

---

**EPIDURALS**

**versus**

**RECTUS SHEATH CATHETERS**

---

**NAPS 2018**

**@antonkrige**

**Royal Blackburn Teaching Hospital**

**EFFECTIVE ANALGESIA**

“Pain as the fifth vital sign” and dependence on the “numerical pain scale” is being abandoned in the US:

Why?

N. Levy\*, J. Sturgess and P. Mills

Department of Anaesthesia and Perioperative Medicine, West Suffolk NHS Foundation Trust, Suffolk, UK

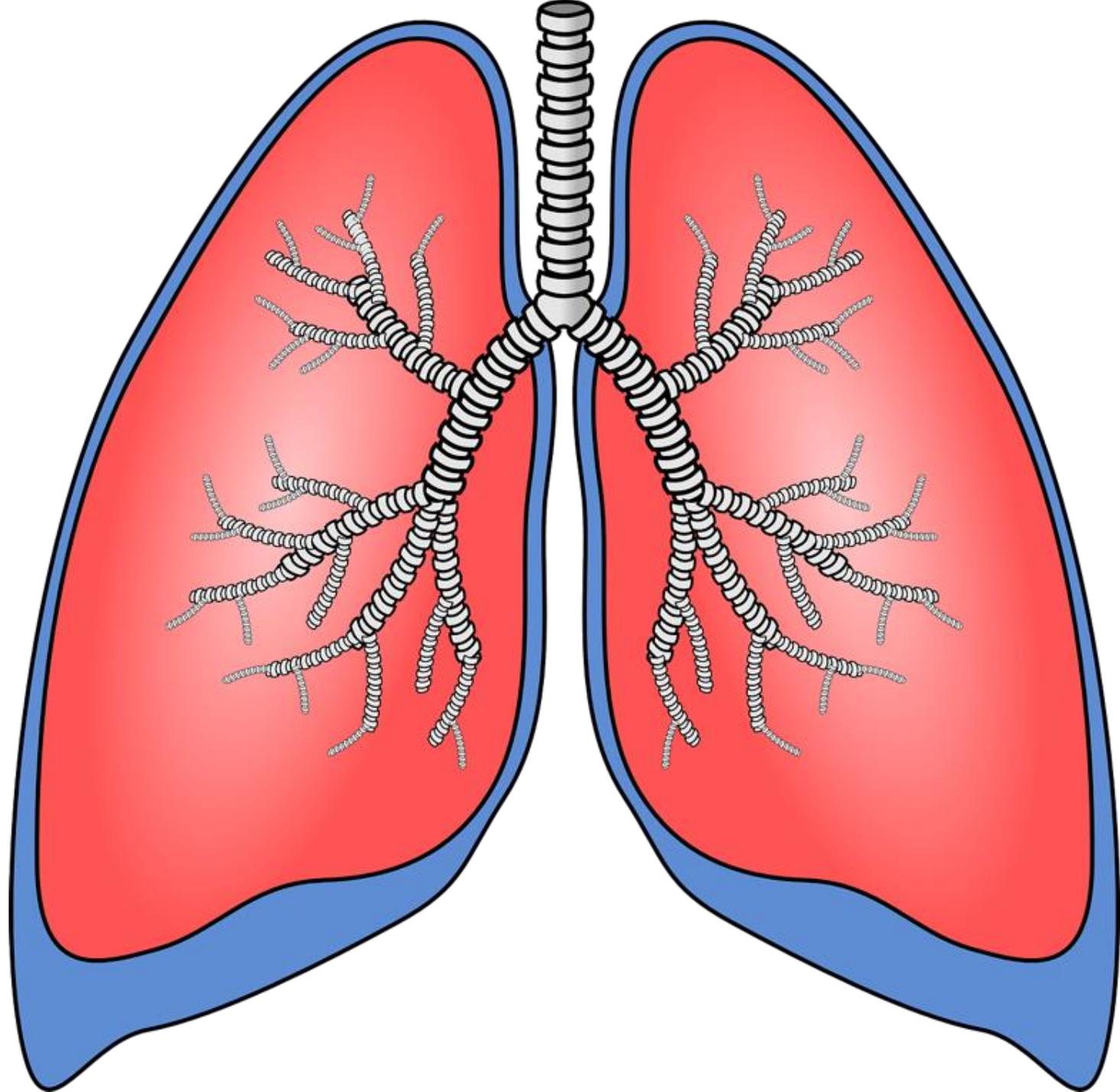
# Joint Commission

**“using numerical pain scales (NPS) alone to monitor patients’ pain is inadequate”**

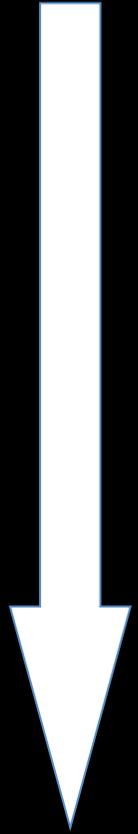
“ stresses the importance of **assessing how pain affects function** & the ability to make progress towards treatment goals”

**DR**INKING **EA**TING **M**OBILIS**ING**





# Adverse Event Rates



**Hypotension**

**Motor Block**

**Ileus/N&V**

**↓ Failure rates**

**Minimal Attachments**

**Skill Sets**

**Cost Effective**

Experience

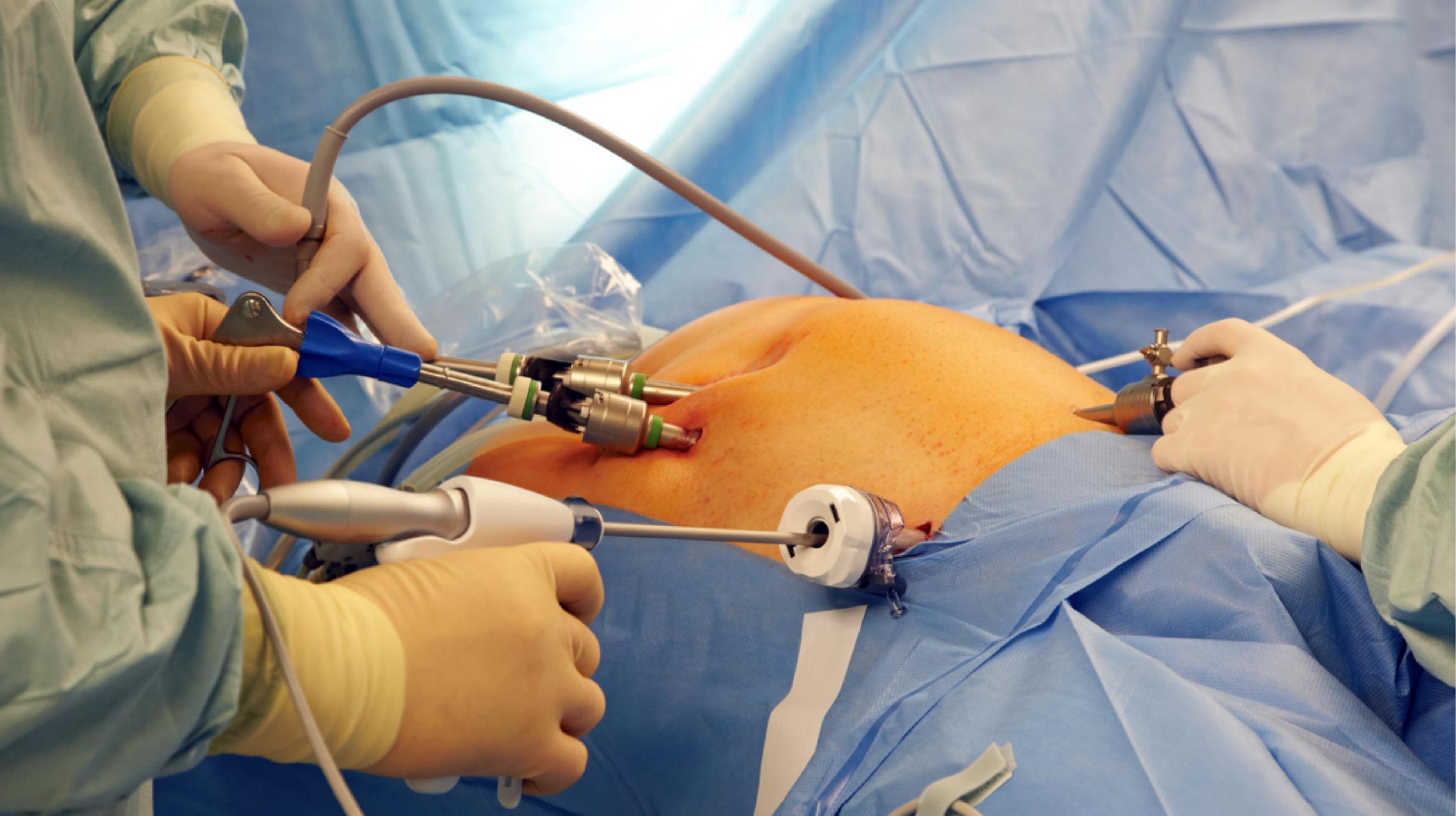
Acceptability

**PATIENT**

Cancer Recurrence

# Chronic Pain



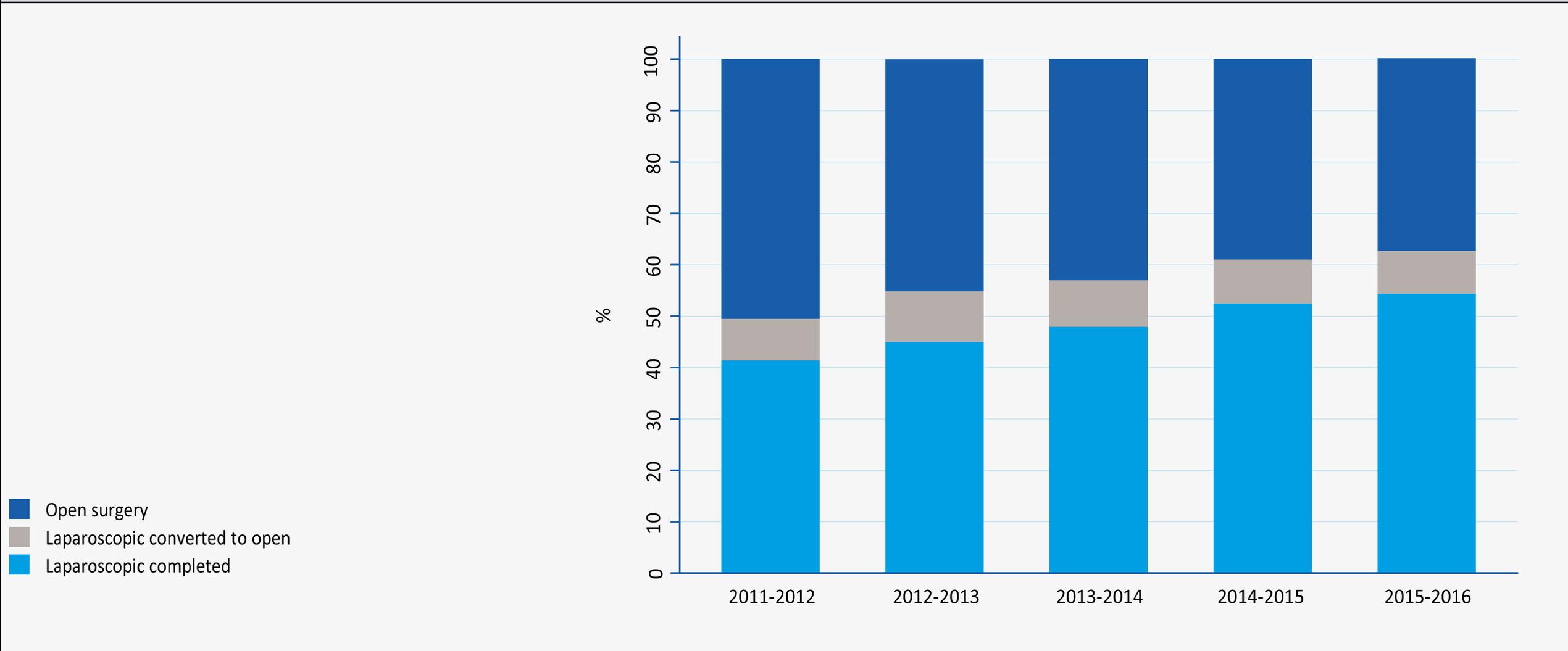


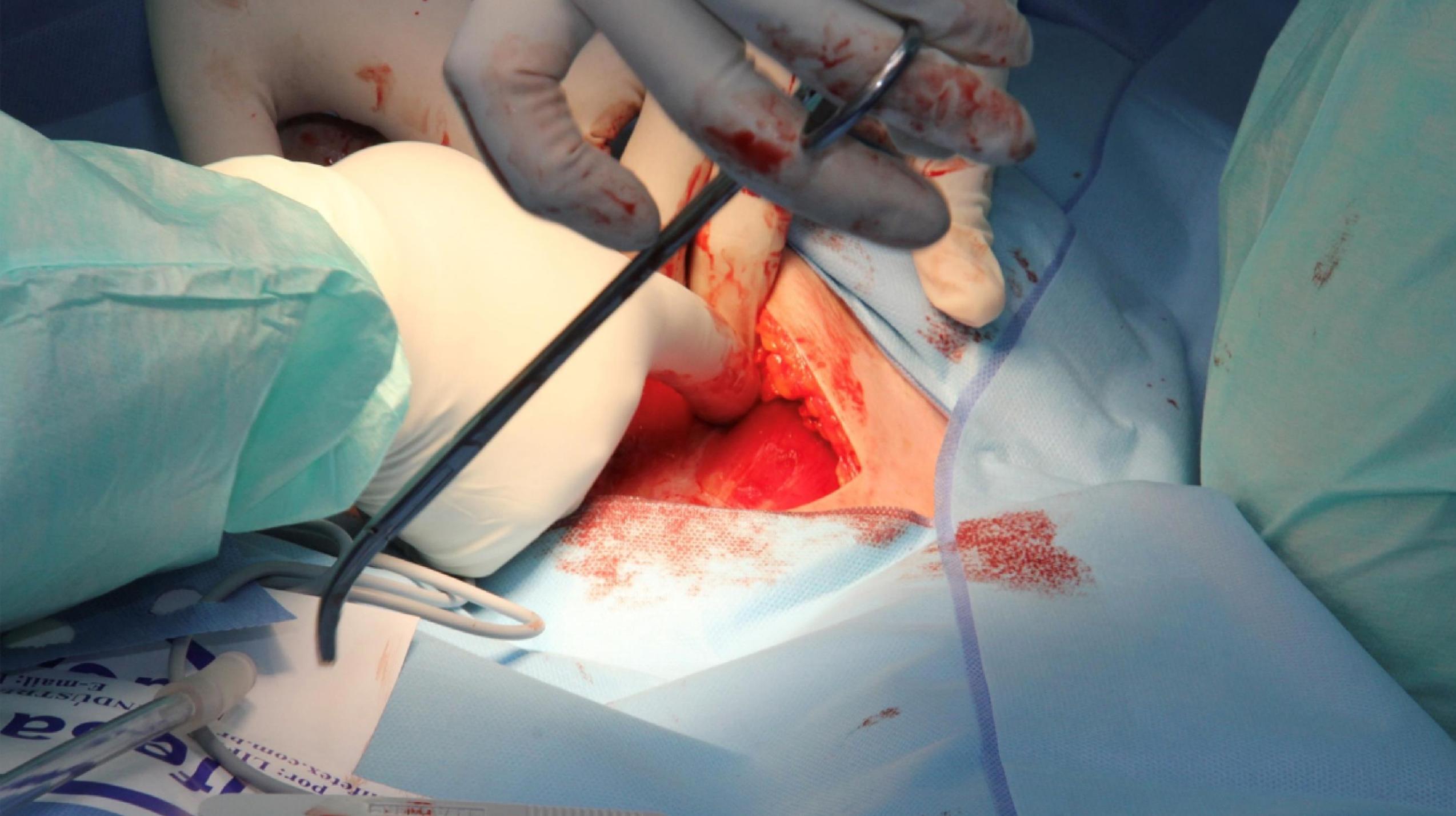
# National Bowel Cancer Audit

Annual Report 2017<sup>Version 2</sup>



**Figure 4.6**  
**Surgical access by audit year**





# Third Patient Report of the National Emergency Laparotomy Audit (NELA)

December 2015 to November 2016



**RCOA**  
Royal College of Anaesthetists

**NIAA HSRIC**  
Health Services Research Centre

 **Royal College  
of Surgeons**  
A HONORABLE SOCIETY

 **HQIP**  
Healthcare Quality  
Improvement Partnership

**NELA**  
National Emergency  
Laparotomy Audit

October 2017

**minimise**

**SYSTEMIC OPIATE**



**Paracetamol +/- NSAIDS**

**GABAPENTIOIDS**

**KETAMINE**

**IV LIDOCAINE INFUSIONS**

**dexamethasone**

**clonidine**

**magnesium**

Mfg: JANSSEN PHARMACEUTICA N.V., Turnhoutseweg 30, B-2340 Beerse, Belgium

# Durogesic

*Fentanyl Système Transdermique*  
*Fentanyl Transdermal System*  
*Fentanyl Sistema Transdérmico*

**25**  
**µg/h**

fentanyl 2,5 mg pro system. transderm.

**1 (25 µg/h) système-system-sistema**

NE PAS UTILISER SI LE SCEAU SUR LA POCHETTE  
EST ROMPU.

DO NOT USE IF SEAL ON POUCH IS BROKEN.

NO UTILIZAR CUANDO EL SELLO SOBRE EL BOLSILLITO  
SE HA DESHECHO.

pour usage externe - for external use  
uso externo

© J-C 2002

INT.-243337/V1



JANSSEN-CILAG

Batch no.:

Mfg./Exp.:



**SPINAL OPIATE**



**THORACIC EPIDURALS**



**THORACIC PARAVERTEBRAL BLOCKADE**



**QUADRATUS LUMBORUM BLOCK**



**TAP BLOCKS**



**RECTUS SHEATH**



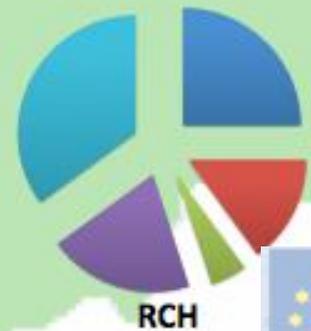
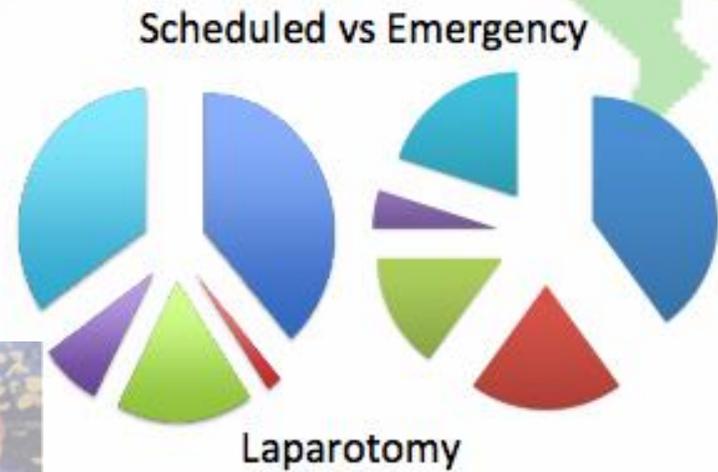
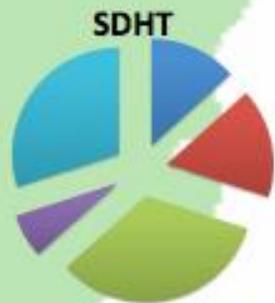
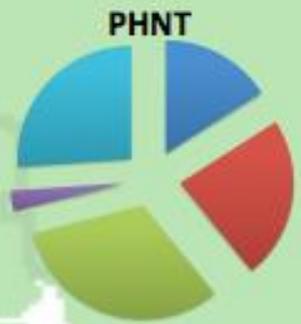
**CATHETERS**

**CONTINUOUS WOUND INFUSION**

**CATHETERS**

# SWARM Post-op Regional Anaesthetics Technique Survey (SPRAT)

Overall data	Number	%
Total occurred	227.0	
Number collected	191.0	84.1%
Age (yrs)	61.4	+/-2.4
Weight (kg)	78.5	+/-2.5
Rectus sheath	47.8	24.8%
TAP	28.5	14.8%
Wound	47.8	24.8%
Spinal	22.6	11.8%
Epidural	45.9	23.8%
Surgeon	90.0	72.0%
Anaesthetist	35.0	28.0%
Ultrasound used	32.0	91.4%
Patient Controlled Analgesia (overall)	76.0	39.8%



- Rectus Sheath
- TAP
- Wound
- Spinal
- Epidural

# THORACIC EPIDURALS



## **Epidural analgesia versus patient-controlled intravenous analgesia for pain following intra-abdominal surgery in adults (Review)**

Salicath JH, Yeoh ECY, Bennett MH

Salicath JH, Yeoh ECY, Bennett MH.

Epidural analgesia versus patient-controlled intravenous analgesia for pain following intra-abdominal surgery in adults.

*Cochrane Database of Systematic Reviews* 2018, Issue 8. Art. No: CD010434.

DOI: 10.1002/14651858.CD010434.pub2.

...pain reduction at rest associated ... EA ... is modest & unlikely to be clinically important. Single-trial estimates ... low-quality evidence ... additional reduction ... pain on movement, which is clinically important.

Any improvement ...interpreted with the understanding ...EA is also associated ...increased chance of failure to successfully institute analgesia, &

an increased likelihood of episodes of hypotension requiring intervention and pruritus.

