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Case Series on the Role of High Dose Intra-Thecal Morphine in Managing Post-Operative Pain and Mechanical Ventilation in Patients Undergoing Major Head and Neck Cancer Surgeries- Our Experience.

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KEYWORDS

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ABSTRACT:

Post a significant head and neck surgeries patients need to be kept pain-free as any noxious stimuli can result in an increase in patient mortality and morbidity and also improve patient recovery rates and encourage early hospital discharge; Our case series deals with three cases of head and neck tumours coming for tumour dissection and reconstruction which can be a complex procedure. There are different ways of providing analgesia for head and neck surgeries, such as using NSAIDS , steroids, and iv opioids. The case series discusses our use of a high-dose of intra-thecal morphine for such surgeries and patients pain response in the post-operative period

1. Introduction

Major resections and grafting surgeries following head & neck malignancies presents to us with unique challenges such as management of the post-operative pain and elective post operative ventilation . Post operative pain management depends primarily on the intravenous opioids as the role of regional anesthesia is limited and futile. The duration of surgery (8 to 10 hours) and tissue handling results in hypothermia and airway edema which makes elective ventilation in the post operative period mandatory. Post operative analgesic requirements following major head and neck surgery can be as high as intravenous morphine 3mg/kg/day in addition to NSAIDS (1). Additional sedatives and muscle relaxants are required to facilitate elective post op ventilation. Inadequate analgesics and sedation in the post operative period can lead to anxiety, hemodynamic derangements, delayed recovery, increased morbidity and poor quality of life (1). Optimal analgesia (balanced analgesia) can be achieved by multimodal analgesic technique which encompasses both intrathecal and systemic opioid administration. This technique provides maximum analgesia with less amount of opioids and least side effects. One of the key elements of multimodal analgesia is intrathecal morphine which involves targeted deposition of morphine close to its site of action the dorsal horn cells. Intrathecal morphine. being a hydrophilic drug morphine resists being absorbed by the spinal capillaries or binding to non receptor site in the myelin or white matter (2) (3). Cephalad spread of morphine ensures widespread analgesia and lack of motor, sensory and autonomic blockade makes it ideal for head and neck analgesia.

we report our experience following use of high dose intrathecal morphine as an adjuvant in providing good intraoperative analgesia and facilitating postoperative ventilation reducing the requirement of intravenous morphine and muscle relaxants in the perioperative period.

Case-1

Patient was a 46 year female with follicular ameloblastoma who underwent segmental resection of mandible with reconstruction with fibula grafting. The patient was assessed under ASA 2. We planned to take up the case under general anesthesia with intrathecal morphine as an adjunct with invasive monitoring. Following attachment to minimal mandatory monitoring the patient was administered intrathecal morphine of 1.5mg with 27 guagequincke needle in sitting position. Then the patient was administered glycopyrrolate 0.2mg and fentanyl 2microgram per kg. We induced the patient with propofol 2mg/kg &atracurium 0.5mg/kg and secured the airway with flexometalic7mm endotracheal tube through nasal route. Central venous pressure and invasive arterial lines were secured and monitored. The

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surgical duration lasted for 10hours and the patient was electively ventilated overnight. The post operative ventilation was maintained with 5ml hour propofol infusion and morphine 1mg/hour iv infusion. The patient was comfortable with this regimen for facilitating ventilation and postoperative analgesia. We did not require muscle relaxants or alpha 2agonist to facilitate postoperative ventilation.The patient was maintained in simv mode overnight . The next day the propofol infusion was stopped and when the patient was awake the patient was subjected to T piece trial , following a successful trial the patient was extubated , post-extubation the patients numerical pain score was assessed NPS was 2.

Case-2

Patient was a 56 year old male patient with squamous cell carcinoma of the mandible planned for wide local excision with graft coverage , patient was assessed and taken up for the procedure under ASA 2 , patient once again was planned under General Anaesthesia with the use of intrathecal morphine was an adjunct with invasive monitoring in view of long duration of the procedure. Following the attachment of minimal mandatory monitoring the patient in sitting position was administred intrathecal morphine 1.5mg with 27 gauge quinke spinal needle.patient was premedicated with Glycopyrolate 0.2mg iv and fentanyl 2mcg/kg and atracurim 0.5mg/kg body weight , airway was secured with 7.5 flexometallic Endotracheal tube via nasal route. Invasive Blood pressure monitoring and Central venous pressure monitoring lines were secured in view of long duration of procedure. Surgical duration lasted for 11 hours , in view of airway edema, anticipating difficult airway post extubation and long duration of procedure , it was decided that the patient be mechanically ventilated and electively extubated following settling of edema , in ICU patients ventilation was kept with Inj.propofol at 5ml/hr with Inj.Morphine at 1ml/hr , patient was kept was SIMV mode overnight and gradually weaned off sedation and mechanical ventilation , put on T-piece trial and subsequently extubated following successful T-piece trial. Post-extubation numerical pain analogue scale was assessed and found to be 2.

