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Controversies for epidural anaesthesia and analgesia for abdominal surgery and pancreatitis

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Background

Intrathecal morphine is a valid alternative to epidural analgesia for major Hepato-Pancreatico-Biliary (HPB) surgery in a pilot study of 38 patients: a step in the right direction for fast-track recovery

Sugavanam A., Thompson K., Schofield N., Prout J., Mallett S.
Royal Free Hospital, Department of Anaesthesiology, London, United Kingdom

Background/Goal of Study: Thoracic Epidural analgesia is the gold standard for major HPB surgery. However, failure and complication rates are problematic and include mobilization delays and prolonged vasopressor use. ITM has been shown to provide effective analgesia[1] for up to 48h and is more time- and cost-effective, but there are concerns about delayed respiratory depression. The addition of intrathecal bupivicaine to ITM may be synergistic and help attenuate the stress response. We carried out a prospective pilot study in our institution to compare analgesia.

Materials and Methods: Between Aug and Oct 2011, 20 patients undergoing HPB surgery were selected to receive 400micg ITM and a variable dose of hyperbaric 0.5% Bupivicaine with a Fentanyl PCA post-operatively. Another 18 patients were selected to receive a T8-T11 epidural with 0.125% bupivicaine and 4micg/ml fentanyl infusion. All patients were followed up for 48h and data is quoted as median (range) or percentage and Mann-Whitney test was used for continuous variables.

Results/Discussion: Demographics, operation duration and estimated blood loss were similar in both groups but more patients in the epidural (EPI) group underwent major hepatectomy (33.3% vs 15%). Pain scores were not significantly different at any time points up to and including 48h. Intra-operative colloid use was significantly higher in the EPI group (1000mls (500-5000) vs 500mls (0-2000); $p = 0.005$) and more EPI patients required vasopressor intra-op (50% vs15%). Post-operative fluid requirements were higher in the EPI group but not statistically significant. Hospital Length of Stay (LOS) was longer in the EPI group (13 days (6-38) vs 9 (5-27) $p = 0.06$)). Times to first oral intake and mobilization were longer in the EPI group but not statistically significant. Episodes of respiratory depression and hypotension were the same in both groups but there were more pneumonias in the EPI group (7 vs 3 episodes).

Conclusions: ITM with bupivicaine and PCA is a valid alternative to thoracic epidural for analgesia in HPB surgery and is associated with less intravenous fluid and vasopressor use and shorter LOS. Safety profiles were similar but there were more pneumonias in the EPI group. In an era of enhanced recovery, ITM may be more suitable in selected patients.

References:

1. Sakowska M *et al* : A change in practice from epidural to intrathecal morphine analgesia for hepato-pancreato-biliary surgery. World J Surg 2009; 33: 1802-8

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No significant difference in pain scores up to 48 hours

Epidural group had more colloid and vasopressor

ORIGINAL ARTICLE

A prospective cohort study of intrathecal versus epidural analgesia for patients undergoing hepatic resection

Ramanathan Kasivisvanathan[1], Nima Abbassi-Ghadi[2], Jeremy Prout[1], Ben Clevenger[1], Giuseppe K. Fusai[3] & Susan V. Mallett[1]

[1]Department of Anaesthesia, Royal Free London NHS Foundation Trust, [2]Department of Surgery and Cancer, Imperial College London, 10th Floor QEQM, St Mary's Hospital, and [3]Department of Hepato-biliary Surgery and Liver Transplant Unit, University College London Royal Free Campus, London, UK

Abstract

Background: The aim of this prospective observational study was to compare peri/post-operative outcomes of thoracic epidural analgesia (TEA) versus intrathecal morphine and fentanyl patient-controlled analgesia (ITM+fPCA) for patients undergoing a hepatic resection (HR).

Method: Patients undergoing elective, one-stage, open HR for benign and malignant liver lesions, receiving central neuraxial block as part of the anaesthetic, in a high-volume hepato-pancreato-biliary unit, were included in the study. The primary outcome measure was post-operative length of stay (LoS).

Results: A total of 73 patients (36 TEA and 37 ITM+fPCA) were included in the study. The median (IQR) post-operative LoS was 13 (11–15) and 11 (9–13) days in the TEA and ITM+fPCA groups, respectively ($P = 0.011$). There was significantly lower median intra-operative central venous pressure ($P < 0.001$) and blood loss ($P = 0.017$) in the TEA group, and a significant reduction in the time until mobilization ($P < 0.001$), post-operative intra-venous fluid/vasopressor requirement ($P < 0.001/P = 0.004$) in the ITM+fPCA group. Pain scores were lower at a clinically significant level 12 h post-operatively in the TEA group ($P < 0.001$); otherwise there were no differences out to day five. There were no differences in quality of recovery or postoperative morbidity/mortality between the two groups.

Conclusion: ITM+fPCA provides acceptable post-operative outcomes for HR, but may also increase the incidence of intra-operative blood loss in comparison to TEA.

Received 27 November 2013; accepted 18 December 2013

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Epidural had significantly better pain scores at 12 h, less blood loss and lower CVP

But, epidural group got more colloid and vasopressor

Spinal had a shorter LOS

No difference in M&M

royal free charity

NIAA

National Institute of Academic Anaesthesia

THE ASSOCIATION OF ANAESTHETISTS

of Great Britain & Ireland

HERALD-1

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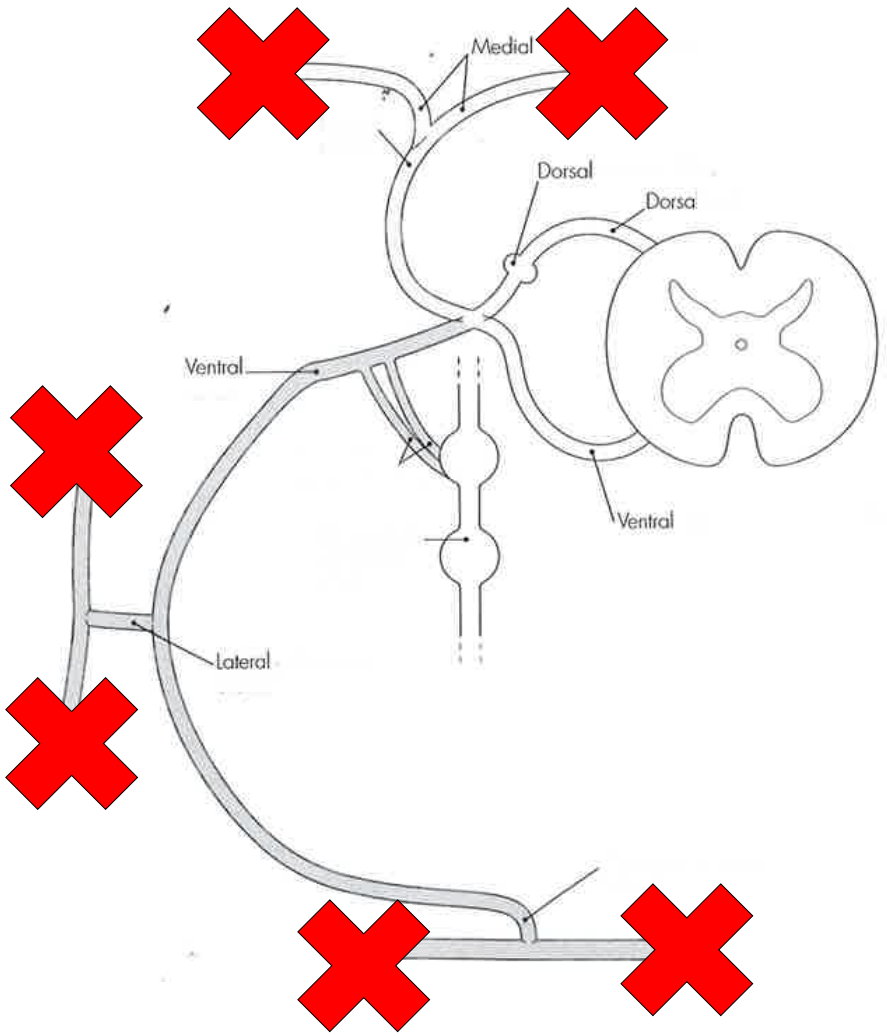

