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Research Article

CERVICAL PLEXUS BLOCK FOR THYROID AND PARATHYROID SURGERIES

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ABSTRACT

Background and Aims: This prospective, randomized, double-blind study was done to evaluate the effect of addition of Dexmedetomidine as an adjunct, to Ropivacaine in superficial cervical plexus block for thyroid and parathyroid surgeries.
Materials and Methods: Hundred ASA (American Society of Anesthesiologists) class I and II patients undergoing thyroid surgeries were enrolled to receive either Ropivacaine with normal saline (Group 1) or Ropivacaine with Dexmedetomidine (Group 2) in cervical plexus block for postoperative analgesia at the end of surgical procedure performed under general anesthesia. Duration of analgesia, number of topup analgesics, hemodynamic parameters, and any adverse events were monitored.
Results: Analgesia in the postoperative period was better in Group 2 with comparable side effects.
Conclusion: Hence, addition of Dexemedetomidine to Ropivacine in cervical plexus block significantly increases the duration of analgesia and patient comfort without increasing the side effects.

INTRODUCTION

Thyroid and parathyroid operations can cause mild to moderate incisional pain. In addition, discomfort in sensation in the throat, nausea, and vomiting can be caused by the operation or by general anesthesia. These affect a majority of the patients, especially within the first day after operation [1,2]

Post-operative analgesia is a vital part of perioperative care. Good post-operative analgesia can positively improve the surgical outcome [3]. Surgeons and anesthesiologists have attempted to prevent or treat these problems with various modalities, such as opioids and nonsteroidal antiinflamatory drugs (NSAIDs), or with additional loco regional anesthesia techniques. Locoregional anesthesia, such as local anesthetic wound infiltration (LWI), bilateral superficial cervical plexus block (BSCPB), and bilateral combined superficial and deep cervical plexus block, can potentially reduce postoperative pain in patients who undergo thyroid operations [4,5,6]

Bilateral superficial cervical plexus block (BSCPB) is a popular regional anesthesia technique for its feasibility and efficacy. Bilaterally superficial cervical plexus block (BSCPB) may reduce analgesic requirements. This technique consists of a bilateral injection of local anaesthetic behind the lateral border of the sternocleidomastoid muscle producing surface anaesthesia of the neck.

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Dexmedetomidine is the most recent α_2-adrenergic agonist introduced into the clinical practice and has found to be useful in different ways [7]. Ropivacaine, a newer local anaesthetic with better safety profile is known to produce prolonged analgesia of nerve blocks [8]. Ropivicaine was chosen for its lesser cardiac toxicity compared with bupivacaine [9]. because for BSCPB significant volumes of local anaesthetic are injected near vascular structures. Aunac and colleagues have demonstrated the safety of ropivacaine 0.5% for combined superficial and deep cervical plexus block in thyroid surgery [10].

METHODS

After obtaining Institutional ethics committee approval, 100 patients of ASA physical status I and II, aged 20-60 years, scheduled for a hemithyroidectomy or total thyroidectomy with or without lymphnode clearance, were enrolled in this randomized double blinded, prospective clinical study after taking consent from all the participants in the study. Patients who refused to participate, less than 20 years of age, ASA physical status 3 or more, known pregnancy, bleeding disorders, allergy to any of the study drugs, presence of acute herpes zoster, chronic pain syndrome, chronic analgesic use and psychiatric disease were excluded from this study. Patients were randomized into group 1 (n=50) and group 2 (n=50) to receive either ropivacaine or ropivacaine with dexmeditomidine in cervical plexus block respectively. During the pre-operative visit on the day before surgery, patients were thoroughly explained about the procedure to be

undertaken and the risks and benefits associated. They were made well conversant with the visual analogue scale (VAS) for post-operative pain. Patients were advised preoperative fasting for a period of 8 hours. None of our patients received any premedication.

