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THORACIC SEGMENTAL SPINAL ANAESTHESIA IN BREAST SURGERIES.

Anaesthesiology

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ABSTRACT

Background And Objectives: To see the effect of thoracic spinal anaesthesia in view of Intra operative Hemodynamic changes, intra operative complications, post operative pain and analgesia requirement, adverse events, post anaesthesia discharge time, patient and surgeon satisfaction in breast surgeries. **Method:** 36 female patients of age group 18-65 years were selected randomly, and thoracic spinal anaesthesia was administered using 1 ml isobaric bupivacaine+25 mcg Fentanyl intrathecally in T5-T6 intervertebral space. Patients were evaluated for hemodynamic stability, any adverse effects, post operative analgesia requirements. **Results:** Thoracic spinal anaesthesia provides better hemodynamic stability, lesser side effects and better post operative analgesia. **Conclusion:** Thoracic segmental spinal anaesthesia in patients undergoing breast surgeries provide better hemodynamic stabilitiy with minimal side effects and longer duration of post operative analgesia.

KEYWORDS

Thoracic Segmental Spinal Anaesthesia, Breast Surgeries, General Anaesthesia

INTRODUCTION:

The word Anaesthesia means “loss of sensations with or without loss of consciousness.” Types of anaesthesia includes mainly General anaesthesia and regional anaesthesia. Definition of General anaesthesia is “Induced state of unconsciousness along with partial or complete loss of reflexes and inability to autonomously maintain an airway and respond purposefully to verbal or physical stimulation.”

Regional anaesthesia consists of inhibiting nerve transmissions to specific region or area of body to relieve pain by infiltrating anaesthetic agents without affecting state of consciousness. [12] There are various benefits to regional anaesthesia over general anaesthetia, including the avoidance of airway manipulation, lower doses, fewer systemic drug adverse effects, quicker recovery, and much less postoperative discomfort.

Spinal anaesthesia can be given in lumbar as well as thoracic intervertebral space. Thoracic spinal anaesthesia is frequently used interchangeably with the term "Segmental spinal." Definition of segmental spinal is “Blocking of the required dermatomes essential for the proposed surgical procedure with very low effective local anesthetic drug dose.” [11] Thoracic segmental spinal anaesthesia is a technique of regional anaesthesia that can potentially be a suitable alternative to general anaesthesia for surgeries, particularly in patients who are considered at high risk for general anaesthesia. In 1909, Jonnesco described the use of spinal anesthesia for surgeries in the skull, head, neck, and the thorax.

General anesthesia is currently the standard technique used for surgical treatment of breast pathologies. Segmental spinal anaesthesia provide great hemodynamic stability, minimal motor block, faster sensory recovery and early bladder -bowel control without added risks with careful performance, and looks very likely that it will establish itself as a routine procedure in day care anaesthesia.

METHODOLOGY:

After approval from the institutional ethical committee, the study was conducted in randomly selected total 36 patients of ASA I, II, III with age group ranging from 18 to 65 years undergoing elective breast surgeries. Detailed history, general and systemic examination was done.

Patients were selected randomly after pre-anesthetics check-up, according to ASA Grade and was explained in detail about the objective of the study, methodology, advantages, and likely complications and their treatment. Patients had been explained about possibility of conversion to general anaesthesia if needed. Informed written consent were taken from those who were willing to participate in the study.

Inclusion Criteria:

- Patients undergoing routine elective breast surgeries.
- Patients of age between 18 -65 years
- Asa grade I,II and III patients
- Patients giving informed written consent.

Exclusion Criteria:

1. Patients who refuse to give consent.
2. Contraindications to spinal anesthesia such as bleeding diathesis or local infection.
3. Patients having thoracic kyphoscoliosis.
4. Hemodynamically unstable patients
5. Severe chronic obstructive pulmonary diseases and Asthma, Emphysema, acute respiratory failure
6. Fixed Cardiac output like MS, AS, HOCM etc.
7. Severe cardiac diseases with heart failure
8. BMI >35 Kg/m^2

Pre anaesthetic preparations were done. Night Before surgery at 10 pm: Tab. Alprazolam orally (0.25mg if weight is <60kg,0.5mg if weight is >60kg). In recovery room after Confirming NBM status of patient (6 to 8 hours minimum) and Securing I.V. line, Preloading was done 30 minutes before surgery (10 ml/kg body weight with Injection Ringer Lactate intravenously).

Premedication :

1. Inj. Glycopyrrolate: 0.01mg/kg IV
2. Inj. Ondansetron: 0.1-0.2mg/kg IV
3. Inj. Midazolam: 0.02mg/kg IV

In Operation Theatre: Standard monitoring was applied in the form of 5-lead electrocardiography, non-invasive blood pressure measuring, and pulse oximetry (SpO_2).

Pre-operative Vitals:

Pulse rate, heart rate, blood pressure, spo2 on Room air were recorded before and after premedication in recovery room.