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ASK FOR EVIDENCE

Anaesthesia 2013, 68, 628–635 doi:10.1111/anae.12191

Review Article

Epidural anaesthesia and analgesia for liver resection

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2 Clinical fellow, 3 Consultant Anaesthetist, Department of Anaesthesia, Royal Free London NHS Foundation Trust, Pond Street, London, UK

Summary

Although epidural analgesia is routinely used in many institutions for patients undergoing hepatic resection, there are unresolved issues regarding its safety and efficacy in this setting. We performed a review of papers published in the area of anaesthesia and analgesia for liver resection surgery and selected four areas of current controversy for the focus of this review: the safety of epidural catheters with respect to postoperative coagulopathy, a common feature of this type of surgery; analgesic efficacy; associated peri-operative fluid administration; and the role of epidural analgesia in enhanced recovery protocols. In all four areas, issues are raised that question whether epidural anaesthesia is always the best choice for these patients. Unfortunately, the evidence available is insufficient to provide definitive answers, and it is clear that there are a number of areas of controversy that would benefit from high-quality dinical trials.

DOI:10.1111/j.1477-2574.2012.00490.x HPB

ORIGINAL ARTICLE

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

Erica J. Revie[1], Dermot W. McKeown[2], John A. Wilson[2], O. James Garden[1] & Stephen J. Wigmore[1]

[1]Department of Clinical Surgery, University of Edinburgh, Edinburgh, UK and [2]Department of Anaesthesia, Critical Care and Pain Medicine, Royal Infirmary of Edinburgh, Edinburgh, UK

Abstract

Objectives: Epidural analgesia is recommended for the provision of analgesia following major abdominal surgery. Continuous local anaesthetic wound infiltration may be an effective alternative. A prospective randomized trial was undertaken to compare these two methods following open liver resection. The primary outcome was length of time required to fulfil criteria for discharge from hospital.

Methods: Patients undergoing open liver resection were randomized to receive either epidural (EP group) or local anaesthetic wound infiltration plus patient-controlled opiate analgesia (WI group) for the first 2 days postoperatively. All other care followed a standardized enhanced recovery protocol. Time to fulfil discharge criteria, pain scores, physical activity measurements and complications were recorded.

Results: Between August 2009 and July 2010, 65 patients were randomized to EP ($n = 32$) or WI ($n = 33$). The mean time required to fulfil discharge criteria was 4.5 days (range: 2.5–63.5 days) in the WI group and 6.0 days (range: 3.0–42.5 days) in the EP group ($P = 0.044$). During the first 48 h following surgery, pain scores were significantly lower in the EP group both at rest and on movement. Resting pain scores within both groups were rated as mild (range: 0–3). There was no significant difference between the groups in time to first mobilization or overall complication rate (48.5% in the WI group vs. 58.1% in the EP group; $P = 0.443$).

Conclusions: Local anaesthetic wound infiltration combined with patient-controlled opiate analgesia reduces the length of time required to fulfil criteria for discharge from hospital compared with epidural analgesia following open liver resection. Epidural analgesia provides superior analgesia, but does not confer benefits in terms of faster mobilization or recovery.

Keywords

analgesia, epidural, liver resection, bupivacaine, wound catheter, enhanced recovery

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Epidural had significantly better pain scores within the first 48h

But the LA group had shorter LOS

No difference in mobilisation of complications

The Use of Intrathecal Morphine for Postoperative Pain Relief After Liver Resection: A Comparison with Epidural Analgesia

Lesley De Pietri, MD*, Antonio Siniscalchi, MD*, Alexia Reggiani, MD*, Michele Masetti, MD†, Bruno Begliomini, MD*, Matteo Gazzi, MD*, Giorgio E. Gerunda, MD†, and Alberto Pasetto, MD*

*Division of Anesthesiology and †Liver and Multivisceral Transplant Center, University of Modena and Reggio Emilia, Italy

An epidural catheter is used in some institutions for postoperative analgesia after liver surgery. However, anesthesiologists may not feel comfortable leaving a catheter in the epidural space because of concern about coagulation disturbances and possible bleeding complications caused by impaired liver function. In this study, we tested a single-shot intrathecal morphine technique and compared it to a continuous epidural naropine infusion for postoperative analgesia in liver surgery. Fifty patients were randomly assigned to an epidural analgesia group (EP group; $n = 25$) and an intrathecal analgesia group (IN group; $n = 25$). The quality of analgesia assessed by a visual analog scale (VAS), the side effects, and the additional IV analgesic requirements were recorded. We did not observe any signs of cord compression. Time to first pain drug requirement was longer in the EP group compared to the IN group (25 ± 18.5 h versus 12 ± 10.3 h; $P < 0.05$). In both groups, the VAS remained less than 30 mm throughout the 48-h follow-up period. Consumption of IV morphine with a patient-controlled analgesia device in the IN group was larger (mostly from 24 to 48 h after surgery) than the EP group (12.0 ± 5.54 mg versus 3.1 ± 2.6 mg, respectively; $P < 0.01$). The incidence of vomiting was 4% in both groups, whereas the incidence of pruritus (16% versus 0%) and nausea (16% versus 4%) was more frequent in the IN group. No postdural puncture headache and no spinal hematoma occurred. After liver resection, a single dose of intrathecal morphine followed by patient-controlled morphine analgesia can provide satisfactory postoperative pain relief. The quality of this treatment, according to the VAS, is not inferior to continuous epidural analgesia up to 48 h after surgery.

(Anesth Analg 2006;102:1157–63)

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Both groups had VAS <30mm

Consumption of morphine was higher in the ITM group as was pruritis and nausea

Epidural Local Anesthetics Versus Opioid-Based Analgesic Regimens for Postoperative Gastrointestinal Paralysis, Vomiting, and Pain After Abdominal Surgery: A Cochrane Review

Joanne Guay, MD,*† Mina Nishimori, MD,‡ and Sandra L. Kopp, MD§

BACKGROUND: The aim of this review was to compare the effects of postoperative epidural analgesia with local anesthetics to postoperative systemic or epidural opioids in terms of return of gastrointestinal transit, postoperative pain control, postoperative vomiting, incidence of gastrointestinal anastomotic leak, hospital length of stay, and cost after abdominal surgery.
METHODS: Trials were identified by computerized searches of the Cochrane Central Register of Controlled Trials (CENTRAL) (2014, Issue 12), Medical Literature Analysis and Retrieval System Online (MEDLINE) (from 1950 to December, 2014) and Excerpta Medica dataBASE (EMBASE) (from 1974 to December 2014) and by checking the reference lists of trials retained. We included parallel randomized controlled trials comparing the effects of postoperative epidural local anesthetic with regimens based on systemic or epidural opioids. The quality of the studies was rated according to the Cochrane tool. Two authors independently extracted data. We judged the quality of evidence according to the Grading of Recommendations, Assessment, Development and Evaluations (GRADE) working group scale.
RESULTS: Based on 22 trials including 1138 participants, an epidural containing a local anesthetic will decrease the time required for return of gastrointestinal transit as measured by time required to observe the first flatus after an abdominal surgery standardized mean difference (SMD) −1.28 (95% confidence interval [CI], −1.71 to −0.86; high quality of evidence; equivalent to 17.5 hours). The effect is proportional to the concentration of local anesthetic used. Based on 28 trials including 1559 participants, we also found a decrease in time to first feces (stool): SMD −0.67 (95% CI, −0.86 to −0.47; low quality of evidence; equivalent to 22 hours). Based on 35 trials including 2731 participants, pain on movement at 24 hours after surgery is also reduced: SMD −0.89 (95% CI, −1.08 to −0.70; moderate quality of evidence; equivalent to 2.5 on a scale from 0 to 10). Based on 22 trials including 1154 participants, we did not find a difference in the incidence of vomiting within 24 hours: risk ratio 0.84 (95% CI, 0.57–1.23); low quality of evidence. Based on 17 trials including 848 participants we did not find a difference in the incidence of gastrointestinal anastomotic leak: risk ratio 0.74 (95% CI, 0.41–1.32; low quality of evidence). Based on 30 trials including 2598 participants, epidural analgesia reduces length of hospital stay for an open surgery: SMD −0.20 (95% CI, −0.35 to −0.04; very low quality of evidence; equivalent to 1 day). Data on cost were very limited.
CONCLUSIONS: An epidural containing a local anesthetic, with or without the addition of an opioid, accelerates the return of the gastrointestinal transit (high quality of evidence). An epidural containing a local anesthetic with an opioid decreases pain after an abdominal surgery (moderate quality of evidence). An epidural containing a local anesthetic does not affect the incidence of vomiting or anastomotic leak (low quality of evidence). For an open surgery, an epidural containing a local anesthetic would reduce the length of hospital stay (very low quality of evidence).
(Anesth Analg 2016;123:1591–602)

