


## Single-Shot Thoracic Spinal Anesthesia (TSA) In Pediatric Patient Under Laparoscopic Cholecystectomy: A Case Report

Imam Ghozali<sup>1</sup>, Tasrif Hamdi<sup>2</sup>, Yusmaidi<sup>3</sup>, John Frans Sitepu<sup>2</sup>

<sup>1</sup>Departemen of Anesthesiology and Intensive Care, Faculty of Medicine, Universitas Lampung, RSUD Dr. H. Abdul Moeloek Provinsi Lampung

<sup>2</sup>Departemen of Anesthesiology and Intensive Care, Faculty of Medicine, Universitas Sumatera Utara, RSUP H. Adam Malik Medan

<sup>3</sup>Departemen of Surgery, Faculty of Medicine, Universitas Lampung RSUD Dr. H. Abdul Moeloek Provinsi Lampung

\*Corresponding Author: Imam Ghozali, E-mail: [tasrif.hamdi@usu.ac.id](mailto:tasrif.hamdi@usu.ac.id) 

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### ABSTRACT

**Introduction:** Laparoscopy is mostly performed under general anesthesia (GA) but laparoscopy using anesthesia such as thoracic spinal anesthesia (TSA) is mostly performed by some anesthesiologists and it is very useful when compared to GA.

**Method:** This paper presents a case report of the use of TSA in healthy pediatric patients who administered anesthesia with TSA in the T10-T11 interspace, using 1 ml of hyperbaric Bupivacaine 5 mg/ml mixed with: 1 ml of Levobupivacaine isobaric 5 mg/ml, Fentanyl 50 µg, Ketamine 10 mg and Dexmedetomidine 10 µg mixed in 1 syringe.

**Results:** During procedure, hemodynamically stable, no nausea, vomiting, or discomfort. Postoperative recovery process was very smooth, hemodynamically stable, no pain was reported or PDPH (Post Dural Puncture Headache) even though we used a 26G spinal needle. The use of TSA is considered very practical and more economical even though it is still carried out very carefully.

**Conclusion:** This is only one single case report. TSA can be a better choice compare with general anesthesia. Stable hemodynamic during laparoscope and TSA can avoid systemic effect of general anesthesia like cognitive affect after general anesthesia, longer for recovery from anesthesia, nausea, vomiting, poor control pain and high cost.

Thoracic Spinal Anesthesia, TSA, Laparoscopic Cholecystectomy

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## INTRODUCTION

Laparoscopy is generally performed under general anesthesia but regional anesthesia such as lumbar and thoracic spinal anesthesia has been widely used and has been found to be useful. In this case report, we write a case report that used thoracic spinal anesthesia (TSA) in pediatric patients who were classified as healthy patients. We performed the TSA action on the T10-T11 interspace. Bupivacaine, levobupivacaine, has been widely used as a local anesthetic in regional anesthesia. In addition, fentanyl, Dexmedetomidine and Ketamine as intrathecal adjuvants are used to accelerate the onset of action, increase the duration of analgesia, and reduce hemodynamic side effects during anesthesia due to the use of large local anesthetics.

## METHOD

This was a retrospective case report, after analysis of patient clinical data. The patient provided written informed consent to publish their case details and any accompanying images. The study protocol complies

with the requirements of the institute's committee of Dr. H. Abdul Moeloek Hospital, Provinsi Lampung, Indonesia.

## RESULTS

A 13-year-old female, American Society of Anesthesiologists physical status I scheduled for laparoscopic cholecystectomy. Investigations were done and informed written consent was taken. The patient was asked to remain nil per oral 6 h before surgery. Patient was preloaded with 500 ml lactated Ringer's solution. In operation theater, a good intravenous (IV) access 18 G was secured for preloading and a non-invasive monitor was attached for monitoring such as electrocardiogram, heart rate (HR), noninvasive blood pressure, oxygen saturation (SpO<sub>2</sub>), temperature, and respiratory rate. Sitting position for TSA and paramedian approach was used. TSA was given using 1 ml hyperbaric bupivacaine 5 mg/ml mixed with 0.5 ml of fentanyl 50 µg/ml, ketamine 10 mg, dexmedetomidine 10 µg mixed in one syringe injected at T10-T11 interspace with a 26-gauge spinal needle after confirming its placement by free flow of clear cerebrospinal fluid (figure 2). Finally, the patient was turned to the supine horizontal position for the operation, and oxygen nasal cannula was started at 2 L/min. Onset of action and level of sensory block was judged by thermal, pin prick method every minute until the establishment of desired block. Hypotension was defined as systolic blood pressure <90 mmHg or >20% decrease in baseline values and was treated by fluids and vasopressors (ephedrine 5 mg). Bradycardia was defined as HR <50/min and was treated by 0.5 mg of atropine intravenous. HR, blood pressure, and SpO<sub>2</sub> were recorded every 3 min. Intra- and post-operative complications such as nausea, vomiting, pain, pruritus, headache, or any other side effects were recorded.