Segmental Thoracic Spinal anesthesia (STSA)was given by senior staff of department of anaesthesia from hospital under all aseptic and antiseptic precautions in sitting position with paramedian approach using anatomical landmark technique at T5-T6 using 25-gauge Quincke spinal needle. After negative aspiration for blood and free flow of clear CSF, Injection isobaric levobupivacaine (0.5%) 1ml+ Injection Fentanyl 25mcg was given in subarachnoid space.

Upper level of sensory level will be checked by pin prick method and when it reaches to T2 – T3 level Time was noted. Motor block was assessed by Modified bromage scale.

When level of block reaches up to required dermatome for respective surgeries achieved, patient was handed over to surgeons and continuous monitoring of patients done before and after induction and then every 15 minutes till surgery lasted. Patients was provided with

oxygen support at least 4ml/min via nasal cannula or venti mask. Patient satisfaction score were noted.

Hypotension was defined as SBP 20% decrease in baseline values and was treated by fluids and Inj. Mephentermine sulphate 6mg intravenously slowly (maximum dose 30mg). Hypertension was defined as SBP > 130 mmHg or > 20% increase in baseline values.

Tachycardia was defined as HR > 100/minute. Bradycardia was defined as HR< 50/min. if needed it would have been treated by Injection Atropine 0.04 mg/kg (maximum dose 3mg) intravenously.

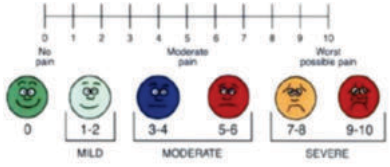
After completion of surgery, patients were shifted to recovery room and watched for vitals and if any complications if occurred. Afterwards patients were shifted to wards and watched for 24 hours for post operative pain assessment and if any adverse effects like :

1. Nausea and vomiting
2. Headache
3. Shoulder pain
4. Urinary retention

Likert's scale for surgeon satisfaction also noted.

Post Operative Monitoring: monitoring of vitals and VAS score done immediately after ot,5 minutes post op,30 minutes,1 hour and every 2 hourly till VAS≥4.

Post-operative Pain Assessment: Visual analog scale (VAS)(0-10)



If VAS score >4, the patient received a rescue analgesic in the form of Injection PCM 20mg/kg IV slowly.Hemodynamic parameters, mean anaesthesia time, duration of surgery, duration of analgesia, patient and surgeon satisfaction score, discharge criteria , % of conversion to GA and side effects, all these were noted.

Post Anesthetic Discharge Scoring System (PADS).

Vital Signs	2 = within 20% of preoperative value 1 = 20%-40% of preoperative value 0 = > 40% preoperative value
Activity and mental status	2 = Oriented × 3 AND has a steady gait 1 = Oriented × 3 OR has a steady gait 0 = Neither
Pain, nausea and/or vomiting	2 = Minimal 1 = Moderate, having required treatment 0 = Severe, requiring treatment
Surgical bleeding	2 = Minimal 1 = Moderate 0 = Severe
Intake and output	2 = has had PO fluids AND voided 1 = has had PO fluids OR voided 0 = Neither

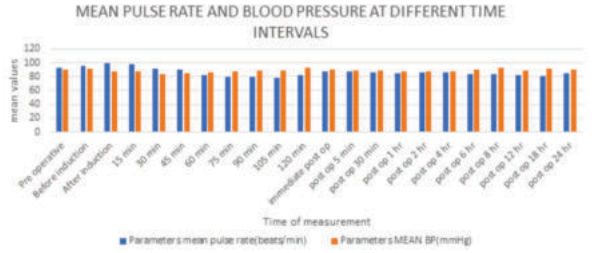
*Total PADS score is 10; Score ≥ 9 considered fit for discharge;**PO = oral administration.

RESULTS:

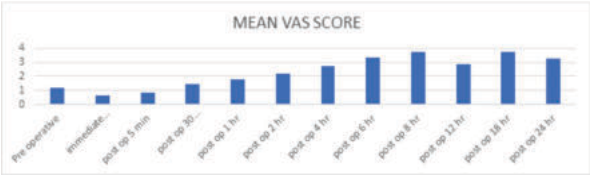
The study was carried out in 36 adult female patients. Demographic data are shown below.

Parameters	Mean ± SD
Age(years)	37.27 ± 11.25
Height(cms)	163.02 ± 4.27
Weight(kgs)	62.02 ± 5.22
BMI(KG/M2)	23.36 ± 2.09
Duration of surgery	102.22 ± 21.29

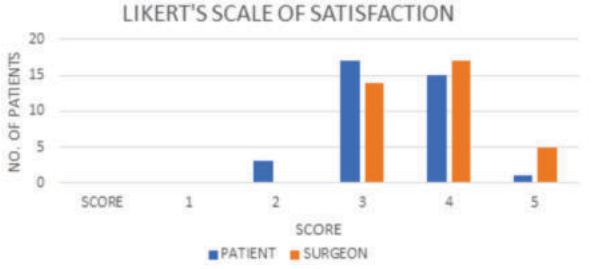
Vital parameters were recorded intra and post operatively as mentioned above. Chart is shown below for changes in mean pulse rates and mean blood pressure of patients at different time intervals. It indicates that no hemodynamic instability noted.



Below chart shows mean VAS score of all patients before surgery and in post operative period upto 24 hours.



