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Ain-Shams Journal of Anesthesiology (2023) 15:72
https://doi.org/10.1186/s42077-023-00369-9

Ain-Shams Journal of Anesthesiology

CASE REPORT Open Access

Thoracic spinal anaesthesia for paediatric upper extremity surgery in limited-resource hospital: a case report

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Abstract

Background Thoracic spinal anaesthesia for upper extremity surgery is rarely performed and exceptional procedure. We report a case in which thoracic spinal anaesthesia (T3–T4 intervertebral space) was performed successfully in a paediatric patient with distal radius fracture ORIF surgery.

Case presentation A 15 years old man with distal radius fracture ORIF was scheduled to undergo remove of implant. His parents did not want to have general anaesthesia because complication of postoperative pulmonary complications, patient has allergy and asthmatic potential. We proposed thoracic spinal anaesthesia with small dose bupivacaine 0.5% hyperbaric (5 mg).

Conclusions Thoracic spinal anaesthesia with small dose bupivacaine 0.5% hyperbaric at the cervical level (C4) may offer an alternative option when general anaesthesia or conventional regional techniques are contraindicated or equipment unavailable to perform peripheral nerve block.

Keywords Thoracic spinal anaesthesia, Paediatric, Upper extremity surgery, Limited-resource hospital, ORIF surgery, General anaesthesia, Case report

Background

Thoracic spinal anaesthesia for upper extremity surgery is rarely performed and exceptional procedure (Shatri and Singh 2022). General anaesthesia is currently the standard technique anaesthesia used for upper extremity surgery (Douglas Hale McMichael 2015). The disadvantages of general anaesthesia include, inadequate pain control due to lack of residual analgesia, increasing the length of hospitalization, high incidence of nausea and vomiting, increased length of stay, and increasing of postoperative pulmonary complications. We report a case in which thoracic spinal anaesthesia (T3–T4 intervertebral space) was performed successfully in a paediatric patient with distal radius fracture ORIF surgery.

Case presentation

A 15-year-old man with distal radius fracture ORIF (Fig. 1) was scheduled to undergo remove of implant. His parents did not want to have general anaesthesia because complication of postoperative pulmonary complications, patient has allergy and asthmatic potential. We proposed thoracic spinal anaesthesia with small dose bupivacaine 0.5% hyperbaric (5 mg).

We decided to perform spinal anaesthesia at T3–T4 intervertebral space with the patient in the sitting position. We performed informed parental consent to the parents of patient that there were two particularly serious risks. The first risk was injury to the spinal cord from the

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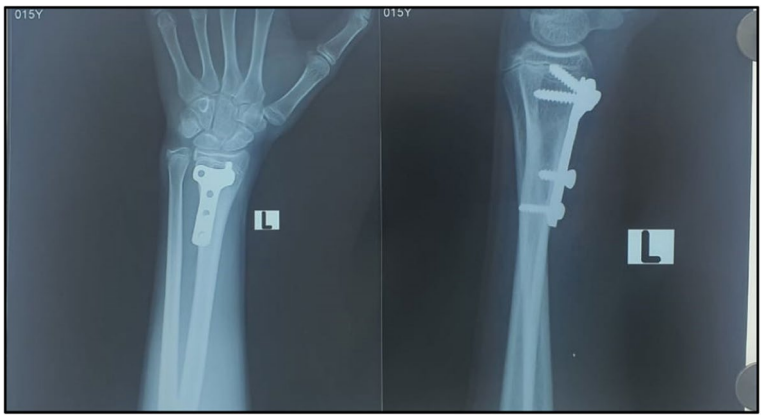

Fig. 1 Postoperative radiographs ORIF radius upper extremity

needle with the possibility of permanent paralysis or of loss of feeling or both in one or more limbs. The second risk was the development of total spinal anaesthesia. The parents of patient understood and accepted the risks.

The patient was placed supine position on the operating table and placed lead electrocardiography, pulse oximeter, and blood pressure cuff. His vital signs are stable. While the patient was held seated, a 27-gauge Quincke-Babcock spinal needle was inserted paramedian under aseptic conditions in the T3–T4 intervertebral spaces. After removing the obturator stylet, the Quincke-Babcock needle is advanced slowly until the cerebrospinal fluid appears (Fig. 2). Hyperbaric bupivacaine (0.75%; 5 mg) is injected in the subarachnoid space in 30 s with a barbotage one time. Hemodynamically stable and no hemodynamic changes after C4 block is achieved. After the sensory block is achieved, the patient can still move both hands, with muscle strength grading 3 (movement against gravity only), but the sensory is completely blocked. The patient is performed remove of implant and the duration of the procedure during 1 h. During surgery hemodynamically stable with SBP in the range 110–120, and HR 60–75 bpm.