On arrival to the operation theatre (OT) complex, all the patients were connected to multichannel monitor and baseline cardiorespiratory parameters like pulse rate, non-invasive blood pressure (NIBP), and peripheral arterial oxygen saturation (SpO2) were noted. IV line was secured with 18G iv cannula. All the patients were induced with propofol 2.5mg/kg and atracurium 0.5mg/kg and intubated with PVC endotracheal tube. Proper position of tube was confirmed with auscultation and Et CO2 monitoring. All the patients were maintained on O2(30%), N2O(70%), Isoflurane 1MAC and atracurium on PCV mode of ventilation with target EtCO2 OF 32-35. Patients were randomized into two groups. Group 1 consisted of 50 patients and received 24ml of 0.2% ropivacaine and 1ml of saline for bilateral cervical plexux block, 12.5ml on each side and Group 2 consisted of 50 patients and received 24ml of 0.2% ropivacaine with 0.5mcg of dexmedetomidine (1ml) for bilateral cervical plexux block, 12.5ml on each side. After Positioning the patients anatomical landmarks were identified with ultrasonography and landmark for needle insertion was identified at the midpoint of posterior border of sternocleidomastoid muscle on both sides. After cleaning the area 22G needle was inserted at the identified point and then directed upwards to deliver 6.25ml of test solution followed by downward direction to deliver same amount of test solution on both sides. Simultaneously Intravenous infusion of lactated Ringer's solution as maintenance fluid was started. Monitoring was continued throughout the operative procedure, recorded at 5-min interval in the intraoperative and at 2-h intervals in the post-operative period. At the end of surgery, patients were reversed with neostigmine and glycopyrrolate and extubated once patients were fully conscious. In all patients, ondansetron (0.1mg/kg) was given approximatively 30 minutes before extubation. Duration of surgery was defined as the time between surgical incision and application of adhesive bandage after closure of the wound in both the groups. Post-operatively, all patients were monitored in the postoperative ward for the first 24 h. Patients were assessed for pain and nausea and vomiting just after shifting to recovery from OT by a resident not involved in the study. Thereafter, in the recovery room, data was collected at 2, 4, 6, 12 and 24 h, calculated from the time of block placement by the same resident. Patients' anaesthesia records were not available to the residents at recovery for the first 24 h. Post-operative pain was assessed with a VAS score of 0–10 (0=no pain and 10=worst imaginable pain). VAS scores ≥4 were treated with rescue analgesic tramadol 100mg. If analgesia was still inadequate after 30 min, inj. Ketorolac 30mg intramuscular was administered as a backup analgesic. The total doses of administered tramadol and ketorolac during the first 24-h period were recorded. Time to the first analgesic requirement was noted. Duration of postoperative analgesia was defined as the time between the last suture application and the request for first rescue analgesic at VAS score ≥4. Number of patients experiencing PONV were accounted for and treated accordingly. Apart from these, patients were monitored throughout the study period for any evidence of complications.

RESULTS

Demographic patterns and pre-operative vital parameters were similar when the two groups were compared [Table 1].

Parameters	Group 1 (*n=50*)	Group 2 (*n=50*)	*P* value
Age (years)	47.80±10.43	46.27±4.35	2.43
Weight (kg)	65.24±15.02	65.87±9.2	1.59
ASA status(I/II)	27/23	26/24	2.84
Preoperativepulse (bpm)	68.74±15.33	70.16±13.45	1.63
Preoperative MAP (mmHg)	93.37±5.31	92.21±7.06	2.33
Preoperative SpO2 (%)	98.28±10.42	98.17±3.35	1.59

Data are given as mean±SD, except ASA physical status. Test done:
Independent sample *t*-test, $Pearson Chi square. *n*: Number of patient;
bpm: Beats per minute; BMI: Body mass index; MAP: Mean arterial pressure

Durations of surgery were 130.32±2.4 and 127.53±3.1 min in group 1 and group 2, respectively, the values being comparable (*P*>0.05). Intra and postoperative vital parameters were comparable in the two groups (*P*>0.05)(Table2).

Parameters	Group 1(*n*=50)	Group 2(*n*=50)	*P* value
Duration of surgery(mins	130.32±2.4	127.53±3.1	2.02
Intra and postoperative pulse (bpm)	68.33±5.25	71.71±5.19	1.9
Intra and postoperative MAP (mmHg)	89.92±19.26	89.98±8.43	1.16
Intra and postoperative SpO2 (%)	99.13±12.87	98.39±10.62	2.53

Data are given as mean±SD. *n*: Number of patient, Test done: Independent sample *t*-test. *Statistically significant; bpm: Beats per minute; mins: Minutes

The mean duration of post-operative analgesia was 285.45±7.14min in group 1 and 725.23±5.26 min in group 2, the difference being statistically significant (*P*<0.001). Total dose of tramadol as rescue analgesic during the first 24 h was 240.56±7.3 mg in group 1 as compared with 105.38±2.22 mg in group 2 (*P*<0.001). Back-up analgesic in the form of intramuscular ketorolac had to be used in five patients (10%) in group 1 as compared with none in group 2 (*P*=0.01). The VAS scores in the immediate post-operative period and after 2, 4, 6, 12 and 24 h in the postoperative period were significantly higher in group 1 (*P*<0.05) as compared to group 2. Maximum VAS score in 24 h also was significantly lower in group 2 as compared to group 1. The incidence of PONV requiring treatment was 12% in group 1 and 10% in group 2 and was statistically comparable (Table 3).