Below chart shows likert's patient and surgeon satisfaction scores.



Below table shows about rescue analgesia time and dose requirement, duration of hospital stay based upon discharge according to post anaesthesia discharge scoring system.

First Rescue Analgesia Requirement (minutes)	442.63 ± 121.67
Cumulative Rescue Analgesia Requirement (no. of doses)	2.33 ± 0.89
Duration Of Hospital Stay(days)	3.08 ± 0.93
Post Anaesthesia Discharge Score	9.16 ± 0.37

Values expressed as Mean ± SD

Side effects were minimal. 3 out of 36 patients developed hypotension which was corrected by giving fluid therapy and Injection mephentermine sulphate 6 mg intravenously. Two patients developed nausea and vomiting intra operatively which was treated by injection ondansetron 4 mg intravenously.

DISCUSSION:

General anaesthesia is preferred technique of anaesthesia till now in breast surgeries. But General anaesthesia has drawbacks in terms of chances of systemic drug side effects due to polypharmacy, more postoperative pain, airway manipulation includes hemodynamic stress response, teeth & oral cavity damage, sore throat and pain related to intubation/extubation. Thus, extended hospital stays lead to increased cost. Patients with compromised respiratory system such as in emphysema, chronic obstructive pulmonary disease (COPD) or asthma, General anaesthesia increases peri operative morbidity. The respiratory system is disrupted by general anaesthesia with opioids, neuromuscular blockers, and mechanical ventilation. Individuals with asthma or COPD are more likely to experience bronchial hyperactivity. Adopting the proper anaesthetic procedures can significantly reduce preoperative anxiety and improve the overall surgical success.[6]

The advantages of spinal anaesthesia include conscious patients, better hemodynamic stability, no airway manipulation, more suppression of neuro endocrine response to surgery, less cardiovascular and respiratory system complications, less post operative nausea, and vomiting, better intra and post operative pain control, lower surgical site infections due to smaller incisions, early ambulation and early recovery. Thus, less duration of hospital stay reduces costs. [7]

Thoracic segmental spinal anaesthesia is the performance of spinal anaesthesia at thoracic vertebral level. With this technique, it is possible to limit spinal anaesthesia only to operative field with use of more diluted and lower local anaesthetic drug doses. So, undesirable

effects can certainly be avoided. For abdominal surgeries, spinal anaesthesia is an ideal procedure because it provides better muscle relaxation, lower side effects. [8]High thoracic block is when T4-T5 or T5-T6 intervertebral space is used. There will be minimal involvement of lower limbs due to restriction of block to lower dermatomes.

Isobaric Levobupivacaine (0.5%) has lower toxicity profile, gradual onset of action, less sensitive to positions, better hemodynamic stability even if the high block levels, shorter motor block time leading to early ambulation and early bladder control. Adding small doses of adjuvants causes increased intensity of sensory block.[11]

In this study 36 female patients of ASA I, II and III who underwent breast surgeries were studied and monitored. Thoracic segmental spinal was successful in each patient with hemodynamic stability maintained. There were minimal side effects and better post operative analgesia with high patient and surgeon satisfaction. The fact that the thoracic technique enables a lower drug dose to be administered due to the proximity of the site of drug injection to the target dermatomes can be used to explain why there was a low incidence of hemodynamic fluctuation.

The use of low doses and thoracic puncture allows segmentation of spinal anaesthesia, so sympathetic block is not completely achieved and there is some preservation of sympathetic reflex remains. Thereby, BP and HR are always remains within normal limits in high segmental thoracic spinal confirms that it can be safe even without tracheal intubation.[2] Better analgesia (low VAS) is attributed to the residual analgesic effects of local anaesthetic and fentanyl in the subarachnoid space. Regional anaesthesia offers superior analgesia over opioid based parenteral anaesthesia (GA) which offers favorable outcome in terms of a significant reduction in post operative pain.

MRI study shows that spinal cord lies more anteriorly within its thecal sac in thoracic region as compared to lumbar level. Therefore, at thoracic level, there may be a safe minimal distance before spinal needle contacting to neural tissue.[10] So, the most serious complication of spinal cord injury while performing thoracic spinal segmental block was not observed in present study. Effective pain management, lesser incidence of nausea & vomiting, lesser hospital stay and cost are essential for patient satisfaction. It facilitates a quicker recovery after surgery, enables for an earlier hospital discharge, and can reduce consequences like persistent pain in the long run. When compared to the general anaesthesia group, the thoracic spinal group spent less time in the hospital and recovery room thus more patient satisfaction.

Limitations of the study were experienced anaesthesiologists in neuraxial block are mandatory, thoracic segmental can only provide sensory and motor block up to limited time period i.e maximum 90 - 120 minutes after that top-up anaesthesia is required. More studies are needed to establish the utility of thoracic segmental spinal anaesthesia.

CONCLUSION:

Thoracic segmental spinal anaesthesia is an better alternative to general anaesthesia as it shows better hemodynamic stability, better post operative analgesia with reduced need of rescue analgesia, minimal complications, higher patient and surgeon satisfaction with early discharge and early recovery.

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