META-ANALYSIS

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(Anesth Analg 2016;123:1591–602)

Epidural local anaesthetic and opoid reduces pain and length of stay

Better time to gut function compared with opoids


SAFETY
FIRST

NAP 3

Major complications of central neuraxial block in the UK

- The census phase produced a denominator of a little over 700,000 CNB. Of these, 46% were spinals and 41% epidurals, and 45% were performed for obstetric indications and 44% perioperative.
- Eighty-four major complications were reported in the year of data collection, with 52 meeting all of the audit inclusion criteria. With the data interpreted 'pessimistically' there were 30 permanent injuries, and 'optimistically' 14.
- The incidence of permanent injury due to CNB (expressed per 100,000 cases) was 'pessimistically' 4.2 (95% confidence interval 2.9–6.1) and 'optimistically' 2.0 (1.1–3.3). These are equivalent to 1 in 24,000 and 1 in 54,000, respectively.
- 'Pessimistically' there were 13 deaths or paraplegias, 'optimistically' five. The incidence of paraplegia or death was 'pessimistically' 1.8 per 100,000 (1.0–3.1) or 1 in 50,000 and 'optimistically' 0.7 (0–1.6) or 1 in 140,000.
- In the 30 patients with permanent harm (judged 'pessimistically') 60% occurred after epidural block, 23% after spinal anaesthesia and 13% after CSE. More than 80% of these patients had a CNB placed for perioperative analgesia.
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Lancet 2002; **359:** 1276–82

Epidural anaesthesia and analgesia and outcome of major surgery: a randomised trial

*John R A Rigg, Konrad Jamrozik, Paul S Myles, Brendan S Silbert, Phillip J Peyton, Richard W Parsons, Karen S Collins, for the MASTER Anaesthesia Trial Study Group**

Findings 255 patients (57·1%) in the epidural group and 268 (60·7%) in the control group had at least one morbidity endpoint or died (p=0·29). Mortality at 30 days was low in both groups (epidural 23 [5·1%], control 19 [4·3%], p=0·67). Only one of eight categories of morbid endpoints in individual systems (respiratory failure) occurred less frequently in patients managed with epidural techniques (23% *vs* 30%, p=0·02). Postoperative epidural analgesia was associated with lower pain scores during the first 3 postoperative days. There were no major adverse consequences of epidural-catheter insertion.

Endpoint	Definition	Frequency of endpoint (%)		p*
		Control (n=441)	Epidural (n=447)	
Postoperative death	Death from any cause within 30 days of surgery	4·3	5·2	0·67
Respiratory failure	Need for prolonged ventilation or reintubation or PaO_2 ⩽50 mm Hg or $PaCO_2$ ⩾50 mm Hg (room air)	30·2	23·3	0·02
Cardiovascular event	AMI, angina, congestive heart failure, cardiac shock, third-degree heart block or major (supra) ventricular tachyarrhythmia	24·0	25·7	0·61
Renal failure	Rise in serum creatinine of >100 μmol/L or serum creatinine ⩾300 μmol/L, or need for haemofiltration or dialysis	8·2	7·4	0·75
GI failure	GI bleeding needing transfusion of 2 units or more of blood or decision to institute total parenteral nutrition	6·8	6·5	0·95
Hepatic failure	Two of total bilirubin ⩾100 μmol/L, alkaline phosphatase ⩾3 times ULN and either lactate dehydrogenase or aspartate transaminase to >2 times ULN in absence of upper abdominal surgery	2·9	2·2	0·65
Haematological failure	Packed-cell volume ⩽20% or WCC ⩽2×10^9/L or platelets ⩽40×10^9/L	4·1	3·4	0·69
Inflammation/sepsis	Infection, pneumonia, or sepsis (all specifically defined)	46·7	42·7	0·26
At least one morbid endpoint	At least one of the above sets of criteria fulfilled	60·5	56·6	0·26
Death or at least one morbid endpoint	Death within 30 days of surgery or at least one of the above sets of criteria fulfilled	60·7	57·1	0·29

AMI=acute myocardial infarction; GI=gastrointestinal; ULN=upper limit of normal; WCC=white-cell count. *χ^2 test.

Table 3: **Endpoints**

Lancet 2002; **359:** 1276–82

ARTICLES

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Interpretation Most adverse morbid outcomes in high-risk patients undergoing major abdominal surgery are not reduced by use of combined epidural and general anaesthesia and postoperative epidural analgesia. However, the improvement in analgesia, reduction in respiratory failure, and the low risk of serious adverse consequences suggest that many high-risk patients undergoing major intra-abdominal surgery will receive substantial benefit from combined general and epidural anaesthesia intraoperatively with continuing postoperative epidural analgesia.

Journal of Clinical Anesthesia 47 (2018) 12–18

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Original Contribution

Epidural compared with non-epidural analgesia and cardiopulmonary complications after colectomy: A retrospective cohort study of 20,880 patients using a national quality database

Kenneth C. Cummings III, MD, MS, FASA[a,*,1], Nicole M. Zimmerman, MS[b,c,1], Kamal Maheshwari, MD, MPH[a,b,1], Gregory S. Cooper, MD[d,2], Linda C. Cummings, MD, MS[d,2]

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[d] Division of Gastroenterology and Liver Disease, Department of Medicine, University Hospitals Cleveland Medical Center, Cleveland, OH, United States

ARTICLE INFO

Keywords:
Anesthesia, epidural
Complication, postoperative
Colectomy
Pain, postoperative

ABSTRACT

Study objective: Epidural analgesia may be associated with fewer postoperative complications and is associated with improved survival after colon cancer resection. This study used the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) to assess any association between epidural analgesia (versus non-epidural) and complications after colectomy.

Design: Retrospective cohort study.

Setting: 603 hospitals in the United States reporting data to NSQIP.

Patients: From 2014–15 data, 4176 patients undergoing colectomy with records indicating epidural analgesia were matched 1:4 via propensity scores to 16,704 patients without.

Interventions: None (observational study).

Measurements: Primarily, we assessed the association between epidural analgesia and a composite of cardiopulmonary complications using an average relative effect generalized estimating equations model. Secondary outcomes included neurologic, renal, and surgical complications and length of hospitalization. Sensitivity analyses repeated the analyses on a subgroup of only open colectomies.

