Kliiniline küsimus nr 10.

Kas patsiendi postoperatiivse ägeda valu ravis on regionaalanalgeesia (epiduraal-analgeesia, närviblokaadid) vs parenteraalne ja enteraalne analgeesia tulemuslikum?

Kriitilised tulemusnäitajad: valu tugevus, valu vähenemine, lisavaluvaigisti vajadus, aeg esimese lisavaluvaigisti vajaduseni, aeg valuvaigistava toime saabumiseni, postoperatiivsete tüsistuste esinemissagedus, rehospitaliseerimine valu tõttu, patsiendi (eestkostja) rahulolu valuraviga, meetodi ohutus

Süstemaatilised ülevaated

Me leidsime hea kvaliteediga tõendumaterjali 5 Cochrane ülevaatest, 5 süstemaatilisest ülevaatest, 7 meta-analüüsist ja 5 RCT-st, mis käsitleb antud küsimuse teemat. Kuna küsimus on mahukas, siis teemad on jaotatud osadeks ja nende kokkuvõte on allpool toodud alapunktidena:

***Epiduraalanalgeesia vs intravenoosne (i/v) opiaat**

1. Epiduraalanalgeesia (püsi-) leevendab paremini valu kui parenteraalsed opioidid (PCA) kuni 72 tundi peale intraabdominaalset operatsiooni, aga on seotud kõrgema sügelemise sagedusega.
2. Epiduraalanalgeesia võrreldes süsteemsete opioididega leevendab paremini valu (kuni kolm päeva peale operatsiooni) ja vähendab intubatsiooni aega peale kõhuaordi operatsioone. Samuti leiti, et epiduraalanalgeesia vähendab postoperatiivse müokardi infarkti, pikenenud mehhaanilise ventilatsiooni, GI ja neeru tüsistuste sagedust. Samas suremus jäi samaks.
3. Epiduraalanalgeesia võrreldes parenteraalselt manustatud opioididega (kaasa arvatud PCA) tagab parema postoperatiivse valu leevenduse kõikide operatsioonitüüpide korral, välja arvatud epiduraalanalgeesia ainult hüdrofiilse opioidiga. Võrreldes i/v PCA-ga epiduraali grupis oli väiksem iiveldus/oksendamise ja sedatsiooni sagedus, samas oli suurem sügelemise, uriini retentsiooni ja motoorse blokaadi sagedus.
4. Epiduraalanalgeesia lokaalanesteetikumidega vähendab gastrointestinaaltrakti paralüüsi võrreldes parenteraalse või epiduraalse opioidiga peale laparotoomiat. Valu leevendus oli sarnane. PONV-i (*postoperative nausea and vomiting*) osas olulist vahet ei olnud. Epiduraalanalgeesia kombinatsioonis lokaalanesteetikum+opioid mõju gastrointestinaaltrakti funktsioonile on siiani lahendamata, küll aga annab parema valu leevenduse.
5. Epiduraalanalgeesia vähendas märkimisväärselt valu ja iileuse kestust kolorektaalkirurgia järgselt. Samas tõstis sügelemise, uriini retentsiooni ja hüpotensiooni sagedust. Epiduraalanalgeesia ei mõjutanud haiglas viibimise aega.
6. Epiduraalanalgeesia vähendab pikenenud mehhaanilise ventilatsiooni või reintubatsiooni vajadust, parandab kopsu funktsiooni ja vere oskügenisatsiooni, samas tõuseb hüpotensiooni, uriini retentsiooni ja sügelemise risk.
7. Epiduraalanalgeesia ja kardiokirurgia – kõrge torakaalepiduraalanalgeesia kasutamine CABG (coronary artery bypass graft) operatsioonidel vähendab postoperatiivset valu, düsrütmiate riski, kopsukomplikatsioone (vähendab atelektaasi ja parandab kopsufunktsiooni) ja ekstubatsiooni aega võrreldes intravenoosse opioid analgeesiaga. Suremust ei mõjuta. Haiglas viibimise aeg oli sarnane. Ei vähenda suremust ja müokardi infarkti riski.

***Epiduraalanalgeesia vs paravertebraalblokaad**

Epiduraalanalgeesial ja paravertebraalblokaadil (PVB) on torakaalkirurgia järgselt võrreldav efekt valule 4-8 tunni, 12, 24 ja 48 tunni möödudes, kopsukomplikatsioonide esinemissagedus ning morfiini vajadus on sarnane. Samas esineb PVB korral vähem uriini retensiooni, iiveldust ja oksendamist, hüpotensiooni ning ebaõnnestunud blokaadide arv on väiksem kui epiduraalanalgeesia korral. Paravertebraalblokaadil leiti ka parem mõju kopsufunktsioonile – märgatavalt parem PEFR (*peak expiratory flow rate*), ühes artiklis leiti ka oluliselt kõrgem FVC (*forced vital capacity*) ja FEV1 oli 2. postoperatiivsel päeval kõrgem kui epiduraalanalgeesia grupis.
Paravertebraalbloki grupis oli korisooli tase statistiliselt madalam kui epiduraalanalgeesia grupis.

***Femoraalnärviblokaad põlveproteesi asetamiseks**

1. Igasugune femoraalnärviblokaad (FNB) (nii pidev infusioon kui ühekordne süst) omab võrreldes morfiini PCAga paremat analgeetilist efekti esimese 72 tunni jooksul, nii liigutamisel kui ka rahuolekus. FNB-i saanud haiged tarbisid vähem morfiini, neil oli vähem iiveldust ja oksendamist ning parem põlve painutus ja suurem rahulolu kui PCAga haigetel.

2. Epiduraalanalgeesiaga võrreldes ei olnud FNB-il esimese 24 tunni valu tugevusel erinevust, aga esines vähem PONV-i ja haiged olid valuraviga rohkem rahul. Pidev FNB on valuravis efektiivsem kui ühekordne FNB.
3. Haiged, kes said pidevat femoraalnärviblokaadi (CFNB) peale põlveproteesi asetamist vajasid rohkem rofekoksiibi ja oksükodooni kui haiged, kes said epiduraalanalgeesiat (CEA) (epiduraal sisaldas ka fentanüüli), kuid CFNB grupis oli oluliselt vähem iiveldust ja oksendamist.
4. Femoraalnärviblokaad võrreldes patsient-kontrollitud analgeesiaga (PCA) – leiti, et PCA grupis esines enam tugeva valu episoode ja ka kõrgemad valuskooringud kui CFNB grupis 1 - 3 postoperatiivse päeva jooksul (eriti rahuloleku valu osas).

***LIA** – lokaalne haava infiltratsioon kateetriga kombineerituna patsiendi poolt kontrollitud (PCA) opioidiga omab sarnast efekti valule võrreldes epiduraalkateetriga, välja arvatud esimesel postoperatiivsel päeval. Mõlemal tehnikal on sarnane mõju haiglas viibimisele, soole peristaltika taastumisele ning opioidi kasutamisel, samas haavakateetrid olid seotud vähemate komplikatsioonide arvuga.
LIA omab varases postoperatiivses perioodis peale põlve proteesimist efektiivset valuvastast toimet enamuses randomiseeritud uuringutes, isegi kombineerituna multimodaalse analgeesiaga, samas analoogset efekti puusa proteesimise järgselt ei pruugi olla. LIA langetab võrreldes kontrollgrupiga (vee ja füsioloogilise lahuse infusiooniga kateeter) oluliselt nii rahuloleku kui liikumise valuskooringut, opioidide kasutust postoperatiivses perioodis, PONV-i esinemissagedust ja haiglas viibimise aega ning tõstab patsientide rahulolu taset.

***TAP blokid kõhukirurgias** – pole uuringuid, mis võrdleks TAP (*transversus abdominis plane*) blokki teiste analgeesia liikidega, nagu epiduraalanalgeesia või LIA (kõhuhaava lokaalanesteetikumi infiltratsioon). On ainult piiratud tõendus, mis soovitab perioperatiivse TAP bloki kasutamist opioidide tarbimise ja valu vähendamiseks peale kõhukirurgiat (võrreldes üldse mittesekkumise või platseeboga). Ei ole ka ilmset postoperatiivse iiveldamise/oksendamise või sedatsiooni vähenemist (mõned väiksed uuringud). Paljud uuringud on hetkel käigus ja ootavad publitseerimist (*Cochrane 2010*).

***Ohutus** – epidepiduraalanalgeesiaga seotud püsiva neuroloogilise kahjustuse risk on väga madal. Epiduraalse hematoomi ja abstsessi riski on kõrgem, kui on diagnoos hilinenud.

Viited

1. There are two common techniques for postoperative pain control **after intra-abdominal surgery: patient-controlled analgesia (PCA) with intravenous opioids and continuous epidural analgesia (CEA).** It is uncertain which method has better pain control and fewer adverse effects. The objective of this review was to compare PCA opioid therapy with CEA for pain control after intra-abdominal surgery in terms of analgesic efficacy, side effects, patient satisfaction and surgical outcome by meta-analysis of the relevant trials. We searched CENTRAL (The Cochrane Library Issue 4, 2002), MEDLINE (January 1966 to October 2002), EMBASE (January 1988 to October 2002), and reference lists of articles. We also contacted researchers in the field. **Randomized controlled trials** of adult patients after intra-abdominal surgery comparing the effect of two pain control regimens in terms of analgesic efficacy and side effects. In the patient-controlled analgesia (PCA) group the patient should be able to operate the device himself. In the continuous epidural analgesia group there was no PCA device. Two authors independently assessed trial quality and extracted data. Study authors were contacted for additional information. Adverse effects information was collected from the trials. **Nine studies involving 711 participants were included.** The **PCA group had a higher pain visual analogue scale than the CEA group during 6, 24 and 72 hour periods.** The weighted mean difference and 95% confidence interval of resting pain was 1.74 (95% CI 1.30 to 2.19), 0.99 (95% CI 0.65 to 1.33), and 0.63 (95% CI 0.24 to	Werawatganon T, Charuluxananan S. ***Patient controlled intravenous opioid analgesia versus continuous epidural analgesia for pain after intra-abdominal surgery.*** Cochrane Database of Systematic Reviews 2005, Issue 1. Art. No.: CD004088. DOI: 10.1002/14651858.CD004088.pub2

1.01), respectively. **The length of hospital stay and other adverse effects were not statistically different except that the incidence of pruritus was lower in the PCA group**, odds ratio of 0.27 (95% CI 0.11 to 0.64). **Authors' conclusions:** CEA is superior to opioid PCA in relieving postoperative pain for up to 72 hours in patients undergoing intra-abdominal surgery, but it is associated with a higher incidence of pruritus. There is insufficient evidence to draw comparisons about the other advantages and disadvantages of these two methods of pain relief.	
2. Epidural analgesia offers greater pain relief compared to systemic opioid-based medications, but its **effect on morbidity and mortality is unclear**. This review was originally published in 2006 and was updated in 2011. **To assess the benefits and harms of postoperative epidural analgesia in comparison with postoperative systemic opioid-based pain relief for adult patients who underwent elective abdominal aortic surgery**. We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library 2010, Issue 11) via Ovid; Ovid MEDLINE (from inception to week 1 November 2010); and EMBASE (from inception to week 1, November 2010). The original search was performed in 2004. We assessed non-English language reports and contacted researchers in the field. We did not seek unpublished data. We included all randomized and quasi-randomized controlled trials comparing postoperative epidural analgesia and postoperative systemic opioid-based analgesia for adult patients who underwent elective open abdominal aortic surgery. Two authors independently assessed trial quality and extracted data. We contacted study authors for additional information and data. We included **15 trials that involved 1297 patients (633 patients received epidural analgesia and 664 received systemic opioid analgesia)** in this review. This included one trial we found in our updated search and one trial from our original review that had been awaiting translation. The **epidural analgesia group showed significantly lower visual analogue scale scores for pain on movement (up to postoperative day three)** regardless of the site of the epidural catheter and epidural formulation. **The postoperative duration of tracheal intubation and mechanical ventilation was significantly shorter, by about 48%, in the epidural analgesia group.** The overall event rates of **myocardial infarction, acute respiratory failure (defined as an extended need for mechanical ventilation), gastrointestinal complications, and renal complications were significantly lower in the epidural analgesia group.** Authors' conclusions: Epidural analgesia provides better pain relief (especially during movement) in the period up to three postoperative days. It reduces the duration of postoperative tracheal intubation by roughly half. The occurrence of prolonged postoperative mechanical ventilation, myocardial infarction, gastric complications and renal complications was reduced by epidural analgesia. **However, current evidence does not confirm the beneficial effect of epidural analgesia on postoperative mortality and other types of complications**.	Nishimori M, Low JHS, Zheng H, Ballantyne JC. ***Epidural pain relief versus systemic opioid-based pain relief for abdominal aortic surgery.*** Cochrane Database of Systematic Reviews 2012, Issue 7. Art. No.: CD005059. DOI: 10.1002/14651858.CD005059.pub3.
3. The authors performed a **meta-analysis** and found that **epidural analgesia overall provided superior postoperative analgesia compared with intravenous patient-controlled analgesia**. The National Library of Medicine's PubMed database was searched for the time period 1966 to August 4, 2004. The full article of each of the 299 abstracts was then reviewed by one of the authors for inclusion into the meta-analysis. There were a total of **1,625 patients randomly assigned to epidural analgesia and 1,583 patients to intravenous PCA.** A total of 251 articles	Wu CL, Cohen SR, Richman JM et al ***Efficacy of postoperative patient-controlled and continuous infusion epidural analgesia versus intravenous patient-controlled analgesia with opioids: a meta-analysis.***

