Archives of Anesthesiology and Critical Care (Spring 2024); 10(2): 203-204.

Available online at http://aacc.tums.ac.ir

Commentary

Thoracic Segmental Anesthesia: A New Paradigm in Anesthesiology Practice

Imran Ahmed Khan[1], Mahtab Alam Ansari[2]*

[1]*Department of Community Medicine, BRD Medical College, Gorakhpur, India.*

[2]*Department of Anesthesiology, BRD Medical College, Gorakhpur, India.*

ARTICLE INFO

Article history:
Received 22 May 2023
Revised 15 June 2023
Accepted 29 June2023

Thoracic spinal anesthesia (TSA) is performing subarachnoid bock at thoracic level with low doses of local anesthetics often with adjuvants. Segmental anesthesia per se implies targeting particular spinal segments according to surgical requirements. By employing TSA some of the drawbacks of General anesthesia and lumber spinal anesthesia can be avoided [1]. Presently TSA is being practiced across the globe with proven safety and success. Surgeries which were once thought difficult and impossible under subarachnoid bock are being routinely done under TSA. These include but not limited to breast surgeries, laparoscopic surgeries, thoracoscopic surgeries and sick laparotomies etc. [2-3]. Most of the obstetrics and gynecological surgeries including, caesarean section, ectopic, laparoscopic surgeries etc. have also been successfully performed under TSA [4]. TSA has been proved to be excellent choice in geriatric patients [5]. High risk cases which were amenable to be conducted only under general anesthesia in advanced setups are now being successfully performed under TSA even in low resource settings.

Safety of TSA: TSA has been found safe under expert hands. Actually, there are two major safety concerns. Firstly, fear of injury to the spinal cord itself and secondly expected adverse hemodynamic effects of high spinal block mainly in terms of blocked of cardiac accelerators and respiratory compromise. Magnetic resonance imaging studies have shown that spinal cord is more anteriorly placed in thoracic segment. Moreover, upper thoracic spines are angulated which provide additional margin of safety during needle insertion [6-7]. Slow and graded spinal needle entry will reduce the chances of spinal cord injury. A study on 300 patients utilizing TSA shown paresthesia in a small number of patients and neurological sequalae in none [8]. Lumbosacral sparing causes minimal vasodilation in lower limbs so right atrial filling is preserved which maintains heart rate. Less sympathetic blocked avoids hypotension. Minimal respiratory compromise occur as main muscle of respiration is diaphragm which is largely unaffected by TSA, expiration is passive and low dosage of local anesthetics impart little motor block of intercostal muscles. A randomized controlled study has shown that TSA is an adequate option for high-risk patients with numerous advantages [9].

Benefits of TSA: The benefits of TSA are many including, avoidance of airway manipulation, conscious patient, effective analgesia, stable hemodynamics, less blood loss, easy homeostasis of carbon dioxide in spontaneously breathing awake patients, opioid sparing, shorter stay in post anesthesia care, too soon initiation of enteral feeding, lesser chances of post anesthesia nausea and vomiting leading to early discharge and early resumption of work. TSA is also very economical too. There is lesser amount of drugs (about half that is used in lumber spinal) needed to obtain desired effect. As minimal segments are blocked and more so sensory component, there is less hemodynamic changes leading

The authors declare no conflicts of interest.

*Corresponding author.
E-mail address: drmahtabalam016@gmail.com

to lesser fluid and medications needed to maintain hemodynamic stability [10]. Various thoracic intervertebral spaces with varying volume of local anesthetics have been described according to proposed surgical requirement [11].

Caution while practicing TSA: TSA shouldn't be taken as a magic bullet to be used everywhere. Expertise of the anesthesiologist is of paramount importance and TSA shouldn't be used by a novice anesthesiologist. It should be utilized in cases where it is most indicated. Patient's safety is of paramount importance. Minimum monitoring standards should be respected. Single shot TSA may not work for long duration surgery and may require continuous TSA with spinocaths. More evidence is needed before it become a routine for low-risk American Society of Anesthesiologists (ASA)-I and II patients.

TSA is a wonderful anesthesia technique with varied indications and excellent safety profile. Several surgical procedures can be conducted under TSA which carry high risk under general anesthesia and difficult to handle under lumber spinal. Rock stable hemodynamics is a peculiar feature of TSA with about half of the total dose administered as compared to lumber spinal. Careful patient selection, expert and trained anesthesiologist and adequate monitoring should be the norm for successful outcome. Low cost of TSA and early discharge are added advantages specially for low resource settings.

References

[1] Khan I, Paliwal N, Ahmad S. Safety and Feasibility of Segmental Thoracic Spinal Anaesthesia (STSA): A Scoping Review. Scholars Journal of Applied Medical Sciences. 2022; 2022:1718-22.

[2] Upadhyay S, Khan IA, Singh SK. Breast Debridement under Segmental Spinal Anaesthesia in a Low Resource Setting: Feasibility and Safety Concerns. Journal of Anaesthesia and Critical Care Case Reports. 2022;8(3):00-

[3] Kejriwal AK, Begum S, Krishan G, Agrawal R. Laparoscopic cholecystectomy under segmental thoracic spinal anesthesia: a feasible economical alternative. Anesthesia, essays and researches. 2017; 11(3):781.

[4] Chauhan R, Sabharwal P, Sarna R, Meena S. Thoracic spinal anesthesia for cesarean section in severe pre-eclampsia: exploring a new dimension. Ain-Shams Journal of Anesthesiology. 2021; 13(1):1-4.

[5] Mehta N, Gupta S, Sharma A, Dar MR. Thoracic combined spinal epidural anesthesia for laparoscopic cholecystectomy in a geriatric patient with ischemic heart disease and renal insufficiency. Local Reg Anesth. 2015; 8:101-4.

[6] Imbelloni LE, Quirici MB, Ferraz Filho JR, Cordeiro JA, Ganem EM. The anatomy of the thoracic spinal canal investigated with magnetic resonance imaging. Anesth Analg. 2010; 110(5):1494-5.

[7] Lee RA, Van Zundert AA, Breedveld P, Wondergem JH, Peek D, Wieringa PA. The anatomy of the thoracic spinal canal investigated with magnetic resonance imaging (MRI). Acta Anaesthesiol Belg. 2007; 58(3):163-7.

[8] Imbelloni LE, Pitombo PF, Ganem EM. The incidence of paresthesia and neurologic complications after lower spinal thoracic puncture with cut needle compared to pencil point needle. Study in 300 patients. Journal of Anesthesia and Clinical Research. 2010.

[9] Ellakany MH. Thoracic spinal anesthesia is safe for patients undergoing abdominal cancer surgery. Anesth Essays Res. 2014; 8(2):223-8.

[10] Gonano C, Leitgeb U, Sitzwohl C, Ihra G, Weinstabl C, Kettner SC. Spinal versus general anesthesia for orthopedic surgery: anesthesia drug and supply costs. Anesth Analg. 2006; 102(2):524-9.

[11] Le Roux JJ, Wakabayashi K, Jooma Z. Defining the role of thoracic spinal anaesthesia in the 21st century: a narrative review. Br J Anaesth.2023; 130(1):e56-65.