Main results: We found no association between epidural analgesia and the primary outcome: average relative effect (95% CI) 0.87 (0.68, 1.11); P = 0.25. We found no significant associations with any secondary outcomes. In the 8005 open colectomies, however, there was a significant association between epidural analgesia and fewer cardiopulmonary complications (average relative effect odds ratio [95% CI] of 0.58 [0.35, 0.95]; P = 0.03) and shortened hospital stay (HR for time to discharge [98.75% CI] of 1.10 [1.02, 1.18]; P < 0.001).

Conclusions: We found no overall association between epidural analgesia and reduced complications after colectomy. In open colectomies, however, epidural analgesia was associated with fewer cardiopulmonary complications and shorter hospitalization. This may inform analgesic choice when planning open colectomy.

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Significant association between epidural and fewer cardiopulmonary complications

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world class expertise local care

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No difference in complications

Epidural had superior pain scores but prolonged length of stay

world class expertise local care

Royal Free London NHS Foundation Trust

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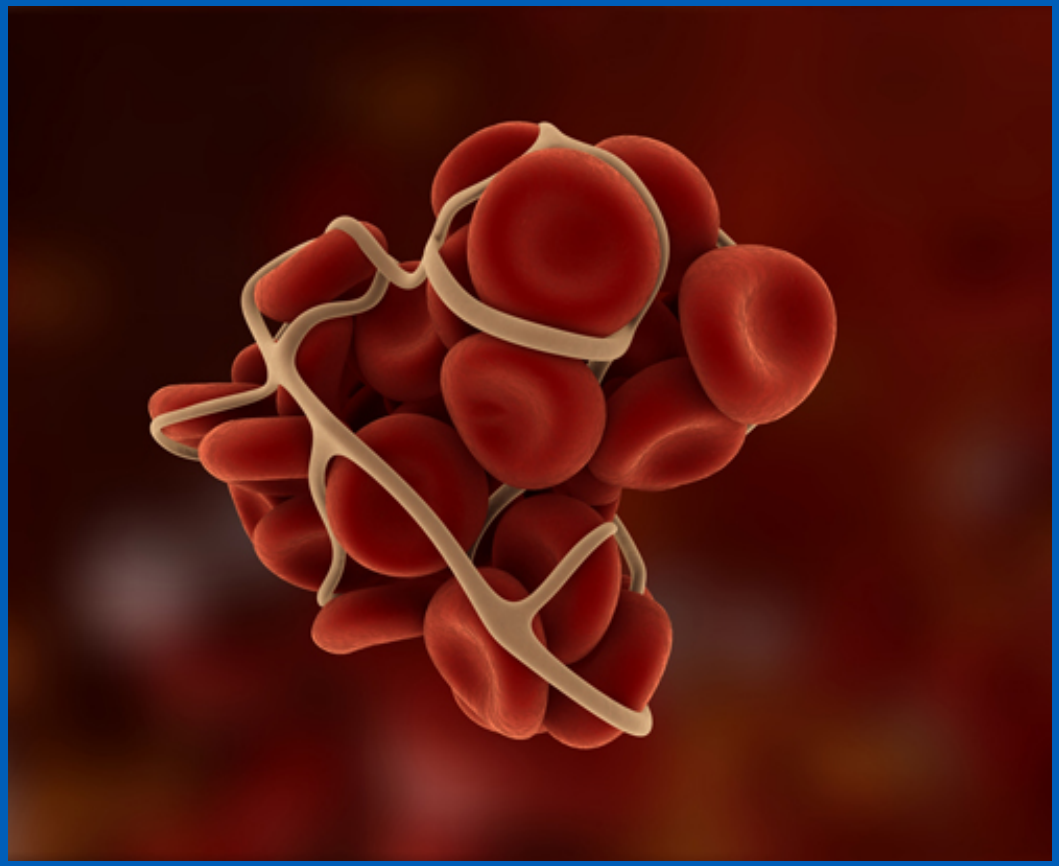

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Hemostasis

Section Editor: Roman M. Sniecinski

Incidence and Risk Factors of Coagulation Profile Derangement After Liver Surgery: Implications for the Use of Epidural Analgesia—A Retrospective Cohort Study

Pierre Jacquenod,* Grégoire Wallon, MD,* Mathieu Gazon, MD,* Benjamin Darnis, MD,† Pierre Pradat, PhD,‡ Victor Virlogeux, MD, PhD,‡ Olivier Farges, MD, PhD,§ and Frédéric Aubrun, MD, PhD*

BACKGROUND: Hepatic surgery is a major abdominal surgery. Epidural analgesia may decrease the incidence of postoperative morbidities. Hemostatic disorders frequently occur after hepatic resection. Insertion or withdrawal (whether accidental or not) of an epidural catheter during coagulopathic state may cause an epidural hematoma. The aim of the study is to determine the incidence of coagulopathy after hepatectomy, interfering with epidural catheter removal, and to identify the risk factors related to coagulopathy.

METHODS: We performed a retrospective review of a prospective, multicenter, observational database including patients over 18 years old with a history of liver resection. Main collected data were the following: age, preexisting cirrhosis, Child-Pugh class, preoperative and postoperative coagulation profiles, extent of liver resection, blood loss, blood products transfused during surgery. International normalized ratio (INR) ≥1.5 and/or platelet count <80,000/mm^3 defined coagulopathy according to the neuraxial anesthesia guidelines. A logistic regression analysis was performed to assess the association between selected factors and a coagulopathic state after hepatic resection.

RESULTS: One thousand three hundred seventy-one patients were assessed. Seven hundred fifty-nine patients had data available about postoperative coagulopathy, which was observed in 53.5% [95% confidence interval, 50.0–57.1]. Maximum derangement in INR occurred on the first postoperative day, and platelet count reached a trough peak on postoperative days 2 and 3. In the multivariable analysis, preexisting hepatic cirrhosis (odds ratio [OR] = 2.49 [1.38–4.51]; $P = .003$), preoperative INR ≥1.3 (OR = 2.39 [1.10–5.17]; $P = .027$), preoperative platelet count <150 G/L (OR = 3.03 [1.77–5.20]; $P = .004$), major hepatectomy (OR = 2.96 [2.07–4.23]; $P < .001$), and estimated intraoperative blood loss ≥1000 mL (OR = 1.85 [1.08–3.18]; $P = .025$) were associated with postoperative coagulopathy.

CONCLUSIONS: Coagulopathy is frequent (53.5% [95% confidence interval, 50.0–57.1]) after liver resection. Epidural analgesia seems safe in patients undergoing minor hepatic resection without preexisting hepatic cirrhosis, showing a normal preoperative INR and platelet count. (Anesth Analg 2018;126:1142–7)