## Neuraxial Anesthesia for the Prevention of Postoperative Mortality and Major Morbidity: An Overview of Cochrane Systematic Reviews

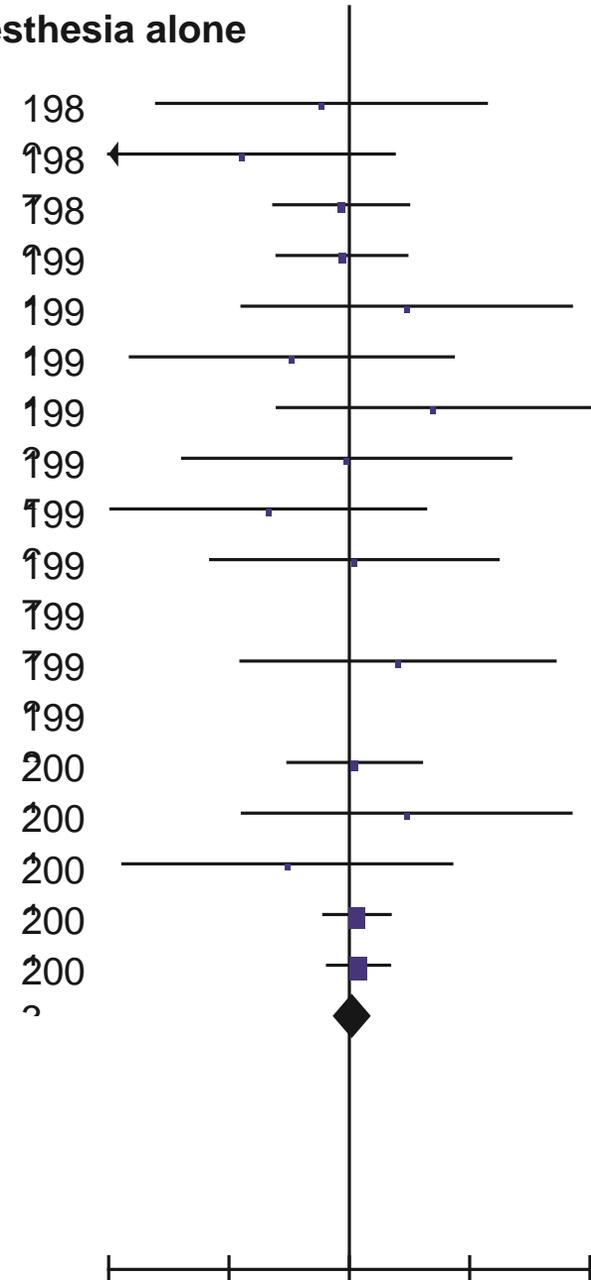
Joanne Guay, MD, Sandra Kopp, MD,\*|| Peter T. Choi, MD, and Nathan Leon Pace, MD†

Santhanam Suresh, MD,¶

‡ Natalie Albert, MD,§

Anesth Analg 2014;119:716–25

### 1.1.2 Regional Anaesthesia added to General Anaesthesia versus General Anaesthesia alone



White 1980 (55) 0 20 1 36 1.2% 0.59 [0.03, 13.78] Yeager 1987 (42) 0 28 3 25 1.4% 0.13 [0.01, 2.36]  
 Reinhart 1989 (41) 3 35 7 70 7.2% 0.86 [0.24, 3.11]  
 Seeling 1991 (58) 6 183 4 106 7.7% 0.87 [0.25, 3.01] Riwar 1991 (29) 1 24 0 24 1.2% 3.00 [0.13, 70.16] Kataja 1991 (36)  
 0 10 1 10 1.3% 0.33 [0.02, 7.32] Davies 1993 (34) 2 25 0 25 1.3% 5.00 [0.25, 99.16]  
 Liu 1995 (28) 1 40 0 12 1.2% 0.95 [0.04, 21.96] Garnett 1996 (35) 0 48 2 51 1.3% 0.21 [0.01, 4.31] Bois 1997 (31) 1 59  
 1 65 1.6% 1.10 [0.07, 17.22] Norman 1997 (37) 0 20 0 19 Not estimable  
 Broekema 1998 (33) 2 60 0 30 1.3% 2.54 [0.13, 51.31] Boylan 1998 (32) 0 19 0 21 Not estimable Norris 2001 (38) 5 89  
 4 79 7.3% 1.11 [0.31, 3.99] Carli 2001 (56) 1 21 0 21 1.2% 3.00 [0.13, 69.70] Paulsen 2001 (57) 0 23 1 21 1.2% 0.31  
 [0.01, 7.12]

Park 2001 (39)	20	514	17	507	29.6%	1.16 [0.62, 2.19]	
Peyton 2003 (40)	23	447	19	441	33.9%	1.19 [0.66, 2.16]	<b>Subtotal (95% CI) 1665 1563 100.0%</b>
						<b>1.07 [0.76, 1.51]</b>	

Total events 65 60 Heterogeneity: Tau<sup>2</sup> = 0.00; Chi<sup>2</sup> = 7.05, df = 15 (P = 0.96); I<sup>2</sup> = 0%  
 Test for overall effect: Z = 0.38 (P = 0.70)

0.01 0.1 1 10 100  
 Favours RA Favours GA

Test for subgroup differences: Chi<sup>2</sup> = 3.23, df = 1 (P = 0.07), I<sup>2</sup> = 69.0%

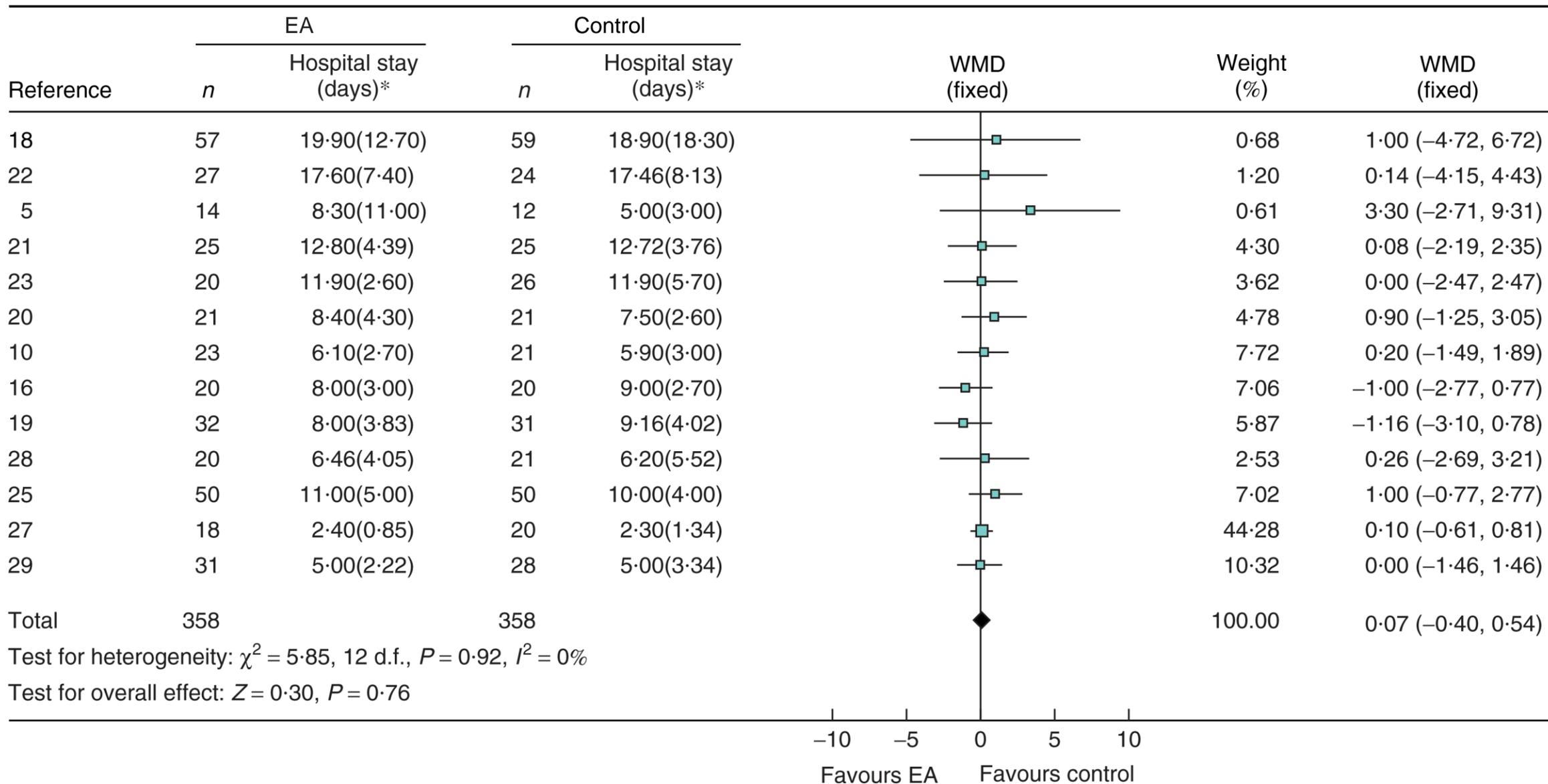
# **Meta-analysis of epidural analgesia *versus* parenteral opioid analgesia after colorectal surgery**

**E. Marret, C. Remy and F. Bonnet and the Postoperative Pain Forum Group**

Department of Anaesthetics and Intensive Care, Tenon University Hospital, Assistance Publique, Hopitaux de Paris, University of Pierre and Marie<sup>^</sup> Curie, Faculty of Medicine Saint Antoine, Paris, France

*Correspondence to:* Dr E. Marret, Departement d'Anesthésie Réanimation, H<sup>^</sup>opital Tenon, 4 Rue de la Chine, 75970 Paris Cedex 20, France<sup>^</sup>

BJS 2007; 94: 665–673

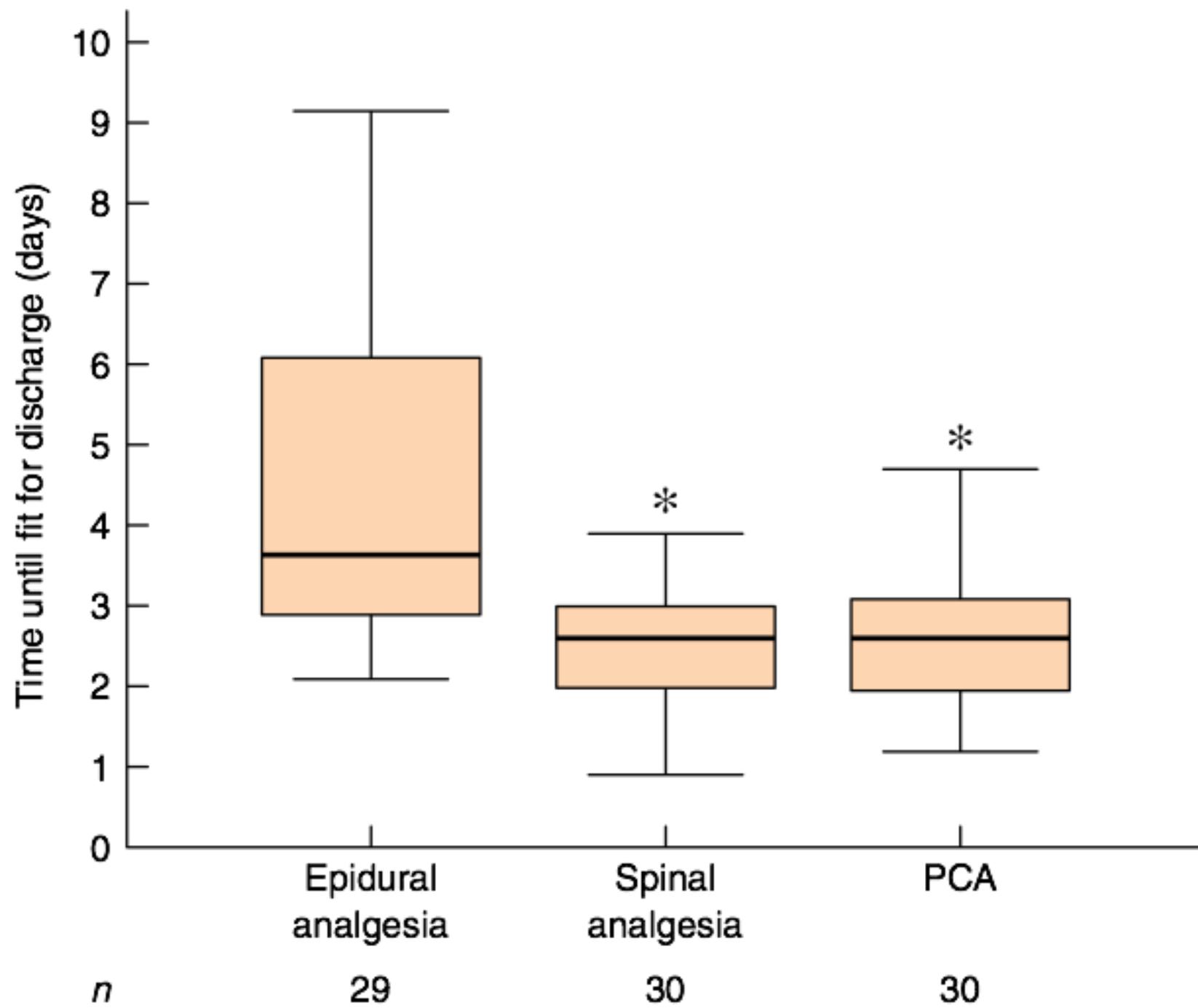


# Randomized clinical trial of epidural, spinal or patient-controlled analgesia for patients undergoing laparoscopic colorectal surgery

**B. F. Levy<sup>1</sup>, M. J. Scott<sup>2</sup>, W. Fawcett<sup>2</sup>, C. Fry<sup>3</sup> and T. A. Rockall<sup>1</sup>**

<sup>1</sup>Minimal Access Therapy Training Unit, <sup>2</sup>Department of Anaesthesia and Intensive Care, Royal Surrey County Hospital, and <sup>3</sup>Postgraduate Medical School, University of Surrey, Guildford, UK

*Correspondence to:* Mr B. F. Levy, Minimal Access Therapy Training Unit (MATTU), Daphne Jackson Road, Guildford GU2 7WG, UK



# Randomized clinical trial of local infiltration plus patient-controlled opiate analgesia vs. epidural analgesia following liver resection surgery

Erica J. Revie<sup>1</sup>, Dermot W. McKeown<sup>2</sup>, John A. Wilson<sup>2</sup>, O. James Garden<sup>1</sup> & Stephen J. Wigmore<sup>1</sup>

<sup>1</sup>Department of Clinical Surgery, University of Edinburgh, Edinburgh, UK and <sup>2</sup>Department of Anaesthesia, Critical Care and Pain Medicine, Royal Infirmary of Edinburgh, Edinburgh, UK

**4.5 days (2.5–63.5) vs  
6.0 days  
(3.0–42.5)**

**P = 0.044**

Randomized clinical trial of perioperative nerve block and continuous local anaesthetic infiltration via wound catheter *versus* epidural analgesia in open liver resection (LIVER 2 trial)

J. Hughes<sup>1</sup>, E. M. Harrison<sup>1</sup>, N. J. Peel<sup>1</sup>, B. Stutchfield<sup>1</sup>, S. McNally<sup>1</sup>, C. Beattie<sup>2</sup> and S. J. Wigmore<sup>1</sup>

HPB 2012, 14, 611–618

**5.75 (4–7) days vs  
6.5 (5–  
9.75)  
days (P =  
0.036)**

BJS 2015; 102: 1619–1628

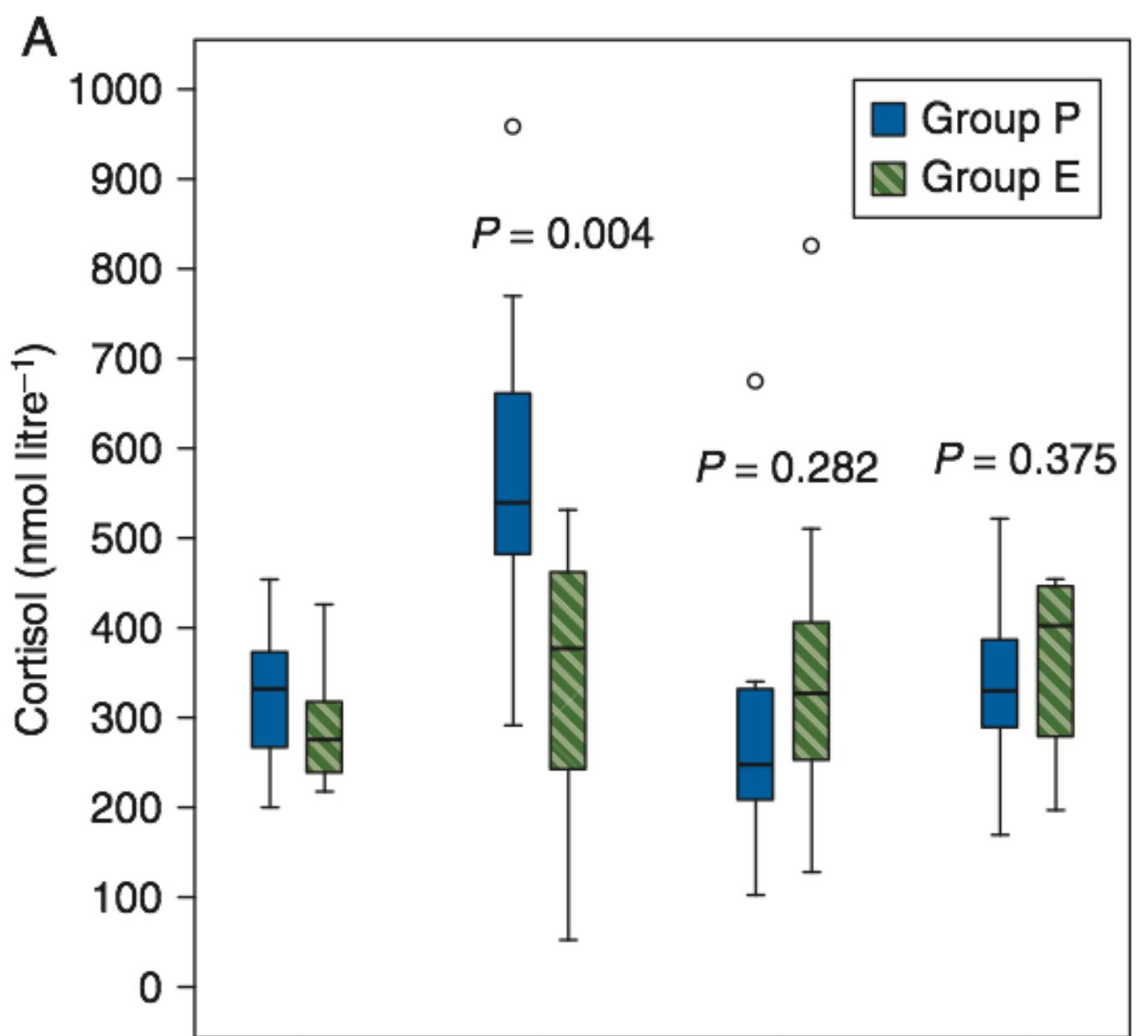
# Thoracic epidural analgesia inhibits the neuro-hormonal but not the acute inflammatory stress response after radical retropubic prostatectomy

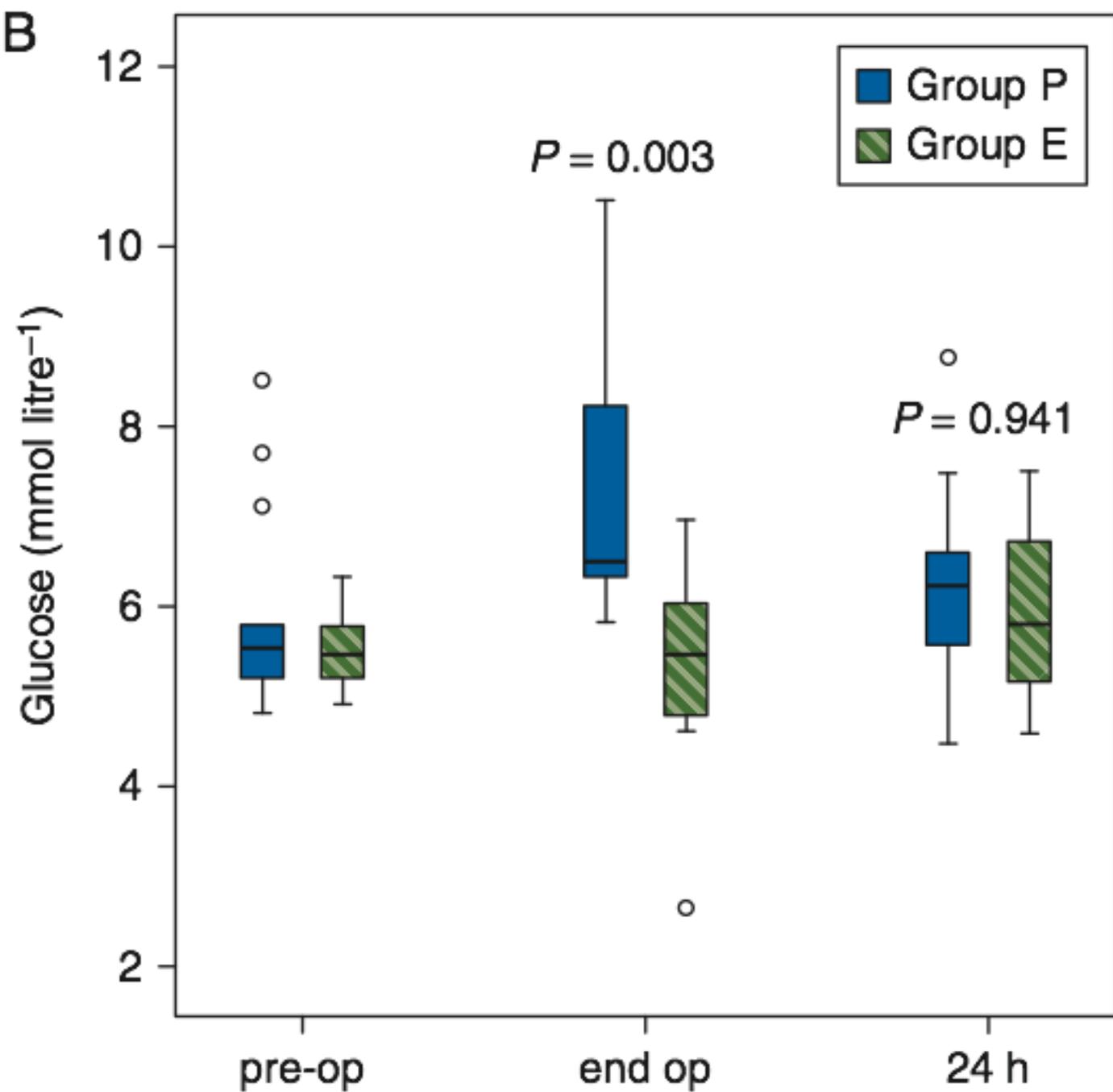
F. Fant<sup>1\*</sup>, E. Tina<sup>2</sup>, D. Sandblom<sup>3</sup>, S.-O. Andersson<sup>3</sup>, A. Magnuson<sup>4</sup>, E. Hultgren-Höörnkvist<sup>5</sup>, K. Axelsson<sup>1</sup> and A. Gupta<sup>1</sup>

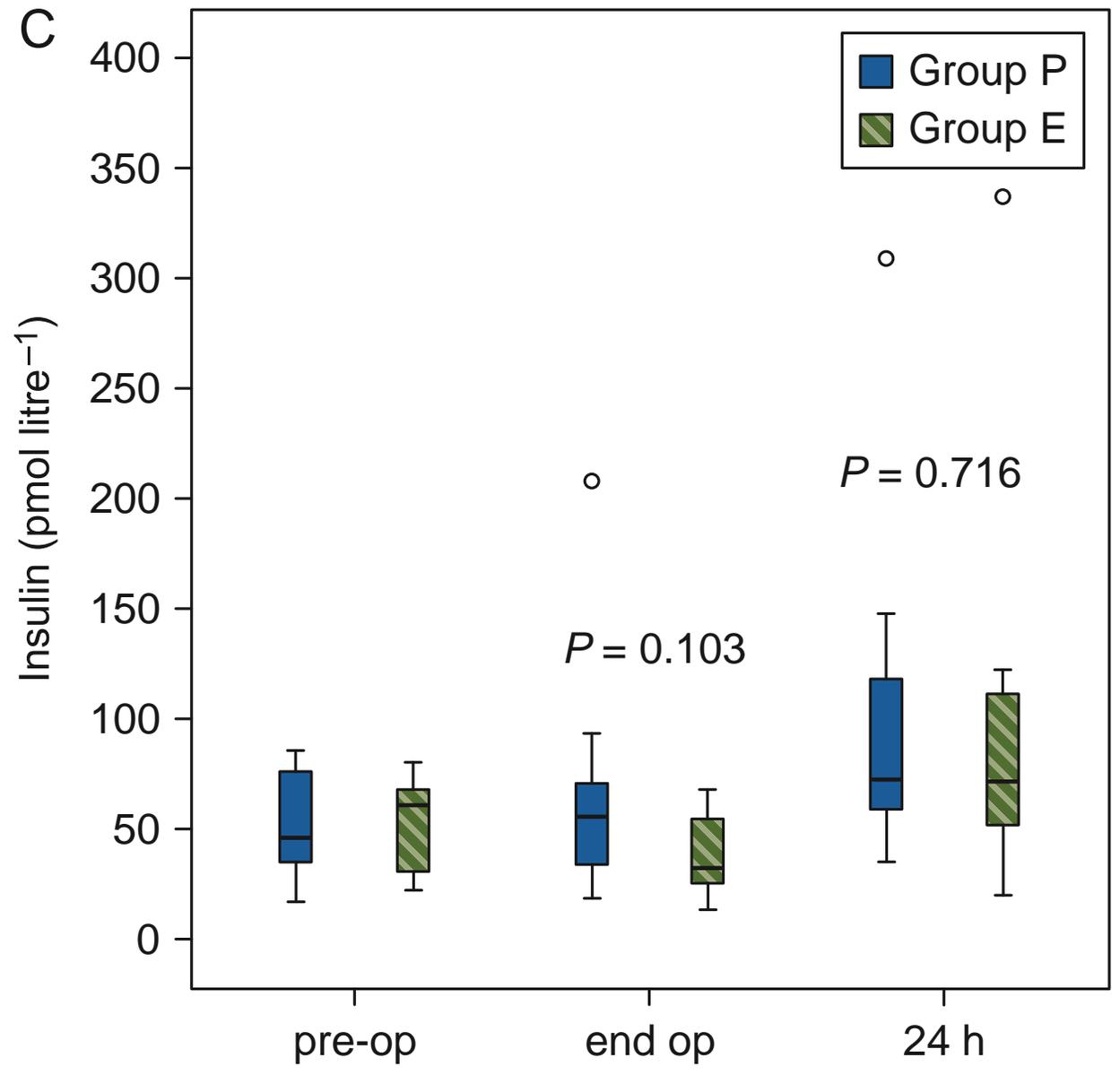
<sup>1</sup> Department of Anesthesiology and Intensive Care, University Hospital, Örebro SE-701 85, Sweden

