Introduction

Acute postoperative pain after inguinal and infra-umbilical hernia repair can be moderate to severe,[1] and up to 20% of patients may develop chronic postoperative pain after hernia surgery.[2] Local anaesthetic techniques are valuable options for decreasing acute postoperative pain and reducing the risk of developing persistent postsurgical pain.[3] Two of these techniques are transversus abdominis plane (TAP) block and local anaesthetic infiltration of the surgical wound. Of note, the TAP block consists of injecting local anaesthetic into the plane between the internal oblique and the transversus abdominis muscles to anaesthetise the sensory nerves supplying the anterior abdominal wall.[4]

Several meta-analyses have summarised evidence that both local anaesthetic wound infiltration[5] and TAP block[6] provide better pain relief after inguinal or infra-umbilical hernia repair than placebo. However, it remains uncertain whether one technique is superior to the other. We therefore, undertook a systematic review and meta-analysis with trial sequential analysis to determine whether TAP block provides better analgesia than wound infiltration after inguinal or infra-umbilical hernia repair.

Methods

Literature search and inclusion criteria

This investigation followed the recommended 'Preferred Reporting Items for Systematic Reviews and Meta-Analyses' (PRISMA) statement process[7] and was prospectively registered on the International Prospective Register of Systematic Reviews (registration number CRD42020208053). The PRISMA flow diagram is depicted in the appendix (Supplementary Fig. 1, http://links.lww.com/EJA/A682).

Two authors (SG and EA) searched the following electronic databases up to 17 June 2020: MEDLINE, Embase, Cochrane Central Register of Controlled Clinical Trials and Web of Science. The following population search terms were applied: Hernia OR Hernia surgery. The results of this search were combined with Block OR Transversus abdominis OR TAP OR Local anaesthesia OR Local anesthesia OR Wound infiltration. The limits of Clinical trials OR Random allocation OR Therapeutic use were then applied to the results. The following words were searched as keywords

Hernia, Hernia Surgery, Incisi*, Operation*, Operative*, Surger*, Surgical*, Perioperati*, Pain*, Nociception*, Analges*, Anesthe*, Anaesthe*, Transversus abdominis plane block, Transvers*, Block*, Local anaesthe*.

The results of this search strategy were limited to randomised controlled trials and humans. No language limits were placed on the search. In addition, the authors scrutinised the references of all retrieved articles for any applicable trials that might not have been captured by the above approach. Finally, Google Scholar was queried to identify any remaining relevant publications, and authors that registered clinical trials on clinicaltrials.gov were contacted.

Two authors (SG and EA) independently collected data from each article on a standardised data collection form. In these forms all data extracted from included studies and data used for all analyses were summarised. These forms were not made publicly available.

Population

The meta-analysis addresses adult patients undergoing open or laparoscopic inguinal hernia repair or infra-umbilical hernia repair.

Intervention and comparator

Only trials investigating pain outcomes and comparing TAP block with wound infiltration were included in this meta-analysis.

Outcomes

Defined outcomes were extracted from each article following our routine approach previously described in meta-analyses on acute postoperative pain.[8–10] The primary outcome was rest pain score at 2 postoperative hours. Secondary pain-related outcomes included: rest pain score at 12 and 24 postoperative hours; dynamic pain score at 2, 12 and 24 postoperative hours; intravenous morphine equivalent consumption at 2, 12 and 24 postoperative hours; time to first analgesic request; rate of postoperative nausea and vomiting within the first 24 postoperative hours; and patient satisfaction assessed on a 11-point numeric rating scale (0, totally dissatisfied; 10, highly satisfied). Other secondary outcomes sought were rates of haematoma, postoperative infection, visceral injury and local anaesthetic systemic toxicity. We also aimed to capture hospital resource-related outcomes such as hospital length of stay.

Trial characteristics

Extracted trial characteristics included TAP block technique; timing of the TAP block and wound infiltration; type, concentration and volume of local anaesthetic administered for TAP block and wound infiltration; anaesthetic strategy; and type of postoperative analgesia.

Rating of the studies

For each randomised trial, the quality ofthe methodology was evaluated using the Cochrane Collaboration's Risk of Bias Tool.[11] Two authors (SG and EA) employed this method to independently screen, review and score the items for each trial. Disagreements in scoring or extracted data were adjudicated by KRK.

Data extraction

The texts, tables or images from the source articles were evaluated to extract the number of participants, number