The NEW ENGLAND JOURNAL of MEDICINE

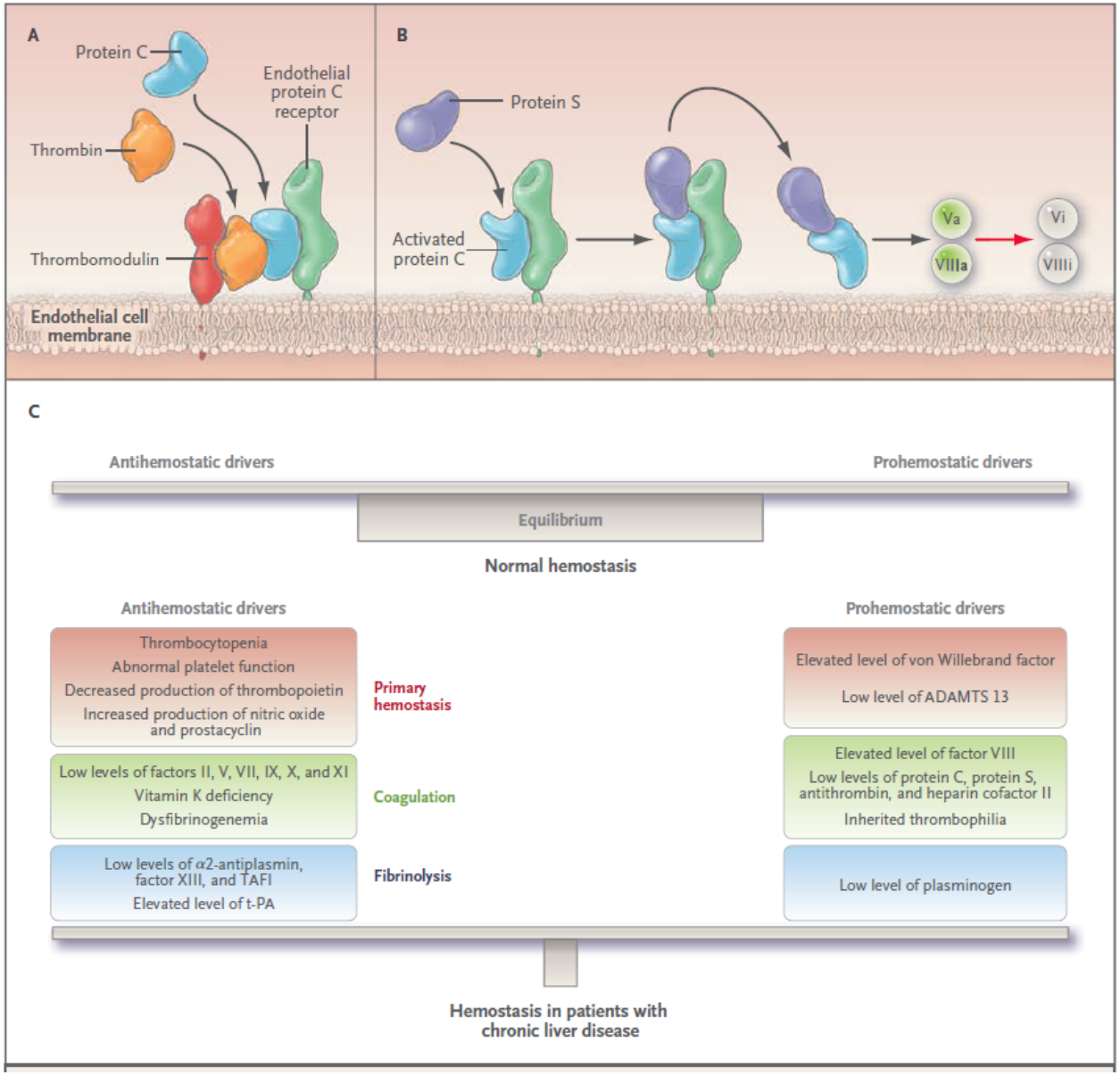
REVIEW ARTICLE

MECHANISMS OF DISEASE

The Coagulopathy of Chronic Liver Disease

Armando Tripodi, Ph.D., and Pier Mannuccio Mannucci, M.D.

N Engl J Med 2011;365:147-56.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Protein C
Endothelial protein C receptor
Thrombin
Thrombomodulin
Endothelial cell membrane
B
Protein S
Activated protein C
Va
VIIIa
Vi
VIIIi
C
Antihemostatic drivers
Prohemostatic drivers
Equilibrium
Normal hemostasis
Antihemostatic drivers
Prohemostatic drivers
Thrombocytopenia
Abnormal platelet function
Decreased production of thrombopoietin
Increased production of nitric oxide and prostacyclin
Primary hemostasis
Elevated level of von Willebrand factor
Low level of ADAMTS 13
Low levels of factors II, V, VII, IX, X, and XI
Vitamin K deficiency
Dysfibrinogenemia
Coagulation
Elevated level of factor VIII
Low levels of protein C, protein S, antithrombin, and heparin cofactor II
Inherited thrombophilia
Low levels of α2-antiplasmin, factor XIII, and TAFI
Elevated level of t-PA
Fibrinolysis
Low level of plasminogen
Hemostasis in patients with chronic liver disease

Anaesthesia 2016, 71, 657–668 doi:10.1111/anae.13459

Original Article

Alterations in coagulation following major liver resection

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2 Consultant, Department of Anaesthesia, Brighton and Sussex University Hospitals, Brighton, UK
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7 Consultant Haematologist, University of Malta, Tal-Qroqq, Msida, Malta

Summary

The international normalised ratio is frequently raised in patients who have undergone major liver resection, and is assumed to represent a potential bleeding risk. However, these patients have an increased risk of venous thromboembolic events, despite conventional coagulation tests indicating hypocoagulability. This prospective, observational study of patients undergoing major hepatic resection analysed the serial changes in coagulation in the early postoperative period. Thrombin generation parameters and viscoelastic tests of coagulation (thromboelastometry) remained within normal ranges throughout the study period. Levels of the procoagulant factors II, V, VII and X initially fell, but V and X returned to or exceeded normal range by postoperative day five. Levels of factor VIII and Von Willebrand factor were significantly elevated from postoperative day one ($p < 0.01$). Levels of the anticoagulants, protein C and antithrombin remained significantly depressed on postoperative day five ($p = 0.01$). Overall, the imbalance between pro- and anticoagulant factors suggested a prothrombotic environment in the early postoperative period.

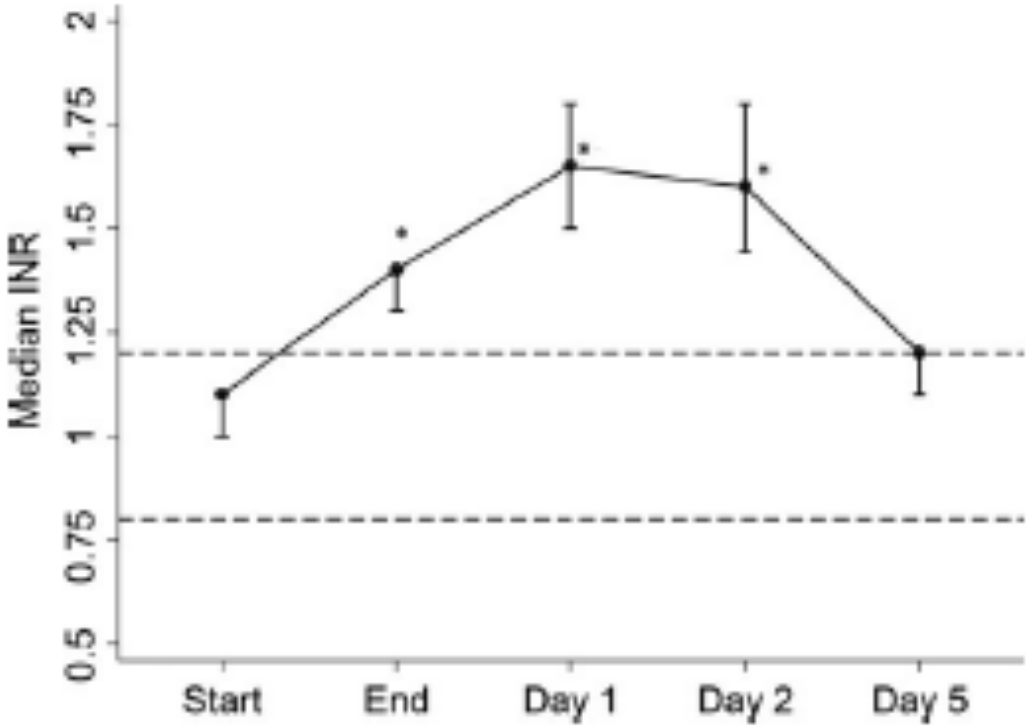


Figure 1 Changes in median international normalised ratio (INR) over time. Error bars are interquartile range. Dashed lines are reference range (0.8–1.2). *$p < 0.01$ compared with baseline.