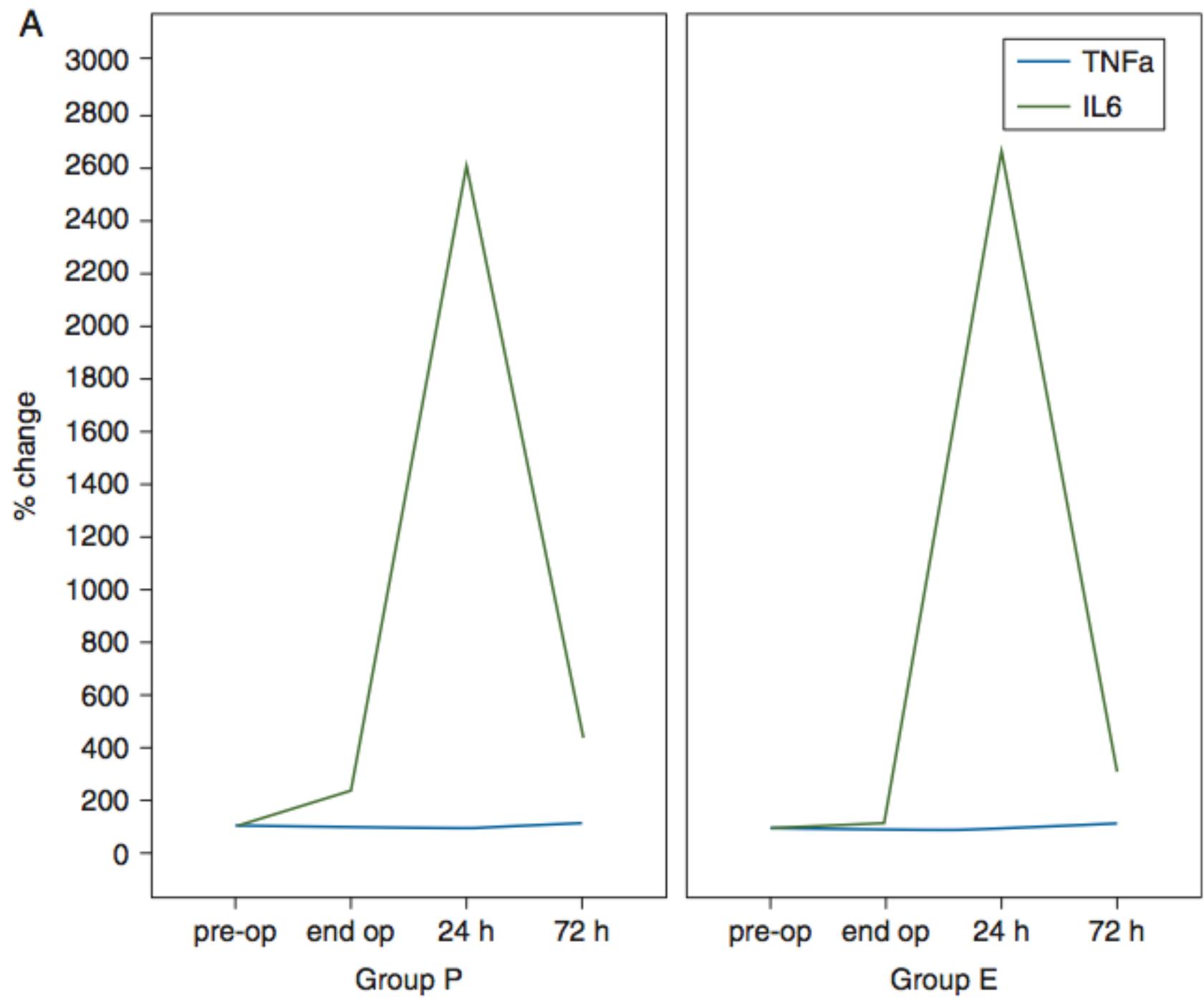
<sup>2</sup> Clinical Research Centre, <sup>3</sup> Department of Urology and the Health Academy, <sup>4</sup> Clinical Epidemiology and Biostatistical Unit, and <sup>5</sup> Örebro University Hospital, School of Health and Medical Sciences, Örebro University, Sweden

BJA 2013; 110 (5),747-757



**B**



**A**

**20% Hypotension**



# Adherence to the Enhanced Recovery After Surgery Protocol and Outcomes After Colorectal Cancer Surgery

*Ulf O. Gustafsson, MD, PhD; Jonatan Hausel, MD; Anders Thorell, MD, PhD; Olle Ljungqvist, MD, PhD; Mattias Soop, MD, PhD; Jonas Nygren, MD, PhD; for the Enhanced Recovery After Surgery Study Group*

**Each additional litre increases complications by 32%**

**(OR, 1.32; 95% CI, 1.17-1.50)**

# NAP 3

Report and findings of the 3rd National Audit

Project of the Royal College of Anaesthetists

## Executive Summary

# Executive summary

Major complications of central neuraxial blocks: the 3rd  
National Audit Project of the Royal College of Anaesthetists

Dr Tim Cook, NAP3 Lead

On behalf of the Royal College of Anaesthetists 3rd National Audit Project

REVIEW ARTICLES

## Failed epidural: causes and management

J. Hermanides, M. W. Hollmann\*, M. F. Stevens and P. Lirk

Department of Anaesthesiology, Academic Medical Center, University of Amsterdam, Meibergdreef 9, 1105AZ Amsterdam, The Netherlands

# 32% Failure Rate

BJA 2012 ; 109 (2):144-154

**RECTUS SHEATH CATHETERS**



Schleich CL. Schmerzlose Operationen. Berlin: Springer; 1899: 240-1.

**Smith BE, Suchak M, Siggins D, Challands J. Rectus sheath block for diagnostic laparoscopy. Anaesthesia. 1988;43(11): 947-948.**

**Ferguson S, Thomas V, Lewis I. The rectus sheath block in paediatric anaesthesia: new indications for an old technique? Paediatric Anaesthesia. 1996;6(6): 463-466.**

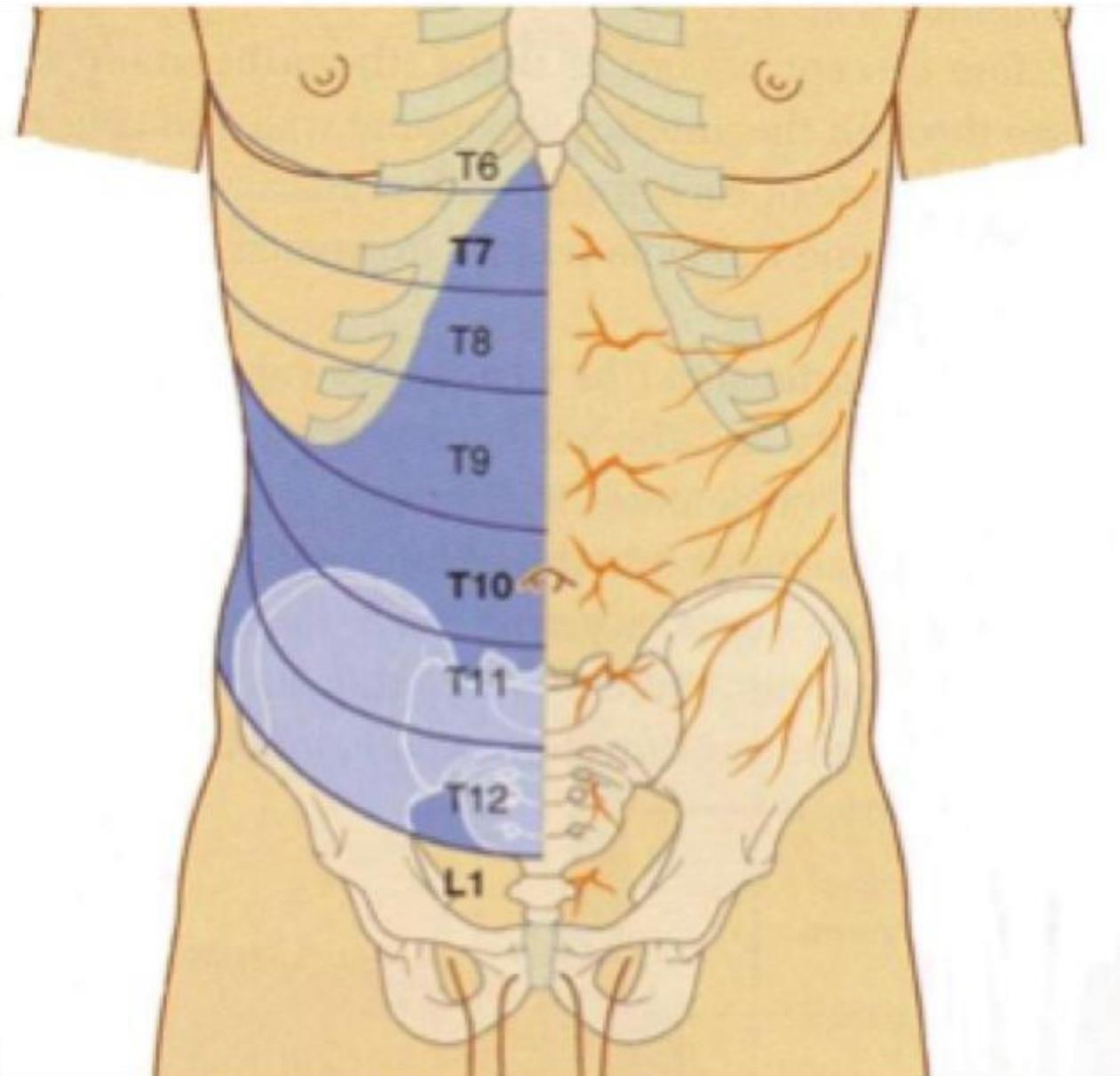
**Willschke H, Bosenberg A, Marhofer P, Johnston S, Kettner SC, Wanzel O, et al. Ultrasonography-guided rectus sheath block in paediatric anaesthesia-a new approach to an old technique. British Journal of Anaesthesia. 2006;97(2):**

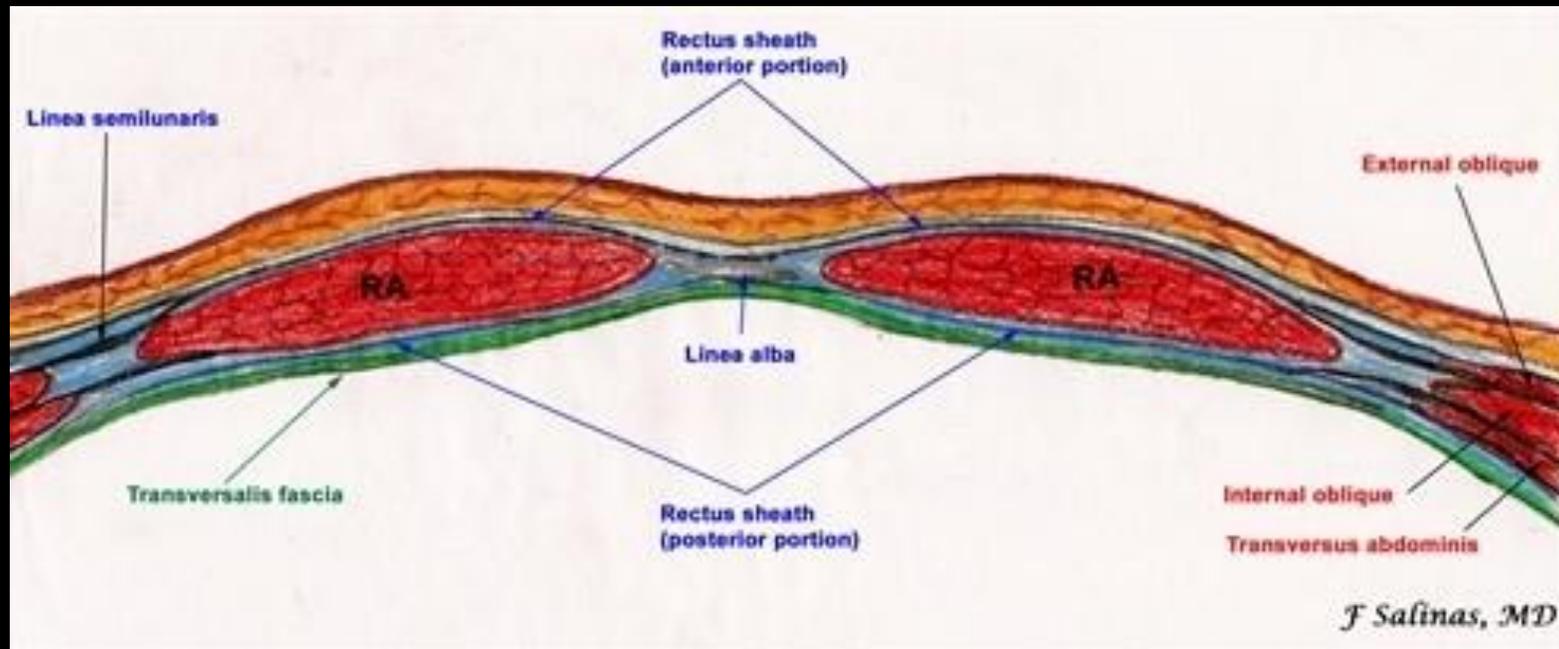
**244-249.**

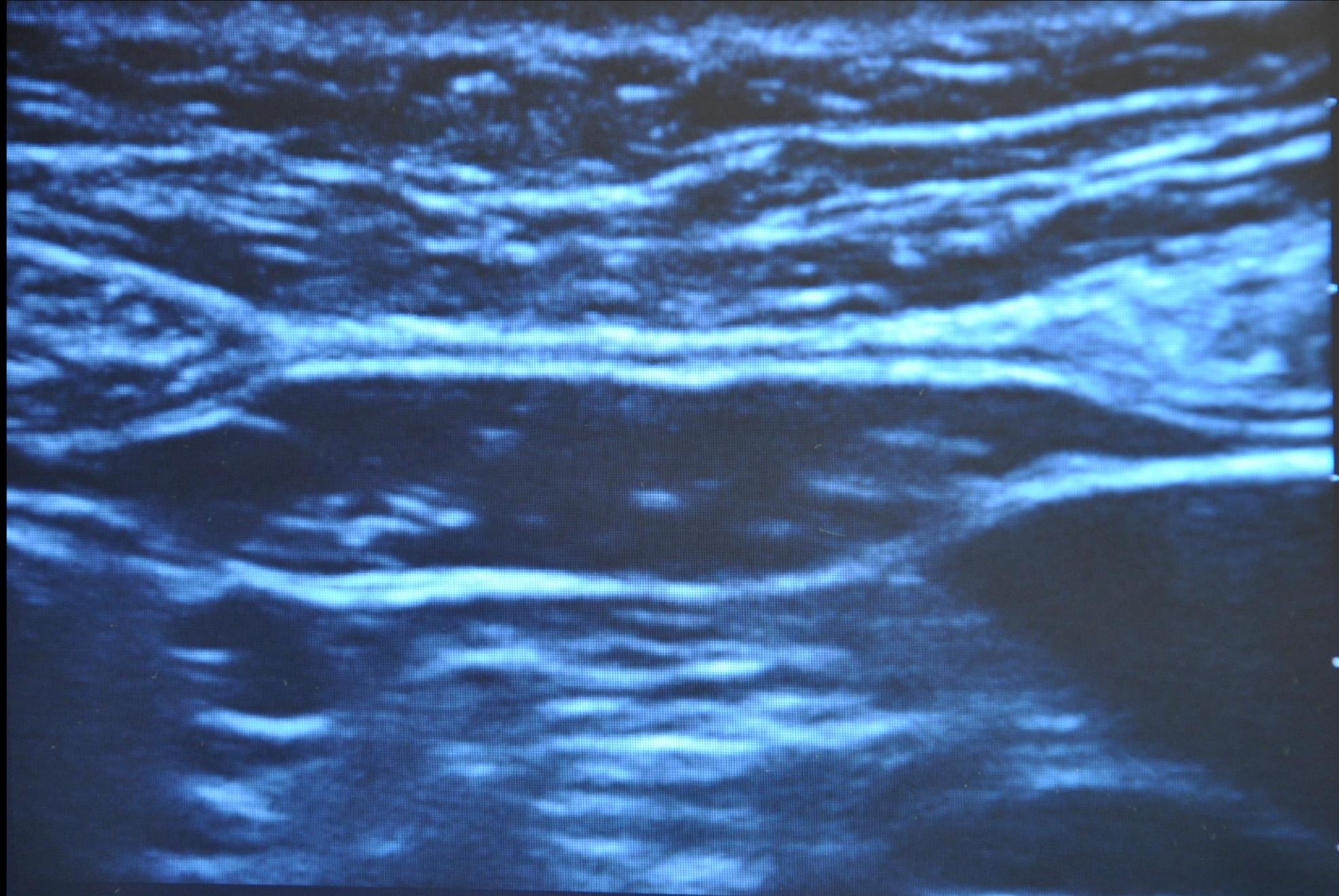
**Dolan J, Lucie P, Geary T, Smith M, Kenny G. The rectus sheath block for laparoscopic surgery in adults: a comparison between the loss of resistance and ultrasound guided techniques. Anaesthesia. 2007;62: 302.**

**Cornish P, Deacon A. Rectus sheath catheters for continuous analgesia after upper abdominal surgery. ANZ Journal of Surgery. 2007;77(12): 84.**

**Sandeman DJ, Dilley AV. Ultrasound-guided rectus sheath block and catheter placement. ANZ Journal of Surgery. 2008;78: 621-623.**