were rejected for the following reasons: 235 were not comparisons of postoperative epidural analgesia versus intravenous PCA as defined in the Materials and Methods, 2 were not randomized, 4 did not report usable VAS or numeric pain scores, and 10 included pediatric subjects. **For all types of surgery and pain assessments, all forms of epidural analgesia** (both continuous epidural infusion and patient-controlled epidural analgesia) **provided significantly superior postoperative analgesia compared with intravenous patient-controlled analgesia, with the exception of hydrophilic opioid-only epidural regimens.** Compared with intravenous PCA, the **epidural group had a lower incidence of nausea–vomiting and sedation but a higher incidence of pruritus, urinary retention, and motor block**. When comparing CEI with PCEA, CEI provided statistically significantly superior analgesia ($P < 0.001$) versus PCEA for overall pain, pain at rest, and pain with activity; however, patients receiving CEI had a significantly higher incidence of nausea–vomiting and motor block but lower incidence of pruritus. Within the epidural group, the majority of the subjects with motor block received CEI. In summary, almost without exception, epidural analgesia, regardless of analgesic agent, epidural regimen, and type and time of pain assessment, provided superior postoperative analgesia compared to intravenous patient-controlled analgesia.	Anesthesiology 103(5): 1079–88 (2005)
4. Gastrointestinal paralysis, nausea and vomiting, and pain, are major clinical problems following abdominal surgery. Anaesthetic and analgesic techniques that reduce pain and postoperative nausea and vomiting (PONV), and prevent or reduce postoperative ileus, may reduce postoperative morbidity, duration of hospitalisation and hospital costs. To **compare effects of postoperative epidural local anaesthetic with regimens based on systemic or epidural opioids, on postoperative gastrointestinal function, postoperative pain, PONV and surgical/anaesthetic complications.** Trials were identified by computerised searches of the Cochrane Controlled Trials Register,MEDLINE, EMBASE and by checking the reference lists of trials and review articles. Randomised controlled trials comparing the effects of postoperative epidural local anaesthetic with systemic or epidural opioids. Collected data included treatment in active (local anaesthetic) and control (opioid based) groups, time to first postoperative stool, time to first postoperative flatus, gastric emptying measured by the paracetamol absorption test, duration of the passage of barium sulphate, pain assessments, use of supplementary analgesics, nausea, vomiting and surgical/anaesthetic complications. **The 22 studies included in this review consisted of a total of 1023 patients: 378 in the treatment groups, 645 in the control groups.** All patients have had an **intra abdominal operation, the surgical procedure included: "colonic or rectal surgery", hysterectomy, cesarean section, "major abdominal surgery", cholecystectomy, abdominal surgery, abdominal aortic surgery and "major abdominal gynaecological surgery"**. Most studies in this review involved a small number of patients. Furthermore half of the studies indicated a poor level of methodology in particular regarding blinding and report of withdrawals. Heterogeneity of included studies was substantial. Results consistently showed **reduced time to return of gastrointestinal function in the epidural local anaesthetic group compared with groups receiving systemic or epidural opioid (37 hours and 24 hours, respectively). Postoperative pain was comparable.** Two studies compared the effect of epidural local anaesthetic with a combination of epidural local anaesthetic and opioid on gastrointestinal function. One study favoured epidural local anaesthetic and one study was indifferent.	Jørgensen H, Wetterslev J, Møiniche S, Dahl JB. ***Epidural local anaesthetics versus opioid-based analgesic regimens for postoperative gastrointestinal paralysis, PONV and pain after abdominal surgery.*** Cochrane Database of Systematic Reviews 2001, Issue 1. Art. No.: CD001893. DOI: 10.1002/14651858.CD001893.

A meta analysis of five of eight studies comparing the effect of epidural local anaesthetic with a combination of epidural local anaesthetic and opioid on postoperative pain, yielded a reduction in VAS pain scores (0-100 mm) on the first postoperative day of 15 mm, in favour of the combination. **No significant differences in PONV were observed between epidural local anaesthetic and opioid based regimens.** Authors' conclusions: Administration of **epidural local anaesthetics to patients undergoing laparotomy reduce gastrointestinal paralysis compared with systemic or epidural opioids, with comparable postoperative pain relief**. **Addition of opioid to epidural local anaesthetic may provide superior postoperative analgesia compared with epidural local anaesthetics alone**. **The effect of additional epidural opioid on gastrointestinal function is so far unsettled**. Randomized, controlled trials comparing the effect of combinations of epidural local anaesthetic and opioid with epidural local anaesthetic alone on postoperative gastrointestinal function and pain are warranted.	
5. Epidural analgesia (EA) with local anaesthetic is considered to play a key role after colorectal surgery. However, its effect on postoperative recovery is still a matter of debate. A systematic review of randomized controlled trials **comparing postoperative EA and parenteral opioid analgesia after colorectal surgery** was performed. The effect on postoperative recovery was evaluated in terms of **length of hospital stay, pain intensity, duration of postoperative ileus, incidence of postoperative complications and side-effects.** Sixteen studies were finally selected that included only patients having colorectal surgery, **406 in the EA group** and **400 in the parenteral opioid (control) group**. Results: **Sixteen trials published between 1987 and 2005 were included**. **EA significantly reduced pain scores and duration of ileus** (weighted mean difference −1.55 (95 per cent confidence interval (c.i.) −2.27 to −0.84) days). On the other hand, it was associated with a **significant increase in the incidence of pruritus** (odds ratio (OR) 4.8 (95 per cent c.i. 1.3 to 17.0)), **urinary retention** (OR 4.3 (1.2 to 15.9)) **and arterial hypotension** (OR 13.5 (4.0 to 57.7)). **EA did not influence duration of hospital stay. Despite improved analgesia and a decrease in ileus, EA has some adverse effects and does not shorten the duration of hospital stay after colorectal surgery.**	Marret E, Remy C & Bonnet F. ***Meta-analysis of epidural analgesia versus parenteral opioid analgesia after colorectal surgery.*** Br J Surg 94(6): 665–73 (2007)
6. To review the **impact of epidural vs systemic analgesia on postoperative pulmonary complications**. Search of databases (1966 to March 2006) and bibliographies. Inclusion criteria were randomized comparison of epidural vs systemic analgesia lasting 24 hours or longer postoperatively and reporting of pulmonary complications, lung function, or gas exchange. **Fiftyeight trials (5904 patients) were included.** Articles were reviewed and data extracted. Data were combined using fixed-effect and random-effects models. **The odds of pneumonia were decreased with epidural analgesia** (odds ratio [OR], 0.54; 95% confidence interval [CI], 0.43-0.68), **independent of site of surgery or catheter insertion, duration of analgesia, or regimen**. The effect was weaker in trials that used patient-controlled analgesia in controls (OR, 0.64; 95% CI, 0.49-0.83) compared with trials that did not (OR, 0.30; 95% CI, 0.18-0.49) and in larger studies (OR, 0.62; 95% CI, 0.47-0.81) compared with smaller studies (OR, 0.37; 95% CI, 0.23-0.58). **From 1971-2006, the incidence of pneumonia with epidural analgesia remained about 8% but decreased from 34% to 12% with systemic analgesia (P<.001);** consequently, the relative benefit of epidural analgesia decreased also. **Epidural analgesia reduced the need for prolonged (>24h) ventilation or reintubation, improved**	Popping DM, Elia N, Marret E et al ***Protective effects of epidural analgesia on pulmonary complications after abdominal and thoracic surgery: a meta-analysis.*** Arch Surg 143(10): 990–9 (2008)

lung function and blood oxygenation, and increased the risk of hypotension, urinary retention, and pruritus. Technical failures occurred in 7%. **Conclusion: Epidural analgesia protects against pneumonia following abdominal or thoracic surgery, although this beneficial effect has lessened over the last 35 years because of a decrease in the baseline risk.**	
7. Pulmonary dysfunction commonly occurs following coronary artery bypass graft (CABG) surgery, increasing morbidity and mortality. We hypothesized that **thoracic epidural anesthesia (TEA) would improve pulmonary function and would decrease complications in patients undergoing CABG surgery**. This **prospective, randomized, controlled trial** was conducted with Ethics Board approval. **Fifty patients, undergoing CABG surgery, were randomized to the epidural group or to the patient-controlled analgesia morphine group**. Patients in the epidural group received a **high, thoracic epidural, preoperatively**. Intraoperatively, 0.75% ropivacaine was infused, followed postoperatively, by 0.2% ropivacaine for 48 hr. Outcome measurements included: **visual analogue pain scores; spirometry; atelectasis scores on chest radiographs; and the incidence of atrial fibrillation.** Results: Twenty-five patients were enrolled in each group. **Patients in the epidural group had significantly less pain on the operative day, and for the subsequent two days.** Compared to baseline, **the forced expiratory volume in one second was significantly higher in the epidural group, on the first and second postoperative days** (43.7 ± 12.2% vs 36.4 ± 12.0%, p < 0.002, and 43.3 ± 12.5% vs 38.4 ± 11.0%, p <0.05). **There was significantly more atelectasis in the control group, four hours postoperatively (p < 0.04); however, on the third, postoperative day, the groups were similar with regards to this outcome**. **The incidence of atrial fibrillation was similar in both groups**, and there were **no complications related to the epidural**. Conclusions: High TEA decreases postoperative pain and atelectasis and improves pulmonary function in patients undergoing CABG surgery. Our results support the use of TEA in this group of patients.	Tenenbein PK, Debrouwere R, Maguire D et al ***Thoracic epidural analgesia improves pulmonary function in patients undergoing cardiac surgery.*** Can J Anaesth 55(6): 344–50 (2008)
8. Perioperative thoracic epidural analgesia reduces stress response and pain scores and may improve outcome after cardiac surgery. This prospective, randomized trial was designed **to compare the effectiveness of patient-controlled thoracic epidural analgesia with patient-controlled analgesia with intravenous morphine on postoperative hospital length of stay and patients' perception of their quality of recovery after cardiac surgery**. **One hundred thirteen patients** undergoing **elective cardiac surgery were randomly** assigned to receive either **combined thoracic epidural analgesia and general anesthesia followed by patient-controlled thoracic epidural analgesia or general anesthesia followed by to patient-controlled analgesia with intravenous morphine**. Postoperative length of stay, time to eligibility for hospital discharge, pain and sedation scores, degree of ambulation, lung volumes, and organ morbidities were evaluated. A validated quality of recovery score was used to measure postoperative health status. Results: **Length of stay and time to eligibility for hospital discharge were similar between the groups**. Study groups differed neither in postoperative global quality of recovery score nor in five dimensions of quality of recovery score. **Time to extubation was shorter (P<0.001) and consumption of anesthetics was lower in the patient-controlled thoracic epidural analgesia group. Pain relief, degree of sedation, ambulation, and lung volumes were similar between the study groups.** There was a **trend for lower incidences of**	Hansdottir V, Philip J, Olsen MF et al ***Thoracic epidural versus intravenous patient-controlled analgesia after cardiac surgery: a randomized controlled trial on length of hospital stay and patientperceived quality of recovery.*** Anesthesiology 104(1): 142–51 (2006)

pneumonia (P<0.085) and confusion (P<0.10) in the patient-controlled thoracic epidural analgesia group, whereas cardiac, renal, and neurologic outcomes were similar between the groups. Conclusions: In elective cardiac surgery, thoracic epidural analgesia combined with general anesthesia followed by patient-controlled thoracic epidural analgesia offers no major advantage with respect to hospital length of stay, quality of recovery, or morbidity when compared with general anesthesia alone followed by to patient-controlled analgesia with intravenous morphine.	
9. High thoracic epidural anesthesia/analgesia (HTEA) for coronary artery bypass grafting (CABG) surgery may have myocardial protective effects. In this prospective randomized controlled study, we investigated the effect of HTEA for elective CABG surgery on the **release of troponin I, time to tracheal extubation, and analgesia**. **120 patients were randomized** to 2 groups of 60 from December 1999 to March 2002 – a general anesthesia (GA) group or a GA plus HTEA group. The GA group received fentanyl (7–15 mkg/kg) and a morphine infusion. The HTEA group received fentanyl (5–7 mkg/kg) and an epidural infusion of ropivacaine 0.2% and fentanyl 2 mkg/ml until postoperative Day 3. **There were no differences in troponin I levels between study groups. The time to tracheal extubation** [median (interquartile range)] **in the HTEA group was 15 min** (10–320 min), **compared with 430 min** (284–590 min) **in the GA group (P<0.0001). Analgesia was improved in the HTEA group compared with the GA group**. **Mean arterial blood pressure post sternotomy and systemic vascular resistance in the intensive care unit were lower in the HTEA group**. We conclude that HTEA for CABG surgery had no effect on troponin release but improved postoperative analgesia and was associated with a reduced time to extubation.	Barrington MJ, Kluger R, Watson R et al ***Epidural anesthesia for coronary artery bypass surgery compared with general anesthesia alone does not reduce biochemical markers of myocardial damage.*** Anesth Analg 100(4): 921–8 (2005)
10. Perioperative central neuraxial analgesia may improve outcome after coronary artery bypass surgery due to attenuation of stress response and superior analgesia. MEDLINE and other databases were searched for randomized controlled trials in patients undergoing coronary artery bypass surgery with cardiopulmonary bypass who were randomized to either general anesthesia (GA) versus general anesthesia–thoracic epidural analgesia (TEA) or general anesthesia–intrathecal analgesia (IT). Results: **Fifteen trials enrolling 1,178 patients were included** for TEA analysis. **TEA did not affect incidences of mortality** (0.7% TEA vs. 0.3% GA) **or myocardial infarction** (2.3% TEA vs. 3.4% GA). **TEA significantly reduced the risk of dysrhythmias with an odds ratio of 0.52, pulmonary complications with an odds ratio of 0.41, and time to tracheal extubation by 4.5 h and reduced analog pain scores at rest by 7.8 mm and with activit by 11.6 mm. Seventeen trials enrolling 668 patients were included for IT analysis. IT had no significant effect on incidences of mortality** (0.3% IT vs. 0.6% GA), **myocardial infarction** (3.9% IT vs. 5.7% GA), **dysrhythmias** (24.8% vs. 29.1%), **nausea/vomiting** (31.3% vs. 28.5%), **or time to tracheal extubation** (10.4 h IT vs. 10.9 h GA). IT modestly decreased systemic morphine use by 11 mg and decreased pain scores by 16 mm. **IT significantly increased the incidence of pruritus** (10% vs. 2.5%). Conclusions: There were no differences in the rates of mortality or myocardial infarction after coronary artery bypass grafting with central neuraxial analgesia. There were associated improvements in faster time until tracheal extubation, decreased pulmonary complications and cardiac dysrhythmias, and reduced pain scores.	Liu SS, Block BM & Wu CL. ***Effects of perioperative central neuraxial analgesia on outcome after coronary artery bypass surgery: a meta-analysis.*** Anesthesiology 101(1): 153–61 (2004)
11. The most recent systematic review and meta-analysis comparing the analgesic efficacy and side effects of paravertebral	Ding X, Jin S, Niu X, Ren H, Fu S, et al.