Parameters	Group 1(*n*=50)	Group 2 (*n*=50)	*P* value
Time to first analgesic at VAS≥4 (mins)	285.45±7.14	725.23±5.26	<0.001*
Total tramadol (mgs)	240.56±7.3	105.38±2.22	<0.001*
Patients receiving ketorolac [*n*)	5	0	< 0.01*
VAS score in immediate postoperative period	2.95±9.41	2.01±0.88	<0.01*
VAS score at 2 hrs	3.11±10.52	2.36±7.29	<0.01*
VAS score at 4 hrs	3.13±6.33	2.53±10.34	<0.01*
VAS score at 6 hrs	3.56±3.74	2.43±0.50	<0.01
VAS score at 12 hrs	3.99±3.49	2.65±8.23	<0.01
VAS score at 24 hrs	3.56±3.52	2.43±12.43	<0.01
Maximum VAS score in 24 hours	5.34±6.7	3.53±3.8	0.01*
PONV requiring treatment; *n* (%)	6(12)	5(10)	1.34

Data are given as mean±SD, *n*: Number of patient; Test done: Independent sample *t*-test, $Pearson Chi square. *: Statistically significant. mgs: Milligrams; PONV: Postoperative nausea and vomiting; VAS: Visual analogue scale

DISCUSSION

Superficial cervical plexus block (SCPB) has been found to be very effective in procedures of neck such as thyroid surgeries, clavicular surgery, carotid endarterectomy and tracheostomy [11,12,13,14]. The duration of analgesia following the nerve blocks is a matter of concern as most of the blocks last for only a few hours. Interestingly, resurgence of the use of α_2-agonists in combination with local anaesthetics has dramatically improved the duration of action of these blocks [7].

The benefits of adequate postoperative analgesia include a reduction in the postoperative stress response, improved surgical outcome, decrease in the incidence of side effects from analgesics and improved patient comfort [15,16,17]

In the present study, the two groups were comparable with regard to demographic parameters like age, weight, ASA status and baseline cardiorespiratory parameters (heart rate, mean arterial pressure and oxygen saturation).

Although wide variations were seen in postoperative pain score, however group 2 had significantly lower mean VAS score compared to group 1. Time to first rescue analgesic and total consumption of rescue analgesic was also significantly lower in group 2 compared to group 1. Local anaesthetic agents like ropivacaine exert anesthetic and analgesic effects by blocking sodium channels whereas alpha-2 adreno receptor agonist like dexmeditomidine act by binding to pre-synaptic c fibers and post-synaptic dorsal horn neurons [18]. Dexmedetomidine acts on pre and post-synaptic sympathetic nerve terminal and central nervous system decreasing the sympathetic outflow and norepinephrine release causing sedation, analgesia and hemodynamic effects. It acts peripherally by blocking conduction through Aα and C fibers to enhance the effects of local anesthetics without increasing the incidence of side effects. The prolongation of effect may result from synergism between local anaesthetics and alpha-2 adreno receptor agonist. Earlier Shih ML *et al* studied Bilateral Superficial Cervical Plexus Block Combined with General Anesthesia Administered in Thyroid Operations and concluded that bilateral superficial cervical plexus block is effective in reducing the amount of general anesthetic required during thyroidectomy. It also significantly lowers the severity of postoperative pain during the first 24 h and shortens the hospital stay [19]. Yoshitomi *et al.*, demonstrated that dexmedetomidine as well as clonidine enhanced the local anesthetic action of lignocaine via peripheral α-2A adrenoceptor [20]. Esmaoglu *et al.*, reported prolongation of axillary brachial plexus block when dexmedetomidine was added to levobupivacaine [21]. Dexmedetomidine also prolongs the effects of local anesthetic agents for posterior tibial nerve and greater palatine nerve sensory blockad [22,23]**.** Eskandar A M *et al.* studied effects of epidural dexmedetomidine and low-volume bupivacaine on postoperative analgesia after total knee replacement. Visual analogue scale of pain showed a significant reduction between the two groups at both rest and movement, and the total dose of nalbuphine consumption during the study period was significantly reduced ($P < 0.002$) in group receiving dexmeditomidine (5 ± 5.15) than in group receiving bupivacaine (11 ± 7.63) [24]