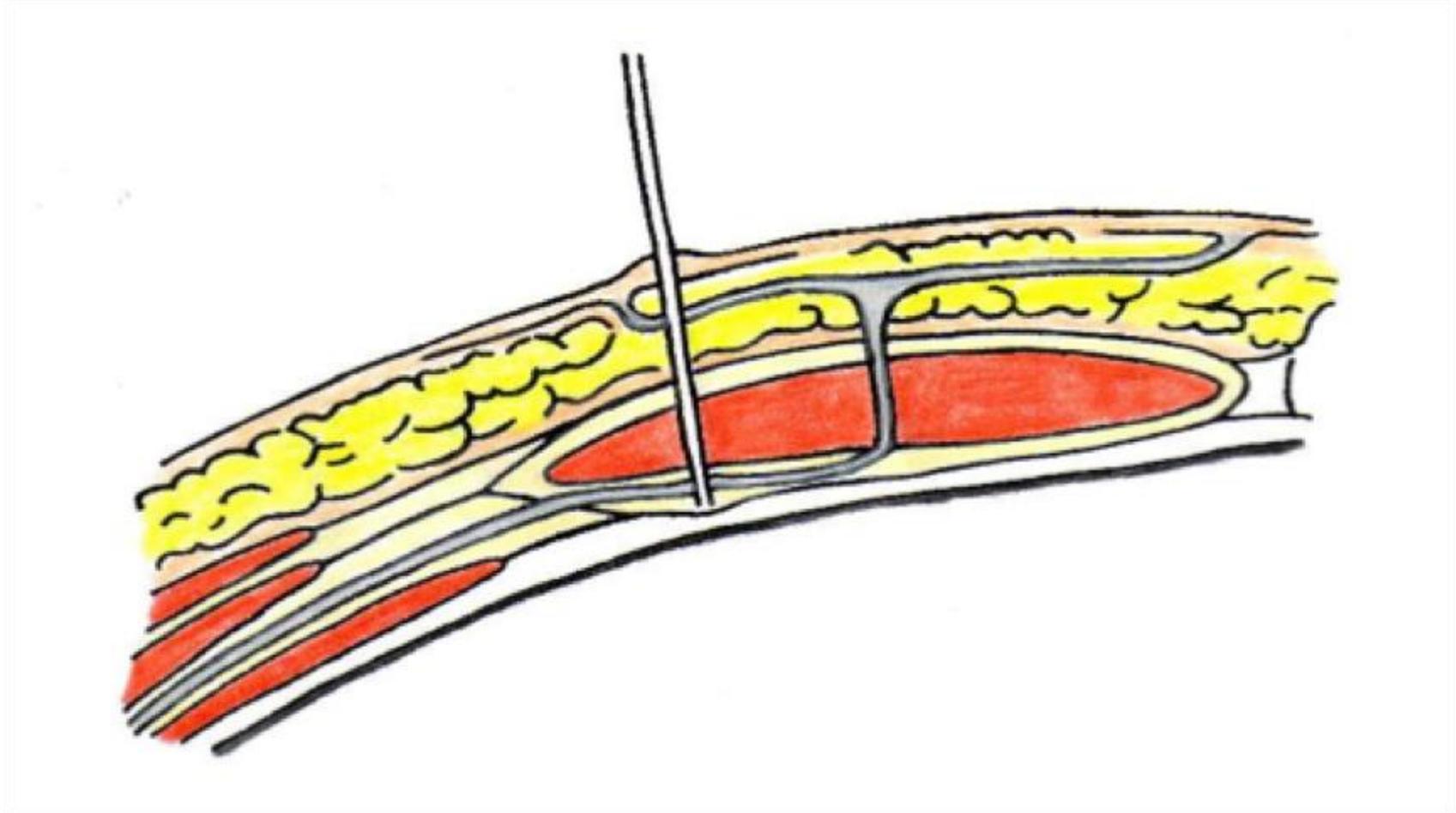




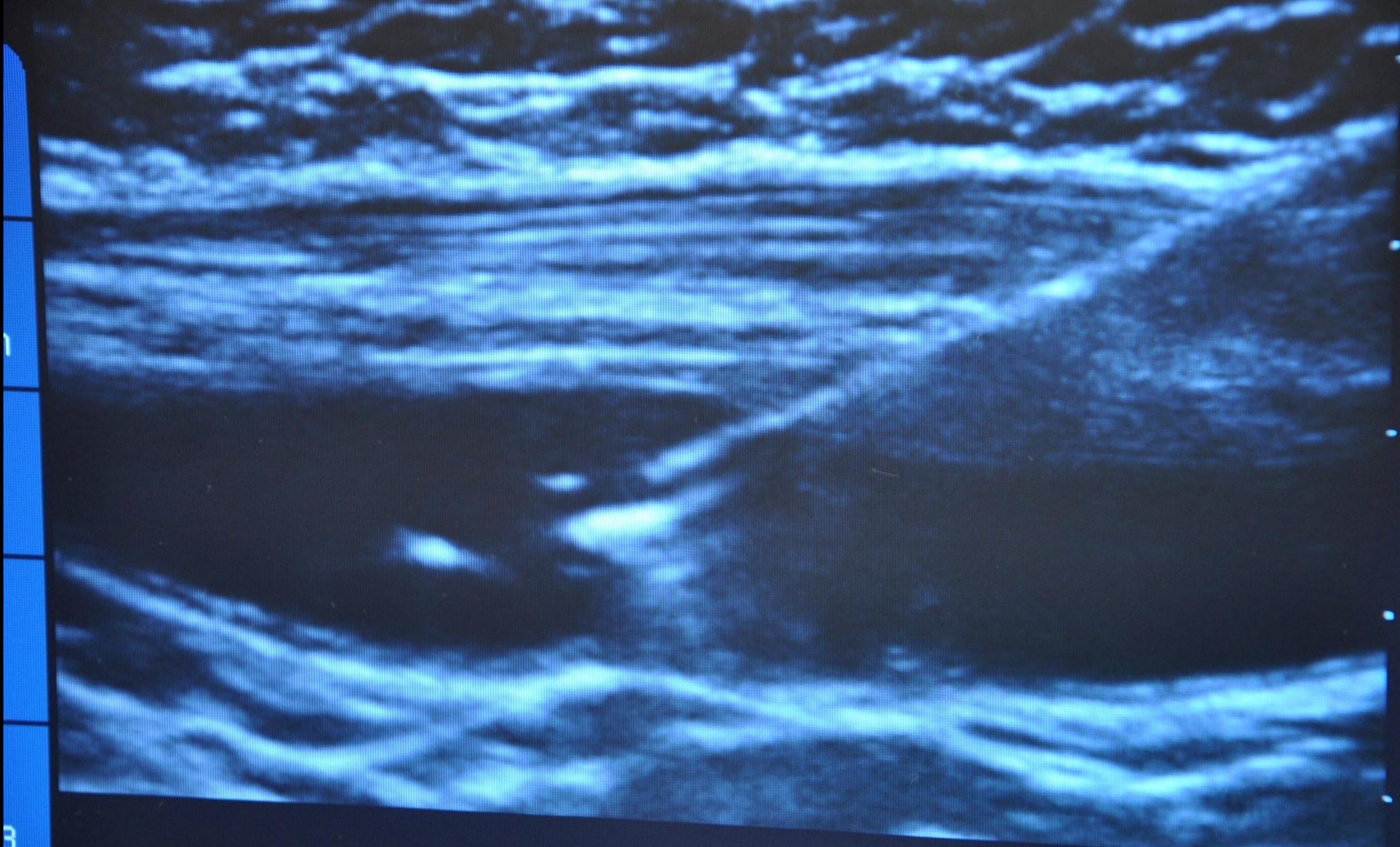


99%  
MI  
0.7  
TIS  
0.1

2.7



95  
M  
O  
T  
O



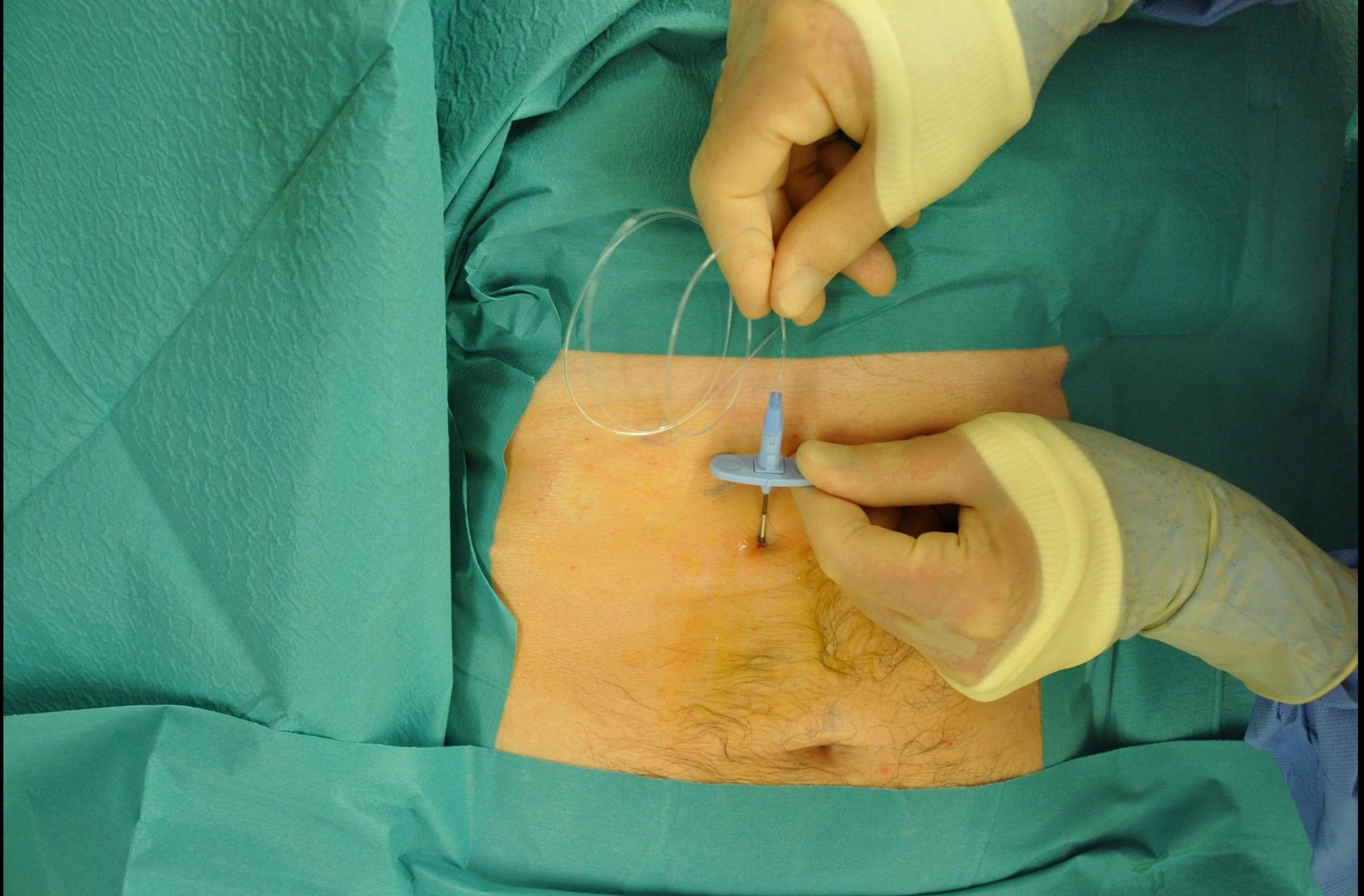
2.7

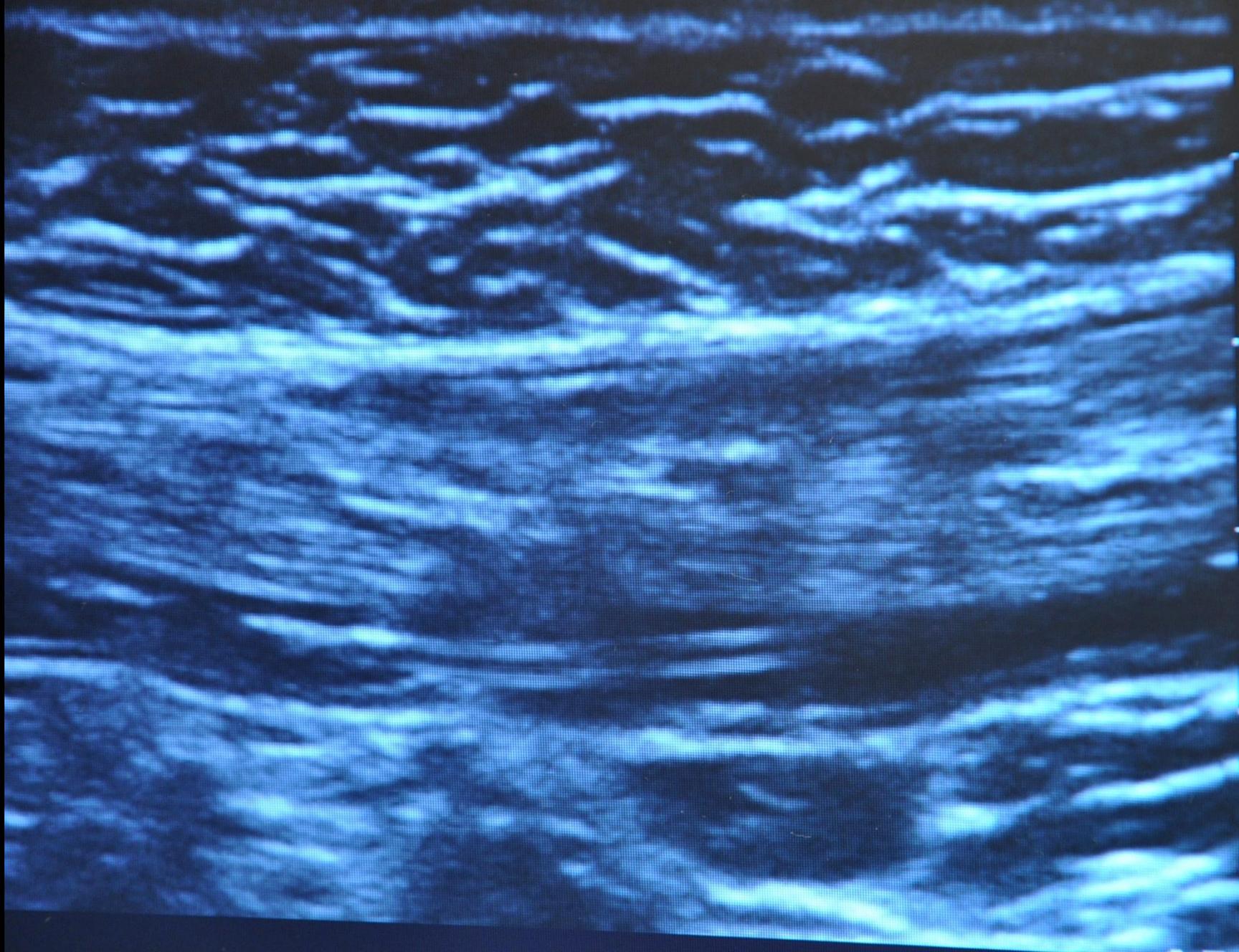
B

ain

Depth

M





FILE



99%

MI

0.7

TIS

0.1

2.7





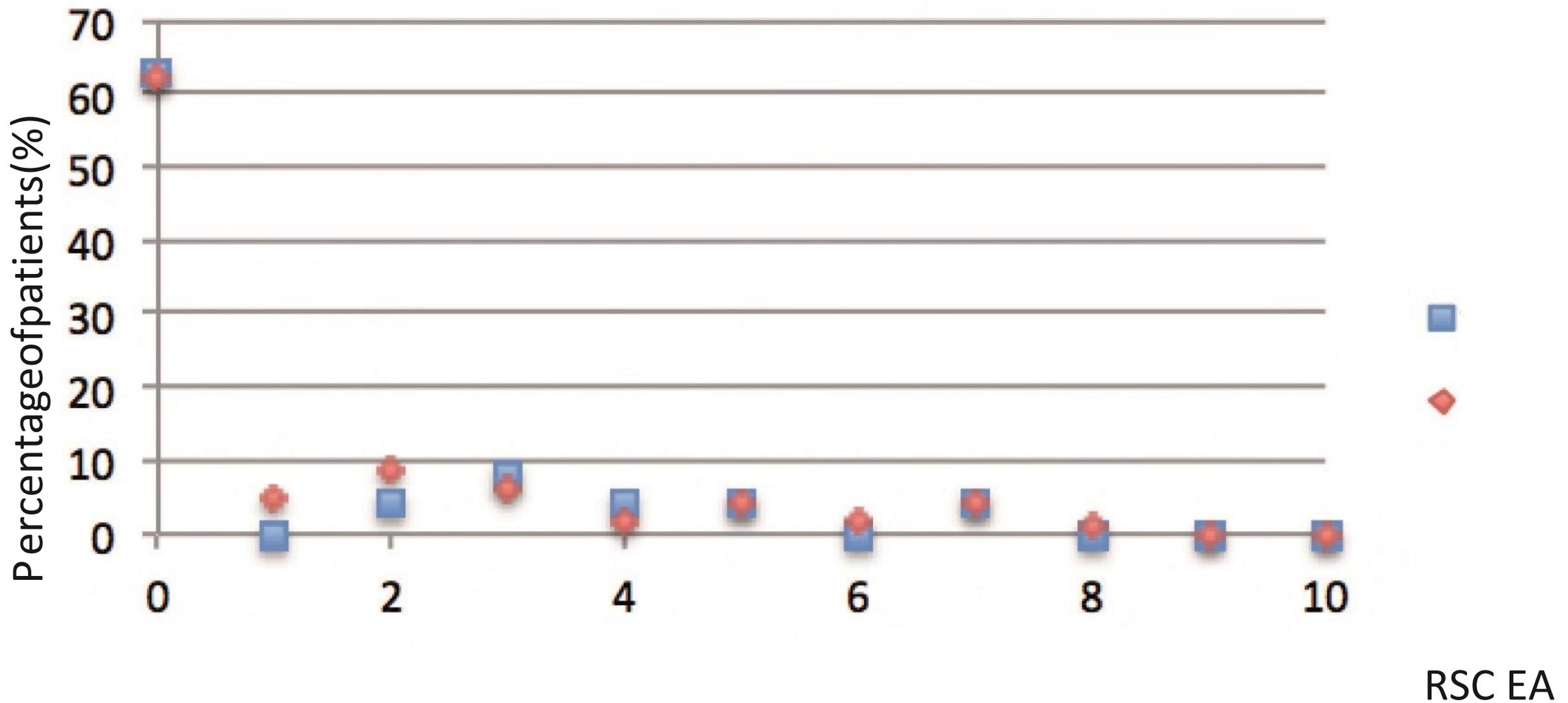


# Ultrasonography guided rectus sheath catheters versus epidural analgesia for open colorectal cancer surgery in a single centre

AR Godden, MJ Marshall, AS Grice, IR Daniels

Royal Devon and Exeter Hospital NHS Foundation Trust, UK

Ann R Coll Surg Engl 2013; 95: 591–594



RSC EA

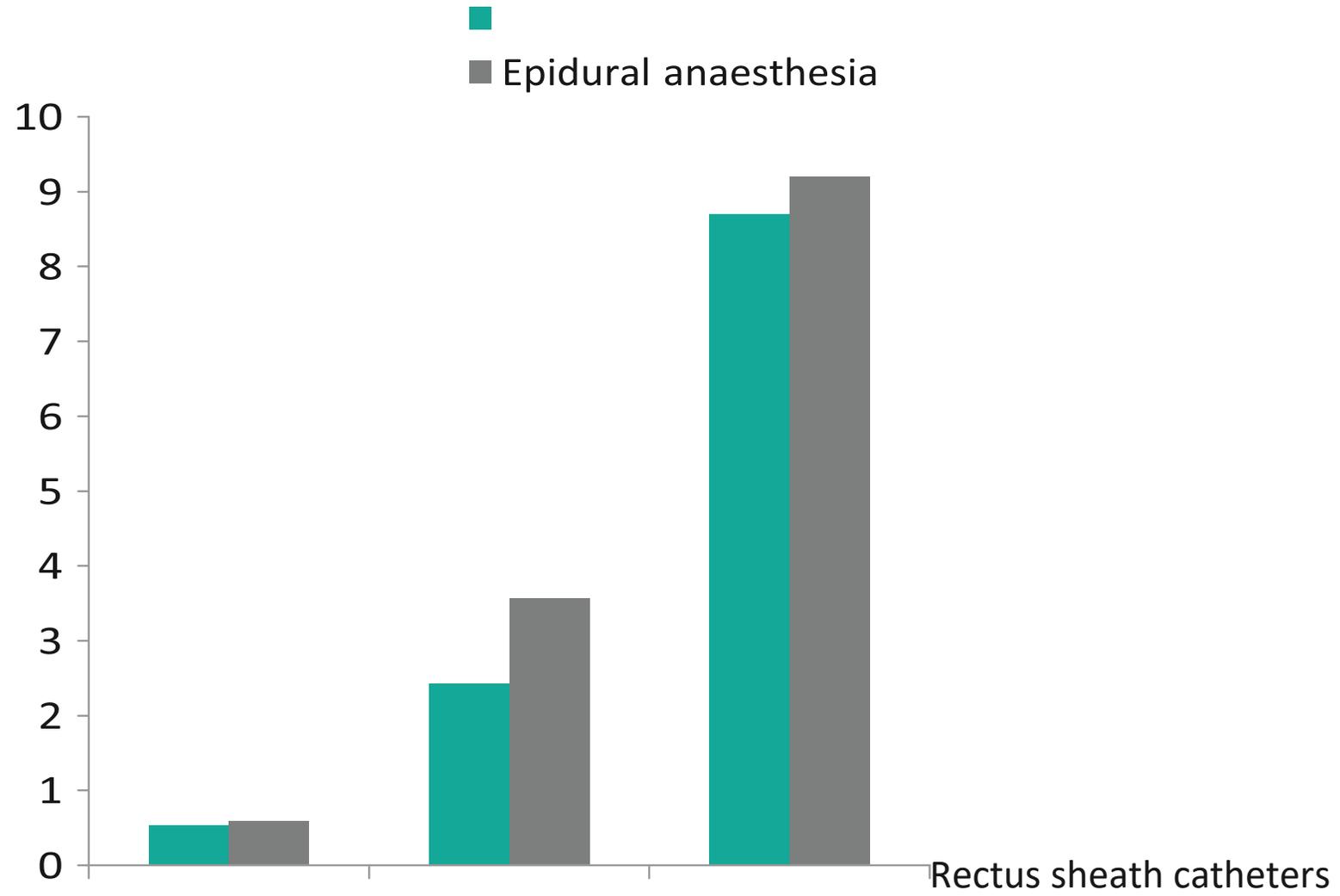
Pain score

Rectus sheath catheters provide equivalent analgesia to epidurals following laparotomy for colorectal surgery

ECG Tudor, W Yang, R Brown, PM Mackey

Taunton and Somerset NHS Foundation Trust, UK

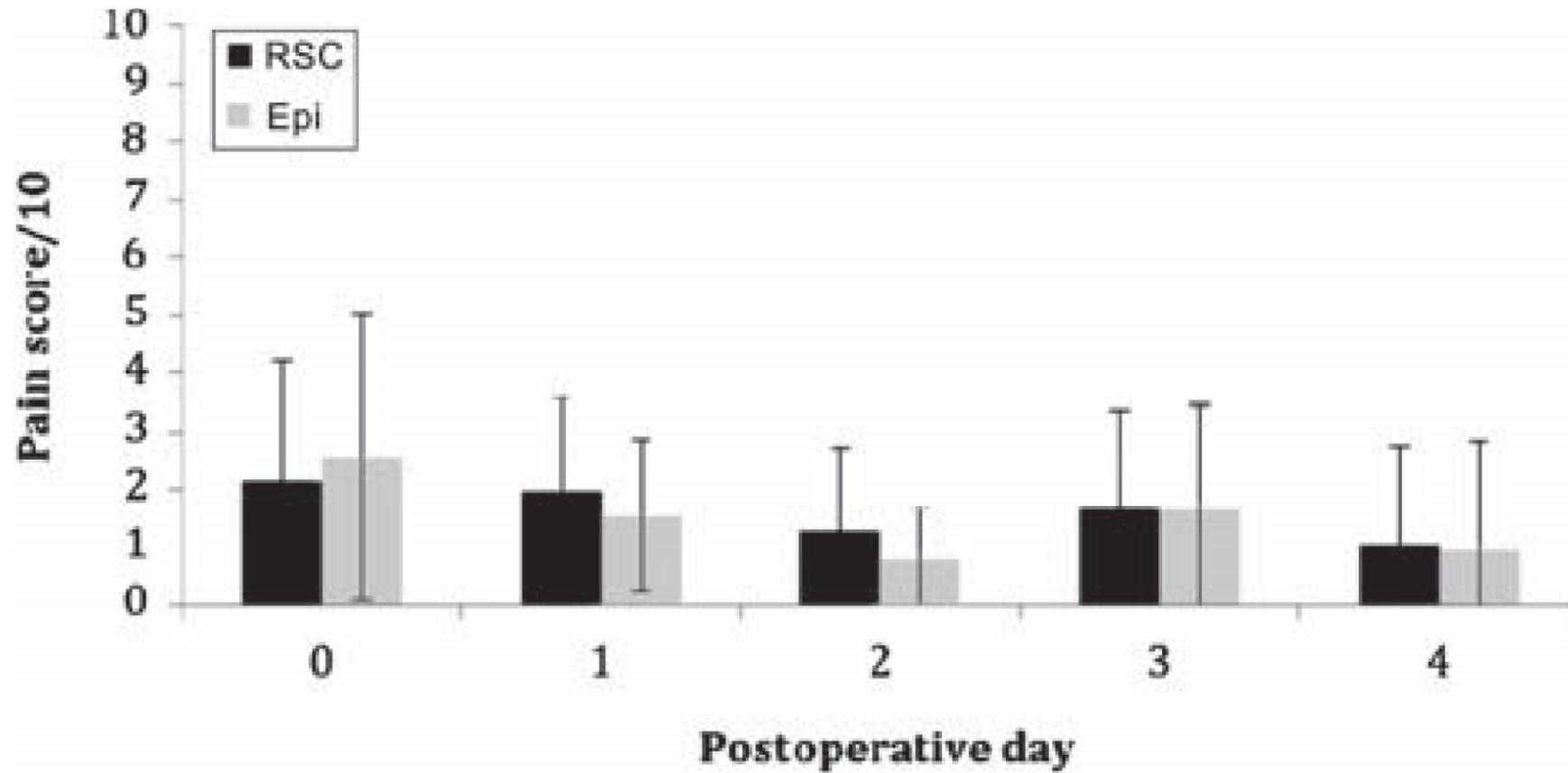
Ann R Coll Surg Engl 2015; 97: 530–533



Mean day 1 Time to mobiliseLength of stay mode  
pain (days) (days)  
score (0–3)

## **An evaluation of the effects of a service change from epidurals to rectus sheath catheters on postoperative pain**

L. Finch<sup>1</sup> , A. Phillips<sup>2</sup> , N. Acheson<sup>3</sup> , P. Dix<sup>1</sup> & C. Berry<sup>1</sup>



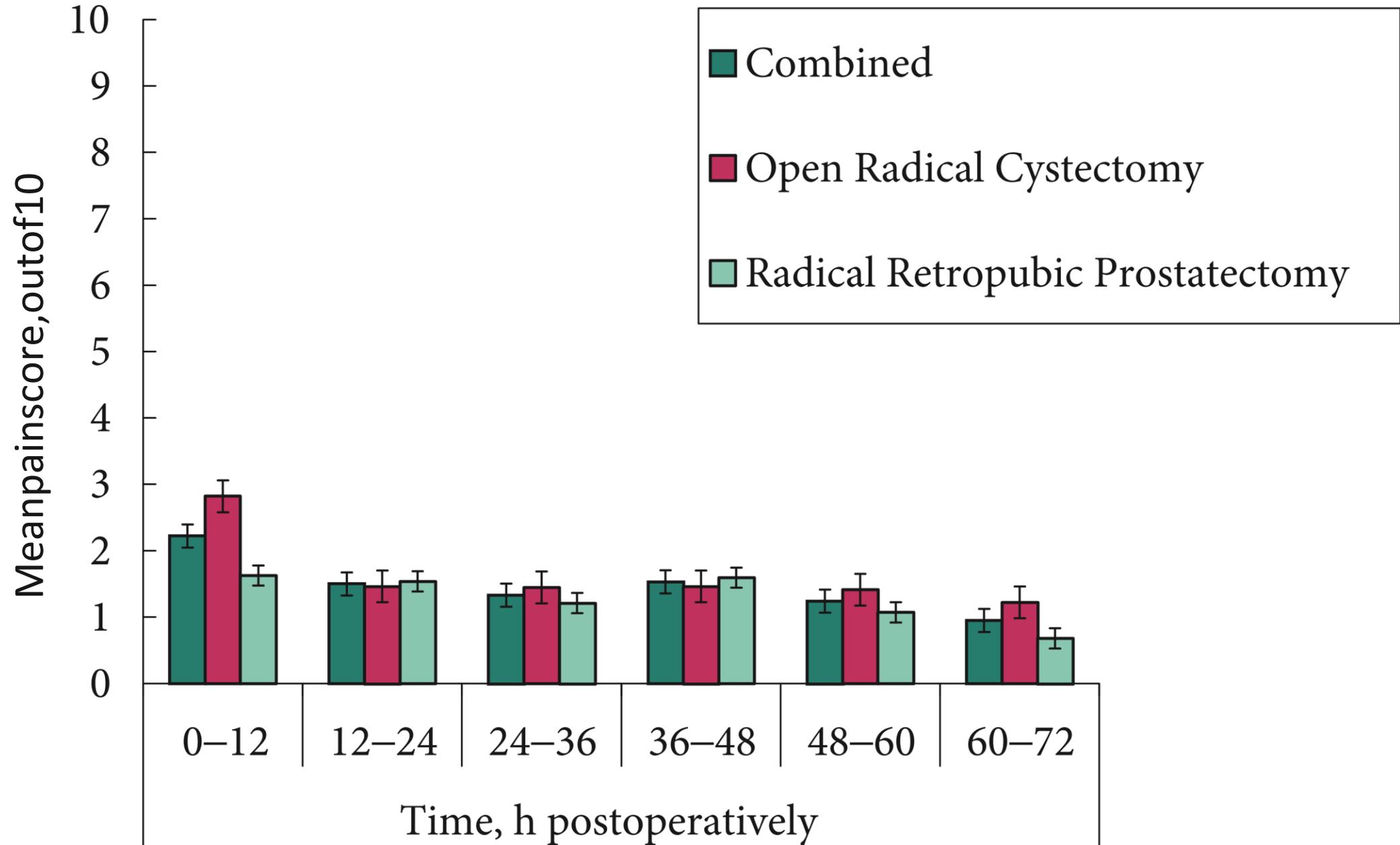
Journal of Obstetrics and Gynaecology, July 2013; 33: 502–504