and epidural blockade for thoracotomy was published in 2006. Nine well-designed randomized trials with controversial results have been published since then. The present report constitutes an updated meta-analysis of this issue. Thoracotomy is a major surgical procedure and is associated with severe postoperative pain. **Epidural analgesia is the gold standard for post-thoracotomy pain management, but has its limitations and contraindications, and paravertebral blockade is increasingly popular.** However, it has not been decided whether the analgesic effect of the two methods is comparable, or whether paravertebral blockade leads to a lower incidence of adverse side effects after thoracotomy. Two reviewers independently searched the databases PubMed, EMBASE, and the Cochrane Library (last performed on 1 February, 2013) for reports of studies comparing post-thoracotomy epidural analgesia and paravertebral blockade. The same individuals independently extracted data from the appropriate studies. **Eighteen trials involving 777 patients were included** in the current analysis. There was **no significant difference in pain scores** between paravertebral blockade and epidural analgesia at 4–8, 24, 48 hours**, and the rates of pulmonary complications and morphine usage during the first 24 hours were also similar.** However, **paravertebral blockade was better than epidural analgesia in reducing the incidence of urinary retention** ($p<0.0001$), **nausea and vomiting** ($p = 0.01$)**, hypotension** ($p<0.00001$), **and rates of failed block were lower in the paravertebral blockade group** ($p = 0.01$). This meta-analysis showed that **PVB can provide comparable pain relief to traditional EPI, and may have a better side-effect profile for pain relief after thoracic surgery.** Further high-powered randomized trials are to need to determine whether PVB truly offers any advantages over EPI.	***A Comparison of the Analgesia Efficacy and Side Effects of Paravertebral Compared with Epidural Blockade for Thoracotomy: An Updated Meta-Analysis.*** PLoS ONE 9(5): e96233. doi: 10.1371/journal.pone.0096233 (2014)
12. Though once considered the gold standard, **epidural anaesthesia has complications that may be significant and include hypotension, urinary retention, partial or patchy block and, in rare cases, devastating neurological injuries also.** Paravertebral block (PVB) is an alternative technique for unilateral surgical procedures like thoracotomy, which may offer similar analgesic effectiveness and a more favourable sideeffect profile than epidural analgesia. This systematic review and meta-analysis of published randomized clinical trials aims to compare thoracic paravertebral with thoracic epidural analgesia (TEA) in thoracotomy for lung surgery. **541 patients from 12 clinical trials have been included** in this systematic review and meta-analysis. We found that **visual analogue scale (VAS) scores at rest and during activity/coughing at 4–8, 24 and 48 h postoperatively were similar in both the PVB and TEA groups.** Considering studies not included in the previous meta-analysis, a VAS score on activity at 48 h is significantly better in the PVB group (mean difference 0.40 cm; 95% confidence interval [95% CI] 0.77, 0.02; Mantel-Haenszel (M-H) fixed). **Hypotension** (odds ratio 0.13; 95% CI 0.06, 0.31; M-H fixed) **and urinary retention are more common in the epidural analgesia group.** So, we conclude that thoracic PVB may be as effective as thoracic epidural analgesia for post-thoracotomy pain relief and is also associated with fewer complications.	Baidya DK, Khanna P, Maitra S. ***Analgesic efficacy and safety of thoracic paravertebral and epidural analgesia for thoracic surgery: a systematic review and meta-analysis.*** Interactive CardioVascular and Thoracic Surgery 18 (2014) 626–636
13. A best evidence topic in cardiac surgery was written according to a structured protocol. The question addressed was: **in patients undergoing thoracic surgery is paravertebral block (PVB) as effective as epidural analgesia for pain management?** A **systematic review** of data between 1966 and May 2004. Altogether **184 papers** were found **(included 1482 patients)** using the reported search, seven of which represented the best evidence to answer the clinical question. All studies agreed that	Scarci M, Joshi A, Attia R. ***In patients undergoing thoracic surgery is paravertebral block as effective as epidural analgesia for pain management?*** Interactive CardioVascular

PVB is at least as effective as epidural analgesia for pain control post-thoracotomy. In one paper, the visual analogue pain score (VAS) at rest and on cough was significantly lower in the paravertebral group (*P*=0.02 and 0.0001, respectively). **Pulmonary function,** as assessed by peak expiratory flow rate (PEFR), **was significantly better preserved in the paravertebral group.** The lowest PEFR as a fraction of preoperative control was 0.73 in the paravertebral group in contrast with 0.54 in the epidural group (*P*<0.004). **Oximetric recordings were better in the paravertebral group (96%) compared to the epidural group (95%) (*P*=0.0001).** Another article reported that **statistically significant differences (forced vital capacity** 46.8% for PVB and 39.3% for epidural group *P*<0.05; **forced expiratory volume in 1 s** (FEV1) 48.4% in PVB group and 35.9% in epidural group, *P*<0.05) **were reached in day 2 and continued until day 3.** Plasma **concentrations of cortisol,** as marker of postoperative stress, **increased markedly in both groups, but the increment was statistically different in favour of the paravertebral group** (*P*=0.003). **Epidural block was associated with frequent side-effects urinary retention** (42%), **nausea** (22%), **itching** (22%) and **hypotension** (3%) and, **rarely, respiratory depression** (0.07%). Additionally, **it prolonged operative time and was associated with technical failure or displacement** (8%). **Epidurals were also related to a higher complication rate (atelectasisypneumonia) compared to the PVB (2 vs. 0). PVB was found to be of equal efficacy to epidural anaesthesia, but with a favourable side effect profile, and lower complication rate.** The reduced rate of complication was most marked for pulmonary complications and is accompanied by quicker return to normal pulmonary function. We conclude intercostal analgesia, in the form of PVB, can be at least as effective as epidural analgesia.	and Thoracic Surgery 10 (2010) 92–96
14. Total knee replacement (TKR) is a common and often painful operation. **Femoral nerve block (FNB) is frequently used for postoperative analgesia.** To evaluate the benefits and risks of FNB used as a postoperative analgesic technique relative to other analgesic techniques among adults undergoing TKR. We searched the Cochrane Central Register of Controlled Trials (CENTRAL) 2013, Issue 1, MEDLINE, EMBASE, CINAHL, Web of Science, dissertation abstracts and reference lists of included studies. The date of the last search was 31 January 2013. We included randomized controlled trials **(RCTs) comparing FNB with no FNB (intravenous patient-controlled analgesia (PCA) opioid, epidural analgesia, local infiltration analgesia, and oral analgesia) in adults after TKR. We also included RCTs that compared continuous versus single-shot FNB.** Two review authors independently performed study selection and data extraction. We undertook meta-analysis (random-effects model) and used relative risk ratios (RRs) for dichotomous outcomes andmean differences (MDs) or standardized mean differences (SMDs) for continuous outcomes. We interpreted SMDs according to rule of thumb where 0.2 or smaller represents a small effect, 0.5 a moderate effect and 0.8 or larger, a large effect. **We included 45 eligible RCTs (2710 participants)** from 47 publications; 20 RCTs had more than two allocation groups. A total of 29 RCTs compared FNB (with or without concurrent treatments including PCA opioid) versus PCA opioid, 10 RCTs compared FNB versus epidural, five RCTs compared FNB versus local infiltration analgesia, one RCT compared FNB versus oral analgesia and four RCTs compared continuous versus single-shot FNB. Most included RCTs were rated as low or unclear risk of bias for the aspects rated in the risk of bias assessment tool, except for the aspect of	Chan EY, Fransen M, Parker DA, Assam PN, Chua N. ***Femoral nerve blocks for acute postoperative pain after knee replacement surgery.*** CochraneDatabase of Systematic Reviews 2014, Issue 5. Art.No.: CD009941.DOI: 10.1002/14651858.CD009941.pub2.

blinding. We rated 14 (31%) RCTs at high risk for both participant and assessor blinding and rated eight (18%) RCTs at high risk for one blinding aspect. **Pain at rest and pain on movement were less for FNB (of any type) with or without a concurrent PCA opioid compared with PCA opioid alone during the first 72 hours post operation.** Pooled results demonstrated a **moderate effect of FNB for pain at rest at 24 hours** (19 RCTs, 1066 participants, SMD -0.72, 95% CI -0.93 to -0.51, moderate-quality evidence) and **a moderate to large effect for pain on movement at 24 hours** (17 RCTs, 1017 participants, SMD -0.94, 95% CI -1.32 to -0.55, moderate-quality evidence). **Pain was also less in each FNB subgroup:** single-shot FNB, continuous FNB and continuous FNB + sciatic block, compared with PCA. **FNB also was associated with lower opioid consumption (IV morphine equivalent) at 24 hours** (20 RCTs, 1156 participants, MD -14.74 mg, 95% CI -18.68 to -10.81 mg, high-quality evidence) **and at 48 hours** (MD -14.53 mg, 95% CI -20.03 to -9.02 mg), **lower risk of nausea and/or vomiting** (RR 0.47, 95% CI 0.33 to 0.68, number needed to treat for an additional harmful outcome (NNTH) four, high-quality evidence), **greater knee flexion** (11 RCTs, 596 participants, MD 6.48 degrees, 95% CI 4.27 to 8.69 degrees, moderatequality evidence) **and greater patient satisfaction** (four RCTs, 180 participants, SMD 1.06, 95% CI 0.74 to 1.38, low-quality evidence) **compared with PCA**. **We could not demonstrate a difference in pain between FNB (any type) and epidural analgesia in the first 72 hours post operation, including pain at 24 hours at rest** (six RCTs, 328 participants, SMD -0.05, 95% CI -0.43 to 0.32, moderate-quality evidence) **and on movement** (six RCTs, 317 participants, SMD 0.01, 95% CI -0.21 to 0.24, high-quality evidence). **No difference was noted at 24 hours for opioid consumption** (five RCTs, 341 participants, MD -4.35 mg, 95% CI -9.95 to 1.26 mg, high-quality evidence) **or knee flexion** (six RCTs, 328 participants, MD -1.65, 95% CI -5.14 to 1.84, high-quality evidence). However, **FNB demonstrated lower risk of nausea/vomiting** (four RCTs, 183 participants, RR 0.63, 95% CI 0.41 to 0.97, NNTH 8, moderate-quality evidence) **and higher patient satisfaction** (two RCTs, 120 participants, SMD 0.60, 95% CI 0.23 to 0.97, low-quality evidence), **compared with epidural analgesia**. **Pooled results of four studies (216 participants) comparing FNB with local infiltration analgesia detected no difference in analgesic effects between the groups at 24 hours for pain at rest** (SMD 0.06, 95% CI -0.61 to 0.72, moderate-quality evidence) **or pain on movement** (SMD 0.38, 95% CI -0.10 to 0.86, low-quality evidence). Only one included RCT compared FNB with oral analgesia.We considered this evidence insufficient to allow judgement of the effects of FNB compared with oral analgesia. **Continuous FNB provided less pain compared with single-shot FNB** (four RCTs, 272 participants) **at 24 hours at rest** (SMD - 0.62, 95% CI -1.17 to -0.07, moderate-quality evidence) **and on movement** (SMD -0.42, 95% CI -0.67 to -0.17, high quality evidence). **Continuous FNB also demonstrated lower opioid consumption compared with single-shot FNB at 24 hours** (three RCTs, 236 participants, MD -13.81 mg, 95% CI -23.27 to -4.35 mg, moderate-quality evidence). Generally, the meta-analyses demonstrated considerable statistical heterogeneity,with type of FNB, allocation concealment and blinding of participants, personnel and outcome assessors reducing heterogeneity in the analyses. Available evidence was insufficient to allow determination of the comparative safety of the various analgesic techniques. Few RCTs reported on serious adverse effects such as neurological injury, postoperative falls or thrombotic events. **Following TKR, FNB** (with or without	