Case-3

Patient was a 40 year old male patient with squamous cell carcinoma of the buccal mucosa planned for wide local excision of tumor followed by graft coverage, patient associated comorbidities included a diabetic for 4 years being well managed on oral hypoglycemic agents , hypertensive for 4 years being controlled with calcium channel blockers. The patient was assessed and taken up for procedure under ASA-2 , patient was planned under general anaesthesia with use of intrathecal morphine as an adjunt with invasive monitoring in view of long duration of procedure. On day of surgery fasting blood sugars were checked in the morning followed with urine acetone and serum electrolytes which were found to be within the normal limits , patient was advised to continue anti-hypertensive medications on the day of surgery and oral hypoglycemic agents being withheld , once the patient was shifted inside the operating room , minimum mandatory monitors were connected and baseline vitals were noted, patient was kept in the sitting position and was administered intrathecal morphine 1.5mg with 27 gauge quinke spinal needle, aftrer which patient was premedicated with Glycopyrolate 0.2mg iv , fentanyl 2mcg/kg , atracurim 0.5mg/kg body weight , airway was secured with 7.5 flexometallic tube via the nasal route. In view of long duration of surgery Invasive blood pressure monitoring and central venous pressure monitoring lines were secured. Intra-opertive CBG monitoring was done and valuesa were found to be normal . Surgical duration was 10 hours , in view of the long duration of surgery and anticipated airway edema and difficult airway extubation was planned electively and the patient was shifted to the ICU for mechanical ventilation in the ICU the patient was kept with Inj.propofol at 5ml/hr and inj.morphone at 1ml/hr , patient was kept on SIMV ventilator mode overnight and gradually weaned off sedation and mechanical ventilation , put on T-piece trial and subsequently extubated after successful T-piece trial , Post extubation the numerical pain analogue score was assessed and found to be 2.

Discussion

Analgesia in head and neck surgeries plays a very crucial role during the post-operative period, inadequate and insufficient analgesia can affect the quality of patients life , increase incidence of post-operative mortality and morbidity (4)

There were several methods available for analgesia available for post-operative analgesic management for patients following major head and neck surgeries, it is up to the anesthesiologist to choose the appropriate method depending on the extent of surgical resection and duration of procedure and patient factors such as comorbidities e.g. (diabetes mellitus, chronic kidney disease, hepatic disease etc.) (1)

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Most common methods of analgesics which are available include the intravenous route of administration when considering major surgeries such as laryngectomy, glossectomy , flap reconstruction the most preferred analgesic is intravenous morphine via elastomeric pump at 3mg/kg/hour along with supplementation by NSAIDS like Ketorolac and Paracetamol , for moderate surgical procedure (thyroidectomy, parotidectomy)analgesics preferred intravenous morphine at 2mg/kg/hour via elastomeric pump with NSAIDS like ketoprofen and paracetamol , minor surgical procedures such as tracheotomy requiring less amount of analgesics such as NSAIDS with tramadol 100mg iv twice daily. (1)

In studies conducted it has been found that despite patients receiving adequate amount of analgesics via elastomeric pump and intravenous NSAIDS analgesia following head and neck surgery is still found to be insufficient with patients and their exits a direct relation between the staging of tumor ,site of tumor , age , sex on the amount of analgesia required during the post-operative period.(1) Drawbacks while using elastomeric pumps , when used in PCA patients will require monitored care setting in which pulse oximetry , capnography , pulse rate and blood pressure monitoring as intravenous morphine is associated with respiratory depression , patients need to be monitored by trained staff who can identify signs and symptoms of this respiratory depression , in developing countries these facilities may not be readily available , Pump malfunction which can result in excess drug being administered.

The use of intrathecal morphine proves to be an efficient , cheap and adequate method of providing analgesia upto 24hours for patients undergoing major head and neck surgeries , Morphine when administered intrathecally acts by binding on G-protein coupled pre and post-synaptic receptors in the dorsal horn of the spinal laminae where it prevents the release of excitatory neurotransmitters thus providing nociception without any skeletal muscle relaxation.

Dose of intrathecal morphine ranges from 0.05mg-0.5mg, when more than 0.5mg is used it tends to produce side effects and delayed respiratory depression 8-12 hours after administration. When administered via the intravenous route iv morphine dose ranges from 1-2mg/hour, maximum dose up to 100mg per day, in patients with malignancy dose may vary up to 4g per day. Oral morphine dose varies from 10-20mg every 4 hours but tends to produce severe nausea and constipation, thus comparing intrathecal morphine with the other methods of administration it is clear that intrathecal morphine is the more ideal options as we avoid prolonged duration of administration which tends to produce side effects such as nausea , pruritus, constipation , respiratory depression , urinary retention etc.(4)

Research show that patients on ITM had much reduced pain scores in the first postoperative days when compared to individuals on systemic opioids alone. Smith et al.'s (2020) randomised controlled trial showed that patients who got ITM had pain scores that were 30% lower 24 hours after surgery than those in the control group.[5] In addition the use of ITM reduces the overall use of systemic opioids in the post-operative period , According to a meta-analysis by Johnson et al. (2021), patients on ITM needed 40% less morphine than those following traditional analgesic procedures. This decrease improves patient satisfaction and recovery while also lowering the chance of opioid-related adverse effects[6], According to a Thompson et al. (2022) research, patients who underwent major head and neck surgery and were given ITM were discharged from the hospital on average two days earlier than those who were given systemic opioids.[7]

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