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# Breast Debridement Under Segmental Spinal Anaesthesia in a Low Resource Setting: Feasibility and Safety Concerns

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## Abstract

General Anaesthesia (GA) can be safely performed for most of the surgical procedures. However, in a small subset of patients, procedure or patients' specific factors will dictate the choice of technique and regional anaesthesia (RA) may offer safer option. Subarachnoid Block can be performed at any of the thoracic and lumbar spinal levels, but is considered safer if it is performed below the termination of the spinal cord to avoid iatrogenic injury to the cord itself. Thoracic segmental spinal anaesthesia has been described in several groups of patients for e.g. laparoscopic cholecystectomy, abdominal cancer, breast cancer surgeries and other procedures. Patient refusal to any kind of procedure is an absolute contraindication. Under such circumstances we either counsel the patient, explain the procedure and risk involved and if options are available, alternative procedure/techniques are offered, for e.g., nerve blocks for lower or upper limb procedure are offered where GA is refused or contraindicated. We report a case of breast debridement performed under thoracic segmental spinal with excellent patient and surgeon satisfaction. Stable perioperative hemodynamics were maintained throughout the peri-operative period. Patient had refused general anaesthesia and we anticipated difficult airway. In our case, segmental thoracic spinal anaesthesia was offered and accepted by the patient. It was successfully performed with an adequate level of the sensory block during the breast debridement. The technique was associated with stable cardio-respiratory parameters and high patient satisfaction.

**Keywords:** Regional Anaesthesia, Segmental Spinal, Thoracic Spinal Anaesthesia

## Introduction

General anaesthesia (GA) can be safely performed for most of the surgical procedures. However, in a small subset of patients, procedure or patients' specific factors will dictate the choice of technique and regional anaesthesia (RA) may offer safer option [1]. Spinal anaesthesia (SA) results from pharmacologic denervation at the level of the spinal cord by introducing local anaesthetic (LA) into the subarachnoid space, resulting in various degree of sensory, motor, and sympathetic blockade according to drug and concentration used [2]. In theory, Subarachnoid Block can be performed at any of the thoracic and lumbar spinal levels, but is considered safer if it is performed below the termination of the spinal cord to avoid iatrogenic injury to the cord itself [3]. Since the performance of the first thoracic spinal anaesthetic (TSA) in early 1908 by Thomas Jonnesco in Romania, many anaesthetists are using it around the world as an alternative anaesthetic technique for numerous surgical procedures where GA pose a higher risk to the patient [4, 5, 6]. We report a case of breast debridement performed under thoracic segmental spinal with excellent patient and surgeon satisfaction. Stable perioperative hemodynamics were maintained throughout the peri-operative period. Patient had refused general anaesthesia and we anticipated difficult airway. Thoracic segmental spinal anaesthesia has been described in several groups of patients for e.g., laparoscopic cholecystectomy, abdominal cancer, breast cancer surgeries and other procedures.

## Case presentation

A 55-year-old obese female patient with a BMI 36 kg/m$^2$ presented with painful breast abscess which was incompletely drained in another hospital few days ago under sedation. On pre-anaesthetic assessment, she was known to be diabetic on oral hypoglycemic agents and had history of snoring. At presentation to our hospital, she was nil per oral for more than 6 hours. On assessment, her non-invasive blood pressure (NIBP) was found to be in the range of 190–160/110–100 mmHg, and her airway was Mallampati grade III. Large draining abscess was present in the lower medial quadrant of right breast. Surgeon wanted to debride and explore the breast with excision biopsy. Patient was reluctant for general anaesthesia perhaps due to previous bad experience. She requested some sort of local/regional Anaesthesia. We offered her the choice of getting her surgery done under thoracic segmental spinal anaesthesia with full explanation of the procedure and the risks, she consented for it. She was told that general anaesthesia would be needed in case of failure or need to extend the anaesthesia due to surgical reasons, she consented for that too.

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We proceeded with two anaesthesiologists present in the operation room after obtaining written informed consent from the patient. Routine monitors were applied (NIBP, pulse oximetry, electrocardiograph), and 18G intravenous access on the left upper limb was established. Under all aseptic precautions, subarachnoid block (SAB) was administered in the sitting position at T6-7 level with a 27G Quincke needle using 1.25 ml of 0.5% isobaric preservative free levobupivacaine and 0.5 ml (25 μg) of fentanyl. The incremental advancement of the needle was slow (1-2 mm each time). The patient did not complain of any paresthesia during needle advancement and after observing free flow of cerebrospinal fluid through the needle hub, drugs for spinal anaesthesia were administered. The patient was made supine and supplemental oxygen was provided with a nonrebreathing face mask @2L/Minute. Patient became pain free within 5 minutes of the administration of the spinal anaesthesia. The effect of the block was assessed with a pinprick, and a segmental sensory block extending from T3 to T10 was achieved without any respiratory compromise. Patient was able to move her legs when asked to do so. Hand grip and voluntary deep breathing was checked intermittently which was found adequate throughout and she maintained saturation of 98– 99% during the surgery. Intraoperative hemodynamics were stable with no requirement of any vasopressors and/or parasympatholytic. Patient responded to vocal command and remained comfortable during the entire procedure. Surgery was completed in 25 min, and the patient was shifted to the Postoperative Care Unit with stable vitals. Patient assisted herself while shifting from OT table to the trolly. In the post-operative period, hemodynamics was monitored, and the patient followed up for any neurologic deficit or any other complaint till the discharge from the hospital next day. None was reported.