concurrent treatments including PCA opioid) **provided more effective analgesia than PCA opioid alone, similar analgesia to epidural analgesia and less nausea/vomiting compared with PCA alone or epidural analgesia.** The review also found that **continuous FNB provided better analgesia compared with single-shot FNB.** RCTs were insufficient to allow definitive conclusions on the comparison between FNB and local infiltration analgesia or oral analgesia.	
15. Pain after total knee arthroplasty is severe and impacts functional recovery. We performed a retrospective study, **comparing conventional patient control analgesia** (PCA) **modalities versus continuous femoral nerve blockade** (CFNB) for **1582 post-TKA** (total knee arthroplasty) **patients.** Using our electronic acute pain service (APS) database, we reviewed the data of 579 patients who had received CFNBs compared with 1003 patients with intravenous PCA over 4 years. **Our results show that the incidence of a severe pain episode was higher in the PCA compared with the CFNB group.** Lower pain scores were observed in the CFNB group compared with the PCA group from postoperative day (POD) 1 to 3, primarily due to lower rest pain scores in the CFNB group. Our study shows that **there is improvement in pain scores, at rest and on movement, as well as a reduction in incidence of severe pain, in patients who receive CFNB versus those who receive intravenous PCA.**	Lee RM, Tey JBL, Chua NHL. ***Postoperative pain control for total knee arthroplasty: continuous femoral nerve block versus intravenous patient controlled analgesia.*** Anesth Pain. 2012;1(4):239-42. DOI: 10.5812/aapm.3404
16. Because postoperative pain after total knee replacement (TKR) can be severe, we compared the **analgesic efficacy of continuous femoral nerve blockade** (CFNB) **and continuous epidural analgesia (CEA) after TKR in this prospective randomized trial.** Patients undergoing TKR under spinal anesthesia were randomized to receive either a **femoral infusion of bupivacaine 0.2%** (median infusion rate 9.3 mL/h) (*n*=53) **or an epidural infusion of ropivacaine 0.2% with fentanyl 4 mkg/mL** (median infusion rate 7.6 mL/h) (*n*=55). Adjuvant analgesics were **oral rofecoxib and oxycodone and IV morphine.** Pain, nausea and vomiting, hypotensive episodes, motor block, range of knee movement, and rehabilitation milestones were assessed postoperatively. **There were equivalent pain scores, range of movement, and rehabilitation in both groups. There was significantly less nausea and vomiting in the CFNB group** (*P*<0.002). **The CFNB group received more rofecoxib** (*P*<0.04) **and oxycodone** (*P*<0.005) **than the CEA group. The operative limb displayed more motor block than the nonoperative limb in both groups at the level of the hip and knee for up to 48 h** (*P*<0.05, Mann-Whitney *U*-test), **but there was no difference between groups in the nonoperative limb.** CFNB is an effective regional component of a multimodal analgesic strategy after TKR.	Barrington MJ, Olive D, Low K. ***Continuous femoral nerve blockade or epidural analgesia after total knee replacement: a prospective randomized controlled trial.*** ANESTH ANALG. 2005;101:1824–9
17. This meta-analysis was designed to **systematically analyse** all published studies **comparing local anaesthetic infiltration with wound catheters and epidural catheters in open liver resection.** A literature search was performed using the Cochrane Colorectal Cancer Group Controlled Trials Register, the Cochrane Central Register of Controlled Trials in the Cochrane Library, MEDLINE, Embase and Science Citation Index Expanded. Randomized trials, and prospective and retrospective studies comparing wound catheters with epidural catheters were included. Statistical analysis was performed using Review Manager Version 5.2 software. The primary outcome measures were pain scores in the post-operative period operation. Secondary outcome measures were hospital stay, time to opening bowels, overall complications and analgesia-specific complications. **Four studies including 705 patients were included in the analysis**. **The pain scores**	Bell R, Pandanaboyana S, Prasad KR. ***Epidural versus local anaesthetic infiltration via wound catheters in open liver resection: a meta-analysis.*** ANZ Journal of Surgery 2014: epub

were significantly lower in those patients with epidural on the first postoperative day (POD) (mean difference of −0.90 [−1.29, −0.52], Z = 4.61) (*P* < 0.00001) **with comparable pain scores on PODs 2 and 3.** There was **no significant difference in the time to opening bowels, opioid use and hospital stay between the techniques. The post-operative complication rate was higher in the epidural group** (risk ratio 1.40 [1.07, 1.83]; χ2 = 0.60, df = 1) (*P* = 0.44); I2 = 0%; Z = 2.42 (*P* = 0.02). **Local anaesthetic infiltration via wound catheters combined with patient-controlled opiate analgesia provides comparable pain relief to epidural catheters except for the first POD**. **Both techniques are associated with similar hospital stay and opioid use with wound catheters associated with lower complication rate.**	
18. In recent years, there has been an increasing interest in local infiltration analgesia (LIA) as a technique to control postoperative pain. We conducted a systematic review of randomized clinical trials investigating LIA for total knee arthroplasty (TKA) and total hip arthroplasty (THA) to evaluate the analgesic efficacy of LIA for early postoperative pain treatment. In addition, the analgesic efficacy of wound catheters and implications for length of hospital stay (LOS) were evaluated. **Twenty-seven randomized controlled trials in 756 patients operated on with THA and 888 patients operated on with TKA** were selected for inclusion in the review. **In THA, no additional analgesic effect of LIA compared with placebo was reported** in trials with low risk of bias when a multimodal analgesic regimen was administered perioperatively. **Compared with intrathecal morphine and epidural analgesia, LIA was reported to have similar or improved analgesic efficacy.** In TKA, most trials reported **reduced pain and reduced opioid requirements with LIA compared with a control group treated with placebo/no injection**. **Compared with femoral nerve block, epidural or intrathecal morphine LIA provided similar or improved analgesia in the early postoperative period but most trials had a high risk of bias due to different systemic analgesia between groups. Overall, the use of wound catheters for postoperative administration of local anaesthetic was not supported in the included trials, and LOS was not related to analgesic efficacy**. Despite the many studies of LIA, **final interpretation is hindered by methodological insufficiencies in most studies**, especially because of differences in use of systemic analgesia between groups. **However, LIA provides effective analgesia in the initial postoperative period after TKA in most randomized clinical trials even when combined with multimodal systemic analgesia. In contrast, LIA may have limited additional analgesic efficacy in THA when combined with a multimodal analgesic regimen**. **Postoperative administration of local anaesthetic in wound catheters did not provide additional analgesia when systemic analgesia was similar and LOS was not related to use of LIA with a fast-track set-up.**	Andersen LØ, Kehlet H. ***Analgesic efficacy of local infiltration analgesia in hip and knee arthroplasty: a systematic review.*** British Journal of Anaesthesia 113 (3): 360–74 (2014)
19. This review evaluated the **efficacy of continuous wound catheters in delivering local anaesthetic in postoperative analgesia**. Continuous wound catheters were found to improve analgesia, reduce opioid use and side-effects, increase patient satisfaction and reduce hospital stay. However, these conclusions should be viewed with some degree of caution due to the heterogeneity of the included studies. MEDLINE and the Cochrane Central Register of Controlled Trials were searched from 1 January 1966 to 19 February 2006. Search terms were reported. There were no language restrictions. Randomised controlled trials (RCTs) of adults (older than 18 years) who had undergone surgery in	Liu S S, Richman J M, Thirlby R C, Wu C L. ***Efficacy of continuous wound catheters delivering local anesthetic for postoperative analgesia: a quantitative and qualitative systematic review of randomized controlled trials.*** Journal of the American

which continuous wound catheters were placed into the operative field by a surgeon were eligible for inclusion. Included trials had to report pain scores or opioid consumption. The participants in the included trials had undergone a variety of operations and catheters were placed at a variety of sites. **The outcomes pain score (using the visual analogue score) with and without activity, opioid rescue during infusion period, opioid use, post-operative nausea and vomiting (PONV), patients rating satisfaction as excellent and length of hospital stay were reported.** Quantitative **systematic review (44 RCTs, n=2,141 participants)**. Results for all surgical groups combined: Pain scores: The **use of continuous wound catheters was associated with a significant decrease in visual analogue scores for pain at rest** (weighted mean difference -10mm, 95% CI: -13, -7, p<0.001, n=1,814 patients) **and in visual analogue score for pain with activity** (weighted mean difference -22mm, 95% CI: -32, -13, p<0.001, n=794 patients) **compared to control.** Substantial **statistical heterogeneity** was found (I^2=85.3%). Opioid use: The **percentage of patients with need for opioid rescue during the infusion period was significantly reduced in the continuous wound catheter group compared to control** (odds ratio 0.15, 95% CI: 0.08, 0.29, p<0.001, n=411 patients). **Opioid use per day was also significantly reduced in the continuous wound catheter group compared to control** (weighted mean difference -11mg, 95% CI: -14, -7, p<0.001, n=1,637 patients) Substantial **statistical heterogeneity was found** (I^2=99.1%) Post-operative nausea and vomiting: The percentage of patients that experienced **post-operative nausea and vomiting was significantly reduced in the continuous wound catheter group compared to control** (odds ratio 0.45, 95% CI: 0.3, 0.68, p<0.001, n=614 patients). Satisfaction rating: The percentage of **patients rating as excellent was significantly greater in the continuous wound catheter group compared to control** (odds ratio 7.7, 95% CI: 1.8, 34, p=0.007, n=209 patients). Length of hospital stay: The **number of days of hospital stay was significantly reduced in the continuous wound catheter group compared to control** (odds ratio -1 (95% CI: -2, -0.3, p=0.04, n=753 patients). Further subgroup analyses were reported for the quantitative review. Continuous wound catheters can confer several benefits, including improved analgesia, reduced opioid use and side-effects, increased patient satisfaction and reduced hospital stay.	College of Surgeons 2006; 203(6): 914-932
20. The **transversus abdominis plane (TAP) block** is a peripheral nerve block which anaesthetises the abdominal wall. The increasing use of TAP block, as a form of pain relief after abdominal surgery warrants evaluation of its effectiveness as an adjunctive technique to routine care and, when compared with other analgesic techniques. To assess effects of TAP blocks (and variants) on postoperative analgesia requirements after abdominal surgery. We searched specialised registers of Cochrane Anaesthesia and Cochrane Pain, Palliative and Supportive Care Review Groups, CENTRAL, MEDLINE, EMBASE and CINAHL to June 2010. We included randomised controlled trials (RCTs) comparing TAP block or rectus sheath block with: no TAP or rectus sheath block; placebo; systemic, epidural or any other analgesia. At least two review authors assessed study eligibility and risk of bias, and extracted data. We **included eight studies (358 participants),** five assessing TAP blocks, three assessing rectus sheath blocks; with moderate risk of bias overall. **All studies had a background of general anaesthesia in both arms in most cases. Compared with no TAP block or saline placebo, TAP block resulted in significantly less postoperative requirement for**	Charlton S, Cyna AM, Middleton P, Griffiths JD. ***Perioperative transversus abdominis plane (TAP) blocks for analgesia after abdominal surgery.*** Cochrane Database of Systematic Reviews 2010, Issue 12. Art. No.: CD007705. DOI: 10.1002/14651858.CD007705.pub2.

morphine at 24 hours (mean difference (MD) -21.95 mg, 95% confidence interval (CI) -37.91 to 5.96; five studies, 236 participants) **and 48 hours** (MD -28.50, 95% CI -38.92 to -18.08; one study of 50 participants) **but not at two hours** (all random-effects analyses). **Pain at rest was significantly reduced in two studies, but not a third.** Only one of three included studies of rectus sheath blocks found a reduction in postoperative analgesic requirements in participants receiving blocks. One study, assessing number of participants who were pain-free after their surgery, found more participants who received a rectus sheath block to be pain-free for up to 10 hours postoperatively. As with TAP blocks, rectus sheath blocks made no apparent impact on nausea and vomiting or sedation scores. Authors' conclusions: **No studies have compared TAP block with other analgesics such as epidural analgesia or local anaesthetic infiltration into the abdominal wound. There is only limited evidence to suggest use of perioperative TAP block reduces opioid consumption and pain scores after abdominal surgery when compared with no intervention or placebo.** There is no apparent reduction in postoperative nausea and vomiting or sedation from the small numbers of studies to date. Many relevant studies are currently underway or awaiting publication.	
21. Epidural anaesthesia is used extensively for cardiothoracic and vascular surgery in some centres, but not in others, with argument over the safety of the technique in patients who are usually extensively anticoagulated before, during, and after surgery. The principle concern is bleeding in the epidural space, leading to transient or persistent neurological problems. We performed an **extensive systematic review** to find published cohorts of use of epidural catheters during vascular, cardiac, and thoracic surgery, using electronic searching, hand searching, and reference lists of retrieved articles. Results: **Twelve studies included 14,105 patients, of whom 5,026 (36%) had vascular surgery, 4,971 (35%) cardiac surgery, and 4,108 (29%) thoracic surgery. There were no cases of epidural haematoma,** giving maximum risks following epidural anaesthesia in cardiac, thoracic, and vascular surgery of 1 in 1,700, 1 in 1,400 and 1 in 1,700 respectively. **In all these surgery types combined the maximum expected rate would be 1 in 4,700.** In all these patients combined there were **eight cases of transient neurological injury, a rate of 1 in 1,700 (95% confidence interval 1 in 3,300 to 1 in 850).** There were **no cases of persistent neurological injury (maximum expected rate 1 in 4,600).** Conclusion: These estimates for cardiothoracic epidural anaesthesia should be the worst case. Limitations are inadequate denominators for different types of surgery in anticoagulated cardiothoracic or vascular patients more at risk of bleeding.	Ruppen W, Derry S, McQuay HJ et al. ***Incidence of epidural haematoma and neurological injury in cardiovascular patients with epidural analgesia/anaesthesia: systematic review and meta-analysis.*** BMC Anesthesiol 6: 10 (2006)
22. The aim of this meta-analysis was to estimate the incidence of rare but serious problems occurring with epidural analgesia in obstetric practice, namely epidural hematoma, epidural infection, and persistent and transient neurologic injuries. Of the 4 million annual births in the United States, 2.4 million involve epidural analgesia. **Serious adverse events are rare but are important in young women**. Robust estimates for the risk of harm are not available. Data for superficial and deep infections, hematoma, and transient and permanent neurologic injury were obtained from studies reporting adverse events with obstetric epidural analgesia, and incidence presented as individual risk for a woman, number of events per million women, and percentage incidence. **A total of 1.37 million women received an epidural for childbirth, reported in 27 articles. Most information (85% of women) was in larger (> 10,000 women) studies published after	Ruppen W, Derry S, McQuay H et al. ***Incidence of epidural hematoma, infection, and neurologic injury in obstetric patients with epidural analgesia/anesthesia.*** Anesthesiology 105(2): 394–9 (2006)

1990, with risk estimates as follows: epidural hematoma, 1 in 168,000; deep epidural infection, 1 in 145,000; persistent neurologic injury, 1 in 240,000; and transient neurologic injury, 1 in 6,700. Earlier and smaller studies produced significantly higher risk estimates for transient neurologic injury plus injury of unknown duration.	