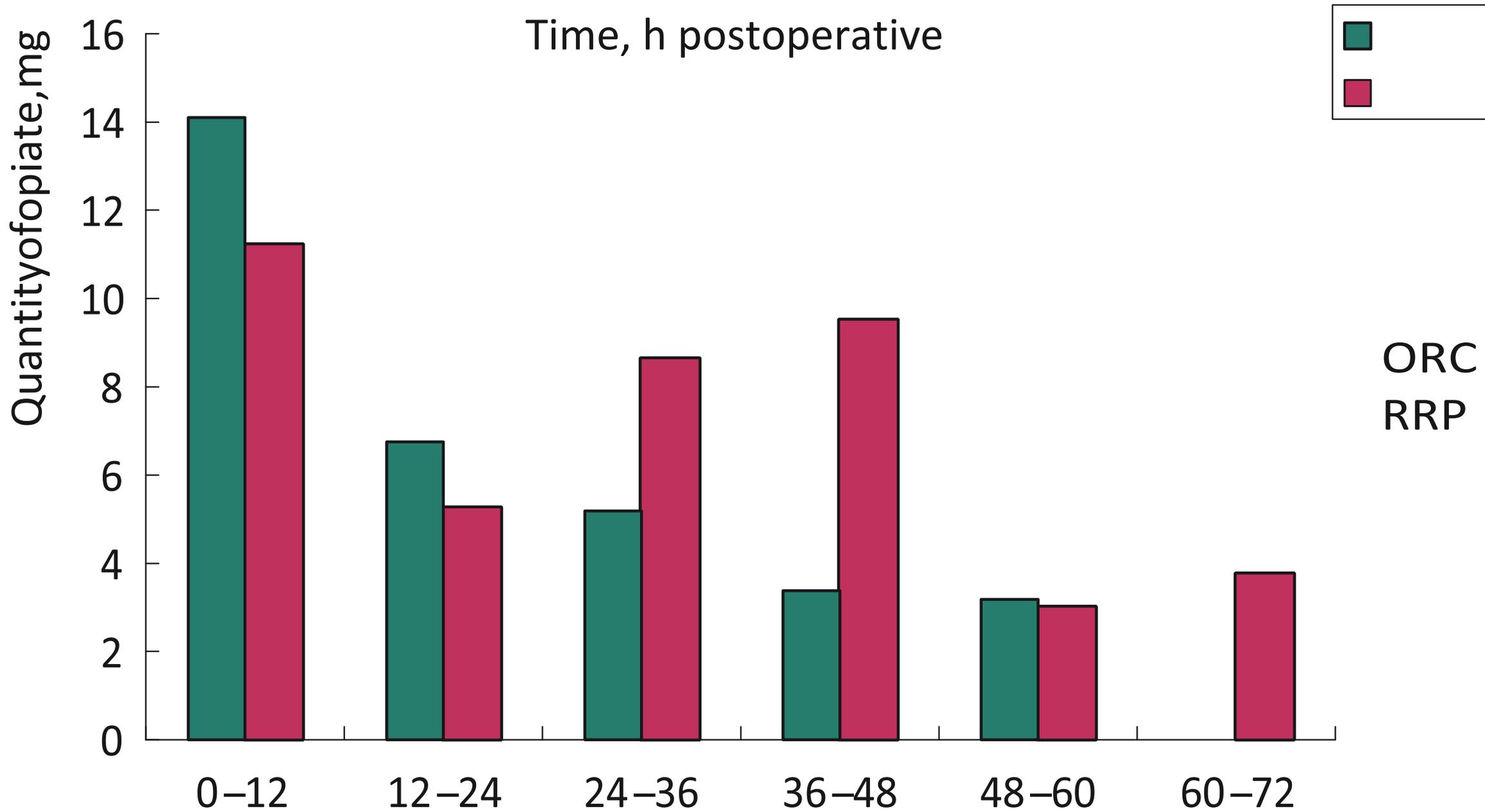
# Use of rectus sheath catheters for pain relief in patients undergoing major pelvic urological surgery

Thomas J. Dutton, John S. McGrath and Mark O. Daugherty

*Exeter Surgical Health Services Research Unit, Royal Devon and Exeter NHS Foundation Trust, Exeter, UK*

BJU Int 2014; 113:246-253





# Rectus Sheath Catheters Following IntraAbdominal Surgery

James Moore<sup>1</sup>; Joe MacIntyre<sup>1</sup>

<sup>1</sup> Nelson Hospital, Nelson, New Zealand

**184 patients; 2008 - 2009**

**Mean Pain Scores Pre Top-up = 3.92**

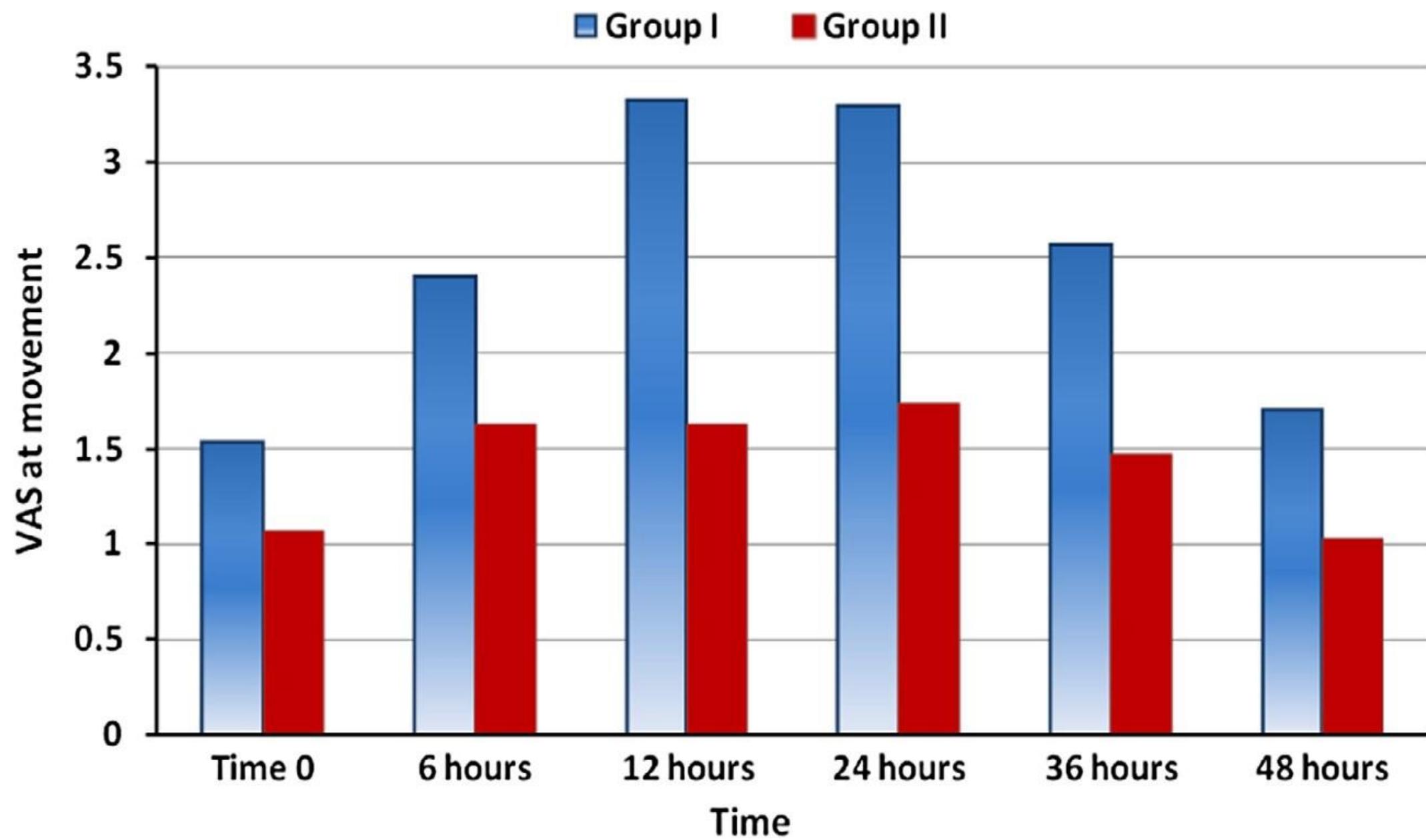
**Post Top-up = 1.26**

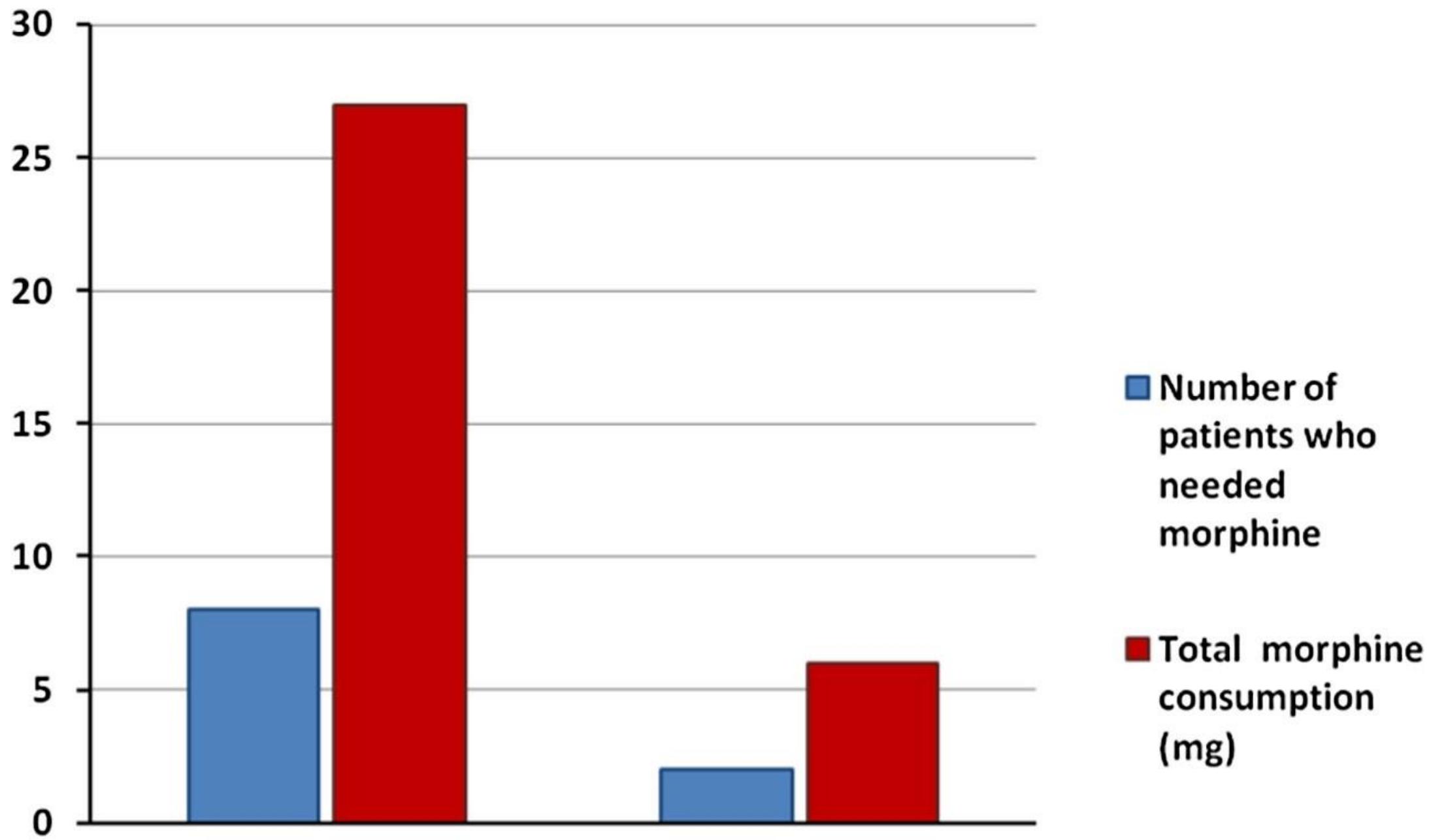
**No AEs; Satisfaction 4.9 (1-5 Likert scale)**

Postoperative analgesia of ultrasound guided rectus sheath catheters versus continuous wound catheters for colorectal surgery: A randomized clinical trial<sup>9</sup>

Abd El Raheem Mostafa Dowidar <sup>1</sup>, Hoda Alsaïd Ahmed Ezz <sup>2,\*</sup>,  
Ahmed Abd Elaziz Shama <sup>3</sup>, Marwa Ahmed Eloraby <sup>3</sup>

Egypt J Anaesth 2016; 32, 3:375-383





Published online 2017 June 10.

**Research Article**

# The Analgesic Efficiency of Ultrasound-Guided Rectus Sheath Analgesia Compared with Low Thoracic Epidural Analgesia After Elective Abdominal Surgery with a Midline Incision: A Prospective Randomized Controlled Trial

Hany Mahmoud Yassin,<sup>1,\*</sup> Ahmed Tohamy Abd Elmoneim,<sup>2</sup> and Hatem El Moutaz<sup>3</sup>

<sup>1</sup>Department of Anesthesia, Faculty of Medicine, Fayoum University, Fayoum, Egypt

<sup>2</sup>Department of Anesthesia, Faculty of Medicine, Benha University, Benha, Egypt

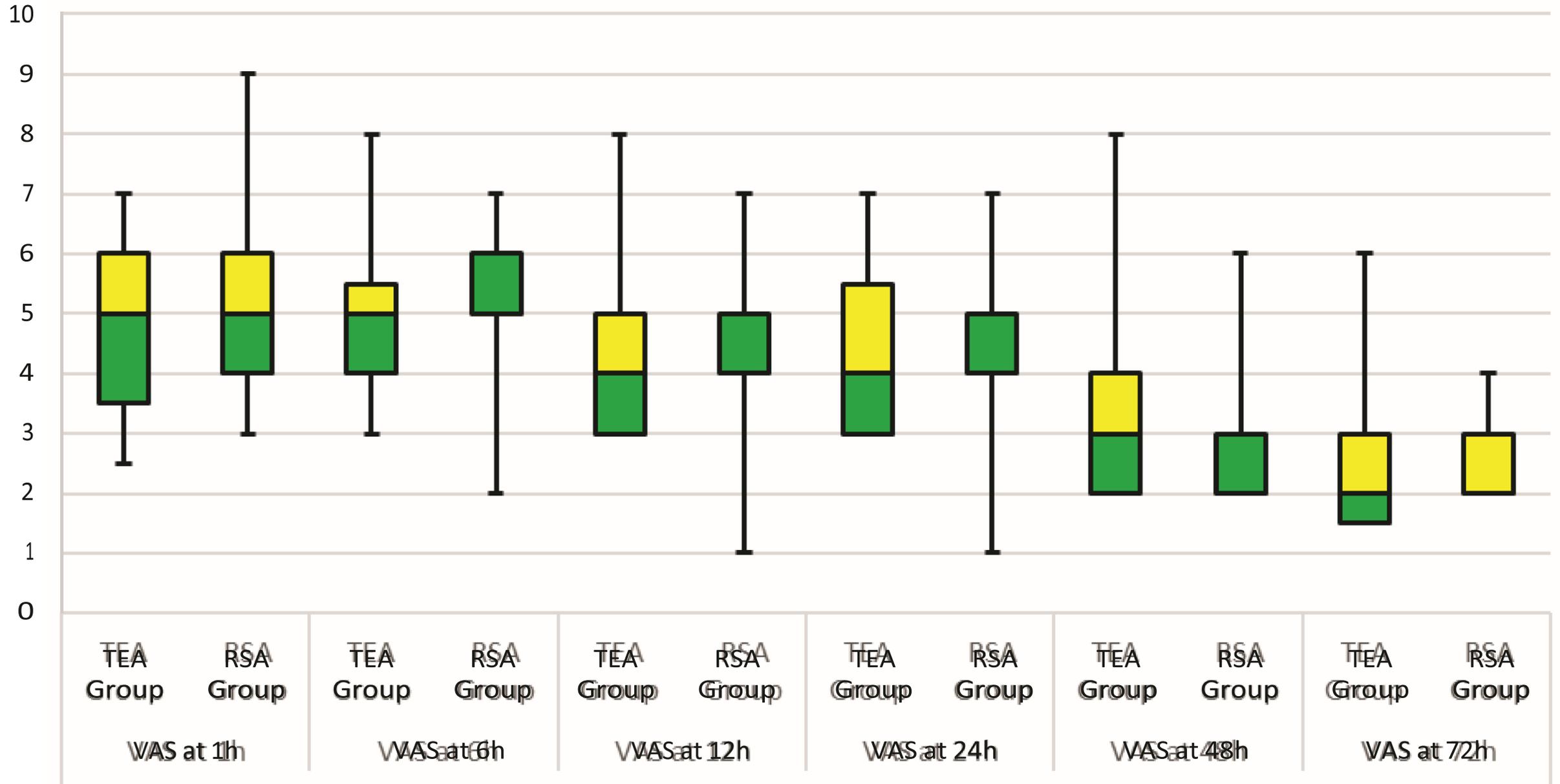
<sup>3</sup>Department of Anesthesia, Faculty of Medicine, Bani Sweif University, Egypt

\*

**Table 2.** Postoperative Morphine Consumption<sup>a</sup>

	<b>TEA (n = 31)</b>	<b>RSA (n = 29)</b>	<b>P Value</b>
<b>Need for morphine n (%)</b>	17 (54.84%)	25 (86.21%)	0.008 <sup>b</sup>
<b>Time to first dose of morphine (min)</b>	256.77 ± 73.45	208.82 ± 64.65	0.031 <sup>b</sup>
<b>Morphine consumption at PACU 0 - 2 hours postoperatively (mg)</b>	6 (4.5, 6)	9 (6, 12)	< 0.001 <sup>b</sup>
<b>Morphine consumption at 2 - 6 hours (mg)</b>	6 (5.25, 6.75)	6 (6, 9)	0.002 <sup>b</sup>
<b>Morphine consumption at 6 - 12 hours (mg)</b>	6 (6, 9)	9 (6, 9)	0.043 <sup>b</sup>
<b>Morphine consumption at 12 - 24 hours (mg)</b>	6 (3, 6)	6 (6, 9)	0.006 <sup>b</sup>
<b>Cumulative morphine consumption during 24 hours postoperatively (mg)</b>	18 (15, 18)	33 (30, 36)	< 0.001 <sup>b</sup>
<b>Morphine consumption at 48 hours (mg)</b>	9 (9, 12)	12 (9, 15)	0.41
<b>Morphine consumption at 72 hours (mg)</b>	9 (6, 9)	9 (6, 9)	0.53
<b>Cumulative morphine consumption during 72 hours postoperatively (mg) (primary outcome)</b>	33 (27, 39)	51 (45, 57)	< 0.001 <sup>b</sup>

# VAS Upon Cough



VAS Upon Cough

	TEA(n=31)	RSA(n=29)	PValue
Ileus			4 (13%)
Nausea			5 (16%)
Vomiting			1 (3.23%)
Pruritus			4 (12.9%)
Timetopassingflatus(h)			61.12 ± 57 9.37 11
<b>Timetoambulation(h)</b>			45.89 ± 38 8.72 12
Patientsatisfactionscore			2 (2 - 3)



# Peri-operative Rectus Sheath Fentanyl-levobupivacaine Infusion vs. Thoracic Epidural Fentanyl Levobupvacaine Infusion in Patients Undergoing Major Abdominal Cancer Surgeries with Medline Incision

Doaa Abd Eltwab M Turkey<sup>1</sup>, Ibrahim Abdel Rahman Ibrahim<sup>2</sup> and Alaa Ali M Elzohry<sup>3\*</sup>

VAS score with coughing	RSB Group (n=50)	TEA (n=50) Group	p value
-------------------------	------------------	------------------	---------

1 hour	3 (2-5)	3 (2-4)	0.854
2 hours	3 (2-4)	2.5 (1-4)	0.251
6 hours	3 (2-4)	2.5 (1-4)	0.465
12 hours	2.5 (1-4)	2 (1-4)	0.735

24 hours	2.4 (1-4)	2 (1-4)	0.693
36 hours	2 (1:3)	1 (1:1)	0.194
48 hours	2 (2:2)	2(1:3)	0.157

Table 6: Pain VAS score with coughing during the postoperative 2 days.

Table 8: ICU, Hospital stay and total (intra and post-operative) fentanyl consumption.

	RSB group (n=50)		TEA group (n=50)		P-value
	Range	Mean±SD	Range	Mean±SD	
ICU stay (day)	2-7	4.47 ± 2.16	02-06	3.8 ± 1.57	0.115
Hospital stay (day)	3-12	8.13 ± 7.62	04-11	7.13 ± 4.12	0.209
Fentanyl (mic/24 hour) consumption	600-900	725.6 ± 234.5	200-320	225.3 ± 122.43	0.000**

STUDY PROTOCOL

Open Access

# Thoracic Epidural analgesia versus Rectus Sheath Catheters for open midline incisions in major abdominal surgery within an enhanced recovery programme (TERSC): study protocol for a randomised controlled trial

Kate M Wilkinson<sup>1</sup>, Anton Krige<sup>1\*</sup>, Sarah G Brearley<sup>2</sup>, Steven Lane<sup>3</sup>, Michael Scott<sup>4</sup>, Anthony C Gordon<sup>5</sup> and Gordon L Carlson<sup>6</sup>

This presentation presents independent research funded by the National Institute for Health

Research (NIHR)  
(Grant  
expressed  
the NHS,  
Care.

under its Research for Patient Benefit (RfPB)  
Reference Number PB-PG-0212-27122). The  
are those of the author(s) and not necessarily  
the NIHR or the Department of Health

Programme  
views  
those of  
and Social



Table 1 Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
<ul style="list-style-type: none"> <li>• Patients &gt;18 years of age</li> </ul>	<ul style="list-style-type: none"> <li>• Contraindication to epidural analgesia: for example, coagulopathy, local infection, systemic sepsis, severe aortic stenosis</li> </ul>
<ul style="list-style-type: none"> <li>• Planned major abdominal surgery including major colorectal resections, pancreaticoduodenectomy and radical cystectomy</li> </ul>	<ul style="list-style-type: none"> <li>• Consent refused for either TEA or RSC</li> </ul>
<ul style="list-style-type: none"> <li>• Planned open midline surgical incision</li> </ul>	<ul style="list-style-type: none"> <li>• Non-English speaker</li> </ul>
<ul style="list-style-type: none"> <li>• Included in the ERP</li> </ul>	<ul style="list-style-type: none"> <li>• Ano-rectal excision: for example, pan-proctocolectomy or abdomino-perineal resection.</li> </ul>
<ul style="list-style-type: none"> <li>• Willing and able to give consent</li> </ul>	<ul style="list-style-type: none"> <li>• Planned transverse or oblique incisional approach</li> </ul>

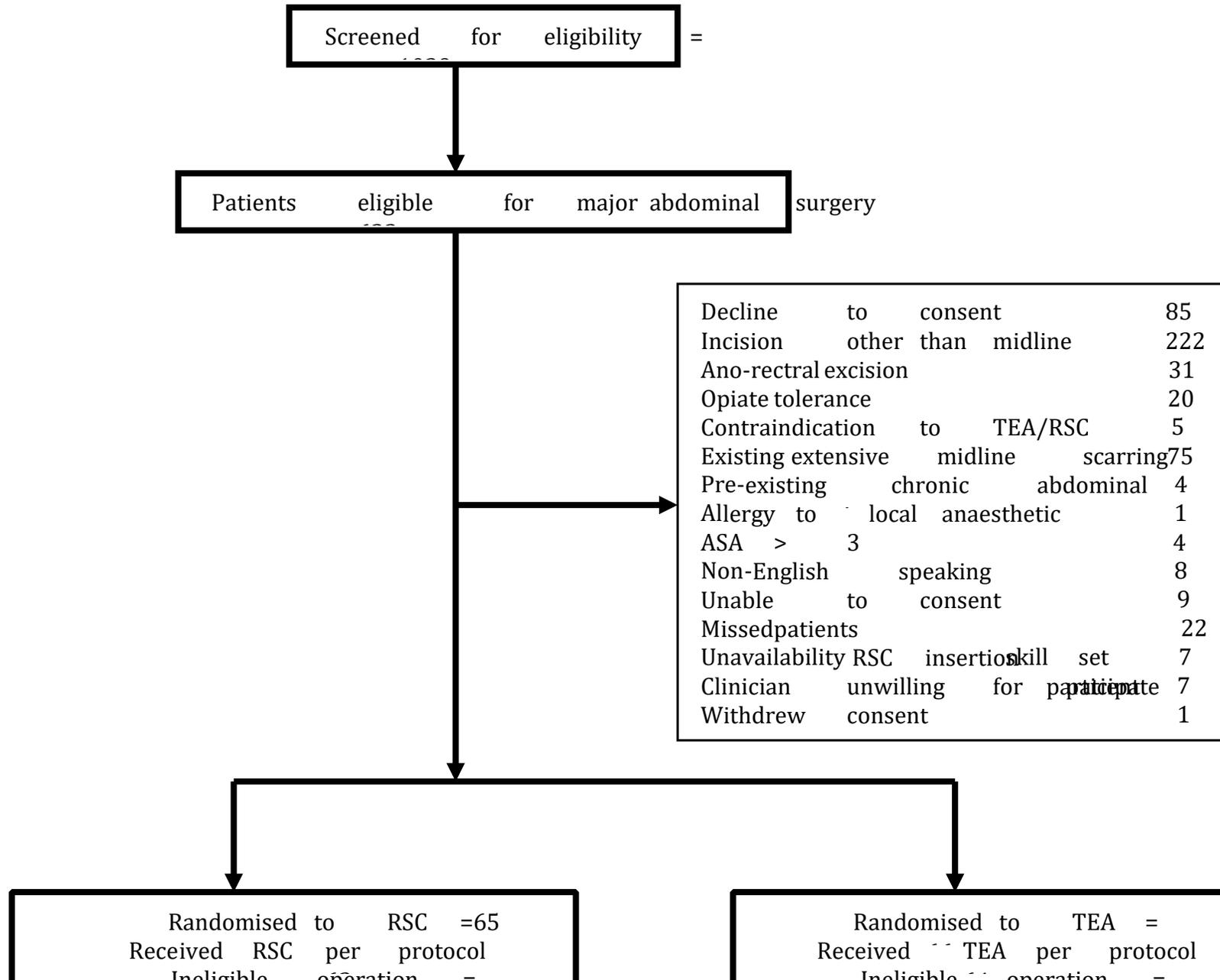


- ASA (American Society of Anesthesiologists) 1 to 3

- Allergy to local anaesthetic drugs or opiates
- Opiate tolerance
- Pre-existing chronic abdominal pain
- Extensive existing midline abdominal scarring

---

Abbreviations: ERP, Enhanced Recovery Programme; RSC, rectus sheath catheter; TEA, thoracic epidural analgesia.