Figure 1. Administering spinal anesthesia in T10-T11 interspace

## OBSERVATION

Sitting position, shoulder relaxed and TSA performed. Onset of sensory block T4-L2 required for minimally invasive laparoscopic cholecystectomy was achieved in 3 min and duration of block was 3 h. Surgery commenced using carbon dioxide insufflation and a pressure limit of 10–12 mmHg. Patient was sedated without intravenous sedation, Ramsay score achieved 3/6. There was single used of 5 mg ephedrine IV for hypotension and easy to threat and no need atropine during the surgery and the patient was hemodynamically stable during intraoperative and postoperative period (figure 2). Furthermore, SpO<sub>2</sub> was above 95% at during laparoscope. Specific enquiry was made about postural puncture headache (PDPH) which was not experienced by our patient. Patient was followed for 72 h postoperatively and no complications were reported. Patient was no complain about neurological deficit postoperatively.



Figure 2. Monitor and situation during operation

## DISCUSSION

TSA action is very easy to perform in the thoracic interspace 10-11 (T10-T11).[1] TSA can be performed as a single shot, continuous with special catheter or a combination with an epidural. The sitting position makes it easy to perform the TSA procedure because this position provides sufficient space for the needle to enter the subarachnoid space in the thoracic region.[2-5] Ultrasound is now routinely used to determine the correct thoracic level and it is strongly recommended.[6,7] Even using ultrasound in addition to the injection level, the depth of the needle can also be monitored so that spinal cord injury does not occur. But not all hospitals have ultrasound and not all anesthesiologists are skilled at performing ultrasound for spinal anesthesia, especially at the thoracic level.

Paresthesia can occur with any spinal procedure, but the greatest risk is when needle injection above the end of the spinal cord. Most paresthesia appears in spinal anesthesia in the lumbar region, namely 13.6%, but its clinical significance is not yet known.[8] This action has been proven safe in previous cases and even used for critical patient cases.[9]

TSA has been widely used for various procedures and is considered to have many advantages over general anesthesia and has been shown to be safe.[10] The combination of hyperbaric and isobaric can provide good onset of action, longer sensory duration and considered safe.[11] Hyperbaric will act predominantly on sensory block (posterior root) while isobaric (anterior root) will action to motor blockade dominantly.[12,13] The combination of these drugs will accelerate the onset of action and longer the duration of sensory blockade and also reduce the incidence of hypotension after spinal anesthesia.[14]

No dyspnea or low saturation and all the time oxygen saturation above 95%. This good condition perhaps can be explained because of using low degree of thoracic muscle blockade by of low dose hyperbaric bupivacaine and mixture with isobaric levobupivacaine. No shoulder pain was founded during laparoscope perhaps using adjuvant in intratracheal local anesthesia. Intrathecal was used fentanyl, ketamine and dexmedetomidine. Intrathecal adjuvant especially ketamine can improve quality of analgesia during laparoscope. Using of ketamine as adjuvant for intrathecal spinal anesthesia has been done and safe.[15]

## CONCLUSION

This is only one single case report. TSA can be a better choice compare with general anesthesia. Stable hemodynamic during laparoscope and TSA can avoid systemic effect of general anesthesia like cognitive affect after general anesthesia, longer for recovery from anesthesia, nausea, vomiting, poor control pain and high cost.

## DECLARATIONS

Ethics approval and consent to participate. Permission for this study was obtained from the Ethics Committee of Universitas Lampung.

## CONSENT FOR PUBLICATION

The Authors agree to publication in Journal of Society Medicine.

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## AUTHORS' CONTRIBUTIONS

MHRS collects the data and writes the initial manuscript. ERD provided contribution and revision regarding the data analysis and imaging aspect of the discussion. RH provided contribution and revision regarding the data analysis and clinical aspect of the discussion. All authors read and approved the final manuscript.

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