Ravijuhendid

Kokkuvõte ravijuhendites leiduvast:

We reviewed 1 guideline. The guideline is:

Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine "Acute Pain Management: Scientific Evidence", 2010 (AU-10)

1. For all types of surgery, epidural analgesia provides better postoperative pain relief compared with parental (including PCA) opioid administration (Level I); except epidural analgesia using hydrophilic opioid only (Level I)

2. High thoracic epidural analgesia used for coronary artery bypass graft surgery reduces postoperative pain, risk of dysrhythmias, pulmonary complications and time to extubation when compared with IV opioid analgesia (Level I)

3. Epidural local anaesthetics improve oxygenation and reduce pulmonary infections and other pulmonary complications compared with parenteral opioids (Level I)

4. Continous epidural analgesia was superior to contonius intercostal analgesia following thoracotomy

5. Epidural pethidine produces better pain relief and less sedation than IV pethidine after Caesarean section (Level II)

6. The risk of permanent neurological damage in association with epidural analgesia is very low; the incidence is higher where there have been delays in diagnosing an epidural haematoma or abscess (Level IV)

7. Immediate decompression (within 8 hours of the onset of neurological signs) increases the likelihood of partial or good neurological recovery (Level IV)

8. Compared with opioid analgesia, continuous peropheral nerve blockade (regardless of catheter location) provides better postoperative analgesia and leads to reductions in opioid use as well as nausea, vomiting, pruritus and sedation (Level I)

9. Compared with thoracic epidural analgesia, continuous thoracic paravertebral analgesia results in comparable analgesia but has a better side effect profile (less urinary retention, hypotension, nausea, and vomiting) than epidural analgesia and leads to a lower incidence of postoperative pulmonary complications (Level I)

10. Continuous interscalene analgesia provides better analgesia, reduced opioid-related side effects and improved patient satisfaction compared with IV PCA after open shoulder surgery (Level II)

11. Continuous femoral nerve blockade provides postoperative analgesia that is as effective as epidural analgesia but with fewer side effects following total knee joint replacement surgery (Level II)

12. Femoral nerve block provides better analgesia compared with parenetral opioid-based techniques after total knee arthroplasty (Level I)

A. NÄRVIBLOKADID ÜLAJÄSEME OPERATSIOONIDE KORRAL

Ravijuhendid:

1. Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine "Acute Pain Management: Scientific Evidence." Third Edition 2010 (AU-10)

2. " Behandlung acuter perioperativer und postraumatischer Schmertzen"2009 (DE-09)

AU-10:

1. Compared with opioid analgesia, continuous peripheral nerve blockade (regardless of catheter location) provides better postoperative analgesia and leads to reductions in opioid use as well as nausea, vomiting, pruritus and sedation (Level I). (Richman JM, 2006)
2. Continuous interscalene analgesia provides better analgesia, reduced opioid-related side effects and improved patient satisfaction compared with IV PCA after open shoulder surgery (Level II).

DE-09

Õla ja õlavarre operatsioonid:

3. Õla- ja õlavarre operatsioonide puhust valu tuleb ravida vähemalt ühekordse interskaleense pikatoimelise paikse anesteetikumi annusega.
   (Soovituse tugevus: A)
4. Kui antud meetodit ei saa kasutada või on patsiendil vastunäidustused, tuleb alternatiivina kasutada intravenoosset süsteemselt toimivat tugevatoimelist opioidi.
   Soovituse tugevus: A
5. Operatsioonidel, mille korral esineb valu tugevusega 30 mm (visuaalne analoogskaala, VAS) üle 12 tunni, on pidev kateetermeetod tõhusam kui intravenoosne patsiendi kontrollitav analgeesia (1b)

Mõlema ravijuhendi soovitused põhinevad samadel uuringutel:

Autor, aasta Tõenduse tase	**Patsiendid**	**Ravi**	**Kontroll**	**Tulemus**
Harvey jt, 2004 1b	N = 19, subakromiaalne dekompressioon	Subakromiaalne blokaad, pidev + patsiendi kontrollitud analgeesia ropivakaiiniga	Platseebo	Operatsioonijärgne valu ↓, opioidi vajadus ↔
Ilfeld jt, 2003 1b	N = 20, ambulatoorne rotaatormanseti operatsioon, akromioplastika, subakromiaalne dekompressioon	Interskaleenne blokaad, ühekordne + pidev ropivakaiiniga	Ühekordne süste + kateeter platseeboga	Operatsioonijärgne valu ↓, opioidi vajadus ↓, kõrvaltoimed ↓, unehäired ↓
Borgeat jt, 2000 1b	N = 35, suuremahulised õlaoperatsioonid	Interskaleenne blokaad, pidev patsiendi kontrollitud analgeesia ropivakaiiniga	Pidev intravenoosne manustamine + PCA nikomorfiiniga	Operatsioonijärgne valu ↓, kõrvaltoimed ↓, patsiendi rahulolu ↑
Klein jt, 2000b 1b	N = 40, ambulatoorne rotaatormanseti operatsioon	Interskaleenne blokaad, ühekordne + pidev ropivakaiiniga	Ühekordne süste + kateeter platseebo-ga	Operatsioonijärgne valu ↓
Lehtipalo jt, 1999 1b	N = 30, (kolmeharuline), akromioplastika	Interskaleenne blokaad, pidev	1. Intravenoosne, PCA morfiiniga 2. Intravenoosne ja lihasesisene morfiini manustamine kui VAS > 30 mm	Operatsioonijärgne valu ↓
Borgeat jt, 1998 1b	N = 60, suuremahulised õlaoperatsioonid	Interskaleenne blokaad, pidev + patsiendi kontrollitud analgeesia	Pidev intravenoosne manustamine + PCA	Operatsioonijärgne valu ↓, kõrvaltoimed ↓, patsiendi rahulolu ↑

		ropivakaiiniga	nikomorfiiniga	
Borgeat jt, 1997 1b	N = 40, suuremahulised õlaoperatsioonid	Interskaleenne blokaad, pidev + patsiendi kontrollitud analgeesia bupivakaiiniga	Pidev intravenoosne manustamine + PCA nikomorfiiniga	Operatsioonijärgne valu ↓, kõrvaltoimed ↓, patsiendi rahulolu ↑
Ilfeld jt, 2005b 3b	N = 50, (retrospektiivne), õlaartroplastika	Interskaleenne blokaad, pidev	Närviblokaadita	Liigutuste ulatus esimesel 24 tunnil ↑, operatsioonijärgne valu ↓

Käe ja käeliigeste operatsioonid:

6. Käe ja käeliigeste operatsioonijärgse valuravis on soovitatav kasutada regionaalset analgeesiameetodit.
   Soovituse tugevus: A

Autor, aasta Tõenduse tase	Patsiendid	Ravi	Kontroll	Tulemus
Hadzic jt, 2004 1b	N = 50, ambulatoorne käe- või käeliigese operatsioon	Intraklavikulaarne blokaad + operatsioonijärgne suukaudne opioid	Üldanesteesia + haavainfiltratsioon	Operatsioonijärgne valu ↓, valuravimite vajadus ↓, varane suunamine kodusele ravile, kõrvaltoimed ↓
Mc Cartney jt, 2004 1b	N = 100, ambulatoorne käe või käeliigese operatsioon	Aksillaarne blokaad lidokaiiniga + operatsioonijärgne suukaudne opioid	Üldanesteesia + operatsioonijärgne suukaudne opioid	Operatsioonijärgne valu esimesel 24 tunnil ↓, anesteesiajärgne intensiivravi ↓, varane suunamine kodusele ravile, aeg esimese valuravimi annuseni ↑, operatsioonijärgne iiveldus ja oksendamine ↓

Süstemaatilised ülevaated

Pleksus-analgeesia vs i/v opiaat –
J. M. Richman et al. leiab oma meta-analüüsis, kuhu on hõlmatud 19 artiklit 603 patsiendiga, et igasugune pidev perineuraalne analgeesia, olenemata kateetri asukohast, omab paremat analgeetilist efekti ning võrreldes opiaatidega nii 24, 48 kui 72 tunnil peale operatsiooni (P<0,001). Samuti esineb vähem opioid-sõltuvaid kõrvaltoimeid.

H. Ullah et al. Cochrane´i ülevaateuuringus leiab, et pidev interskaleenne brahiaalpleksuse blokaad omab paremat valuvaigistavat toimet kuni 72 tundi postoperatiivselt võrreldes opiaatidega. Samas hõlmab see ülevaade ainult kaht (keskmise või halva kvaliteediga) uuringut, 147 patsiendiga.

Kokkuvõtte (abstract või kokkuvõtlikum info)	Viide kirjandusallikale
	.
Although most randomized clinical trials conclude that the addition of continuous peripheral nerve blockade (CPNB) decreases postoperative pain and opioid- related side effects when compared with opioids, stud- ies have included relatively small numbers of patients and the majority failed to show statistical significance during all time periods for reduced pain or side effects. We identified studies primarily by searching Ovid	**Does Continuous Peripheral Nerve Block Provide Superior Pain Control to Opioids? A Meta-Analysis** Jeffrey M. Richman, MD, Spencer S. Liu, MD, Genevieve Courpas, BA, Robert Wong,

Medline (1966 – May 21, 2004) for terms related to post-operative analgesia with CPNB and opioids. Each article from the final search was reviewed and data were extracted from tables, text, or extrapolated from figures as needed. Nineteen articles, enrolling 603 patients, met all inclusion criteria. Inclusion criteria were a clearly defined anesthetic technique (combined general/ regional anesthesia, general anesthesia alone, peripheral nerve block), randomized trial, adult patient population (>18 yr old), CPNB (or analgesia) used postoperatively (intrapleural cathethers were deemed not to be classified as a peripheral nerve catheter), and opioids administered for postoperative analgesia in groups not receiving peripheral nerve block. Perineural analgesia provided better postoperative analgesia com- pared with opioids (P < 0.001). This effect was seen for all time periods measured for both mean visual analog scale and maximum visual analog scale at 24 h (P < 0.001), 48 h (P < 0.001), and 72 h (mean visual analog scale only) (P < 0.001) postoperatively. Perineural cath- eters provided superior analgesia to opioids for all cath- eter locations and time periods (P < 0.05). Nausea/ vomiting, sedation, and pruritus all occurred more commonly with opioid analgesia (P < 0.001). A reduction in opioid use was noted with perineural analgesia (P < 0.001). CPNB analgesia, regardless of catheter location, provided superior postoperative analgesia and fewer opioid-related side effects when compared with opioid analgesia.d postoperatively	MD, Andrew J. Rowlingson, BA, John McGready, MS, Seth R. Cohen, BS, and Christopher L. Wu, MD Anesth Analg 2006;102:248 – 57
Background Postoperative pain may lead to adverse effects on the body, which might result in an increase in morbidity. Its management therefore poses a unique challenge for the clinician. Major shoulder surgery is associated with severe postoperative pain, and different modalities are available to manage such pain, including opioid and non-opioid analgesics, local anaesthetics infiltrated into and around the shoulder joint and regional anaesthesia. All of these techniques, alone or in combination, have been used to treat the postoperative pain of major shoulder surgery but with varying success. **Objectives** The objective of this review was to compare the analgesic efficacy of continuous interscalene brachial plexus block (ISBPB) with parenteral opioid analgesia for pain relief after major shoulder surgery. Search methods We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (2012, Issue 12), MEDLINE (1950 to December 2012), EMBASE (1980 to December 2012), Web of Science (1954 to December 2012), CINAHL (1982 to December 2012) and bibliographies of published studies. **Selection criteria** We included randomized controlled trials assessing the effectiveness of continuous ISBPB compared with different forms of parenteral opioid analgesia in relieving pain in adult participants undergoing elective major shoulder surgery. **Data collection and analysis** Two review authors independently assessed trial quality and extracted outcome data. We included two randomized controlled trials (147 participants). A total of 17 participants were excluded from one trial because of complications related to continuous ISBPB (16) or parenteral opioid analgesia (one). Thus we have information on 130 participants (66 in the continuous ISBPB group and 64 in the parenteral opioid group). The studies were clinically heterogeneous. No meta- analysis was undertaken. However,	**Continuous interscalene brachial plexus block versus parenteral analgesia for postoperative pain relief after major shoulder surgery** Hameed Ullah, Khalid Samad, Fauzia A Khan Cochrane Database of Systematic Reviews 2014, Issue 2.

results of the two included studies showed better pain relief with continuous ISBPB following major shoulder surgery and a lower incidence of complications when interscalene block is performed under ultrasound guidance rather than without it. **Authors' conclusions** Because of the small number of studies (two) relevant to the subject and the high risk of bias of the selected studies, no reasonable conclusion can be drawn.	

