers

- Clonidine
- Ketamine
- IV Lidocaine
- Magnesium
- Together with TAP
- Gabapentin

- Evidence?

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The counterattack: Round 6

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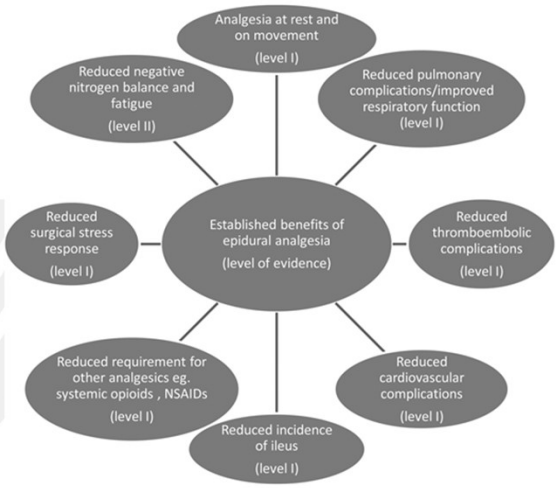
Volume 14, Issue 5
October 2014



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Cochrane Database of Systematic Reviews

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Epidural local anaesthetics versus opioid-based analgesic regimens for postoperative gastrointestinal paralysis, vomiting and pain after abdominal surgery (Review)

Guay J, Nishimori M, Kopp S

Key results

We found that an epidural containing a local anaesthetic reduces the time required for return of gut function compared with an opioid-based regimen (equivalent to 17 hours). An epidural providing a local anaesthetic and an opioid also reduce pain (equivalent to a reduction of 2.5 on a scale from 0 to 10 for pain on movement at 24 hours after surgery) and time spent in hospital for open surgery (equivalent to one day). We found no evidence that an epidural with a local anaesthetic would affect the incidence of vomiting or poor healing of the gut.

Evidence PRO

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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.

Open Access Full Text Article

ORIGINAL RESEARCH

Thoracic epidural analgesia reduces myocardial injury in ischemic patients undergoing major abdominal cancer surgery

This article was published in the following Dove Press journal:
Journal of Pain Research
12 April 2017
Number of times this article has been viewed

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Background and objectives: Major abdominal cancer surgeries are associated with significant perioperative mortality and morbidity due to myocardial ischemia and infarction. This study examined the effect of perioperative patient controlled epidural analgesia (PCEA) on occurrence of ischemic cardiac injury in ischemic patients undergoing major abdominal cancer surgery.

Patients and methods: One hundred and twenty patients (American Society of Anesthesiologists grade II and III) of either sex were scheduled for elective upper gastrointestinal cancer surgeries. Patients were allocated randomly into two groups (60 patients each) to receive, besides general anesthesia: continuous intra and postoperative intravenous (IV) infusion with fentanyl for 72 h postoperatively (patient controlled intravenous analgesia [PCIA] group) or continuous intra and postoperative epidural infusion with bupivacaine 0.125% and fentanyl (PCEA group) for 72 h postoperatively. Perioperative hemodynamics were recorded. Postoperative pain was assessed over 72 h using visual analog scale (VAS). All patients were screened for occurrence of myocardial injury (MI) by electrocardiography, echocardiography, and cardiac troponin I serum level. Other postoperative complications as arrhythmia, deep venous thrombosis (DVT), pulmonary embolism, pneumonia, and death were recorded.

Results: There was a significant reduction in overall adverse cardiac events (myocardial injury, arrhythmias, angina, heart failure and nonfatal cardiac arrest) in PCEA group in comparison to PCIA group. Also, there was a significant reduction in dynamic VAS pain score in group PCEA in comparison to PCIA at all measured time points. Regarding perioperative hemodynamics, there was a significant reduction in intra-operative mean arterial pressure (MAP); and heart rate in PCEA group in comparison to PCIA group at most of measured time points while there was not a significant reduction in postoperative MAP and heart rate in the second and third post-operative days. The incidence of other postoperative complications such as DVT, pneumonia and in hospital mortality were decreased in PCEA group.

Conclusion: Perioperative thoracic epidural analgesia in patients suffering from coronary artery disease subjected to major abdominal cancer surgery reduced significantly postoperative major adverse cardiac events with better pain control in comparison with perioperative IV analgesia.

Keywords: postoperative myocardial infarction, thoracic epidural analgesia, PCA

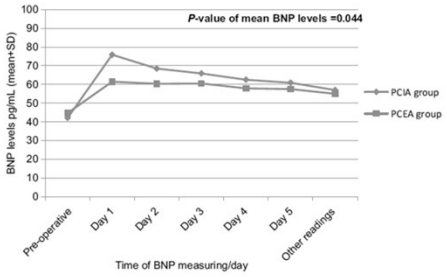
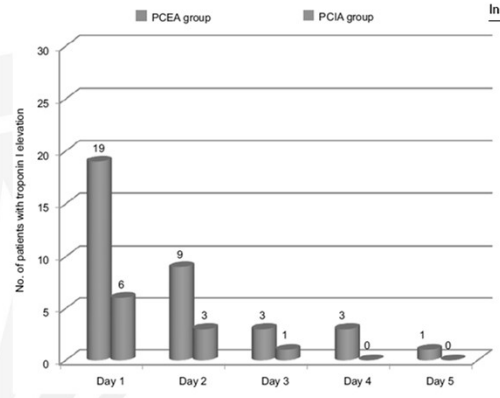


Table 2 Postoperative outcome

Outcome	PCIA (N=60)	PCEA (N=60)	*P*-value
Myocardial injury	22 (36.67%)	5 (8.33%)	0.001
Ventricular arrhythmia	14 (23.33%)	5 (8.33%)	0.042
Atrial arrhythmia	22 (36.67%)	7 (11.66%)	0.012
Angina	33 (55%)	10 (16.66%)	0.001
Heart failure	9 (15%)	4 (6.67%)	0.038
Nonfatal cardiac arrest	4 (6.67%)	2 (3.33%)	0.044
Pulmonary embolism	3 (5%)	1 (1.67%)	0.001
Pneumonia	6 (10%)	1 (1.67%)	0.000
Deep venous thrombosis	2 (3.33%)	0 (0%)	N/A
In hospital mortality	2 (3.33%)	1 (1.67%)	0.896



JOURNAL ARTICLE

Effects of Surgeon Volume and Hospital Volume on Quality of Care in Hospitals

Robert G. Hughes, Sandra S. Hunt and Harold S. Luft
Medical Care
Vol. 25, No. 6 (Jun., 1987), pp. 489-503

Published by: Lippincott Williams & Wilkins
Stable URL: http://www.jstor.org/stable/3765332
Page Count: 15

Topics: Surgeons, Health outcomes, Physicians, Mortality, Hospitals, Length of stay, Health care quality, Coronary artery bypass, Hospital units, Control variables

THAT IS EXACTLY THE CASE FOR US AS WELL !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

Take Home Message

- TEA is one of our most researched techniques
- One of our most valuable and strong tools in postoperative painrelief
- The only real valid alternative is PVB (which has it's own problems)
- All other potential replacements have poor evidence
- Recent research shows TEA's ENORMOUS advantage in severe sick patients
- You cannot consequently think you will be able to be proficient in placing TEA's for those cases alone if you only reserve them for that purpose
- Side effects can be mitigated by having enough case-load, to give up on dogmas and to know the level you place your TEA