# Baseline Characteristics

	<i>RSC</i>	<i>TEA</i>
<i>N</i>	66	65
<i>Age</i> <i>years</i> <i>Median (IQR)</i>	69.50 (17)44- 99	67.00 (13)40- 84
<i>Range</i>		
<i>Gender</i>	23 (34.4%)	20 (30.8%)
<i>Females</i>	42 (64.6%)	45 (69.2%)
<i>Male</i>		

<b><i>BMI</i></b>	<b><i>Mean (SD)</i></b>	27.94 (4.92)	27.28 (5.38)
<b><i>ASA disease classification</i></b>		10 (15.4%)	16 (24.6%)
	<b><i>ASA 1</i></b>	41 (61.3%)	37 (56.9%)
		14 (21.5%)	12 (18.5%)
	<b><i>ASA 2</i></b>		

<b>ASA 3</b>		
<b><i>P-POSSUM Morbidity (%)</i></b> <b><i>Median (IQR)</i></b>	34.97 (41.85)	32.73 (25.65)
<b><i>P-POSSUM Mortality (%)</i></b> <b><i>Median (IQR)</i></b>	1.75(4.01)	1.09(4.10)
<b><i>Operation</i></b>	25 (37.9%)	22 (33.8%)
<b><i>Major rectal resection</i></b>	25 (37.9%)	26 (40.0%)
	16 (24.2%)	17 (26.2%)
<b><i>Major colonic resection</i></b>		

<i>Radical Cystectomy</i>		
<i>Incision Length</i>	219.64 (68.51)	220.02 (95.58)
<i>Mean(st. dev)</i>		

# Operative Details



<b><i>Anterior Resection</i></b>	25	15 (23.1%)	4	P=0.41 <sup>2</sup>
<b><i>Left Hemicolectomy</i></b>	(38.5%)	5	(6.2%)	
<b><i>Right Hemicolectomy</i></b>	(7.7%)	10	(15.4%)	
<b><i>Radical Cystectomy</i></b>	11 (16.9%)	17	(26.2%)	
<b><i>Sigmoid resection</i></b>	16 (24.6%)	6	(9.2%)	
<b><i>Total-Subtotal colectomy</i></b>	4 (6.2%)	2	(3.1%)	
<b><i>Total abdominal hysterectomy</i></b>	2 (3.1%)	1	(1.5%)	
<b><i>Laparotomy and stoma</i></b>	0	4	(6.2%)	
<b><i>Small bowel resection</i></b>	0	2	(3.1%)	
<b><i>Hartmans</i></b>	0	3	(4.6%)	
<b><i>Panproctocolectomy/APR</i></b>	1 (1.5%)	1	(1.5%)	
	1 (1.5%)			



<b><i>Incision Length</i></b>	219.64 (68.51)	220.02 (95.58)	P=0.98 <sup>3</sup>
<b><i>Mean(st. dev)</i></b>			

***Stoma***

*No*

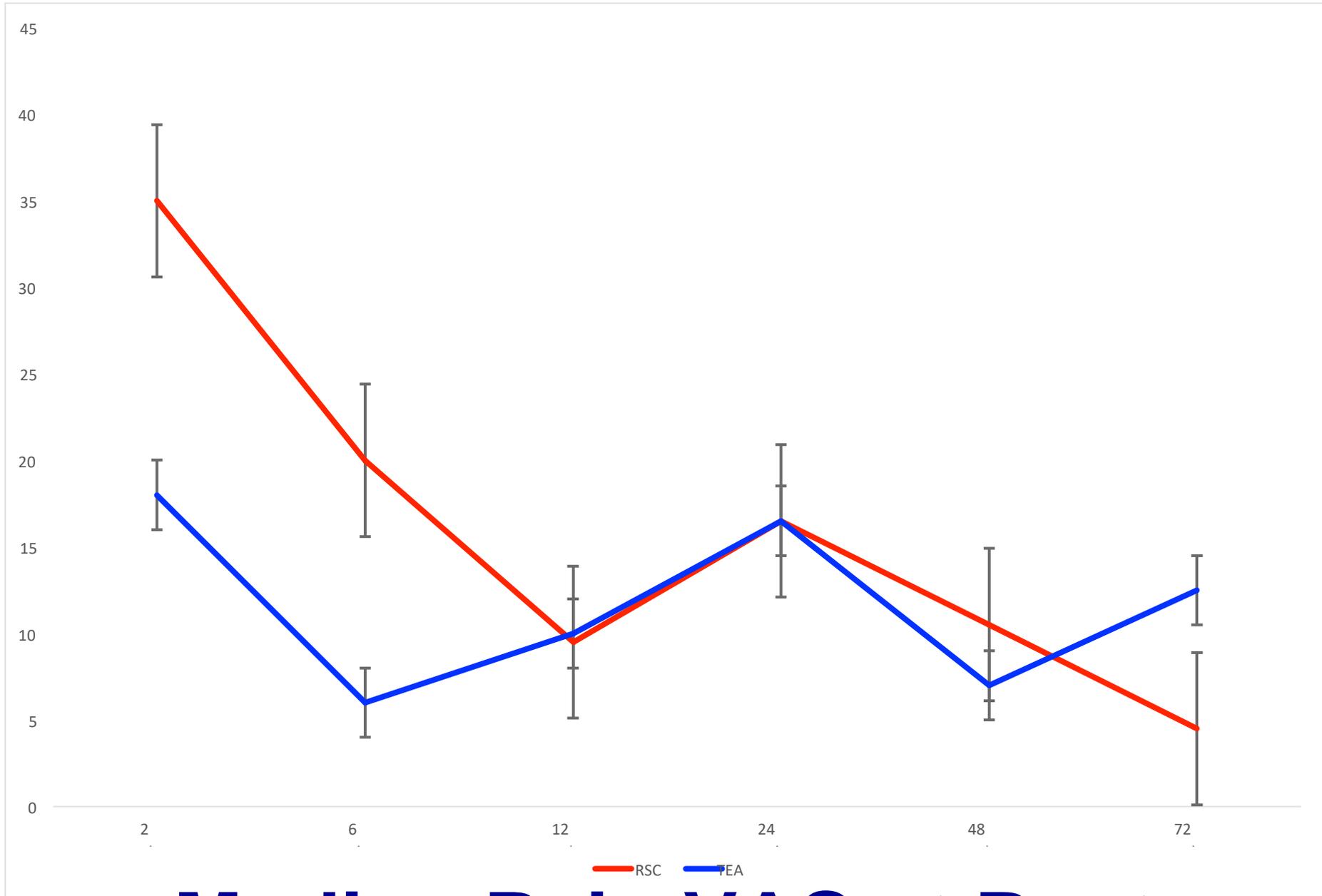
(54.7%)

$P=0.25^2$

29

35

(44.6%)

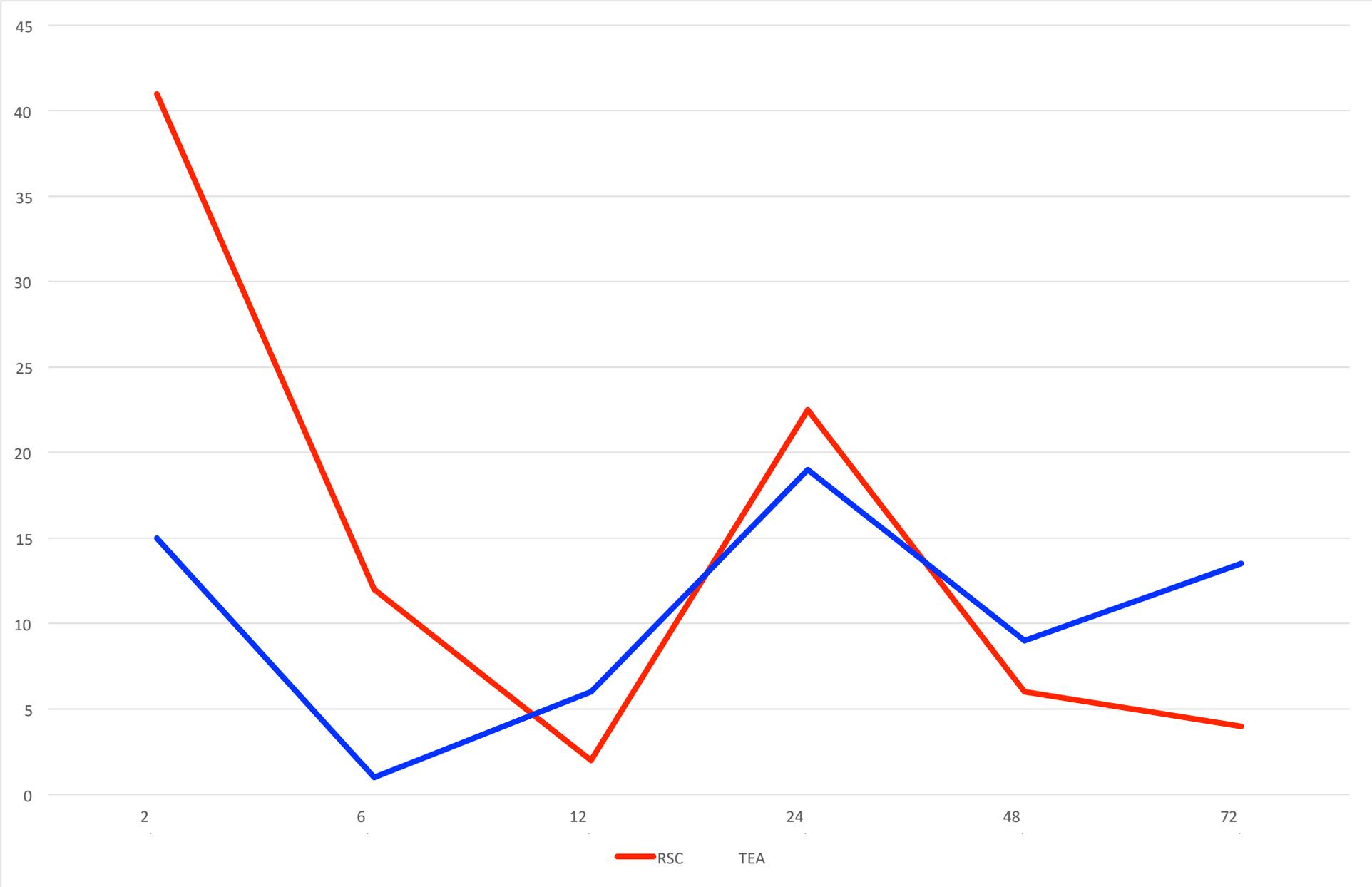


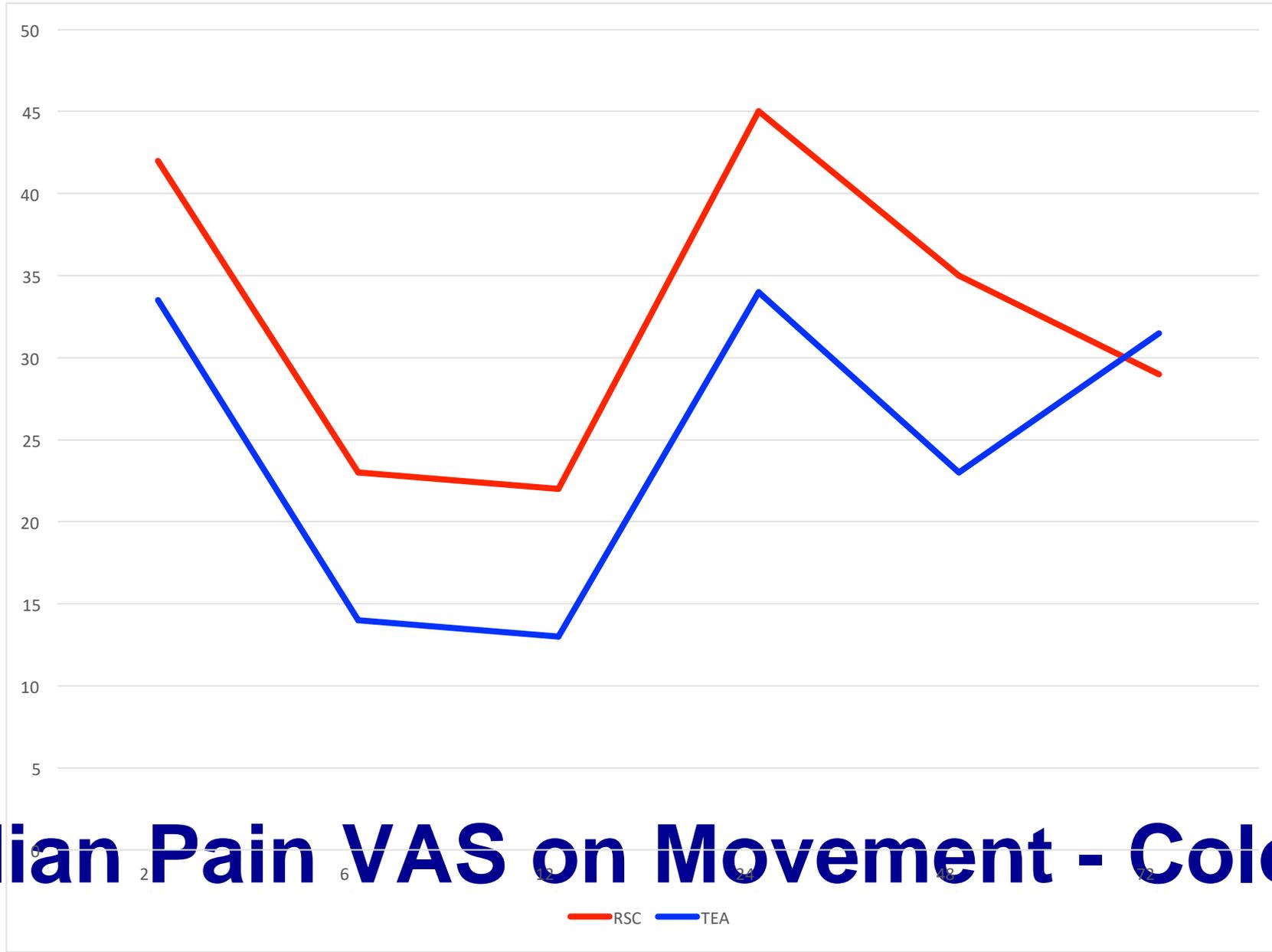
# Median Pain VAS on Movement





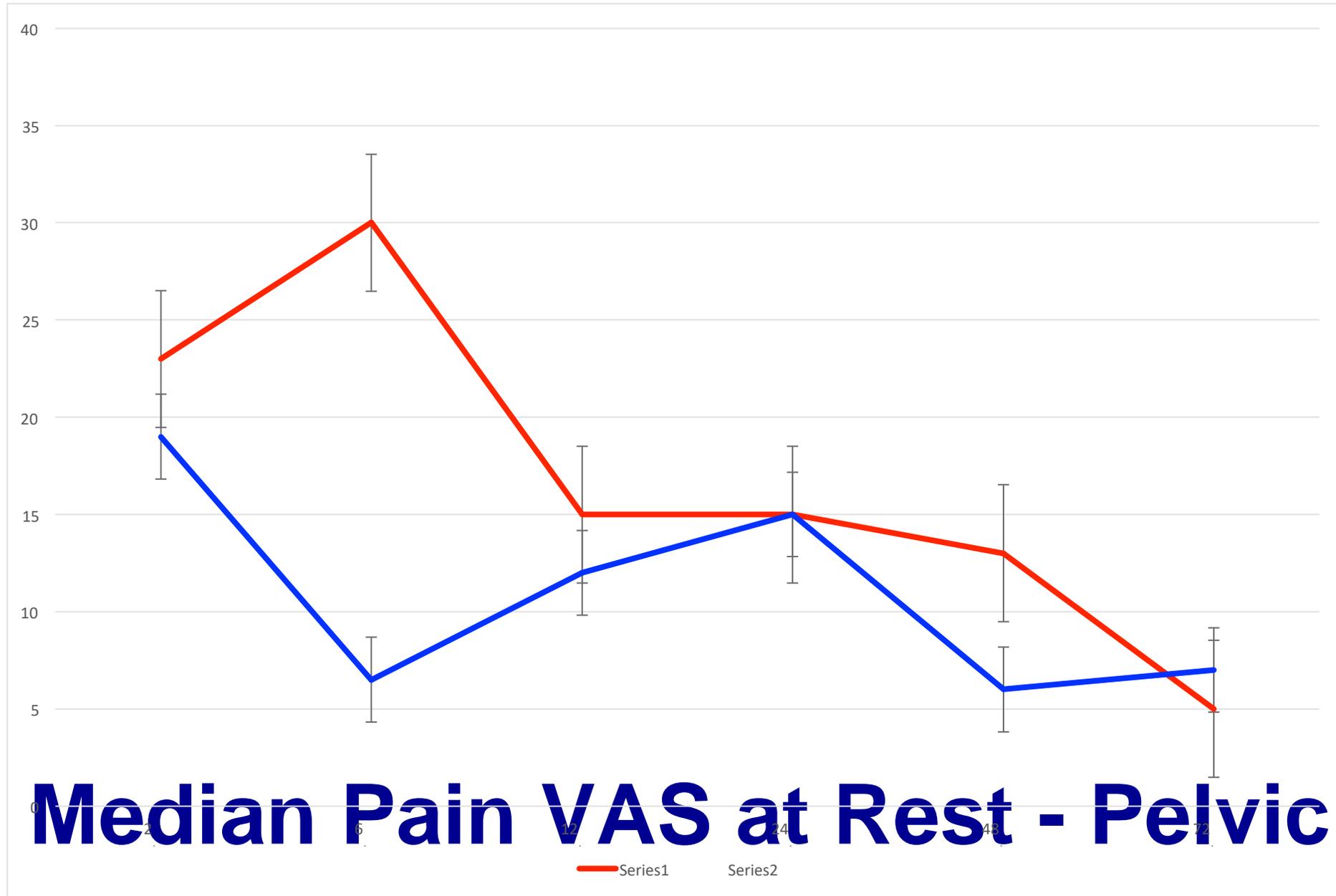
# Median Pain VAS at Rest - Colonic

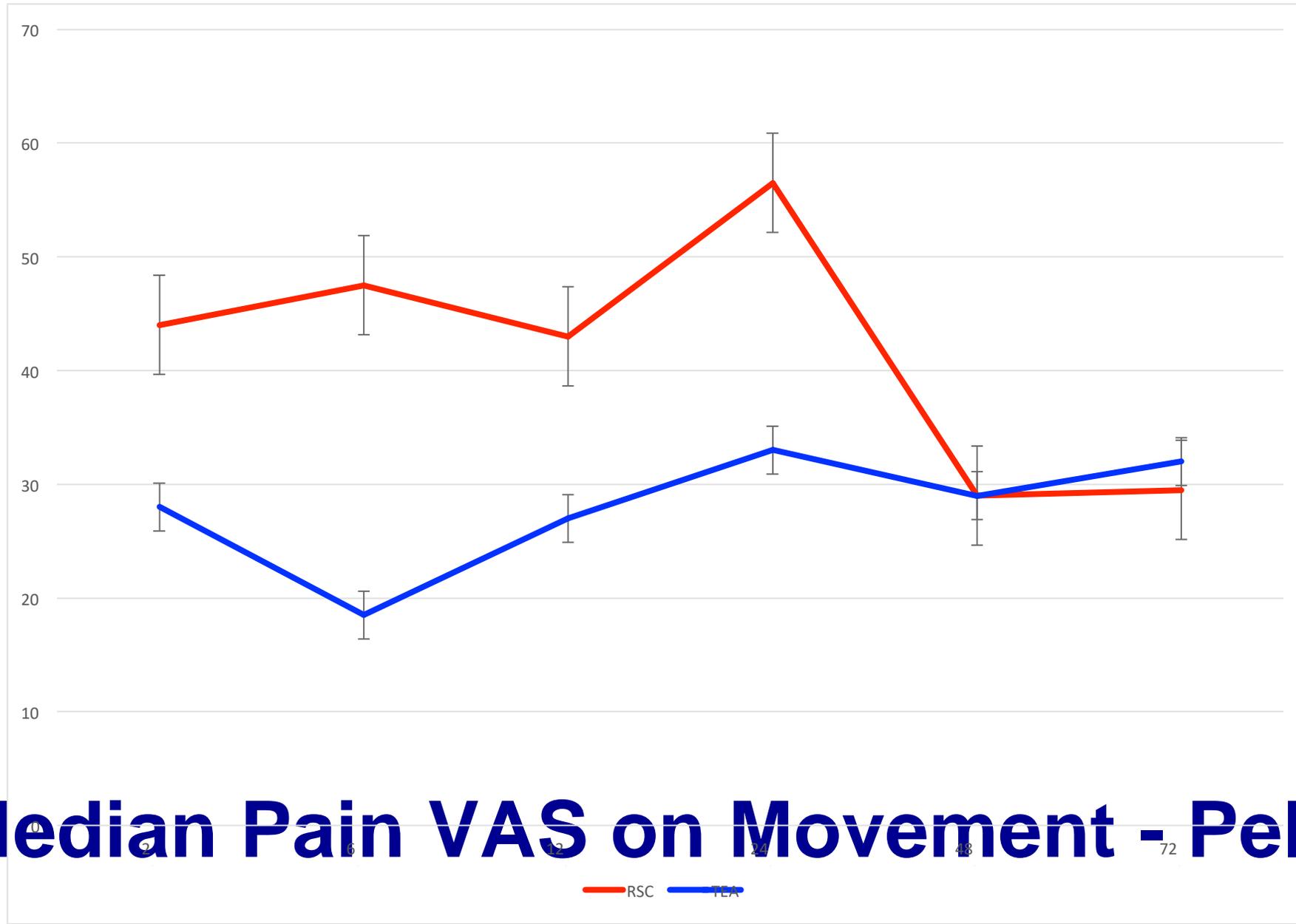




# Median Pain VAS on Movement - Colonic

RSC TEA





# Median Pain VAS on Movement - Pelvic

RSC TEA

**Table 3. Opiate Consumption**

	<i>RSC</i>	<i>TEA</i>	<i>Significance</i>
<i>Time to 1st opiate rescue medication (minutes)</i>	(1358)	(3664)	P=0.005 <sup>2</sup>
<i>Day 1</i>	N=41 30(38)	N=35 28(56)	P=0.65 <sup>2</sup>
<i>Day 2</i>	N=23 30(28)	N=27 (70)	P=0.34 <sup>2</sup>

<b>Day 3</b>	N=19 17 (20)	N=30 (75)	P=0.04 <sup>2</sup>
<b>Day 4</b>	N=18 16.5 (23)	N=32 30(60)	P=0.07 <sup>2</sup>
<b>Total</b>	N=48 (65)	N=55 47(180)	P=0.36 <sup>2</sup>

# Opiate Consumption

1 Chi-squared test 2 Mann-Whitney U test \* *Median (IQR)*

# Functional Analgesia

**Sleep quality,  
Respiratory function  
Ability to mobilise**

**no significant differences**

# Analgesia Satisfaction

**“Excellent”**

**46.6% RSC**

**&**

**36.2% TEA**

# Functional Recovery

**Gut function**

**Median length of stay**

**PQRS Day4,7 & 30**

**no significant  
difference**

# Functional Recovery

		<i>RSC</i>	<i>TEA</i>	<i>Significance</i>
<i>PQRS30</i>	<i>Nociceptive</i>	14 (23.3%)	12 (20.3%)	P=0.64 <sup>2</sup>
	<i>Not recovered</i>	46 (76.6%)	47 (79.7%)	
<i>Recovered</i>				
<i>PQRS30</i>	<i>Emotive</i>	39 (63.9%)	34 (57.6%)	P=0.48 <sup>2</sup>
	<i>Not recovered</i>			