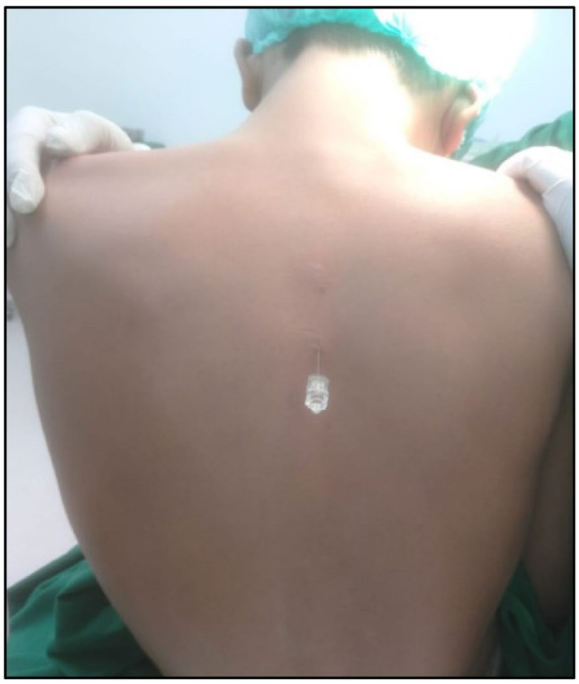

Fig. 2 Paramedian thoracic spinal anaesthesia, spinal anaesthesia needle insertion at T3-T4

Discussion

Spinal anaesthesia has several advantages compared with general anaesthesia. This is because spinal anaesthesia has little effect on respiration and cardiac complications, the avoidance of airway instrumentation and its potential complications, can suppress the neuroendocrine response from surgery, adequately managed acute postoperative pain, earlier recovery of gastrointestinal function, less effect of postoperative nausea and vomiting, earlier ambulation and discharge from hospital, a lower incidence of deep vein thrombosis, lower surgical site infection rates, reduced need for blood transfusions, and reduced costs (Roux et al. 2023).

Thoracic spinal anaesthesia has been performed for a variety of surgical procedures. These include lower limb orthopaedic surgery, abdominal cancer surgery, breast surgery, laparoscopic cholecystectomy, and caesarean delivery. However, no one has reported upper limb orthopaedic surgery under thoracic spinal anaesthesia. This case report shows that thoracic spinal anaesthesia with cervical level (C4) block results good outcome and safe in patients undergoing upper limb surgery. Although this

action was avoided by the anaesthesiologists because fear of iatrogenic injury to the spinal cord, cephalad spread of local anaesthetic causing a complete spinal block, and haemodynamic instability owing to blockade of cardio-accelerator sympathetic fibres, but no cases of complete spinal block were identified in the literature where thoracic spinal anaesthesia was performed (Roux et al. 2023; Imbelloni and Gouveia 2014; Kour and Wani 2019; Spannella et al. 2020; Hobaika et al. 2015; Mahmoud et al. 2014; Daszkiewicz et al. 2016; Chauhan et al. 2021).

Conclusions

Thoracic spinal anaesthesia with small dose bupivacaine 0.5% hyperbaric at the cervical level (C4) may offer an alternative option when general anaesthesia or conventional regional techniques are contraindicated or equipment unavailable to perform peripheral nerve block.

Abbreviations

ORIF	Open Reduction And Internal Fixation
C4	Cervical level 4
T3	Thoracal level 3
T4	Thoracal level 4
SBP	Systolic blood pressure
HR	Heart rate

Acknowledgements

The authors would like to give special thanks to all of anaesthesiologists in 4 Saudara Group, Medan, Sumatera Utara, Indonesia. Thank you to my friends for their support in writing this case, Fadly Ramadhan and Syarir Supratman Hutabarat.

Authors' contributions

AP, TH, JFS, IG, and AL contributed to all aspects of this manuscript, including writing draft and reading reference; supervision procedure, analysis, and drafting the article.

Funding

None.

Availability of data and materials

Data available on request from the authors.

Declarations

Ethics approval and consent to participate

This is an anonymous case report. Although written informed consent was obtained from the parents of patient for publication of this case report, National Center of Research and Education Institute (NCREI) as the ethics committee in our hospital waived the need for ethics committee approval (101/KEP/NCREI/2023).

Consent for publication

Written informed parental consent was obtained from the parents of patient for publication of this case report and any accompanying images. We performed informed parental consent to the parents of patient that there were two particularly serious risks. The parents of patient understood and accepted the risks. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Competing interests

The authors declare that they have no competing interests.

Received: 17 March 2023 Accepted: 16 August 2023
Published online: 01 September 2023

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