## Discussion

Patient refusal to any kind of procedure is an absolute contraindication. Under such circumstances we either counsel the patient, explain the procedure and risk involved and if options are available, alternative procedure/techniques are offered, for e.g., nerve blocks for lower or upper limb procedure are offered where GA is refused or contraindicated. In our case, segmental thoracic spinal anaesthesia was offered and accepted by the patient. It was successfully performed with an adequate level of the sensory block during the breast debridement. The technique was associated with stable cardio-respiratory parameters and high patient satisfaction.

Conventionally, trained anesthesiologists often afraid to perform spinal anaesthesia above the termination of the spinal cord due to fear of injuring the spinal cord from the needle tip. TSA offers a feasible alternative in patients who are at high risk of perioperative morbidity and mortality under GA, with particular reference to older patients who have reduced physiological reserve and multiple comorbidities. [7]. Spinal anaesthesia has several advantages compared with GA These include: fewer respiratory and cardiac complications [8], a more pronounced suppression of the neuroendocrine stress response to surgery [9], better intraoperative and postoperative pain control, [10] earlier recovery of gastrointestinal function [11], less postoperative nausea and vomiting [12], earlier ambulation and discharge from hospital [13], a lower incidence of deep vein thrombosis [14], lower surgical site infection rates [15], reduced need for blood transfusions [15], and reduced costs [16]. A significant advantage of SA is the avoidance of airway instrumentation and its potential complications. Although GA represents the standard of care when performing major abdominal and thoracic surgery, TSA is now being used by increasing number of anesthesiologists around the world.

Thoracic subarachnoid block is often thought to cause hemodynamic or respiratory compromise due to the blocked of cardioaccelerator fibers and intercostal nerves, respectively. In a study segmental spinal anaesthesia performed for laparoscopic cholecystectomy at T10 level in 20 patients was evaluated where upper sensory block level obtained was T2–T4 with minimal hemodynamic changes and no respiratory complications [17]. Thoracic spinal with low doses isobaric local anaesthetic also offers some advantages of lesser motor block (due to differential block) in a conscious patient. MRI studies has shown that spinal cord is more anterior in the thoracic region, thus reducing the chances of injury as compared to lumber region, especially when we go in a graded manner during the needle placement in subarachnoid space [18]. The amount of CSF in the thoracic spinal segment is comparatively less as in lumbar and cervical segment and the thoracic nerve roots are thinner as compared to the lower or upper ones, there is lesser dilution of the anaesthetic drug and the dose required per segment is much less. The nerve roots are easily blocked due to their smaller diameter. Both these factors contributing to a good block with lesser amounts of LA used. One of the studies comparing conventional doses of hyperbaric bupivacaine at lumbar level with half the dose in the thoracic injection, highlighted the onset time to reach T-3 level is reduced with the latter. With the thoracic injection, the incidence of hypotension was less, and capability to move themselves to the transport trolly (stretcher) was an added advantage as the duration of motor and sensory block were significantly shorter with the smaller dose and thoracic approach [19] The literature illustrates that TSA is both a feasible and adequate anaesthesia can be achieved in a wide range of patients for number of surgical procedures [20]. Patients offered this technique must be assessed very carefully and managed by anesthetists with considerable experience (Two anesthesiologists were present continuously during this case) of regional anaesthesia. There is no single anesthetic technique which fits all patient for all surgery, but what is described here is an option to expand the concept of regional anaesthesia by performing spinal anaesthesia in the thoracic region with high patient satisfaction and of proven safety which offers greater advantages in certain high-risk patients [21].

## Conclusion

Thoracic segmental spinal anaesthesia can be used successfully and safely for breast surgeries by experienced anesthesiologist with excellent patient and surgeon satisfaction. Cardio-respiratory stability is maintained though there is remote chances of hypotension or bradycardia as is common with any spinal anaesthesia. Further randomized control trials need be done in a large cohort to establish its full usefulness and safety.

**Clinical relevance**

This case report discusses the feasibility and safety of segmental spinal Anaesthesia for breast surgery. Thoracic spinal Anaesthesia provides a safe and comfortable Anaesthesia with high patient and surgeon satisfaction.

**Declaration of patient consent:** The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his/her consent for his/her images and other clinical information to be reported in the Journal. The patient understands that his/her name and initials will not be published, and due efforts will be made to conceal his/her identity, but anonymity cannot be guaranteed.

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