		22 (36.1%)	25 (42.4%)	
	<i>Recovered</i>			
<i>PQRS30</i>	<i>ADL</i>		14 (23.7%)	P=0.59 <sup>2</sup>
	<i>Not</i>	12 (19.7%)	45 (76.3%)	
<i>recovered</i>	<i>Recovered</i>	49 (80.3%)		



<b>PQRS30</b>	<b>Cognitive</b>	27 (45.0%)	19 (32.2%)	P=0.15 <sup>2</sup>
	<b>Not</b>			
<b>recovered</b>				
	<b>Recovered</b>	33 (55.0%)	40 (67.8%)	

# Morbidity

POMS Day 5

Complications/Dindo-Clavien

**No significant differences**

## **Hypotension/Vasopressor Dependency**

**29.7% vs 49.2%; p=0.02**

## **Day 3 weight gain**

**0 (3) vs 1 (3); p=0.05**



# Adverse Events

**9 TEA vs 3 RSC**

# Systematic review of the systemic concentrations of local anaesthetic after transversus abdominis plane block and rectus sheath block

J. Rahiri<sup>1,\*</sup>, J. Tuhoe<sup>2</sup>, D. Svirskis<sup>3</sup>, N. J. Lightfoot<sup>4</sup>, P. B. Lirk<sup>5</sup> and A. G. Hill<sup>1</sup>

<sup>1</sup>Department of Surgery, South Auckland Clinical Campus, The University of Auckland, Auckland, Otahuhu, New Zealand,

<sup>2</sup>Tiakina Te Ora, Auckland, Papakura, New Zealand, <sup>3</sup>School of Pharmacy, The University of

Auckland, Auckland, New Zealand, <sup>4</sup>Department of Anaesthesiology, University of Amsterdam, Amsterdam

1105AZ, The Netherlands and <sup>5</sup>Department of Anaesthesia and Pain Medicine, Counties Manukau Health, Middlemore Hospital, Auckland, New Zealand

British Journal of Anaesthesia, 118 (4): 517–26 (2017)

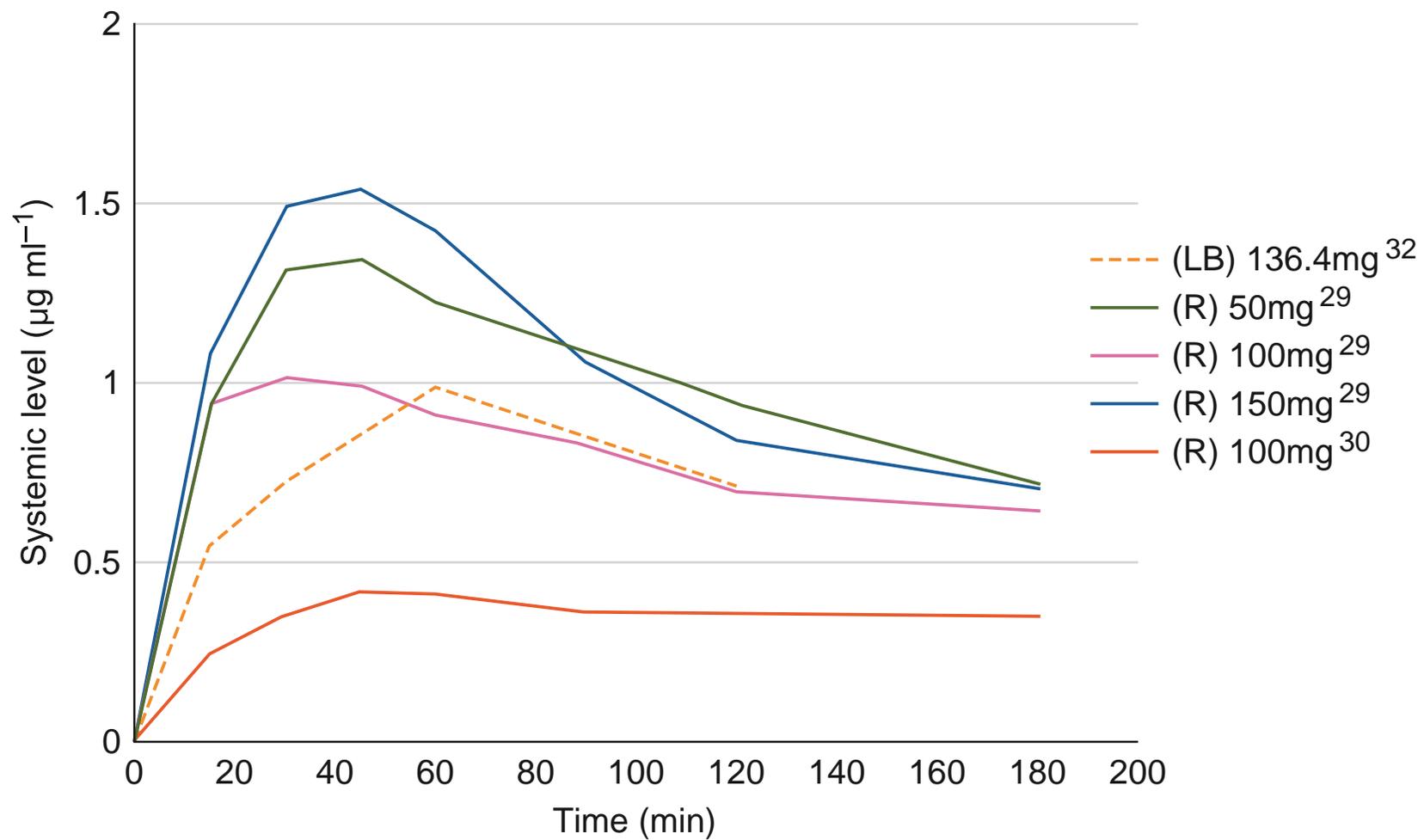
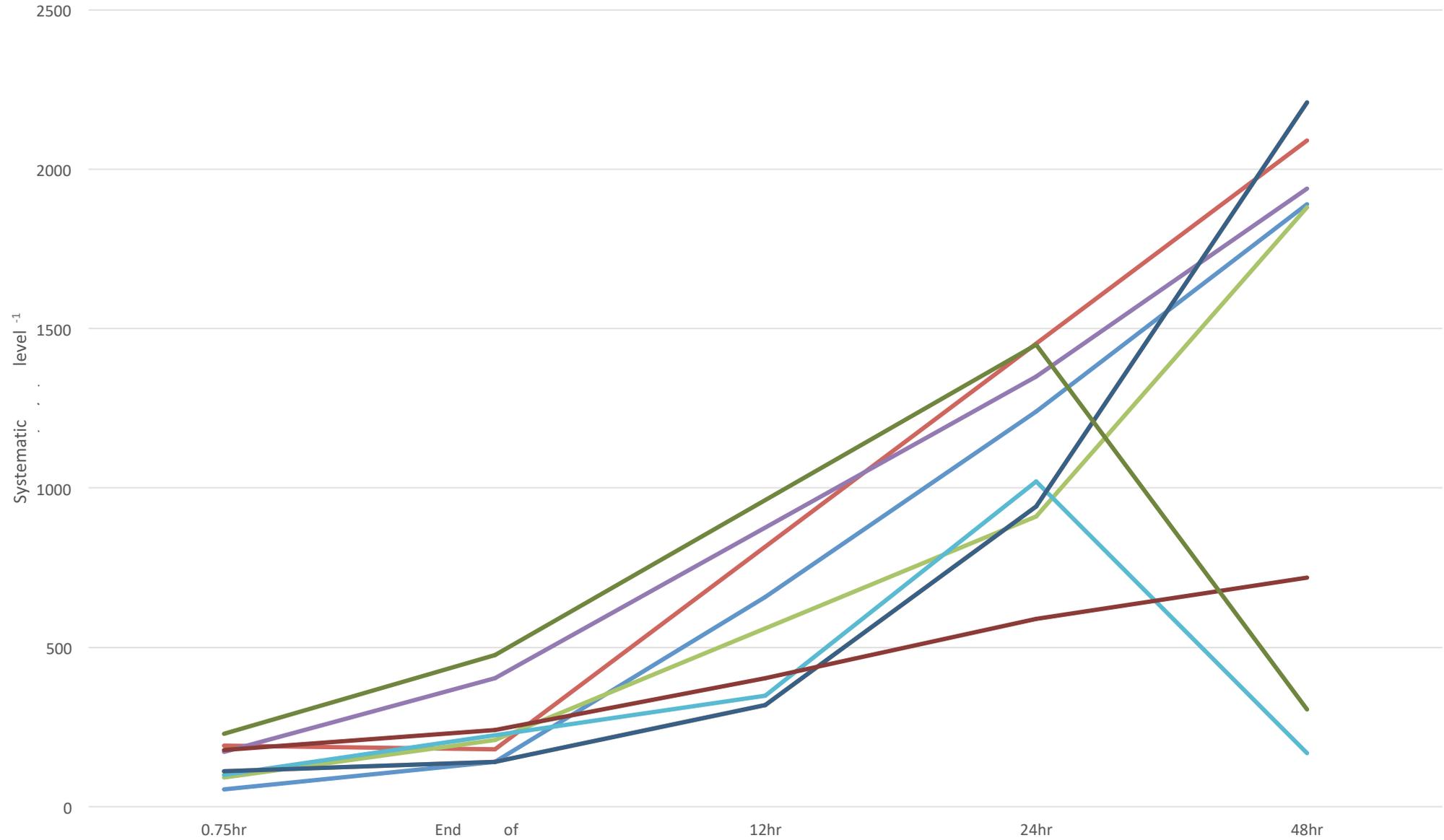
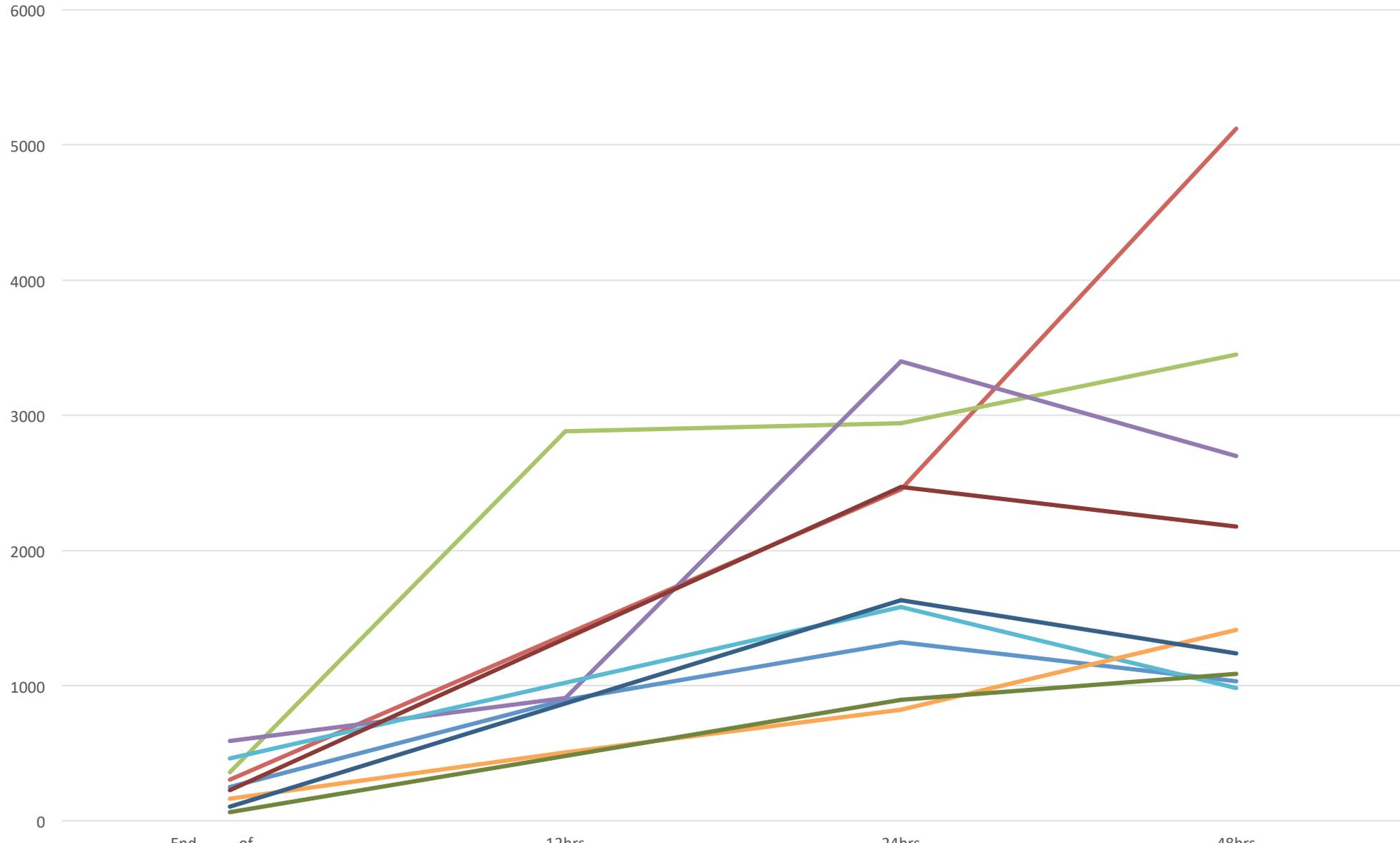


Fig 3 Systemic absorption of ropivacaine (R) and levobupivacaine (LB) after bilateral ultrasound-guided (USG) rectus sheath block (RSB).

# Bupivacaine (TEA)



# Ropivacaine (RSC)



# Intervention Failure Rates



**21% RSC & 29% TEA**

Failures	RSC (66)	Tea (65)	Significance
Patients with failures	14 (21.2%)	19 (29.2%)	0.14 <sup>2</sup>
Catheter disconnection	5	5	0.98 <sup>2</sup>
Catheter Dislodged	2	3	0.63 <sup>2</sup>
Catheter leakage	1	2	0.55 <sup>2</sup>
Failed insertion	0	1	0.31 <sup>2</sup>
Inadequate block	4	7	0.32 <sup>2</sup>
Malposition	1	0	0.33 <sup>2</sup>
Patient instability	0	1	0.31 <sup>2</sup>
Patient refused bolus dose	1	0	0.32 <sup>2</sup>

# Health Economics

Overall mean stay **1.83 days shorter RSC**

Major Colonic **0.62 days**

**Major Rectal 1.79 days Radical**

**Cystectomy 4.27 days = £381**

**Savings/RSC**

**Rectus sheath catheters vs thoracic epidurals for post-operative analgesia following midline laparotomies. Work load implications for acute pain teams** Graterol J.<sup>1</sup>*Royal Cornwall Hospital NHS Trust, Dept of Anaesthesiology & Pain*

*Medicine, , Welch I.* <sup>2</sup>

1

2

*Truro, United Kingdom, Peninsula College of Medicine and Dentistry, Dept of Anaesthesiology & Pain Medicine, Truro, United Kingdom*

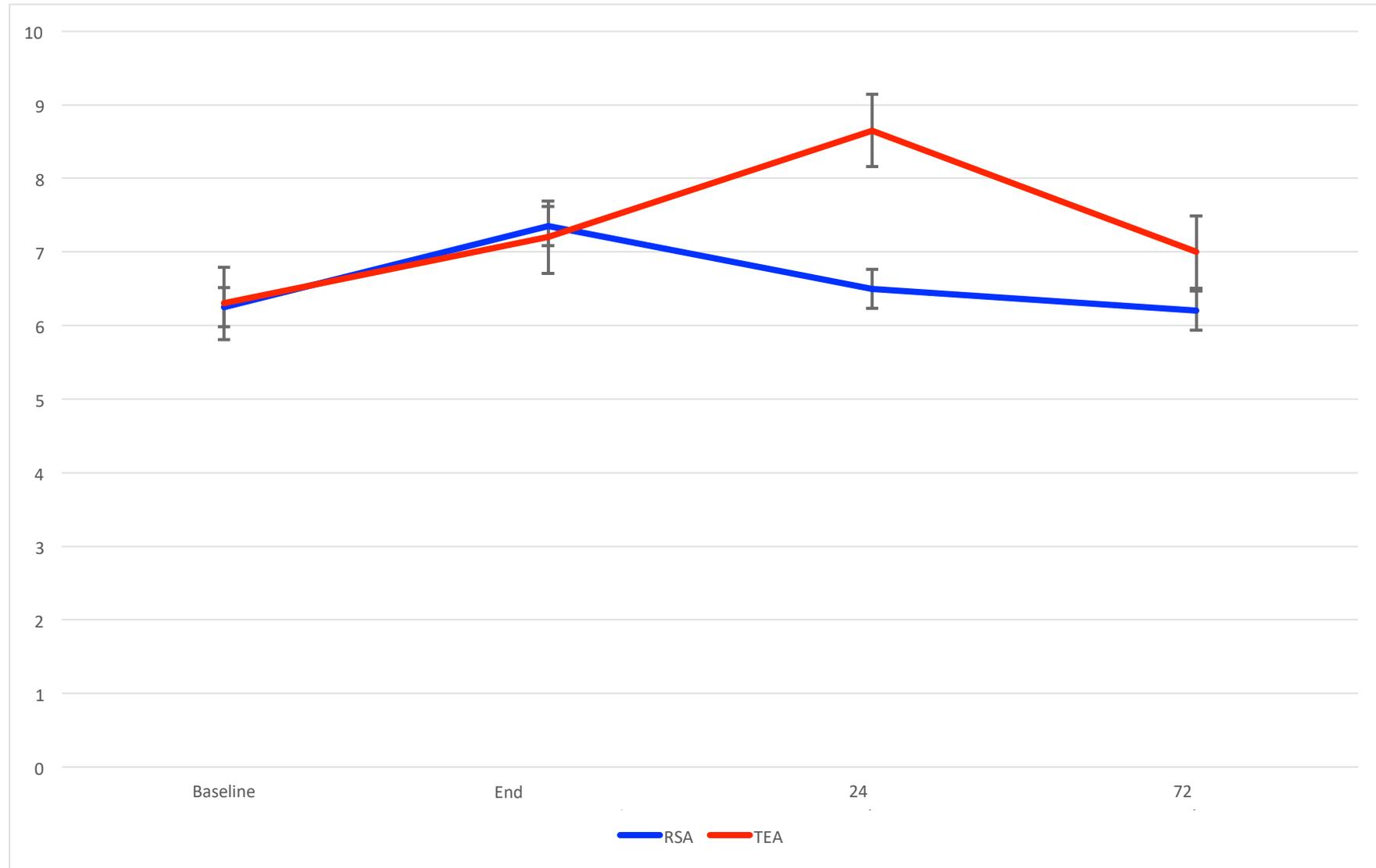
**Median visits 2 (1-6) vs 3 (1-9)**

**Mean time reviewing 38 min vs 55 min**

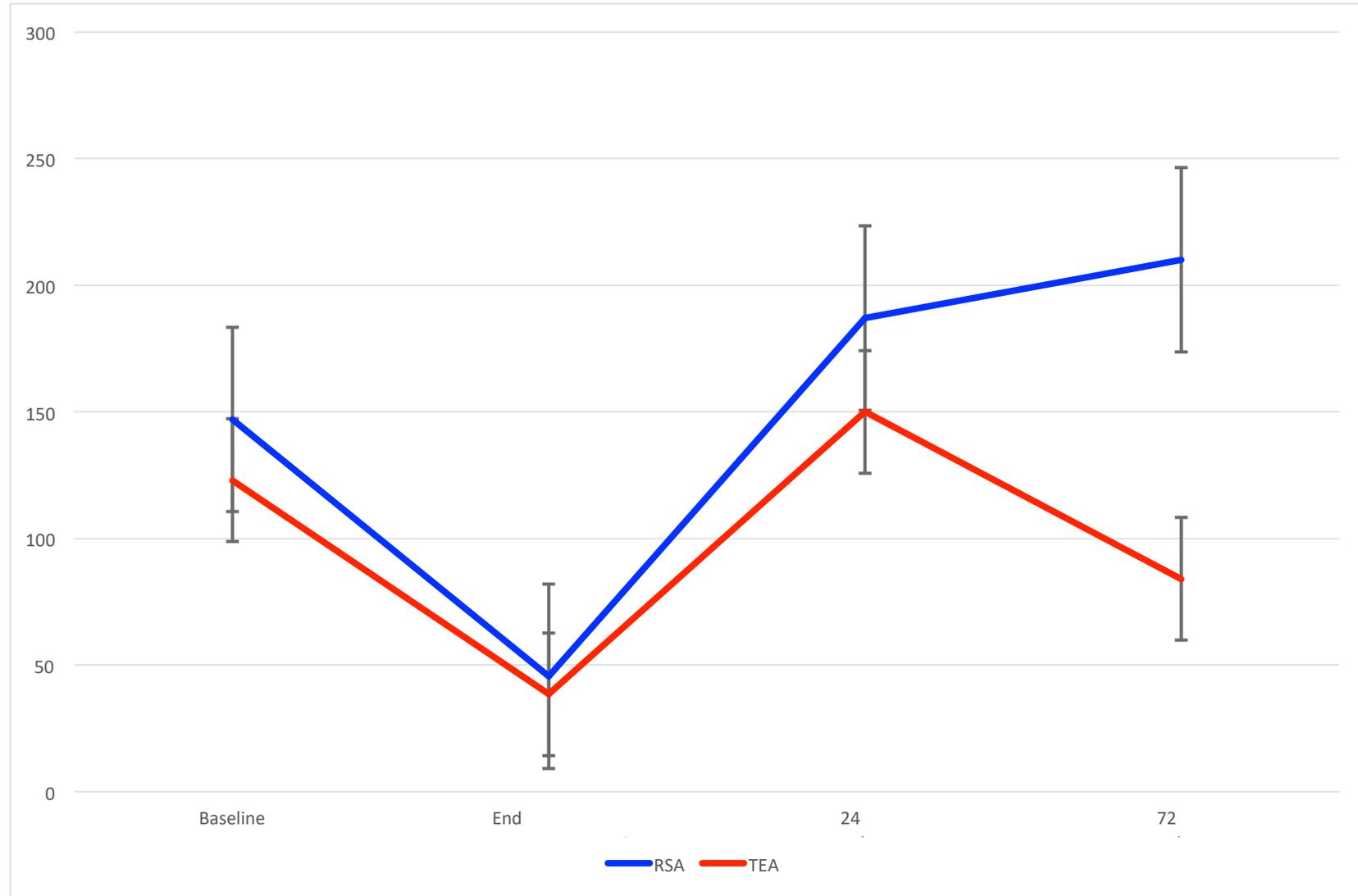
Problems 15 vs27 (p=0.038)