B. LIA- LOKAALNE INFILTRATSIOONI ANALGEESIA (LOCAL INFILTRATION ANALGESIA
Mõiste:
Antud juhul räägime põlve või puusaliigese endoproteesimise puhul kasutatavast suure mahuga, multimodaalsest haava (liigeskapsli) inflitratsioonist. Multimodaalne seetõttu, et kasutakse erinevaid segusid, reeglina pikatoimeline lokaalanesteetikum+ NSAID+ adrenaliin.
Teine mõiste on *local anaesthetic infiltration*- põhimõtteliselt haava infiltratsioon lokaalanesteetikumiga.
Süstemaatlised ülevaated:

PUUSALIIGESE ENDOPROTEESIMINE

- ## LIA vs platseebo või no treatment:

Leidus 2 süstemaatilist ülevaadet (Yin, Marques)

Yin 2014- LIA (391 pt) vs platseebo või no treatment (357 pt). 9 uuringut: 4 uuringus intra- ja postoperatiivne LIA, ainult intraoperatiivne LIA 5 uuringus.

Valu tugevus- hinnatud 4, 6, 8, 24 ja 48 tunnil liikumisel ja rahuolekus:

Oluline valutugevuse vähenemine LIA grupis

- **4 tunnil** nii rahuolekus (WMD, 17.72; 95% CI, 25.19 to 10.24; P < .00001; heterogeneity: I2 = 90%, P < .00001), liikumisel (WMD, 11.47; 95% CI, 15.58 to 7.36; P < .00001; heterogeneity: I2 = 49%, P = .14)
- **6 tunnil** liikumisel (SMD, 10.91; 95% CI, 20.14 to 1.68; P = .02; heterogeneity: I2 = 77%, P = .04)
- 24 hours rahuolekus (SMD, .58; 95% CI, 1.04 to .11; P = .01; heterogeneity: I2 = 79%, P = .0009). p < 0.00001)

Ülejäänud ajahetkedel valu tugevuse vähendamisel LIA eelist **ei leitud.**

Opioidi vajadus:

Tugev tõestus, et LIA **vähendab opioidi vajadust** esimesel ööpäeval (SMD, 1.24; 95% CI, 1.98 to .50; P = .001; heterogeneity: I2 = 89%,P < .00001) ja 48 kuni 72 tunnil (SMD, .40; 95% CI, .76 to .04; P = .03; heterogeneity: I2 = 0%, P = .54)

Table 2. Quantitative Results of LIA on Pain Scores and Analgesic Consumption After Hip Arthroplasty

MAJOR OUTCOMES	STUDIES INCLUDED	NUMBER OF PATIENTS, LIA/CONTROL	STATISTICAL METHOD	MEAN DIFFERENCE (95% CI)	P VALUE FOR STATISTICAL SIGNIFICANCE	P VALUE FOR HETEROGENEITY	I2 TEST FOR HETEROGENEITY
Pain scores PACU at rest	Weng 2008, Solovyova 2013	73/73	SMD (random)	1.91 (5.99, 2.18)	.36	<.00001	99%
6 h at	Lunn	96/96	WMD	6.66 (15.38, 2.07)	.13	.07	69%

rest	2011, Aguirre 2012		(random)				
6 h with motion	Lunn 2011, Aguirre 2011	96/96	WMD (random)	10.91 (20.14, 1.68)	.02	.04	77%
8 h at rest	Andersen 2007, Lunn 2011, Murphy 2012	105/106	SMD (random)	.14 (.89, .62)	.72	.0004	87%
8 h with motion	Andersen 2007, Lunn 2011	68/71	WMD (random)	15.81 (44.25,12.63)	.28	.003	89%
Analgesic consumption 0–6 h	Weng 2008, Busch 2010	70/70	SMD (random)	2.88 (7.02, 1.26)	.17	<.00001	98%
7–12 h	Weng 2008, Busch 2010	70/70	SMD (random)	.84 (1.94, .25)	.13	.002	90%
13–18 h	Weng 2008, Busch 2010	70/70	SMD (fixed)	.24 (.57, .10)	.16	.30	8%
19–24 h	Weng 2008, Busch 2010	70/70	SMD (fixed)	.14 (.47, .19)	.42	.99	0%
24–48 h	Andersen 2007, Chen 2010	64/64	SMD (fixed)	.26 (.60, .09)	.15	.18	45%
48–72 h	Andersen 2007, Chen 2010	64/64	SMD (fixed)	.40 (.76, .04)	.03	.54	

Kõrvaltoimed:

Tõsiseid **kõrvaltoimeid,** mis oleks seotud LIA-ga, **ei raporteeritud** (k.a infektsioon). LIA grupis esines kõrvaltoimeid 15,5 % (23/206), kontrollgrupis 19,8% (35/177).

Patsientide rahulolu:

2 uuringus pt rahulolu suurem, 2 uuringus olulist vahet ei leitud.

Haiglas viibimise aeg:

4 analüüsitud uuringus ei ole olulist vahet
Margues 2014*:* 13 uuringut, 909 pt

Valu tugevus:

Oluliselt väiksem 24 tunnil rahuolekus SMD −0.61 (95% CI −1.05, −0.16; p = 0.008) ja liigutamisel SMD −0.85 (95% CI −1.45, −0.25; p = 0.006). Ka **48 tunnil** on valu tugevus **väiksem** nii rahuolekus SMD −0.29 (95% CI −0.52, −0.05; p = 0.018) kui ka liigutamisel. SMD −0.43 (95% CI −0.78, −0.09; p = 0.014).
Ühekordse LIA korral (7 uuringut) oli **valu väiksem 24 tunnil** SMD -0.63 (95% CI -1.21, -0.006; p= 0.031), **48 tunnil** valu tugevus **sarnane** mõlemas grupis.
Korduvate dooside või püsiinfusiooni korral (5 uuringut) oli valu tugevus **väiksem liigutamisel 24 tunnil** SMD -1.38 (95% CI -2.5,-0.26; p= 0.016) , **48 tunnil** nii rahuolekus SMD - 4.49 (95% CI -0.96, -0.02; p= 0.043) kui ka liigutamisel SMD -0.6 (95%CI -1.16, -0.04; p= 0.036)

Opioidi vajadus:

Opioidi vajadus väiksem LIA grupis.
Haige mobiliseerimine võimalik varem LIA grupis

Kõrvaltoimed:

Iiveldust esines **vähem** LIA grupis (5 uuringut, 309 pt); Peto OR 0.46 (95% CI 0.27, 0.80; p= 0.006)
Tõsine kude **infektsioon** esines 5 patsiendil ,sellest 4 LIA grupis: Peto OR 3.47 (95% CI 0.58,20.81; p= 0.17. 4 infektsiooni juhtumit esines patsientidel, kellele manustati kordusdoose postoperatiivselt kateetri kaudu.

Haiglasoleku aeg:

Haiglasoleku aeg mõnevõrra **lühem:** 0,83 päeva (95% CI 0.12, 1.54 päeva; p= 0.022)

- LIA vs epiduraalanalgeesia-

Margues 2014- 1 uuring 80 pt-ga.

- **Valu tugevus väiksem** epiduraali infusiooni ajal **epiduraali grupis, 48 tunnil oli valu tugevam EA grupis võrreldes LIA-ga.**
- **Opiaadi vajadus väiksem** LIA grupis 20%.

Haiglasoleku aeg keskmiselt 2 päeva **lühem L**IA grupis.

Lisaks leitud 2 uuringut

Pandazi 2013- 63 pt: intraoperatiivne LIA vs epiduraalanageesia vs PCA morfiiniga. Tulemused:

- **Väiksem opioidi vajadus igal ajahetkel**
- **Valu** tugevus **väiksem** rahuolekus 6 , 12, 24 tunnil ning liikumisel 6 ja 12 tunnil LIA grupis **võrreldes PCA** grupiga kuid **EA grupiga võrreldes vahet ei olnud**.
- **Kõrvaltoimete** suhtes **vahet ei olnud** gruppide vahel.

Jules-Elysee 2015: RCT, 84 pt, EA vs multimodaalne analgeesia k.a periartikulaarne infiltratsioon (PAI).

Tulemused:

- **Valu tugevus väiksem EA** grupis liikumisel 0.74 (95% CI 0.18 kuni 1.31; p= 0.01)
- **Opioidi vajadus suurem PAI** grupis esimesl postoperatiivsel päeval (43 ± 21mg vs 28 ±23 mg;p=0.002).
- **Haiglas oleku aeg sarnane** mõlemas grupis (3.0 vs 3.1 päeva).
- **Kõrvaltoimed**: iiveldust , oksendamist ja sügelust esines **rohkem EA** grupis (p< 0.05)

PÕLVELIIGESE ENDOPROTEESIMINE

- ## LIA vs platseebo või " no treatment"

Xu 2014- ühekordne LIA vs platseebo või "no treatment", 18 RCT, 1858 pt kokku. **Valu tugevus oluliselt väiksem** LIA grupis (16 RCT-d):

- 2 h (WMD −3.61, 95% CI −7.19 to −0.03; P = 0.048; heterogeneity P = 0.19, I2 = 31.4%)
- 4 h (WMD −7.30, 95% CI −12.95 to −1.66; P = 0.01; heterogeneity P b 0.01, I2 = 77.7%)
- 6 h (WMD −7.50, 95% CI −11.74 to −3.25; P = 0.01; heterogeneity P b 0.01, I2 = 86.7%)
- 12 h (WMD −4.14, 95% CI −7.88 to −0.40; P = 0.03; heterogeneity P b 0.01, I2 = 86.7%)
- 24 h (WMD − 5.15, 95% CI −8.04 to −2.26; P = 0.01; heterogeneity P b 0.01, I2 = 78.6%)
- 48 h (WMD −2.73, 95% CI −4.80 to −0.67; P = 0.01; heterogeneity P = 0.22, I2 = 25.1%)

Opioidi vajadus väiksem (8 RCT) LIA grupis (WMD -5.21, 95% CI -9.89 -0.52; p=0.03; I^2 79,1%)
Funktsiooni taastumine (ROM- "range of motion") **parem** LIA grupis (WMD 2.05 95% CI 0.21 3.89; p= 0.03; I^2 0%)
Kõrvaltoimete osas **vahet ei olnud** gruppide vahel.
Marques 2014- 12 RCT.

Valu tugevus:

Kõikides uuringutes kokku oli **valu tugevus väiksem** LIA grupis 24 tunnil SMD -0.40(95% CI - 0.58, -0.22; p=<0.001) ja 48 tunnil SMD 0.27(95% CI -0.50, -0.50; p= 0.018).
Uuringutes, kus oli teostatud ainult **ühekordne LIA** operatsiooni ajal, oli **valu** tugevus **väiksem** LIA grupis **24 tunni**l rahuolekus SMD -0.25 (95% CI -0.45, -0.04; p= 0.017) ja liigutamisel SMD -0.28 (95% CI -0.47; - 0.10; p=0.003). **48 tunnil kliiniliselt olulist vahet gruppide vahel ei olnud.**
Püsiinfusiooni või kordusdooside manustamise korral oli **valu tugevus väiksem** nii **24 tunnil** rahuolekus SMD -0.59 (95% CI - 0.83; -0.35; p=<0.001) kui liigutamisel SMD -0.69 (95% CI -1.15, -0.23; p= 0.003), **48 tunnil** rahulolekus SMD -0.52 (95% CI -0.78, -0.26; p< 0.001) ja liigutamisel SMD -0.59 (95% CI-1.00, -0.19; p= 0.004)

Opioidi vajadus väiksem 35-40 % SLIA grupis ja 32-52% väiksem CLIA grupis.

Haiglas viibimise aeg lühem CLIA grupis 1 päeva võrra (p=0.012)

LIA vs FNB

Marques 2014- 6 uuringut,

- **Ei ole tõestust**, et valu tugevus oleks **väiksem** uuringugrupis.
- **Opioidi vajaduses vahet ei olnud.**
- Uuringutes, mis hindasid patsientide **mobiliseerimist** postoperatiivselt, olid LIA grupis veidi **paremad** tulemused võrreldes FNB-ga.
- **Haiglasoleku aeg oli võrdne** gruppide vahel.

Fan 2015-8 RCT-d, 752 pt.

- **Valu tugevus rahuolekus väiksem** LIA grupis esimesl postoperatiivsel päeval (SMD = -0.494, p < 0.001, I^2 = 8,3%), **liikumisel** olulist **vahet** gruppide vahel **ei olnud** (SMD=- 0.263, P =0.28).
- **Opioidi vajadus** esimesel postoperatiivsel päeval **väiksem** LIA grupis võrreldes FNB-ga (SMD=-0.73 p<0.001)
- **Kõrvaltoimed:** iiveldust oksendamist, pearinglust esines LIA grupis **vähem** (p= 0.27 ja p= 0.218), samas oli **rohkem haava infektsiooni ja uriini retensiooni** (p=0.745 ja p=0.242).

- ## LIA vs EA

Margues 2014- 3 uuringut , 204 pt.

- **Valu vähenemine tõenäolisem LIA** grupis võrreldes EA-ga.
- **Opioidi vajadususes** vahet ei olnud.
- **Mobiliseerimine parem** LIA grupis.
- Haiglasoleku aeg lühem LIA grupis.

