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CASE REPORT

A Case Report on Dermatome-Specific Anesthesia in Difficult Airway: Keep Your Options Open

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ABSTRACT

Awake fiberoptic intubation (AFI) is often preferred in patients with a difficult airway but is related to major and minor complications. Regional anesthesia can be feasible with a preformulated and resilient plan in those scenarios. We present a case report of a 54-year-old male patient of left carcinoma buccal mucosa with chest skin defect due to iatrogenic tumor implantation scheduled for defect repair. Thoracic Segmental Spinal Anaesthesia (TSSA) was planned with AFI as a preformulated strategy. Satisfactory anesthesia was achieved from T2 to T8. The hemodynamic remained stable and the patient remained awake and comfortable throughout the perioperative period. In conclusion, TSSA can be considered an alternative to general anesthesia in patients with difficult airways undergoing chest skin defect repair using a rotational flap, as long as the anesthetist has the required instinctive knowledge and awareness of the possible difficulties associated with intubation or ventilation.

KEYWORDS

• Awake tracheal intubation • Commando operation • Iatrogenic • Pectoralis major myocutaneous flap • Segmental thoracic spinal anesthesia • Tumor implantation

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INTRODUCTION

Awake fiberoptic intubation(AFI) is often preferred in patients with a difficult airway.[1] However, regional anesthesia (RA) may be a feasible option. It offers benefits over general anesthesia and prevents the potentially serious consequences of challenging airway management.[2,3] RA options include spinal anesthesia (SA), Thoracic Epidural Anaesthesia, bilateral erector spinae plane block (ESPB), or bilateral thoracic paravertebral block (PVB). Currently, thoracic segmental spinal anesthesia (TSSA) has emerged as a safe and effective option for various surgeries, including laparoscopic cholecystectomy, breast cancer, abdominal cancer surgeries, etc., as the sympathetic blockade is confined to fewer dermatomes.[4]

Case Presentation:

We present a case of a 54-year-old male patient of left carcinoma buccal mucosa with chest skin defect due to iatrogenic tumor implantation scheduled for defect repair using a local rotational flap. Five months prior, the patient underwent Commando surgery with pectoralis major myocutaneous (PMMC) flap repair. The airway examination showed inter-incisor distance restricted to 1 cm, upper lip bite test of grade III, and limited atlanto occipital extension due to scarring from the previous surgery as shown in Figure 1.

Figure 1: The patient mouth opening is restricted

The laboratory and other relevant investigations were unremarkable. The preoperative check-up was done and the baseline parameters were within normal range. The body mass index (BMI) was 23 kg/m^2 and the patient belonged to an American Society of Anaesthesiologists (ASA) physical status II with hypertension for the past 2 years controlled on medications, tablet Telmisartan 40 mg OD and Nicardipine extended release 20 mg BD. The defect was approximately 6x7 cm at the T4 level, 0.5 cm from the midline towards the left as shown in Figure 2.

Figure 2: The chest skin defect of approximately 6X7 cm at nipple/T4 level

AFI was initially considered as the anesthetic approach. However, the patient refused and asked for alternatives. Therefore, TSSA was planned with AFI as a preformulated strategy. The patient was appropriately counselled about the risks and benefits of the procedures and written consent was obtained. ASA standards monitors were attached and an 18 G intravenous line was secured inside the operation theatre. Under aseptic precautions, segmental spinal anesthesia was performed using a 25 G Quincke spinal needle at the T4-T5 intervertebral space through a median approach in a methodical manner to pierce the dura mater for flow of clear CSF. A total of 1.4 mL of medication was used intrathecally: 1.2 mL of 0.5% isobaric levobupivacaine and 0.2 mL (20 mcg) of fentanyl. The onset time of spinal anesthesia was 2 minutes and the level of sensory block was assessed by pin-pricked method and motor block by epidural scoring

scale by arm movement (ESSAM) score for the upper limb consisting of 4 grades (0-3) which assessed hand grip(T1/C8), wrist flexion (C8/C7) and elbow flexion (C6/C5). Satisfactory anesthesia was achieved from T2 to T8 in 2 minutes with no motor blockade of the upper limb. Hemodynamic parameters were recorded with continuous heart rate, SpO_2, temperature monitoring, and mean arterial pressure readings at 2-minute intervals for the first 10 minutes, and then at 5-minute intervals for the rest. Hemodynamic remained stable throughout the perioperative period. The surgery lasted for approximately 1 hour without complications. The patient remained awake, comfortable, and cooperative, and was subsequently transferred to the post-anesthesia care unit.