European Journal of Anaesthesiology 2014; 31:239 June  
2014 –

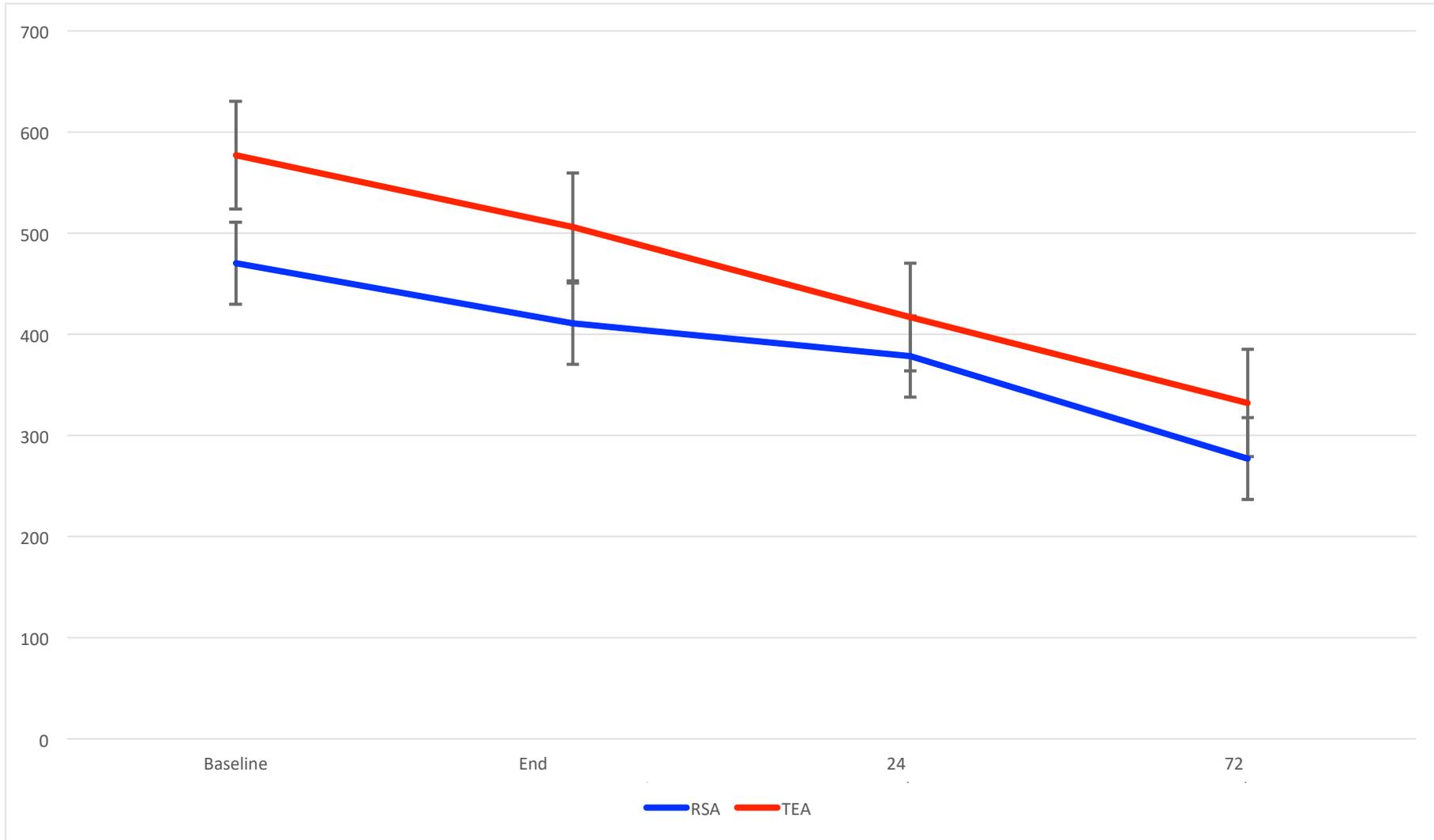
Glucose



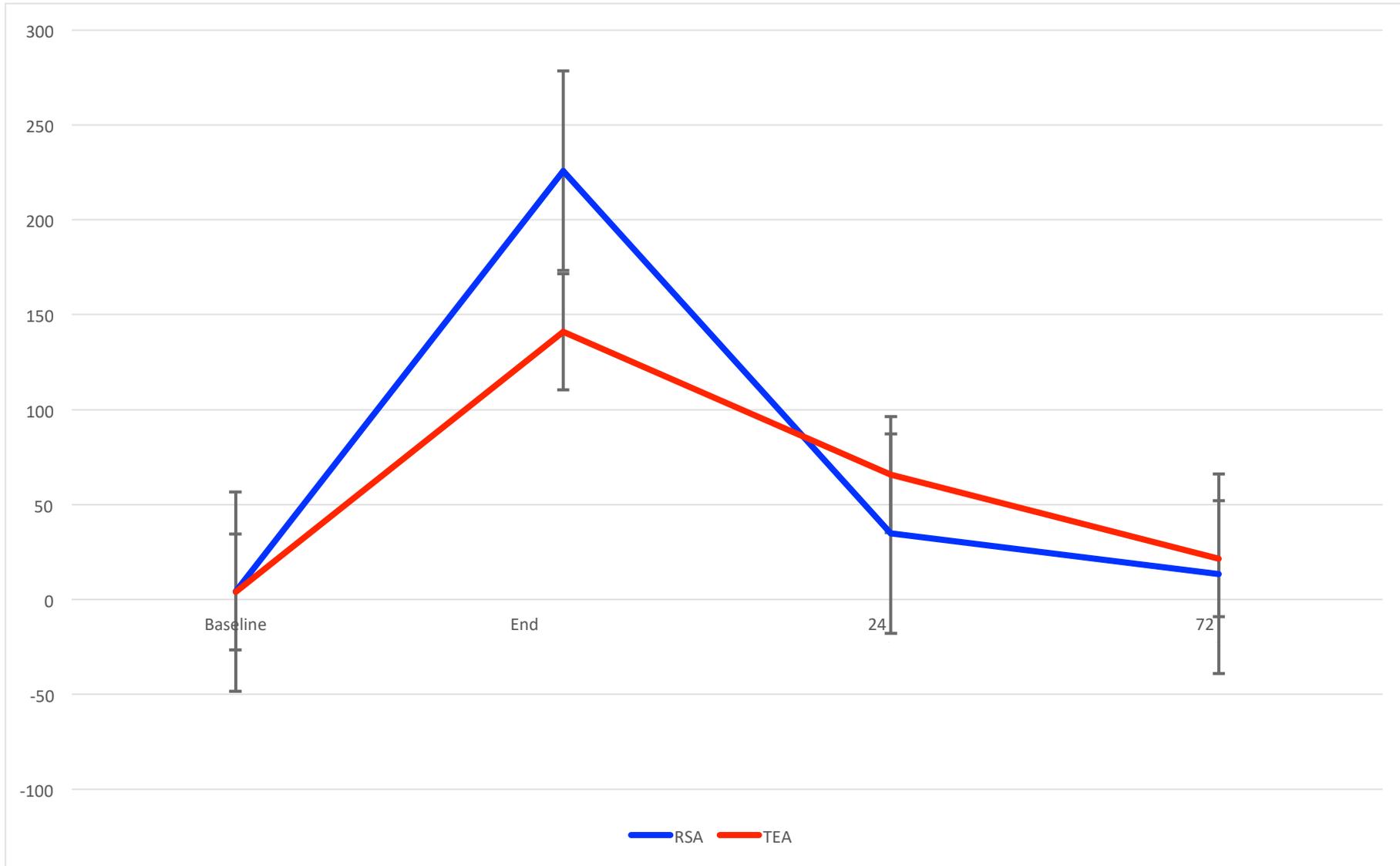
# Insulin



# Cortisol



# IL-6













The TERSC project: Thoracic Epidural Analgesia



(TEA) and Rectus Sheath Catheters



(RSC)







Patient experience of TEA and RSC



for open midline incisions in major abdominal



surgery within an Enhanced Recovery



Program







A nested qualitative



study within a



randomised controlled trial









Dr Sarah Brearley and Dr Sandra Varey



The International Observatory on End of Life Care



Division of Health Research



Lancaster University

Funded by  
**NHS**  
National Institute for  
Health Research

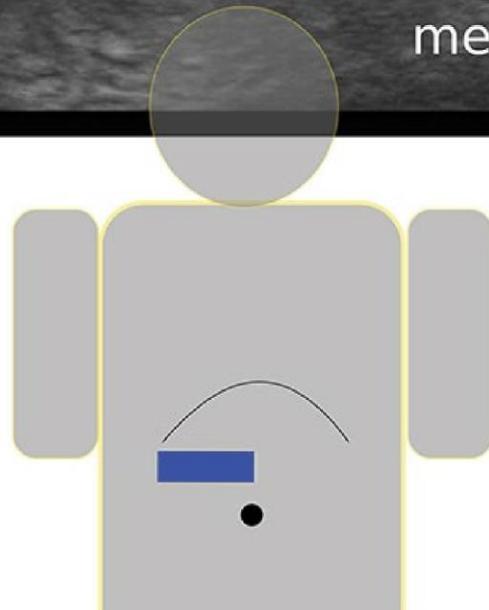
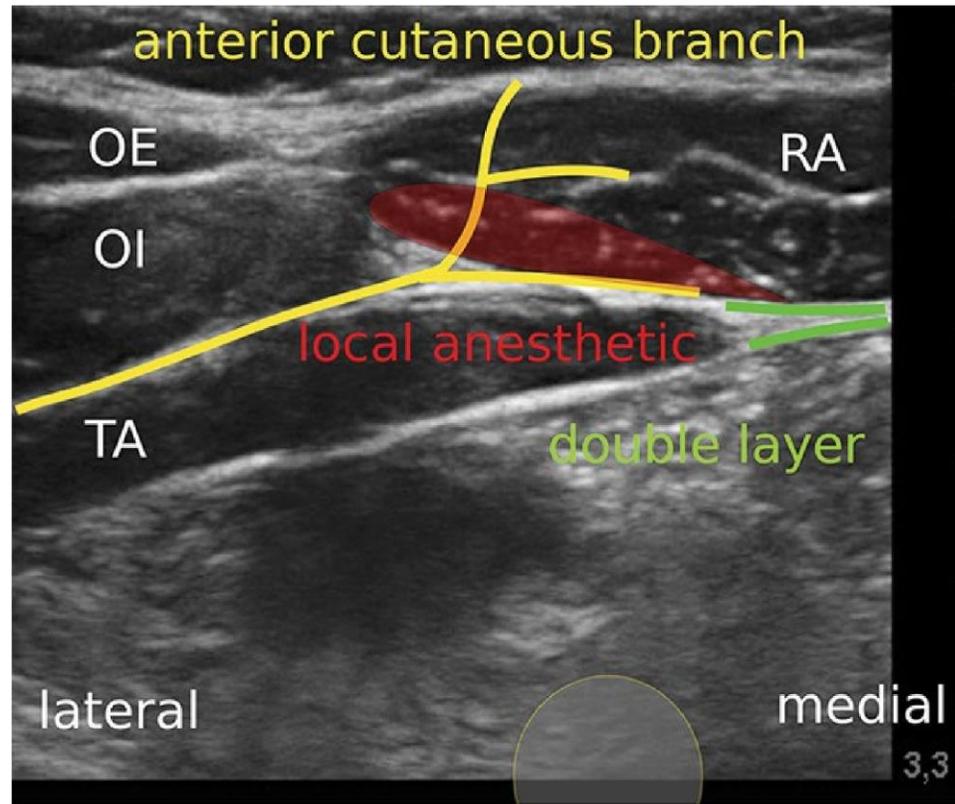
“...both arms of the trial expressed having anxieties & fears about the TEA prior to the intervention.”

“For some, the fear of the TEA was greater than their fears about their diagnosis and surgery.”

“TEA was found to add to, & possibly even intensify, anticipatory fears & uncertainties about post-surgical outcomes.”

**Does the approach influence the success rate  
for ultrasound-guided rectus sheath blocks?  
An anatomical case series**

Seidel R et al. Local and Regional Anesthesia 2017;10:61–65



...LA should be injected at the lateral edge of the rectus sheath, usually at the level of the surgical incision (due to the possibility of restricted craniocaudal spread).

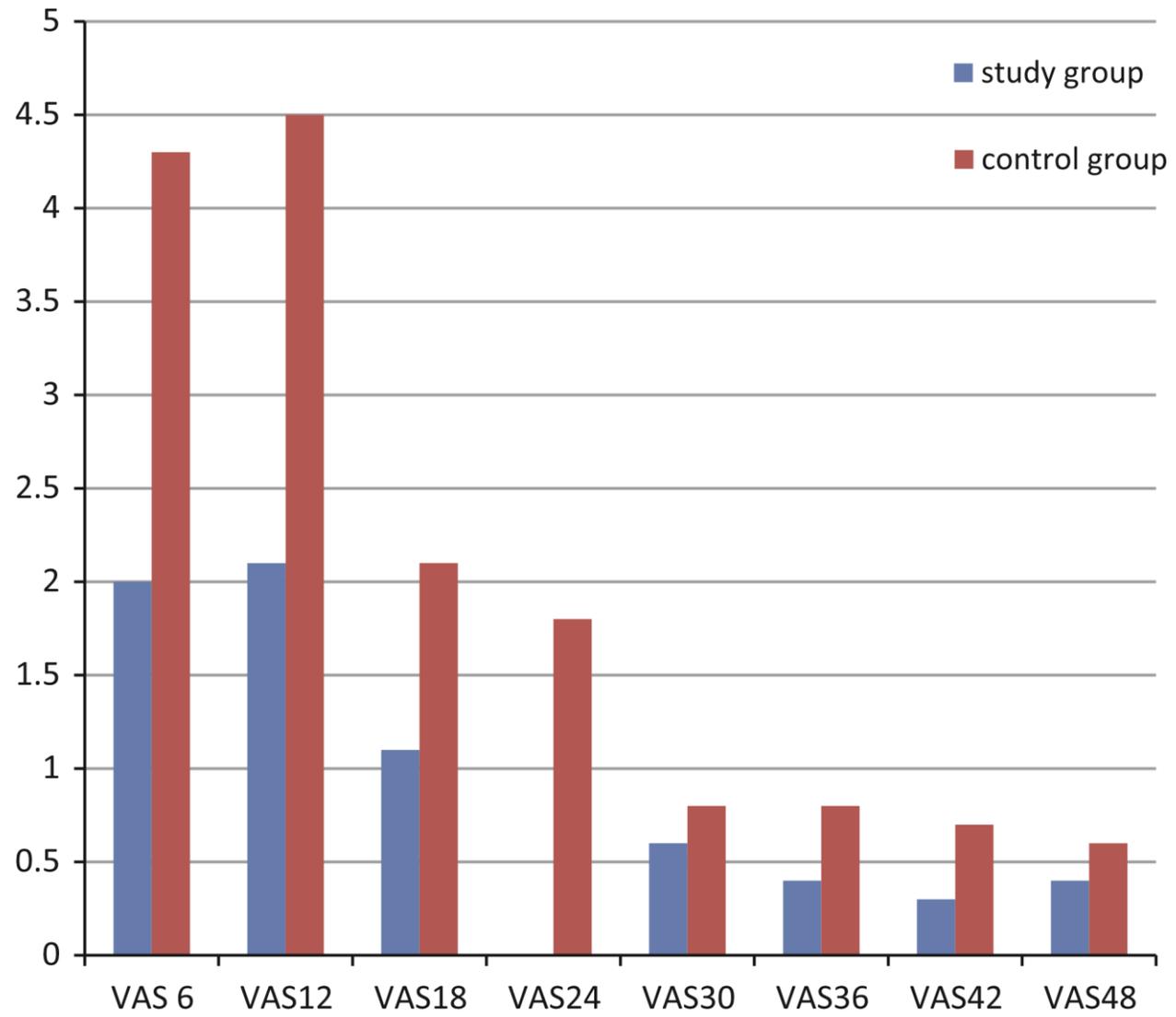
A lateral approach avoids accidental puncture of the epigastric artery.

# Surgically performed rectus sheath block – Effect of morphine added to bupivacaine versus bupivacaine only: A prospective randomized controlled double blinded trial

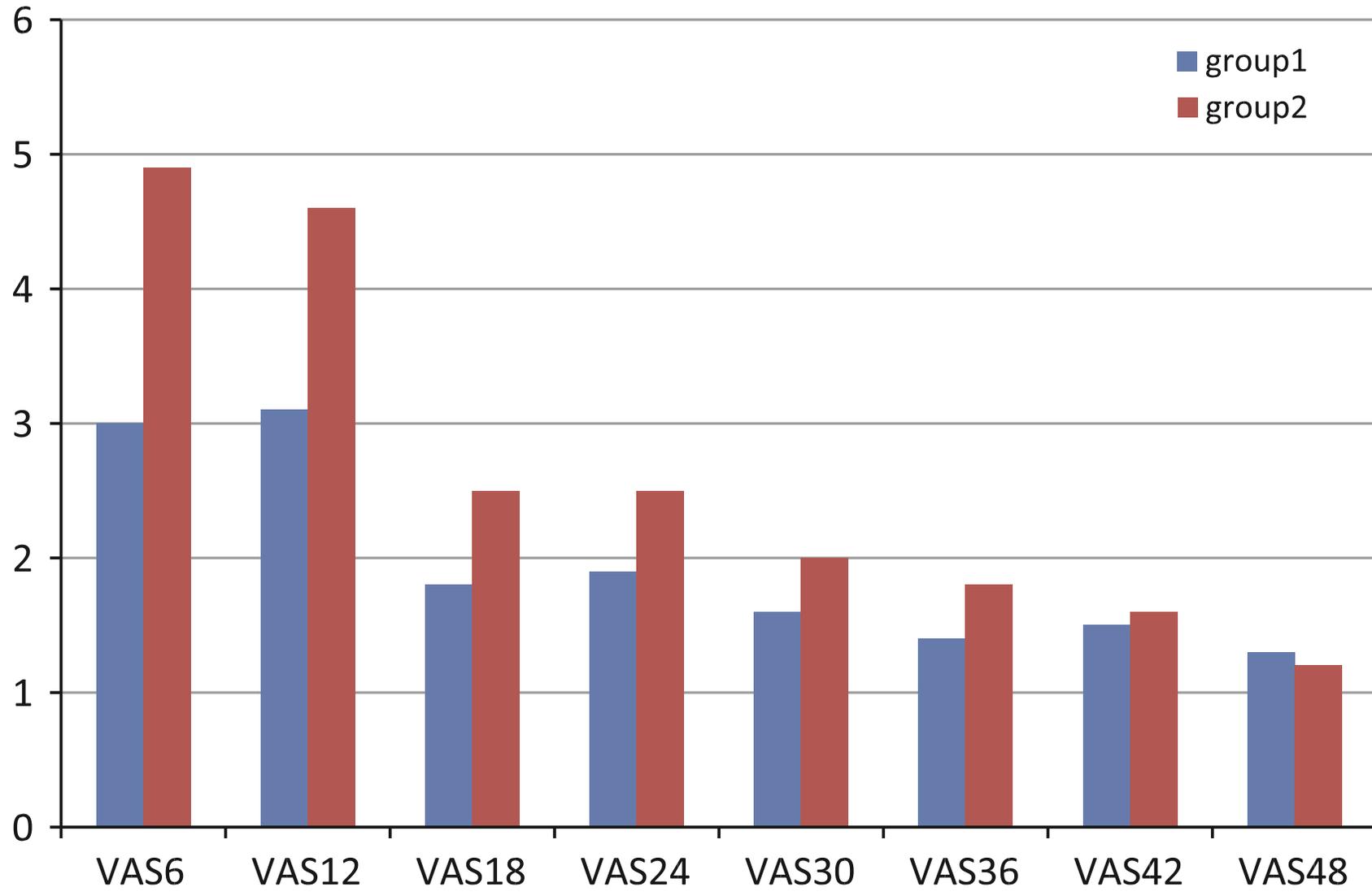
Amir M. Shabana <sup>a,\*</sup>, Manzoor Dar <sup>b</sup>, Mohamed A. Ghanem <sup>b</sup>

<sup>a</sup> Anaesthesia and Surgical Intensive Care, Faculty of Medicine, Mansoura University Hospitals, Egypt <sup>b</sup>  
General Surgery, Faculty of Medicine, Mansoura University Hospitals, Egypt

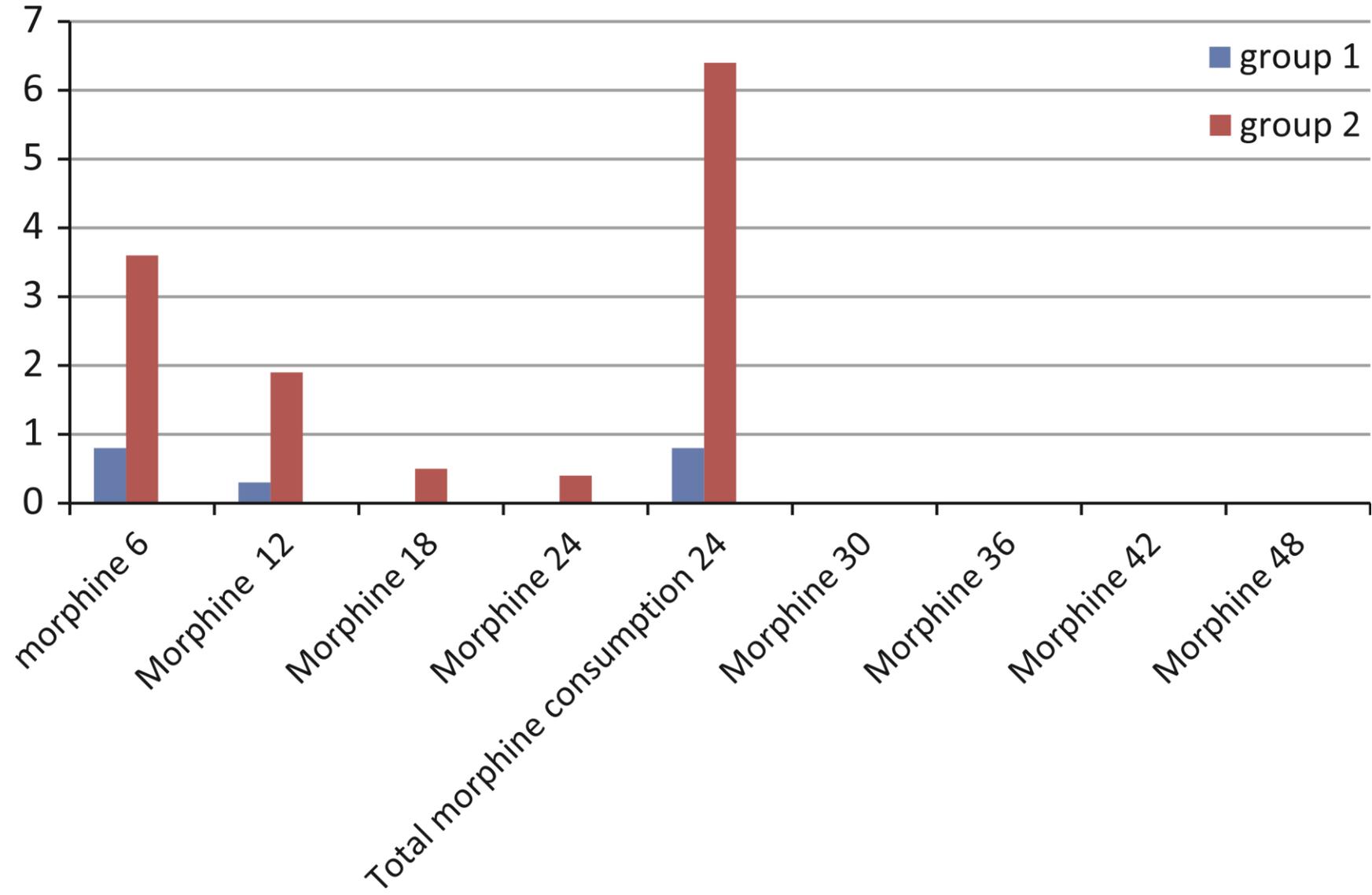
# VAS at Rest



# **VAS Movement**



# Morphine Consumption



**Multimodal analgesia using intrathecal diamorphine, and paravertebral and rectus sheath catheters are as effective as thoracic epidural for analgesia post-open two-phase esophagectomy within an enhanced recovery program**

C L Donohoe, A W Phillips, E Flynn, C Donnison, C L Taylor, R C F Sinclair, D Saunders, A Immanuel, S M Grilin

*Diseases of the Esophagus*, Volume 31, Issue 6, 1 June 2018, doy006,

<https://doi.org/10.1093/dote/doy006>

**...spinal diamorphine with combined paravertebral & RSC appears to provide comparable pain relief post two-phase esophagectomy & may provide more**

**reliable & safe analgesia than the current standard of care.**

**Rectus sheath analgesia in intensive care patients: technique description and case series**

*K. Webster, S. Hubble. Royal Hobart Hospital, Hobart, Tasmania, Australia, Royal Devon and Exeter Hospital and Peninsula Medical School, Exeter and Institute of Biomedical Science, London, United Kingdom.*

*Anaesthesia and Intensive Care, Vol. 37, No. 5, September 2009*

**RSC ... on 7 laparotomy patients in the ICU ... All patients had contraindications to epidural insertion.**

**...low pain scores, low opiate consumption,  
cardiovascular stability, high patient satisfaction & no  
catheter-related adverse events...**



Anton Krige, Michael J. P. Scott (Eds.)

## Analgesia in Major Abdominal Surgery

Anton Krige  
Michael J. P. Scott  
*Editors*

 Springer

# Analgesia in Major Abdominal Surgery

- Provides a practical how-to guide
- Includes videos of techniques
- Written by experienced experts who are also jobbing clinicians

This book presents current evidence in an Enhanced Recovery Programme context, and provides a common sense approach to using the array of available analgesia techniques appropriately in major abdominal surgery. Current pain relief options are discussed, many of which have been described only in the last ten years. Topics covered range from the now widespread use of portable ultrasound machines to an appreciation of the value of some older drugs in a new context. Analgesia for Major Abdominal Surgery is aimed at anaesthetists, acute pain teams, and acute pain nurses, as well as colorectal, hepatobiliary, urological and gynecological surgeons.

1st ed. 2018, X, 324 p. 95 illus., 79 illus. in color.