Lisaks leidus 2 RCT-d LIA vs EA
Binici 2014- 30 pt (28 N ja 2 M).

- **Valu tugevuses** vahet ei olnud 30 minutil ja 8 , 12 tunnil (p> 0.05), 60 minutil ja 2 tunnil valu tugevus statistiliselt olulisel määral tõusnud LIA grupis (p < 0.05).
- **Valuvaigisti vajadus** oluliselt **tõusnud** LIA grupis 60 minutil ja 2 tunnil (p< 0.05), teistel ajahetkedel vahet ei ole.
- Bromage skoor EA grupis kõrgem 60 minutil (p< 0.01), 8, 12 ja 14 tunnil vahet ei olnud (p>0.05)

Jadeau 2013- 45 pt, EA+ FNB vs LIA.

- **Valu tugevus suurem** LIA grupis **liigutamise**l (p= 0.0084), **rahuolekus vahet ei olnud** (p=0.4068).
- **Opioidi vajadus suurem** LIA grupis (228 mg vs 142 mg)
- **Haiglas oleku aeg võrdne** mõlemas grupis (3,2 päeva)

Viited:

Kokkuvõtte (abstract või kokkuvõtlikum info)	Viide kirjandusallikale
Objective: The aim of this study was to compare the effects of epidural analgesia with infiltration analgesia in postoperative pain control for total knee arthroplasty. **Methods**: Thirty patients (28 female, 2 male; mean age: 69.37±5.11 years, range: 61 to 80 years) undergoing total knee arthroplasty between May 2011 and September 2011 were randomly divided into 2 groups. All patients received spinal anesthesia with bupivacaine. Postoperative analgesia of 72 ml 0.9% NaCl + 48 ml bupivacaine (1 ml = 5 mg, total 120 ml) was administered throughout 24 hours to Group 1 (n=15) by epidural catheter and to Group 2 (n=15) by ON-Q infiltration pump. Groups were compared based on the Bromage scores and visual analog scale (VAS), blood pressure, postoperative analgesia requirement and side effects. **Results:** Demographic data were similar in both groups. Rates of additional analgesia requirement at the postoperative 60th minute and 2nd hour were significantly higher in Group 2 than Group 1 ($p<0.05$). Rates of nausea-vomiting at the postoperative 60th minute and 2nd hour were significantly higher in Group 1 than Group 2 ($p<0.05$ and $p<0.01$, respectively). Bromage scores at 60 minutes and 2 hours was significantly higher in Group 1 than in Group 2 ($p<0.01$). Mean VAS scores at 60 minutes and 2 hours were significantly higher in Group 2 than Group 1 ($p<0.05$). While a statistically significant difference was found between systolic arterial pressure measurements at 60 minutes ($p<0.05$), there was no significant difference in diastolic arterial pressure and peak heart rate. **Conclusion**: Although the analgesic effect of local infiltration is provided later than by epidural analgesia, the same level of pain control can be achieved with initial additional analgesia. Local infiltration is superior to epidural analgesia in respect of few side effects and early mobilization. Key words: Epidural analgesia; knee arthroplasty; local infiltrative analgesia; postoperative pain.	Acta Orthop Traumatol Turc 2014;48(1):73-79 **A comparison of epidural analgesia and local infiltration analgesia methods in pain control following total knee arthroplasty** Eylem BİNİCİ BEDİR, Tuhan KURTULMUŞ, Selma BAŞYİĞİT, Uğur BAKIR, Necdet SAĞLAM, Gürsel SAKA
Total knee arthroplasty (TKA) is usually associated with severe post-operative pain, which can prevent rehabilitation of patients' knee function and influence the satisfaction of surgery. Local infiltration analgesia (LIA) is a method that has been applied in clinical practice recently. However, the clinical use of this method is still under discussion. In this paper, we systematically reviewed randomized clinical trails (RCTs) comparing LIA with peripheral nerve block (PNB) to verify the efficacy and safety of LIA. During the analysis, we strictly filtered papers and chose ones that had fewer disturbance	The Jpurnal of Arthroplasty **The Comparison of Local Infiltration Analgesia With Peripheral Nerve Block Following TKA: A System Review With Meta-Analysis**

variables. We also analyzed the heterogeneity. We conclude that when compared with PNB, pain control with LIA is at least comparable	Lin Fan, MD , Chunyan Zhu, MD , Pengfei Zan, MD , Xiao Yu, MD, Jin Liu, MD, Qi Sun, MD , Guodong Li, MD
Purpose: To examine the efficacy and safety of single-dose local infiltration of analgesia (LIA) for post-operative pain relief in total knee arthroplasty (TKA) patients. **Methods:** A systematic electronic literature search (up to Aug 2013) was conducted to identify the RCTs that address the efficacy and safety of single-dose LIA in the pain management after TKA. Subgroup analysis was conducted to determine changes of visual analog score (VAS) values at six different postoperative time points. Weighted mean differences or relative risks with accompanying 95% confidence intervals were calculated and pooled using a random effect model. **Results**: Eighteen trials involving 1858 TKA patients met the inclusion criteria. The trials were liable to medium risk of bias. The VAS values at postoperative 2 h, 4 h, 6 h, 12 h, 24 h, and 48 h per patient were significantly lower in the LIA group than in the placebo group, and the former group also had less morphine consumption and better early functional recovery including range of motion, time to straight leg raise and 90° knee flexion than the latter group. No significant difference in length of hospital stay or side effects was detected between the two groups. **Conclusions:** The current evidence shows that the use of single-dose LIA is effective for postoperative pain management in TKA patients, with satisfactory short-term safety. More high-quality RCTs with long-term follow-ups are required for examining the long-term safety of single-dose LIA. Level of evidence: I, II	The Knee 21 (2014) 636–646 **Efficacy and safety of single-dose local infiltration of analgesia in total knee arthroplasty: A meta-analysis of randomized controlled trials** Chang-Peng Xu, Xue Li, Zhi-Zhong Wang, Jin-Qi Song a, Bin Yu
Abstract: Postoperative pain after hip arthroplasty (HA) is very common and severe. Currently, use of routine analgesic methods is often accompanied by adverse events (AEs). Local infiltration analgesia (LIA) for controlling pain has been a therapeutic option in many surgical procedures. However, its analgesic efficacy inHAand its safety remain unclear. Data from9 randomized controlled trials, involving 760 participants, comparing the effect of LIA with that of placebo infiltration or no infiltration on patients undergoing HA were retrieved from an electronic database, and the pain scores, analgesic consumption, and AEs were analyzed. Effects were summarized using weighted mean differences, standardized mean differences, or odds ratio with fixed or random effect models. There was strong evidence of an association between LIA and reduced pain scores at 4 hours at rest (P < .00001) and with motion (P < .00001), 6 hours with motion (P = .02), and 24 hours at rest (P = .01), and decreased analgesic consumption during 0 to 24 hours (P = .001) after HA. These analgesic efficacies for LIA were not accompanied by any increased risk for AEs. However, the current meta-analysis did not reveal any associations between LIA and the reduced pain scores or analgesic consumption at other time points.	The Journal of Pain, Vol 15, No 8 (August), 2014: pp 781-799 **Local Infiltration Analgesia for Postoperative Pain After Hip Arthroplasty: A Systematic Review and Meta-Analysis** Jun-Bin Yin, Guang-Bin Cui, Ming-Shan Mi, Yu-Xia Du, Sheng-Xi Wu, Yun-Qing Li and Wen Wang

The results suggest that LIA can be used for controlling pain after HA because of its efficacy in reducing pain scores and thus can reduce analgesic consumption on the first day without increased risk of AEs. Perspective: This is the first pooled database meta-analysis to assess the analgesic effects and safety of LIA in controlling pain after HA. The derived information offers direct evidence that LIA can be used for patients undergoing HA because of its ability to reduce pain scores and analgesic consumption without any additional AEs.	
Abstract: Postoperative pain after hip arthroplasty (HA) is very common and severe. Currently, use of routine analgesic methods is often accompanied by adverse events (AEs). Local infiltration analgesia (LIA) for controlling pain has been a therapeutic option in many surgical procedures. However, its analgesic efficacy inHAand its safety remain unclear. Data from9 randomized controlled trials, involving 760 participants, comparing the effect of LIA with that of placebo infiltration or no infiltration on patients undergoing HA were retrieved from an electronic database, and the pain scores, analgesic consumption, and AEs were analyzed. Effects were summarized using weighted mean differences, standardized mean differences, or odds ratio with fixed or random effect models. There was strong evidence of an association between LIA and reduced pain scores at 4 hours at rest (P < .00001) and with motion (P < .00001), 6 hours with motion (P = .02), and 24 hours at rest (P = .01), and decreased analgesic consumption during 0 to 24 hours (P = .001) after HA. These analgesic efficacies for LIA were not accompanied by any increased risk for AEs. However, the current meta-analysis did not reveal any associations between LIA and the reduced pain scores or analgesic consumption at other time points. The results suggest that LIA can be used for controlling pain after HA because of its efficacy in reducing pain scores and thus can reduce analgesic consumption on the first day without increased risk of AEs. Perspective: This is the first pooled database meta-analysis to assess the analgesic effects and safety of LIA in controlling pain after HA. The derived information offers direct evidence that LIA can be used for patients undergoing HA because of its ability to reduce pain scores and analgesic consumption without any additional AEs.	Bone Joint J. 2013 May ; 0(5): 629–635 **Analgesia after total knee replacement: local infiltration versus epidural combined with a femoral nerve blockade. A prospective, randomised pragmatic trial** Jacques T. YaDeau, M.D., Ph.D.,
Abstract PURPOSE: Epidural and intravenous patient-controlled analgesia (PCA) are established methods for pain relief after total hip arthroplasty (THA). Periarticular infiltration is an alternative method that is gaining ground due to its simplicity and safety. Our study aims to assess the	Arch Orthop Trauma Surg. 2013 Nov;133(11):1607-12. **Periarticular infiltration for pain relief after total hip arthroplasty: a comparison with epidural**

efficacy of periarticular infiltration in pain relief after THA. METHODS: Sixty-three patients undergoing THA under spinal anaesthesia were randomly assigned to receive postoperative analgesia with continuous epidural infusion with ropivacaine (epidural group), intraoperative periarticular infiltration with ropivacaine, clonidine, morphine, epinephrine and corticosteroids (infiltration group) or PCA with morphine (PCA group). PCA morphine provided rescue analgesia in all groups. We recorded morphine consumption, visual analog scale (VAS) scores at rest and movement, blood loss from wound drainage, mean arterial pressure (MAP) and adverse effects at 1, 6, 12, 24 h postoperatively. RESULTS: Morphine consumption at all time points, VAS scores at rest, 6, 12 and 24 h and at movement, 6 and 12 h postoperatively were lower in infiltration group compared to PCA group ($p < 0.05$), but did not differ between infiltration and epidural group. There was no difference in adverse events in all groups. At 24 h, MAP was higher in the PCA group ($p < 0.05$) and blood loss was lower in the infiltration group ($p < 0.05$). CONCLUSIONS: In our study periarticular infiltration was clearly superior to PCA with morphine after THA, providing better pain relief and lower opioid consumption postoperatively. Infiltration seems to be equally effective to epidural analgesia without having the potential side effects of the latter.	**and PCA analgesia.** Pandazi A, Kanellopoulos I, Kalimeris K, Batistaki C, Nikolakopoulos N, Matsota P, Babis GC, Kostopanagiotou G.
Abstract Background: Surgical pain is managed with multi-modal anaesthesia in total hip replacement (THR) and total knee replacement (TKR). It is unclear whether including local anaesthetic infiltration before wound closure provides additional pain control. Methods: We performed a systematic review of randomised controlled trials of local anaesthetic infiltration in patients receiving THR or TKR. We searched MEDLINE, Embase and Cochrane CENTRAL to December 2012. Two reviewers screened abstracts, extracted data, and contacted authors for unpublished outcomes and data. Outcomes collected were post-operative pain at rest and during activity after 24 and 48 hours, opioid requirement, mobilisation, hospital stay and complications. When feasible, we estimated pooled treatment effects using random effects meta-analyses. Results: In 13 studies including 909 patients undergoing	BMC Musculoskeletal Disorders 2014, 15:220 Local anaesthetic infiltration for peri-operative pain control in total hip and knee replacement: systematic review and meta-analyses of short- and long-term effectiveness Elsa MR Marques , Hayley E Jones, Karen T Elvers, Mark Pyke, Ashley W Blom and Andrew D Beswick