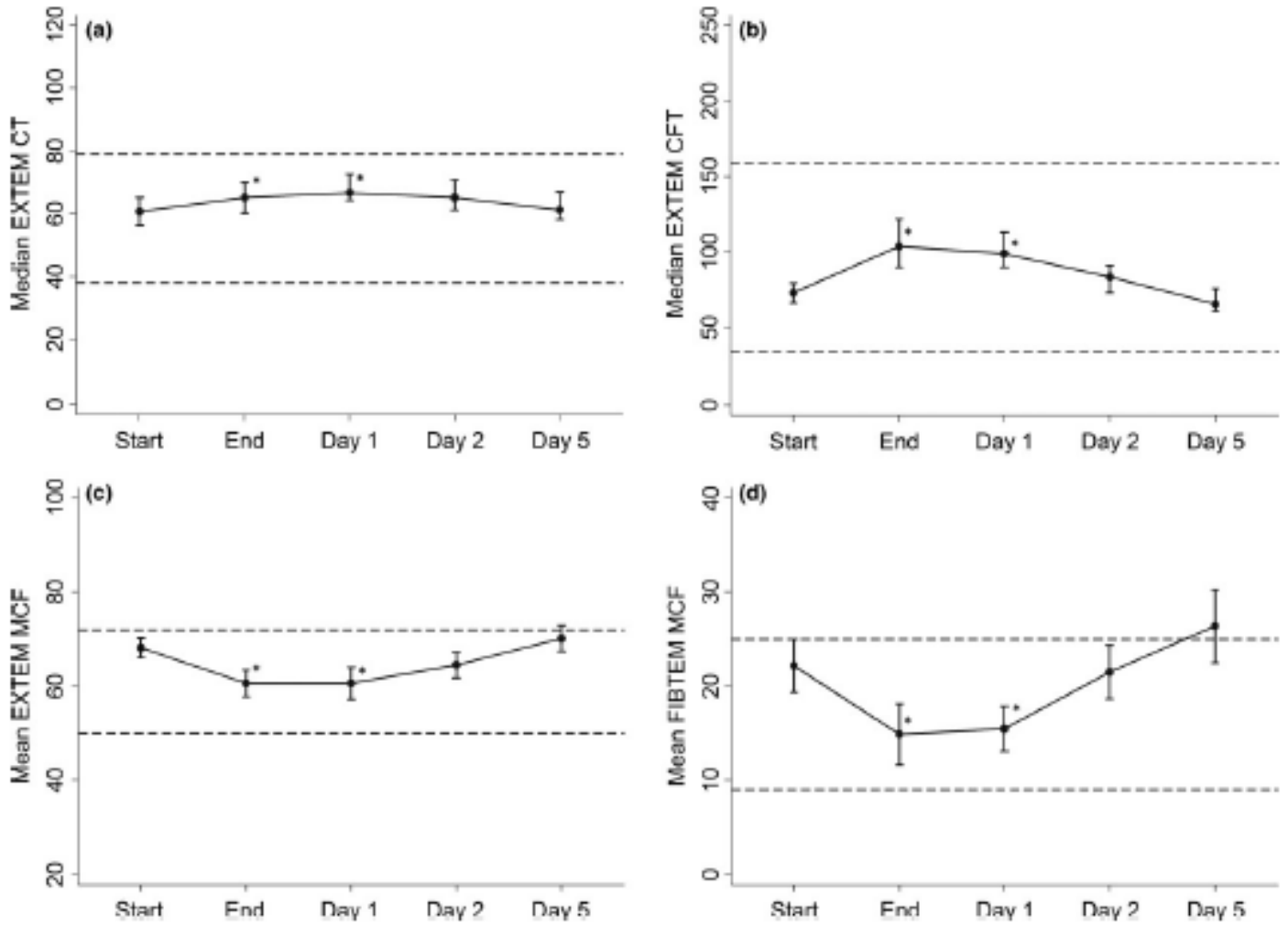


Figure 5 Changes in median (a) EXTEM CT (b) EXTEM CFT (c) EXTEM MCF (d) FIBTEM MCF over time. Error bars are IQR. Dashed lines are reference ranges. *p < 0.01 compared with baseline.

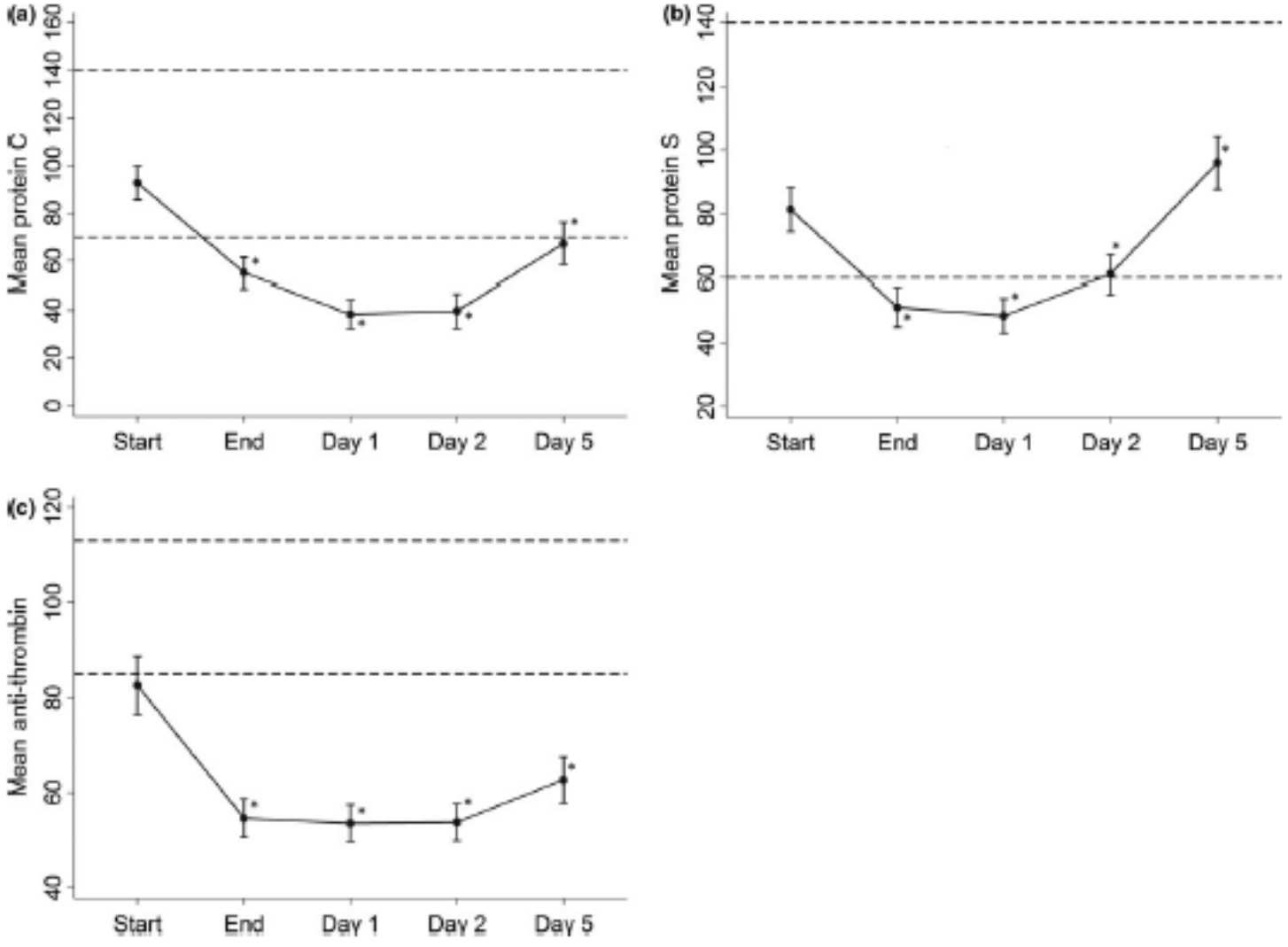
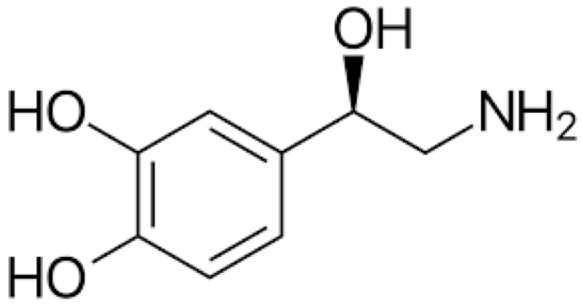


