



Best evidence topic

In children undergoing umbilical hernia repair is rectus sheath block effective at reducing post-operative pain? Best evidence topic (bet)

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ABSTRACT

A best evidence topic was constructed according to a structured protocol. The question addressed was: In children undergoing umbilical hernia repair is a rectus sheath block (RSB) better than local anaesthetic infiltration of the surgical site, at reducing post-operative pain? From a total of 34 papers, three studies provided the best available evidence on this topic. One randomised clinical trial showed RSB had a better analgesic effect in the immediate post-operative period. In another randomised trial opioid consumption in the peri-operative period was found to be significantly lower in patients administered RSB. These improvements in pain and analgesia consumption need to be balanced against the expertise, training, equipment required, time implications and complications of performing a RSB.

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1. Introduction

A best evidence topic was constructed according to a structured protocol. This has previously been described in the International Journal of Surgery [1].

2. Clinical scenario

You are due to do a day case paediatric umbilical hernia repair (UHR) on a busy list and the anaesthetist decides to administer a rectus sheath block (RSB) before the surgical incision. Your paediatric surgical consultant suggests a nerve block may not be necessary and instead we could infiltrate the wound with local anaesthetic at the end of the procedure. The consultant anaesthetist argues a RSB gives better pain control post-operatively. You decide to search the literature for the best available evidence.

3. Three-part question

In [children undergoing umbilical hernia repair] is [a rectus sheath block better than local anaesthetic infiltration of the surgical site,] at [reducing post-operative pain]?

4. Search strategy

Evidence was searched using Medline and Embase. The following terms were searched: (umbilic* ADJ3 herni* [title, abstract] OR umbilical hernia [MeSH Terms]) AND (((rectus OR umbilic* OR para-umbilical OR para-umbilical) ADJ3 block* [title, abstract]) OR ((nerve block OR regional anaesthesia) AND (rectus abdominis muscle) [MeSH Terms])). Papers published in English were considered and given the paucity of information on this topic no limit on the publication year was applied. The search was duplicate filtered and reference lists of all relevant papers were searched for secondary references. The search was current as of 5th June 2014.

5. Search outcome

34 papers were found using the reported search. Of these 5 were duplicates, 6 were not related, 4 were in languages other than English, 4 dealt with adult patient population, 2 were conference abstracts and did not answer the question and 3 were letters of correspondence. Of the remaining 10 papers, 6 did not answer the question. Three papers compared RSB with local anaesthetic infiltration (LAI) and represent the best evidence to answer the clinical question.

6. Results

The results of the three papers (three prospective randomised clinical trials) are summarised in Table 1.

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Table 1
Best evidence papers.

Author, date, country	Patient group	Study type, level of evidence	Outcomes	Key results	Comments
Dingeman et al. [9] 2013 USA	52 patients (age 3–12 years) randomly assigned to one treatment group: RSB ($n = 27$) vs. LAI ($n = 25$) Both treatments administered at the end of the procedure. No significant differences in baseline patient demographics or length of stay in PACU Surgical case duration significantly longer in RSB group (39 vs. 30 min; $P = 0.04$)	Prospective, randomised clinical trial. Level II	Post-op pain scores at defined intervals for the first 24 h after surgery Post-op analgesia use Parent's perception of child's pain at 12 and 24 h after surgery	First obtainable post-op median pain scores were 0 in both groups. Subsequent pain scores at 10 min intervals after arrival in the PACU till discharge remained: – 0 in the RSB group – 1 in the LAI group (0 = no hurt; 1 = hurts just a little bit) Pain scores were found to be significantly lower in RSB group at: 10 min ($p = 0.04$), 30 min ($p = 0.01$), ≥ 40 min ($p = 0.03$) after arrival in the PACU. The percentage of patients reporting no pain (score 0) at these times was significantly higher in the RSB group ($p < 0.05$). No significant difference in: - pain scores after discharge from PACU, - pain assessment by parents at 12 and 24 h after surgery - post-op analgesia use No significant difference in: - Post-op analgesia requirement - Post-op pain scores - Time to rescue analgesia. 14 patients were given an intra-operative dose of morphine (11 LAI group vs. 3 RSB group). Peri-operative mean opioid consumption was significantly higher in the LAI group (mean: 0.13 mg/kg) than the RSB group (mean: 0.07 mg/kg). ($p = 0.008$) No significant difference in: - post-op morphine use - post-op pain scores	Well designed and rigorously conducted trial. Mean difference of 1 point in pain scores between the groups is modest, however considered significant by investigators. Study demonstrates short-term post-op analgesic benefits of RSB over LAI; benefits not sustained.
Gurnaney et al. [8] 2011 USA.	54 patients (age 5–18 years) randomly assigned to one treatment group: RSB ($n = 27$) vs. LAI ($n = 27$) RSB administered before surgical incision, LAI at end of procedure. No significant differences in baseline patient demographics	Prospective, randomised clinical trial. Level II	Post-op analgesia (opioid) use Post-op pain scores at time of PACU admission, at hourly intervals and at discharge. Time to first rescue analgesia	No significant difference in: - Post-op analgesia requirement - Post-op pain scores - Time to rescue analgesia. 14 patients were given an intra-operative dose of morphine (11 LAI group vs. 3 RSB group). Peri-operative mean opioid consumption was significantly higher in the LAI group (mean: 0.13 mg/kg) than the RSB group (mean: 0.07 mg/kg). ($p = 0.008$) No significant difference in: - post-op morphine use - post-op pain scores	Poor quality randomised trial. Potential for selection bias with trial design. Not all patients accounted for in final analysis. Peri-operative differences in mean opioid consumption are modest.
Isaac et al. [10] 2006 Canada	13 patients (age 1–8 years) randomly assigned to one treatment group: RSB ($n = 7$) vs. LAI ($n = 6$) Both treatments administered at the end of the procedure. Mean age difference between the groups was 2 years.	Pilot study, randomised trial Level II	Post-op pain scores at 10 min intervals till discharge. Post-op analgesia use (IV morphine administered if pain score ≥ 8) Parent's perception of child's pain at 12 and 24 h after surgery	No significant difference in: - post-op morphine use - post-op pain scores	As pilot study, small sample size, power limited, possibility of type II error. RSB not ultrasound-guided. Concluded RSB has no advantage over LAI for post-op pain management in children undergoing UHR.

LAI: local anaesthetic infiltration.

PACU: post-anaesthesia care unit.

RSB: rectus sheath block.

UHR: umbilical hernia repair.

7. Discussion

UHR is one of the most commonly performed day case operations in the paediatric population and is usually carried out in children over the age of three. To improve pain management following UHR, LA is usually administered either as a RSB or

infiltrated at the wound site. The RSB for UHR in children was first suggested by Ferguson and colleagues [2]. The authors describe a potential space that exists between the posterior aspect of the rectus muscle and the posterior wall of its sheath. Administering local anaesthetic (LA) in this space allows distribution at various levels affecting multiple intercostal nerves. Courreges et al. [3]

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