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EFFECTS OF BILATERAL INFRAORBITAL AND INFRATROCHLEAR NERVE BLOCK ON EMERGENCE AGITATION AFTER SEPTORHINOPLASTY: A RANDOMIZED CONTROLLED STUDY

Anaesthesiology

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ABSTRACT

Aim: Emergence agitation is common after septorhinoplasty and postoperative pain is the main risk factor for this condition. Infraorbital and Infratrochlear nerve block have been reported to help pain management in patients after nasal surgical procedures under General Anaesthesia. **Method:** Our study was conducted randomly amongst sixty four pateints whose septorhinoplasty surgery was planned under general anaesthesia were included in study. Patients were randomly distributed to Group1(ION and ITN block) and Group2 (No block). Duration of surgery and anaesthesia, Riker Sedation-Agitation Scale(RSAS), EA presence, Duration of post-operative analgesia, Numerical rating scale(NRS) scores and cumulative Tramadol consumption were recorded. **Result:** Incidence of EA and NRS score of the patients in Group1 were statistically significantly ($p<0.05$) lower than the patients in Group2. In addition, total postoperative analgesia duration in Group1 was statistically significantly ($p<0.05$) higher than patients in Group2. **Conclusion:** Hence, management of Emergence agitation and Pain in early post-operative period after septorhinoplasty with bilateral ION and ITN block is a simple and efficient technique.

KEYWORDS

Emergence Agitation, Infraorbital nerveblock, Infratrochlear nerveblock, postoperative pain, Septorhinoplasty.

INTRODUCTION

Management of pain is a crucial component in postoperative care. Poor post-operative pain treatment may prolong hospital stays, usage of opioids, recovery times, development of chronic pain, mortality, and morbidity. It may also raise the risk of thromboembolic and pulmonary complications[3].

Septorhinoplasty is a common surgical procedure for aesthetically enhancing the appearance of the nose and also repairing nasal deformities. Nasal surgeries done under general anaesthesia can usually produce mild to moderate post-operative pain, but there can be unexpectedly high levels of post-operative pain in some instances[6,7]. The latest practice guidelines published by the American Society of Anesthesiologists (ASA) for perioperative acute pain management recommend the use of multimodal analgesia and regional blockages where possible[4].

Emergence agitation (EA) is a clinical condition characterized by agitation, confusion, disorientation and aggressive behavior in the early stage of recovery from general anesthesia[1]. It can lead to serious complications for patients, including injury, hemorrhage, increased pain, self-extubation, and removal of catheters[2]. The incidence of EA can reach up to 55.4% in adults after ear, nose and throat surgery[8]. Effective pain management can prevent incidence of EA.

The use of local anesthesia is a cost-effective option for decreasing postoperative pain scores and reducing analgesic requirements, and it can be used in nasal surgery as a primary option procedure. Along with general anesthesia, bilateral infraorbital and infratrochlear nerve blocks have been shown to have beneficial effects on pain management following nasal surgery in a day surgery unit[13]. The infraorbital nerve (ION) is a branch of the maxillary part of the trigeminal nerve. This nerve innervates the skin of the nose and septum mobile nasi. The infratro- chlear nerve (ITN) innervates the root of the nose and is an extraconal branch of the nasociliary nerve, which is a branch of the ophthalmic portion of the trigeminal nerve[5]. According to reports, use of peripheral nerve block of ION and ITN helps in pain management after nasal procedures[10-13]. Hence, we conducted this study with primary objective to measure the outcome of EA and Postoperative analgesia after combining ION and ITN nerve block and General Anaesthesia in patients of septorhinoplasty.

METHODS

Our study was conducted as a prospective randomized study in tertiary care center. Declaration and written informed consent was obtained from all patients. Sixty four patients between the ages 18–65 who had ASA physical status I–II and whose septorhinoplasty surgery was planned under general anesthesia were included in the study. Pregnancy, cancer, known local anesthetic drug allergy, preoperative chronic pain, inability to provide informed consent, body mass index (BMI) 35 > kg/m2 and coagulopathy were considered as exclusion criteria. All patients went through thorough pre-anaesthetic evaluation. Patients were randomly distributed into two groups; Group A: ION and ITN blocks were performed; Group B: ION and ITN blocks were not performed.