THR, patients receiving local anaesthetic infiltration experienced a greater reduction in pain at 24 hours at rest by standardised mean difference (SMD) −0.61 (95% CI −1.05, −0.16; p = 0.008) and by SMD −0.43 (95% CI −0.78 −0.09; p = 0.014) at 48 hours during activity. In TKR, diverse multi-modal regimens were reported. In 23 studies including 1439 patients undergoing TKR, local anaesthetic infiltration reduced pain on average by SMD −0.40 (95% CI −0.58, −0.22; p < 0.001) at 24 hours at rest and by SMD −0.27 (95% CI −0.50, −0.05; p = 0.018) at 48 hours during activity, compared with patients receiving no infiltration or placebo. There was evidence of a larger reduction in studies delivering additional local anaesthetic after wound closure. There was no evidence of pain control additional to that provided by femoral nerve block. Patients receiving local anaesthetic infiltration spent on average an estimated 0.83 (95% CI 1.54, 0.12; p = 0.022) and 0.87 (95% CI 1.62, 0.11; p = 0.025) fewer days in hospital after THR and TKR respectively, had reduced opioid consumption, earlier mobilisation, and lower incidence of vomiting. Few studies reported long-term outcomes. Conclusions: Local anaesthetic infiltration is effective in reducing short-term pain and hospital stay in patients receiving THR and TKR. Studies should assess whether local anaesthetic infiltration can prevent long-term pain. Enhanced pain control with additional analgesia through a catheter should be weighed against a possible infection risk.	
Abstract **Background:** The optimal postoperative analgesia after primary total hip arthroplasty remains in question. This randomized, double-blind, placebo-controlled study compared the use of patient-controlled epidural analgesia (PCEA) with use of a multimodal pain regimen including periarticular injection (PAI). We hypothesized that PAI would lead to earlier readiness for discharge, decreased opioid consumption, and lower pain scores. **Methods**: Forty-one patients received PAI, and forty-three patients received PCEA. Preoperatively, both groups were administered dexamethasone (6 mg, orally). The PAI group received a clonidine patch and sustained-release oxycodone (10 mg), while the PCEA group had placebo. Both groups received combined spinal-epidural anesthesia and used an epidural pain pump postoperatively; the PAI group had normal saline solution, while the PCEA group had bupivacaine and hydromorphone. The primary outcome, readiness for discharge, required the discontinuation of the epidural, a pain score of <4 (numeric rating scale) without parenteral narcotics, normal eating, minimal nausea, urination without a catheter, a dry surgical wound, no acute medical	*J Bone Joint Surg Am*, 2015 May 20; 97 (10): 789 -798 **Patient-Controlled Epidural Analgesia or Multimodal Pain Regimen with Periarticular Injection After Total Hip Arthroplasty** Kethy M. Jules-Elysee, MD; Amanda K. Goon, BA; Geoffrey H. Westrich, MD; Douglas E. Padgett, MD; David J. Mayman, MD; Amar S. Ranawat, MD;

problems, and the ability to independently transfer and walk 12.2 m (40 ft). **Results:** The mean time to readiness for discharge (and standard deviation) was 2.4 ± 0.7 days (PAI) compared with 2.3 ± 0.8 days (PCEA) (p = 0.86). The mean length of stay was 3.0 ± 0.8 days (PAI) compared with 3.1 ± 0.7 days (PCEA) (p = 0.46). A significant mean difference in pain score of 0.74 with ambulation (p = 0.01; 95% confidence interval [CI], 0.18 to 1.31) and 0.80 during physical therapy (p = 0.03; 95% CI, 0.09 to 1.51) favored the PCEA group. The mean opioid consumption (oral morphine equivalents in milligrams) was significantly higher in the PAI group on postoperative day 0 (43 ± 21 compared with 28 ± 23; p = 0.002) and postoperative days 0 through 2 (136 ± 59 compared with 90 ± 79; p = 0.004). Opioid-Related Symptom Distress Scale (ORSDS) composite scores for severity and bothersomeness as well as scores for nausea, vomiting, and itchiness were significantly higher in the PCEA group (p < 0.05). Quality of Recovery-40 scores and patient satisfaction were similar. **Conclusions:** PAI did not decrease the time to discharge and was associated with higher pain scores and greater opioid consumption but lower ORSDS scores compared with PCEA. The choice for analgesic regimen may depend on a particular patient's threshold for pain and the potential side effects. Level of Evidence: Therapeutic Level I. See Instructions for Authors for a complete description of levels of evidence.	
Otsingud:	
19.08.2015 Pubmed Search (((((((((local infiltration analgesia) OR regional filtration analgesia) OR local blockade analgesia) OR joint infiltration analgesia) OR periarticular infiltration analgesia) OR intraarticular infiltration analgesia) OR wound infiltration analgesia) OR wound infusion analgesia) AND hip arthroplasty) AND hip replacement Filters: Meta-Analysis; Systematic Reviews Results: 43 Ovid, 25.08.2015 Search terms used: analgesia arthroplasty blocade controlled hip hip arthroplasty hip replacement infiltration infusion intraarticular intraarticular analgesia joint joint infiltration analgesia joint infusion analgesia local local blocade analgesia local infiltration analgesia patient patient controlled analgesia periarticular periarticular analgesia periarticular infusion analgesia regional regional infiltration analgesia Replacement Results: 0	

Ovid 25.08.2015 analgesia arthroplasty blocade controlled infiltration infusion intraarticular intraarticular analgesia joint joint infiltration analgesia joint infusion analgesia knee knee arthroplasty knee replacement local local blocade analgesia local infiltration analgesia patient controlled analgesia periarticular periarticular analgesia periarticular infusion analgesia regional regional infiltration analgesia replacement Pubmed 28.08.15(((((((((local infiltration analgesia) OR regional infiltration analgesia) OR local blockade analgesia) OR joint infiltration analgesia) OR joint infusion analgesia) OR periarticular infiltration analgesia) OR periarticular analgesia)) AND ((hip replacement) OR hip arthroplasty)) AND ((((iv analgesia) OR systemic analgesia) OR patient controlled analgesia) OR intravenous analgesia) Filters: published in the last 5 years Results:27	

C. TAP

Süstemaatilised ülevaated:

1. Yu 2014 : Four RCTs, 96 single –shot TAP-block and 100 sinlge-shot LAI (local anaesthetic infiltration) patients

Results:

TAP-block group had **lower VAS pain scores 24 hours** postoperatively compared with the LAI group, both at rest (WMD [95% CI] = −0.67 [p < 0.01] and with movement (WMD = −0.89, p < 0.01). There were **no significant** between-group **differences** in 24-hour postoperative **morphine requirements**, the rates of **PONV** or VAS pain scores at **2** and **4 h postoperatively**.

2. Carlton 2010: 8 uuringut, 358 pt

TAP vs placebo: **significantly less postoperative requirement for morphine at 24 hours** (mean difference (MD) -21.95 mg, 95% confidence interval (CI) -37.91 to 5.96; five studies, 236 participants) **and 48 hours** (MD -28.50, 95% CI -38.92 to -18.08; one study of 50 participants) **but not at two hours** (all random-effects analyses). **Pain at rest was significantly reduced in two studies, but not a third.**

3. Johns 2012: 9 RCTs, 413 (205/208) pt, abdominal surgery.

Cumulative **morphine utilization was statistically significantly reduced at 24 h.** [WMD=23.71mg (38.66-8.76); P=0.002] and 48h [WMD=38.08mg (18.97-57.19); P<0.0001] in patients who received a TAP block and the **incidence of PONV was significantly reduced** [OR=0.41(0.22-0.74); P=0.003]. There was a **nonsignificant reduction in the visual analogue scales of postoperative pain** [WMD=0.73cm (1.84-0.38), P=0.2]. There were no reported adverse events following TAP block.

Viited:

Kokkuvõtte (abstract või kokkuvõtlikum info)	**Viide kirjandusallikale**
The **transversus abdominis plane (TAP) block** is a peripheral nerve block which anaesthetises the abdominal wall. The increasing use of TAP block, as a form of pain relief after abdominal surgery warrants evaluation of its effectiveness as an adjunctive technique to routine care and, when compared with other analgesic techniques. To assess effects of TAP blocks (and variants) on postoperative analgesia requirements after abdominal surgery. We searched specialised registers of Cochrane Anaesthesia and Cochrane Pain, Palliative and Supportive Care Review Groups, CENTRAL, MEDLINE, EMBASE and CINAHL to June 2010. We included randomised controlled trials (RCTs) comparing TAP block or rectus sheath block with: no TAP or rectus sheath block; placebo; systemic, epidural or any other analgesia. At least two review	Charlton S, Cyna AM, Middleton P, Griffiths JD. ***Perioperative transversus abdominis plane (TAP) blocks for analgesia after abdominal surgery.*** Cochrane Database of Systematic Reviews 2010, Issue 12. Art. No.: CD007705. DOI: 10.1002/14651858.CD007705.pub2.

authors assessed study eligibility and risk of bias, and extracted data. We **included eight studies (358 participants),** five assessing TAP blocks, three assessing rectus sheath blocks; with moderate risk of bias overall. **All studies had a background of general anaesthesia in both arms in most cases. Compared with no TAP block or saline placebo, TAP block resulted in significantly less postoperative requirement for morphine at 24 hours** (mean difference (MD) -21.95 mg, 95% confidence interval (CI) -37.91 to 5.96; five studies, 236 participants) **and 48 hours** (MD -28.50, 95% CI -38.92 to -18.08; one study of 50 participants) **but not at two hours** (all random-effects analyses). **Pain at rest was significantly reduced in two studies, but not a third.** Only one of three included studies of rectus sheath blocks found a reduction in postoperative analgesic requirements in participants receiving blocks. One study, assessing number of participants who were pain-free after their surgery, found more participants who received a rectus sheath block to be pain-free for up to 10 hours postoperatively. As with TAP blocks, rectus sheath blocks made no apparent impact on nausea and vomiting or sedation scores. Authors' conclusions: **No studies have compared TAP block with other analgesics such as epidural analgesia or local anaesthetic infiltration into the abdominal wound. There is only limited evidence to suggest use of perioperative TAP block reduces opioid consumption and pain scores after abdominal surgery when compared with no intervention or placebo.** There is no apparent reduction in postoperative nausea and vomiting or sedation from the small numbers of studies to date. Many relevant studies are currently underway or awaiting publication.	
BACKGROUND:Postoperative pain management is of great importance in perioperative anesthetic care. Transversus abdominis plane (TAP) block has been described as an effective technique to reduce postoperative pain and morphine consumption after open lower abdominal operations. Meanwhile, local anesthetic infiltration (LAI) is also commonly used as a traditional method. However, the effectiveness of these two methods has not been compared before. METHODS:A meta-analysis of all relevant randomized controlled trials (RCTs) was conducted to compare the efficacy of single shot TAP block with that of single shot LAI for postoperative analgesia in adults. Major medical databases and trial registries were searched for published and unpublished RCTs. The endpoints include postoperative visual analog scale (VAS) pain score, morphine requirement, and rate of postoperative nausea and vomiting (PONV). For continuous data, weighted mean differences (WMDs) were formulated; for dichotomous data, risk ratios (RR) were calculated. Results were derived using a random-/fixed-effects model with 95% confidence interval (CI). RESULTS:Four RCTs, encompassing 96 TAP-block and 100 LAI patients, were included in the final analysis. Patients in the TAP-block group had lower VAS pain scores 24 hours postoperatively compared with the LAI group, both at rest (WMD [95% CI] = -0.67 [p < 0.01] and with movement	**Transversus abdominis-plane block versus local anesthetic wound infiltration in lower abdominal surgery: a systematic review and meta-analysis of randomized controlled trials** BMC Anesthesiology 2014, 14:121 Nanze Yu, Xiao Long, Jorge R Lujan-Hernandez, Julien Succar, Xin Xin and Xiaojun Wang

(WMD = -0.89, p < 0.01). There were no significant between-group differences in 24-hour postoperative morphine requirements, the rates if PONV or VAS pain scores at 2 and 4 h postoperatively. CONCLUSION:TAP block and LAI provide comparable short-term postoperative analgesia, but TAP block has better long-lasting effec	
AIM: Reduced opioid use in the immediate postoperative period is associated with decreased complications. This study aimed to determine the effect of transversus abdominis plane (TAP) block on morphine requirements 24 h after abdominal surgery. Secondary outcomes included the effect of TAP block on morphine use 48 h after surgery, incidence of postoperative nausea and vomiting (PONV) and impact on reported pain scores (visual analogue scale). **METHOD:**A systematic review of the literature was conducted for randomised controlled trials (RCTs) evaluating the effects of TAP block in adults undergoing abdominal surgery. For continuous data, weighted mean differences (WMD) were formulated; for dichotomous data, odds ratios (OR) were calculated. Results were produced with a random effects model with 95% confidence intervals (CI). **RESULTS:**Nine studies, including published and unpublished data, containing a total of 413 patients were included. Of these 205 received a TAP block and 208 a placebo. Cumulative morphine utilization was statistically significantly reduced at 24 h. [WMD=23.71mg (38.66-8.76); P=0.002] and 48h [WMD=38.08mg (18.97-57.19); P<0.0001] in patients who received a TAP block and the incidence of PONV was significantly reduced [OR=0.41(0.22-0.74); P=0.003]. There was a nonsignificant reduction in the visual analogue scales of postoperative pain [WMD=0.73cm (1.84-0.38), P=0.2]. There were no reported adverse events following TAP block. **CONCLUSION:**Transversus abdominis plane block is safe, reduces postoperative morphine requirements, nausea and vomiting and possibly the severity of pain after abdominal surgery. It should be considered as part of a multimodal approach to anaesthesia and enhanced recovery in patients undergoing abdominal surgery.	**Clinical effectiveness of transversus abdominis plane (TAP) block in abdominal surgery: a systematic review and meta-analysis.** Johns N, O'Neill S, Ventham NT, Barron F, Brady RR, Daniel T Colorectal Dis. 2012 Oct;14(10):e635-42. doi: 10.1111/j.1463-1318.2012.03104.x.

D. EPIDURAALI SEESOLEKU AEG
Tõenduspõhist informatsiooni ei leidnud.
a. Epidural analgesia: What nurses need to know
Mona Sawhney PhD, RN, NP
Nursing2015August 2012 Volume 42 Number 8 Pages 36 - 41
Epidural analgesia is discontinued when the patient's pain can be controlled by oral analgesics, the patient is experiencing adverse reactions that outweigh the benefits, pain isn't adequately controlled, or the patient's clinical status has changed and the risk of complications associated with maintaining epidural analgesia increases (such as the patient requiring anticoagulation)

b. www.gosh.nhs.uk

96 h (vastsündinud 72 h)