DISCUSSION

Iatrogenic tumor implantation is a dissemination of tumor cells resulting in a local relapse or distant metastasis during diagnosis or treatment of malignancy. 5 Squamous epithelial debris, consistent with squamous cell carcinoma, was found in both glove and instrument following surgeries for Squamous Cell Carcinoma in the head and neck. 6 Likewise, in our case iatrogenically the tumor was implanted into the chest wall during PMMC flap advancement through orally contaminated gloves and later a nodule appeared at the chest wall that was excised for biopsy under local anesthesia so the defect was created. Although there is no consensus for the recommendation of instrument or glove changes following cancer excision, based on multiple case reports and observations, it is firmly advisable to change gloves and instruments following resection of any suspicious or established cancerous tumors. 7

Guidelines recommend awake tracheal intubation either using AFI or videolaryngoscopesas the technique of choice for patients with difficult airway (8-10). Despite being the gold standard, AFI is related to major and minor complications such as airway injury, bleeding, loss of airway, bronchospasm, and aspiration. 2 The NAP4 had two reported cases of failed awake FOI that required surgical airway management due to obstruction and regurgitation of blood. 1 Regional anesthesia may be a viable and realistic option to prevent the consequences of difficult airway management (DAM).[3] It avoids the inducing agent's adverse effects, peri-operative opioid requirement, and delayed recovery. Even though the American Society of Anesthesiologists 2013 DAM guidelines consider RA a feasible option with a preformulated and resilient plan.[2,11,12] In terms of cancer recurrence, RA can prevent or inhibit the stress of surgery and further decrease the perioperative factors that promote the growth of tumors and their metastasis. Exadaktylos AK et al also stated that recurrence and metastasis-free survival at 24 months and 36 months was found more in patients receiving regional anesthesia than those receiving GA.[13] The patient factors like cooperation, anatomy, positioning during surgery, allergy to local anesthetic agents, and surgical factors like anticipated blood loss, duration, and site of surgery should guide the decision to perform RA. To aid in decision-making, Pascarella G et al formulated a summary flow chart regarding the use of RA in patients with DA. They also recommend the usage of ultrasound for the assessment and management of DA and suggest marking the cricothyroid membrane to facilitate front-of-neck access during emergency scenarios.[12]

In the present case report, TSSA was performed at the T4-T5 intervertebral space, through the median approach, and the needle was advanced in the cephalad direction. As aforementioned by Imbelloni et al, there is a great distance from the dura mater to the spinal cord at the levels T2, T5, and T10, with the greatest being at T5, and using a 45° angle when aiming the midthoracic space will help protect the spinal cord against the intentional or unintentional dural perforation.[14,15]

TSSA provides segmental blockade and muscle relaxation in the chest wall, which is ideal for chest wall surgeries and allows the surgeon to perform delicate procedures and improve precision. Likewise, M Bohar et al observed that segmental thoracic spinal anesthesia is a feasible, safe, and effective regional anesthesia technique that provides good perioperative analgesia, muscle relaxation, and hemodynamic stability.[16]

Additionally, it causes fewer hemodynamic variations with infrequent use of vasopressors or parasympatholytic drugs, less postoperative nausea, vomiting, delirium, cognitive dysfunction, early ambulation, and early

recovery of bowel and bladder functions which improves surgical outcomes and postoperative recovery.[4,17,18] Our patient also had a similar experience.

Hereafter, TSSA can be considered an alternative to general anesthesia in patients with difficult airways undergoing chest skin defect repair using a rotational flap, as long as the anesthetist has the required intuitive knowledge and expertise, and a comprehensive understanding of the potential challenges associated with intubation or ventilation.

CONCLUSION

TSSA's role in reducing airway-related complications and maintaining hemodynamic stability makes it an excellent choice for managing difficult airway patients in chest surgeries provided that the anesthesiologist must have a well-prepared intubation strategy.

Conflict of Interest: Nil

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