After the patients were taken to the operating room, 18 gauge IV cannula was secured on the back of the hand. 10 mL/kg/h IV isotonic NaCl 0.9% infusion was started. 5 mg IV dexamethasone was administered to prevent postoperative nausea and vomiting (PONV) and surgical edema and ecchymosis. The patients were continuously monitored with electrocardiography, pulse oximeter and noninvasive blood pressure measurements recorded every 5 minutes. Preoxygenation was done with a facemask for three minutes. Induction was done with 2–2.5 mg/kg IV propofol, 0.1 mg/kg vecuronium and 1 µg/kg IV fentanyl. Oral intubation was done with adequate sized portex cuffed endotracheal tube and anaesthesia was maintained with 50% Nitrous oxide and 50% Oxygen ,0.01mg/kg Vecuronium and Sevoflurane.

After induction, bilateral ION and ITN blocks were applied to the patients in Group 1 by a single experienced anesthesiologist. In the supine position, the patient's head was placed on a central line. The infraorbital ridge was palpated. Thus, the ION block was performed with the extraoral approach by determining the location of the infraorbital foramen. A 24 G needle was inserted laterally into the nostril, then moved forward 1–2 cm until it was felt under the finger localizing the location of the foramen to prevent globe injuries. Taking care not to inject into the foramen itself, 4 mL of 0.5% bupivacaine was slowly injected after negative blood aspiration was confirmed. The ITN block was performed by placing the needle 1 cm above the inner canthus and targeting the junction of the orbit and nasal bone. After the negative blood aspiration, 1 mL of 0.5% bupivacaine was injected. The same amounts of bupivacaine were injected into the opposite side using the same techniques. One-minute pressure was applied to the injection points to prevent hematomas.

Septorhinoplasty was carried out by using open approach. At the end of surgery, nasal packing was done using beta-vaseline gauge and splints were applied. Thirty minutes before the end of the operation, all patients were administered 1g IV paracetamol for postoperative pain management and 4 mg IV ondansetron for PONV prophylaxis. Oral suction was done at the end of surgery and reversal was done with 0.004mg/kg IV glycopyrolate and 0.02mg/kg IV neostigmine. Extubation was done after complete recovery of respiration, muscle tone, power and reflexes.

Patients were then sent to post-anaesthesia care unit (PACU) for

observation. The Riker Sedation-Agitation Scale uses a numeric score from 1 to 7 to assess the level of patient sedation and is especially adapted to warn the clinician of "unarousable" and "dangerous agitation" levels of patient sedation[14]. An RSAS score of ≥5 was defined as EA[14]. Postoperative pain was evaluated using a NRS ranging from 0 (no pain) to 10 (maximum imaginable pain)[5]. The highest NRS scores of the patients were recorded in 0–2 hours, 2–8 hours and 8–24 hours after reaching PACU (0 hours)[5]. For patients with NRS scores > 3, IV tramadol 25 mg was administered at 10-min intervals. Incidence of EA, total duration of analgesia and cumulative tramadol consumption were recorded. All patients were also observed for any side effects like neurological deficit in the blocked area, injection site edema, hematoma or PONV.

Statistical analysis was performed by using SPSS software. Data were analyzed using paired or unpaired t-test. Data are shown as mean ± standard deviation (SD). p value<0.05 considered as statistically significant and p<0.001 considered as statistically highly significant .

RESULTS

This study included sixty eights patients. Table 1shows demographic data like age, height, weight and duration of surgery. There was no significant statistical difference between two groups in regards of demographic data and duration of surgery.

Demographic Data And Duration Surgery (Table1)

	Group A(n=34) (Mean+SD)	Group B(n=34) (Mean+SD)	p value
Age(years)	34.7+9.2	36.6+10.2	p>0.05
Height(cm)	162.8+5.8	165+4.2	
Weight(kg)	68+4.8	65.8+5.4	
Duration of surgery(minutes)	120.8+14.5	118+14.2	

Incidence of EA was measured using RSAS scale and it was higher in Group B (88.2%) compared to Group A (11.2%) which was statistically highly significant (p<0.001) (Table 2).

Incidence of EA (Table 2)

	Group A(n=34)	Group B(n=34)	p value
Incidence of EA (%)	4(11.7)	30(88.2)	p<0.001

As shown in table 3, when NRS>3, 25mg tramadol IV was given as rescue analgesia and this time was considered as total duration of analgesia. This was higher in Group A (422.8+102.5minutes) compared to Group B (187.6+100.8 minutes) and this difference was statistically highly significant (p<0.001).