Figure 4 Changes in mean (a) protein C (b) protein S and (c) antithrombin over time. Error bars are 95% CI. Dashed lines are reference ranges. *p < 0.01 compared with baseline.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doi:10.1155/2009/271986

Research Article

Fast Track Liver Resection: The Effect of a Comprehensive Care Package and Analgesia with Single Dose Intrathecal Morphine with Gabapentin or Continuous Epidural Analgesia

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Received 15 April 2009; Accepted 14 September 2009

Recommended by William Jarnagin

Background. A comprehensive care package for patients undergoing hepatectomy was developed with the aim of minimal physiological disturbance in the peri-operative period. Peri-operative analgesia with few gastrointestinal effects and reduced requirement for intravenous (IV) fluid therapy was central to this plan. *Methods.* Data on 100 consecutive patients managed with continuous epidural infusion ($n = 50$; bupivicaine 0.125% and fentanyl 2 μg/mL at 0.1 mL/kg/hr) or intrathecal morphine ($n = 50$; 300 μg in combination with oral gabapentin 1200 mg preoperatively and 400 mg bd postoperatively) was compared. *Results.* The epidural and intrathecal morphine groups were equivalent in terms of patient demographics, procedures and complications. Patients receiving intrathecal morphine received less intra-operative IV fluids (median 1500 mL versus 2200 mL, $P = .06$), less postoperative IV fluids (median 1200 mL versus 4300 mL, $P = .03$) than patients receiving epidural infusion. Patients managed with intrathecal morphine established a normal dietary intake sooner (16 hours versus 20 hours, $P = .05$) and had shorter hospital stays than those managed with epidural infusions (4.7 ± 0.9 days versus 6.8 ± 1.2 days, $P = .02$). *Conclusions.* Single dose intrathecal morphine is a safe and effective means of providing peri-operative analgesia. Patients managed with intrathecal morphine have reduced peri-operative physiological disturbance and return home within a few days of hepatic resection.

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ITM had less fluids, time to eating sooner and shorter LOS (4.7 vs 6.8)

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Database of Abstracts of Reviews of Effects (DARE): Quality-assessed Reviews [Internet].

The effect of analgesic modality on outcome following open liver surgery: a systematic review of post-operative analgesia

Review published: 2014.

Bibliographic details: Hughes M, McNally S, McKeown DW, Wigmore S. The effect of analgesic modality on outcome following open liver surgery: a systematic review of post-operative analgesia. Minerva Anestesiologica 2014: epub. [PubMed]

Abstract

Postoperative analgesia following liver resection remains controversial. The traditional standard of care of thoracic epidural is increasingly questioned due to perceived associated complications and delays to recovery. Evidence supporting alternative analgesic techniques is emerging however best practice is not yet established. This review aimed to evaluate the literature to assess the optimum analgesic technique following liver resection. A systematic review was conducted of trials evaluating analgesic methods in open liver surgery. Primary outcome was the postoperative complication rate. Secondary outcomes were length of stay and pain scores. Fourteen trials matching the inclusion criteria were analysed. No difference was observed in systemic complication rates between analgesic modalities. Epidural was associated with prolonged length of stay when compared with continuous wound infiltration and intrathecal morphine. Epidural offered equivalent or superior pain scores when compared to alternative techniques. In summary current evidence suggests alternative analgesic modalities may provide favorable recovery outcomes following liver surgery but consistent evidence is limited. Epidurals provide superior pain relief to alternatives but this does not translate into reduced length of stay or complication rate following liver surgery.

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CRD has determined that this article meets the DARE scientific quality criteria for a systematic review.

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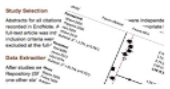

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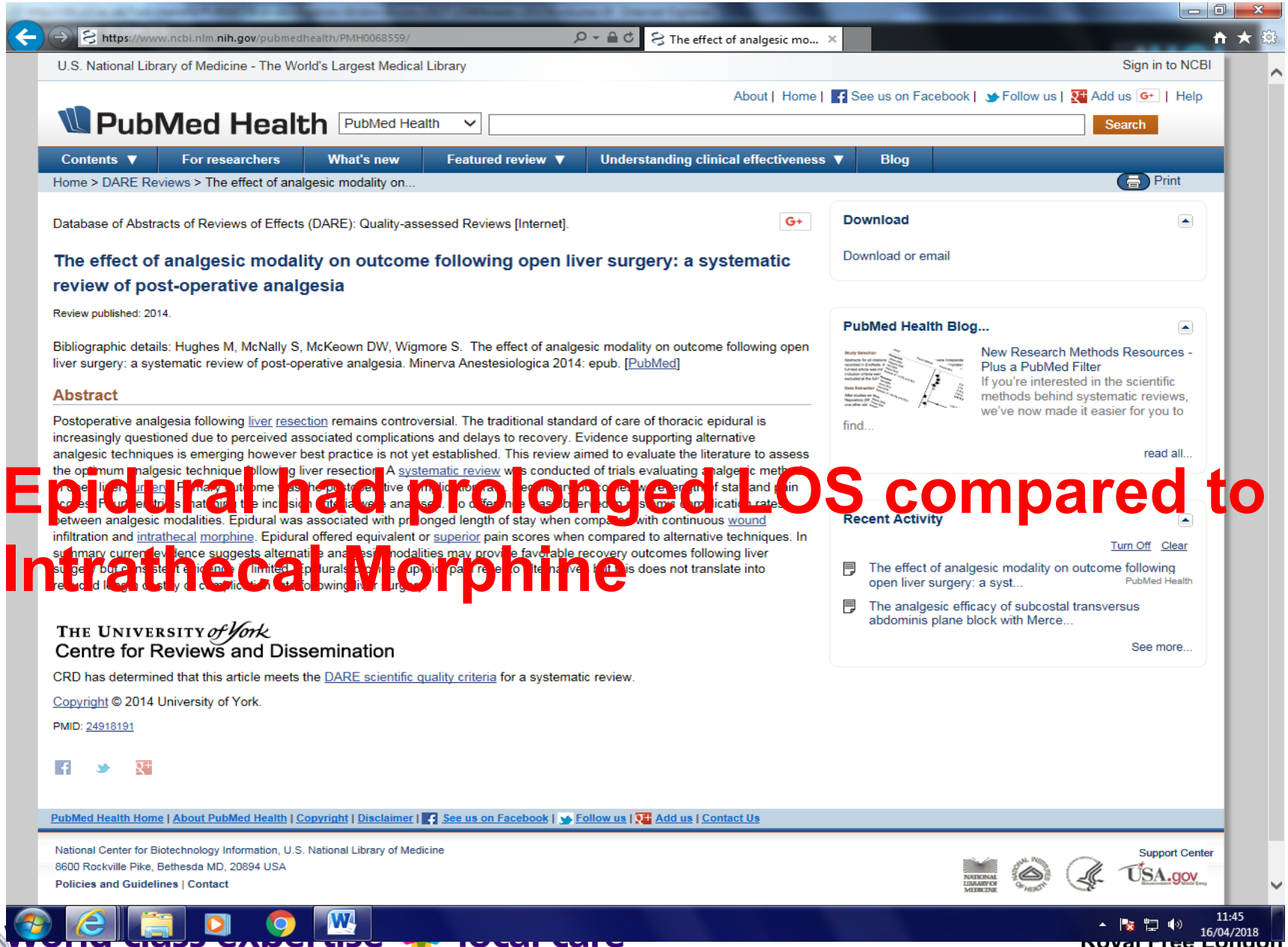
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CRD has determined that this article meets the DARE scientific quality criteria for a systematic review.
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World J Surg (2009) 33:1802–1808
DOI 10.1007/s00268-009-0131-2

