1399–P269

Pain following hernia repair: Which regional analgesic techniques?

prospect

procedure specific postoperative pain management

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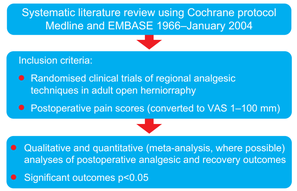
Background

- Since hernia repair is increasingly becoming a day-case procedure, there is a need to optimise postoperative pain management to enhance early recovery.
- Various regional techniques are used in different centres to provide pain relief following herniorraphy. To date, there has been no comprehensive review of the relative analgesic benefits of these techniques.
- The PROSPECT initiative provides evidence-based recommendations for procedure-specific postoperative pain management, formulated by an international Working Group of anaesthesiologists and surgeons.
- PROSPECT conducted a systematic review of postoperative analgesic effects of regional techniques in herniorraphy, and assessed other recovery outcomes where reported.

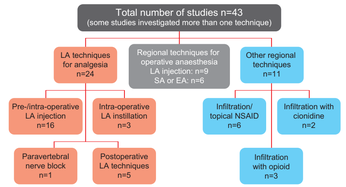
Methods

Figure 1. Systematic review of analgesic effects of regional analgesia techniques following adult herniorraphy



Results

Figure 2. Overview of systematic review: The majority of studies assessed LA injection techniques for analgesia or operative anaesthesia



LA, local anaesthetic; SA, spinal anaesthesia; EA, epidural anaesthesia; NSAID, non-steroidal anti-inflammatory drug

Table 1. PROSPECT definitions of LA injection techniques

- Terminology and descriptions of LA techniques were inconsistent between studies.
- Most studies of LA application described methods that combined two or more LA injection techniques, according to the definitions used by PROSPECT.

Inguinal nerve block	Discrete nerve block at the site of the ilioinguinal, iliohypogastric and/or genitofemoral nerve
Field block	Infiltration into the superficial and deeper structures in the field of surgery (which may also result in a block of the ilioinguinal, iliohypogastric and/or genitofemoral nerve)
Wound infiltration	Injection of local anaesthetic into the cutaneous/ subcutaneous/deeper structures of the surgical field

Figure 3. All twelve studies that compared pre-/ intra-operative LA injection techniques with placebo showed a reduction in pain scores, recorded at various times postoperatively; of these, nine studies showed a significant benefit at 0–6 h

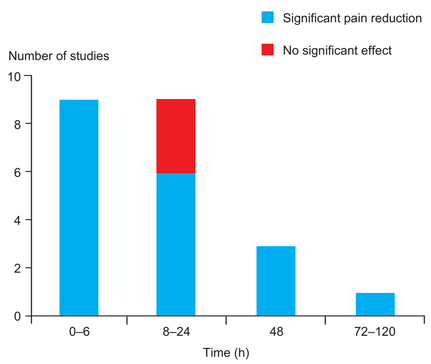


Table 2. Qualitative results of systematic review

- LA injection techniques reduce pain and supplementary analgesic requirements compared with placebo, whether given before or after incision.
- LA injection for operative anaesthesia provides superior postoperative analgesia compared with general or neuraxial anaesthesia, reduces the length of hospital stay and incidence of nausea or sore throat compared with general anaesthesia, and reduces the incidence of urinary retention compared with spinal anaesthesia.
- For paravertebral nerve block, LA instillation, and application of NSAIDs, clonidine or opioids, data are more limited or inconclusive.

		Net effect of regional analgesic technique *versus* control (Number of studies showing significant benefit of regional analgesic technique/total studies)		
Regional analgesic technique	**Control**	**Pain scores**	**Analgesic requirement**	**Other recovery outcomes**
LA analgesic techniques				
LA injection, pre-/intra-operative (n=12)	Placebo	↓ (12/12)	↓ (7/9)	↔ PONV (0/4)
LA injection, pre-operative (n=3)	LA injection, at closure	↔ (0/3)	↔ (1/3)	
LA instillation (no needles), intra-operative (n=2)	Placebo	↓ (2/2)	↓ (2/2)	
LA instillation, at closure (n=1)	LA injection, pre-operative	↔ (0/1)	↔ (0/1)	
Postoperative LA infusion (n=3)	Placebo	↓ (3/3)	↔ (1/3)	↓ Nausea (1/1)
Paravertebral nerve block (n=1)	Peripheral nerve block	↔ (0/1)	↓ (1/1)	↓ PONV (1/1)
Bolus LA at the surgical site, postoperative (n=2)	Placebo	↔ (0/2)	↔ (0/2)	
Operative anaesthesia techniques				
LA injection (n=7)	GA	↓ (6/7)	↔ (2/5)	↓ Nausea (3/6; meta-analysis of 5 studies, p<0.00001); ↓ Hospital stay (3/4); ↓ Sore throat (3/3)
LA injection ± GA (n=5)	SA	↓ (4/5)	↔ (0/4)	↓ Hospital stay (2/4; meta-analysis of 2 studies, p<0.00001); ↓ Urinary retention (3/3); ↓ Conversion to GA (1/1)
SA (n=4)	GA	↔ (2/4)	↓ (2/3)	↓ PONV (3/3); ↔ Hospital stay (1/3); ↑ Urinary retention (3/3)
SA (n=1)	EA	↓ (1/1)	↔ (0/1)	↔ PONV (0/1); ↔ Hospital stay (0/1); ↔ Urinary retention (0/1)
Other regional analgesic techniques				
NSAID at the surgical site by infiltration or topical gel (n=2)	Placebo or LA	↓ (2/2)	↓ (2/2)	
NSAID at the surgical site by infiltration or topical gel (n=5)	Systemic NSAID	↔ (2/5)	↔ (1/5)	
Infiltration with clonidine (n=2)	Placebo	↔ (1/2)	↔ (0/2)	
Infiltration with clonidine (n=2)	Systemic clonidine	↔ (1/2)	↔ (0/2)	
Infiltration with opioid (n=2)	Placebo	↔ (0/2)	↔ (1/2)	
Infiltration with opioid (n=3)	Systemic opioid	↔ (1/3)	↔ (0/3)	