Time to first rescue analgesia (Table 3)

	Group A (n=34) (Mean+SD)	Group B (n=34) (Mean+SD)	p value
Time to first rescue analgesia (Total duration of postoperative analgesia)(minutes)	422.8+102.5	187.6+100.8	p<0.001

It was also found that the NRS score of the patients in Group A were statistically significantly lower than the patients in Group B (p<0.05)(Table 4).

Pain score (in NRS)(Table 4)

Pain score (in NRS)	Group A (n=34) (Mean+SD)	Group B (n=34) (Mean+SD)	p value
0-2 h	1.03+0.47	2.88+0.8	0.04
2-8 h	2.64+0.58	3.55+0.65	p<0.001
8-24 h	3.14+0.74	3.2+0.83	0.51

No any side effects or complications were experienced in any of the groups due to nerve blocks.

DISCUSSION

The current study shows less incidence of EA, lower NRS score. and longer duration of analgesia with ION and ITN blocks combined with general anaesthesia in patients undergoing septorhinoplasty.

EA is more common in ENT patients than in other patients; the incidence of EA is 55.4% among ENT patients[8]. Ketamine, propofol and dexmedetomidine had shown good results in reducing the incidence of EA in adults.[16,17,18] Pharmacological prophylaxis, however, may result in residual sedation, hypotension, hypertension and Bradycardia which prolongs PACU stay and increase the cost. Several studies have supported the use of pre-emptive nerve blocks as analgesics during nasal surgeries.[9,10,18,19] Hence, we used peripheral nerve blocks as primary option for pain management; furthermore, patients did not experience side effects such as sedation or hemodynamic changes.

In present study, demographic data and duration of surgery were comparable among both the groups and statistically not significant (p>0.05) (Table 1). Similar to our study Cekic B et al.[10] and Higashizawa T et al.[11] also studied effect of ION nerve blocks under general anaesthesia and observed no significant difference in demographic data and duration of surgery.

The exact etiology of EA is not certain. Although there is no known cause of EA, pain is thought to be a key contributing factor. In the literature, there has been evidence of an association between EA and pain.[20] The postoperative pain scores following a septorhinoplasty procedure are considerably high.[6,7] In septorhinoplasty patients, Choi et al. found a significant association between pain and EA.[18] Agitation that happens even during painless operations can be prevented and treated with adequate analgesia using regional blocks, opioids, and nonsteroidal anti-inflammatory drugs.[19] In the current study incidence of EA was 88.2% in the control group, it was reduced to 11.7% when peripheral nerve blocks were performed for pain management.

Infraorbital and Infratrochlear nerves innervates the areas of face within the surgical field of septorhinoplasty,[21,22] The bilateral in fraor bital nerve block has previously been reported to decrease postoperative pain scores.[10-13] Together with infraorbital nerve block, bilateral infratrochlear nerve block also reduced pain score.[9] Çekiç et al reported that the ION block performed with the combination of 0.25% levobupivacaine and 50 mg tramadol provides effective postoperative analgesia in patients undergoing nasal surgery without any side effects.[9] In the current study, we observed that patients in the block group had NRS scores that were statistically significantly lower than those of the control group's patients at 0-2 hours, 2-8 hours, and 8-24 hours following surgery (p<0.05).

In a study to evaluate the effect of ION and ITN nerveblock on EA after septorhinoplasty, Choi et al gave IV tramadol 25mg at 10 mins interval when NRS>3 as rescue analgesia.[18] In present study, 1 g IV paracetamol was administered to both groups 30 minutes before extubation, and 25 mg IV tramadol in the case of postoperative pain with an NRS >3. Time to request for rescue analgesia was considered as total duration of postoperative analgesia. Parthasarathy et al studiee effect of ppre-emptive nerve block on opioid consumption in patients undergoing nasal surgeries and observed that time to request for first rescue analgesia was statistically significantly higher in block group.[23] Similarly, we observed that postoperative analgesia duration of patients in Group A (422.8+102.5minutes) was longer compared to Group B (187.6+100.8 minutes). This difference is statistically highly significant (p<0.001).

Present study has following limitations. First, the sensory elicitation cannot be made before surgery as blocks were performed under general anaesthesia. Second, present study has small sample size (68 patients). Further studies with larger sample size and multicenter approach will give more accurate results.

CONCLUSION

Hence, bilateral ION and ITN nerve blocks are effective pain management strategies because of their beneficial effects in reducing perioperative pain, opioid requirements and emergence agitation in patients undergoing septorhinoplasty surgery under general anaesthesia.

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