World Journal of Surgery

A Change in Practice from Epidural to Intrathecal Morphine Analgesia for Hepato-Pancreato-Biliary Surgery

Magdalena Sakowska · Elizabeth Docherty · David Linscott · Saxon Connor

World J Surg (2009) 33:1802–1808
DOI 10.1007/s00268-009-0131-2

World Journal of Surgery

Hypotension and fluid administartion was higher in the epidural group

A Change in Practice from Epidural to Intrathecal Morphine Analgesia for Hepato-Pancreato-Biliary Surgery

Magdalena Sakowska · Elizabeth Docherty · David Linnett · Saxon Conner

Respiratory complications higher in epidural group and LOS longer

World J Surg (2009) 33:1802–1808
DOI 10.1007/s00268-009-0131-2

World Journal of Surgery

A Change in Practice from Epidural to Intrathecal Morphine Analgesia for Hepato-Pancreato-Biliary Surgery

Magdalena Sakowska · Elizabeth Docherty · David Linscott · Saxon Connor

38% failure rate….

Royal Free London NHS
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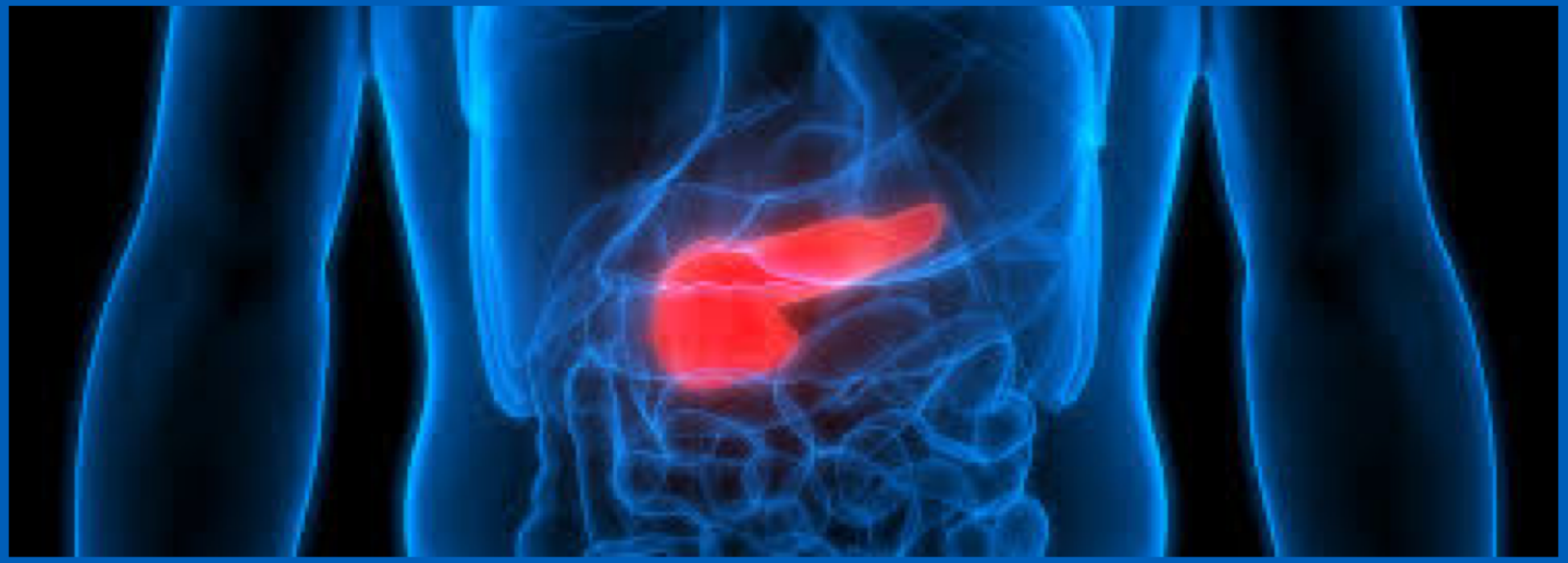

Acute Pancreatitis

world class expertise ✦ local care

Acute Pancreatitis

- Release of proinflammatory mediators excreted into the circulation
- Systemic complications can arise
- Prognosis remains poor in severe acute pancreatitis

Epidural in acute pancreatitis

- In addition to analgesia, the modulatory effects of epidural could improve organ perfusion with reduced complications in the post op period
- Beneficial effects in animal studies – reduced thromboembolic and abdominal complications
- Possibly increase pancreatic perfusion, decrease liver damage and inflammatory response, and reduce mortality

Crit Care Med. 2018 Mar;46(3):e198-e205. doi: 10.1097/CCM.0000000000002874.

Thoracic Epidural Analgesia and Mortality in Acute Pancreatitis: A Multicenter Propensity Analysis.

MEASUREMENTS AND MAIN RESULTS: One thousand three ICU patients with acute pancreatitis were enrolled, of whom 212 died within 30 days. Epidural analgesia was used in 46 patients and was associated with reduced mortality in unadjusted analyses (4% vs. 22%; p = 0.003). After adjustment for baseline variables associated with mortality, epidural analgesia was still an independent predictor of 30-day mortality (adjusted odds ratio, 0.10; [95% CI, 0.02-0.49]; p = 0.004). Using propensity score analysis, the risk of all-cause 30-day mortality in patients with acute pancreatitis receiving epidural analgesia was significantly lower than that in matched patients who did not receive epidural analgesia (2% vs. 17%; p = 0.01).

CONCLUSIONS: Among critically ill patients with acute pancreatitis, mortality at 30 days was lower in patients who received epidural analgesia than in comparable patients who did not. These findings support ongoing research on the use of epidural analgesia as a therapeutic intervention in acute pancreatitis.

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Thoracic epidural analgesia: a new approach for the treatment of acute pancreatitis?

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Abstract

This review article analyzes, through a nonsystematic approach, the pathophysiology of acute pancreatitis (AP) with a focus on the effects of thoracic epidural analgesia (TEA) on the disease. The benefit-risk balance is also discussed. AP has an overall mortality of 1 %, increasing to 30 % in its severe form. The systemic inflammation induces a strong activation of the sympathetic system, with a decrease in the blood flow supply to the gastrointestinal system that can lead to the development of pancreatic necrosis. The current treatment for severe AP is symptomatic and tries to correct the systemic inflammatory response syndrome or the multiorgan dysfunction. Besides the removal of gallstones in biliary pancreatitis, no satisfactory causal treatment exists. TEA is widely used, mainly for its analgesic effect. TEA also induces a targeted sympathectomy in the anesthetized region, which results in splanchnic vasodilatation and an improvement in local microcirculation. Increasing evidence shows benefits of TEA in animal AP: improved splanchnic and pancreatic perfusion, improved pancreatic microcirculation, reduced liver damage, and significantly reduced mortality. Until now, only few clinical studies have been performed on the use of TEA during AP with few available data regarding the effect of TEA on the splanchnic perfusion. Increasing evidence suggests that TEA is a safe procedure and could appear as a new treatment approach for human AP, based on the significant benefits observed in animal studies and safety of use for human. Further clinical studies are required to confirm the clinical benefits observed in animal studies.

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Epidural analgesia in critically ill patients with acute pancreatitis: the multicentre randomised controlled EPIPAN study protocol

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Summary

- Epidurals probably provide better analgesia
- Failure rate
- Possibly longer length of stay
- More fluids/vasopressors
- May be useful in acute pancreatitis

Questions?

https://youtu.be/K5ecNlgNf7o