↓ Majority of studies show significant benefit of treatment over control. ↔ Majority of studies show no significant benefit of treatment over control.
↑ Majority of studies show significant disadvantage of treatment over control. GA, general anaesthesia; PONV, postoperative nausea and vomiting.

Figure 4. LA injection for anaesthesia versus GA: Meta-analyses showed a significant benefit of LA injection techniques for reducing pain scores at rest at (A) 1 h and (B) 24 h, and (C) on movement at 24 h

(A) VAS pain scores at rest at 1 h

Study	n	LA Mean (SD)	n	GA Mean (SD)	WMD (fixed) 95% CI	Weight %	WMD (fixed) 95% CI
Aasbø 2002	30	4.6 (6.7)	29	32.0 (22.0)		57.6	–27.4 (–35.7, –19.0)
Özgün 2002	25	17.2 (13.8)	25	36.2 (20.7)		42.4	–19.0 (–28.7, –9.3)
Total (95% CI)	55		54			100.0	–23.8 (–30.2, –17.5)

Test for heterogeneity: p=0.20
Test for overall effect: p<0.00001
–100 –50 0 50 100 Favours LA Favours GA

(B) VAS pain scores at rest at 24 h

Study	n	LA Mean (SD)	n	GA Mean (SD)	WMD (fixed) 95% CI	Weight %	WMD (fixed) 95% CI
Gönüllü 2002	25	12.0 (11.0)	25	18.0 (14.0)		47.8	–6.0 (–13.0, 1.0)
Özgün 2002	25	19.0 (7.0)	25	27.6 (15.6)		52.2	–8.6 (–15.3, –1.9)
Total (95% CI)	50		50			100.0	–7.3 (–12.1, –2.5)

Test for heterogeneity: p=0.59
Test for overall effect: p=0.003
–100 –50 0 50 100 Favours LA Favours GA

(C) VAS pain scores on movement at 24 h

Study	n	LA Mean (SD)	n	GA Mean (SD)	WMD (fixed) 95% CI	Weight %	WMD (fixed) 95% CI
Gönüllü 2002	25	39.6 (16.0)	25	50.0 (17.0)		15.9	–10.4 (–19.6, –1.3)
Özgün 2002	25	17.0 (3.5)	25	22.6 (9.4)		84.0	–5.7 (–9.6, –1.7)
Total (95% CI)	50		50			100.0	–6.4 (–10.0, –2.7)

Test for heterogeneity: p=0.35
Test for overall effect: p=0.0006
–100 –50 0 50 100 Favours LA Favours GA

Conclusions

- LA injection techniques are effective for postoperative analgesia, particularly during the first 6 hours after surgery, whether administered pre- or intra-operatively.
- LA injection for operative anaesthesia provides superior postoperative analgesia and other recovery benefits compared with general or neuraxial anaesthesia.
- Intra-operative LA instillation without needles reduced pain scores, but data are limited.
- There is evidence that postoperative LA infusion, via a catheter, reduces postoperative pain. However, further studies are warranted to investigate the potential risks and benefits of this technique.
- There is little evidence to support the use of paravertebral nerve blocks or local application of NSAIDs, clonidine or opioids.

Presented at the 11th World Congress on Pain, Sydney, Australia, 21–26 August 2005

Regional analgesic techniques studied

Regional analgesic technique	Control
LA analgesic techniques	
LA injection, pre-/intra-operative[1–12]	Placebo
LA injection, pre-operative[13–15]	LA injection, at-closure
LA instillation (no needles), intra-operative[16, 17]	Placebo
LA instillation, at-closure[18]	LA injection, pre-operative
Postoperative LA infusion[19–21]	Placebo
Paravertebral nerve block[22]	Peripheral nerve block
Bolus LA at the surgical site, postoperative[23, 24]	Placebo
Operative anaesthesia techniques	
LA injection[25–31]	GA
LA injection ± GA[12, 27, 29, 30, 32]	SA
SA[12, 27, 29, 30]	GA
SA[33]	EA
Other regional analgesic techniques	
NSAID at the surgical site by infiltration or topical gel[10, 34]	Placebo or LA
NSAID at the surgical site by infiltration or topical gel[34–38]	Systemic NSAID
Infiltration with clonidine[39, 40]	Placebo
Infiltration with clonidine[39, 40]	Systemic clonidine
Infiltration with opioid[41, 42]	Placebo
Infiltration with opioid[41–43]	Systemic opioid

LA: local anaesthetic GA: general anaesthesia SA: spinal anaesthesia EA: epidural anaesthesia

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