Thyroid surgery is associated with a high incidence of PONV [25]. In our study, 22% of the patients suffered PONV. Lesser incidence of PONV in our study was due to use of antiemetic ondansetron which was given to all patients 30 minutes before anticipated extubation. Incidence of PONV was comparable between the two groups that correlates the earlier studies.

CONCLUSION

Addition of dexmeditomidine as an adjunct to ropivacaine in superficial cervical block for postoperative analgesia in thyroid and parathyroid surgeries resulted in improved postoperative analgesia in the form of increased duration of analgesia and decreased analgesic requirements without any untoward side effects.

Refrences

1. Lacoste L, Thomas D, Kraimps JL, *et al*. Postthyroidectomy analgesia: morphine, buprenorphine or bupivacaine? *J Clin Anesth.* 1997; 9:189-193.
2. Sonner JM, Hynson JM, Clark O, *et al*. Nausea and vomiting following thyroid and parathyroid surgery. *J Clin Anesth.* 1997; 9:398-402.
3. Crews JC. Multimodal pain management strategies for office-based and ambulatory procedures. *JAMA* 2002; 288:629-32.
4. Gozal Y, Shapira SC, Gozal D, *et al*. Bupivacaine wound infiltration in thyroid surgery reduces postoperative pain and opioid demand. *Acta Anaesthesiol Scand.* 1994; 38:813-815.
5. Dieudonne N, Gomola A, Bonnichon P, *et al*. Prevention of postoperative pain after thyroid surgery: a double-blind randomized study of bilateral superficial cervical plexus blocks. *Anesth Analg*. 2001; 92:1538-1542.
6. Aunac S, Carlier M, Singelyn F, *et al*. The analgesic efficacy of bilateral combined superficial and deep cervical plexus block administered before thyroid surgery under general anesthesia. *Anesth Analg.* 2002;95:746-750
7. Kaygusuz K, Kol IO, Duger C, Gursoy S, Ozturk H, Kayacan U, *et al*. Effects of adding dexmedetomidine to levobupivacaine in axillary brachial plexus block. *Curr Ther Res Clin Exp* 2012; 73:103-11.
8. MClellan KJ, Faulds D. Ropivacaine: An update of its use in regional anaesthesia. *Anesth Analg* 2000; 60:1065-93.
9. Graf BM, Abraham I, Eberbach N. Differences in cardiotoxicity of bupivacaine and ropivacaine are the result of physicochemical and stereoselective properties, *Anesthesiology,* 2002, vol. 96 (pg. 34)
10. AunacS, Carlier M, Singelyn F, De Kock M. The analgesic efficacy of bilateral combined superficial and deep cervical plexus block administered before thyroid surgery under general anesthesia, *Anesth Analg* 2002, vol. 95 (pg. 50)
11. Dieudonne N, Gomola A, Bonnichon P, Ozier YM. Prevention of postoperative pain after thyroid surgery: A double-blind randomized study of bilateral

superficial cervical plexus blocks. *AnesthAnalg* 2001; 92:1538-42.
12. Choi DS, Atchabahian A, Brown AR. Cervical plexus block provides postoperative analgesia after clavicle surgery. *Anesth Analg* 2005; 100:1542-3.
13. Barone M, Diemunsch P, Baldassarre E, Oben WE, Ciarlo M, Wolter J, *et al.* Carotid endarterectomy with intermediate cervical plexus block. *Tex Heart Inst J* 2010; 37:297-300.
14. Wedel DJ. Nerve blocks. In: Miller RD, editor. Miller's Anesthesia. 7th ed. Philadelphia Elsevier, Churchill Livingstone; 2010. p. 1664-5.
15. Kehlet H. Surgical stress: the role of pain and analgesia. *Br J Anaesth.* 1989; 63:189-95.
16. Capdevila X, Barthelet Y, Biboulet P, Ryckwaert Y, Rubenovitch J, d'Athis F. Effects of perioperative analgesic technique on the surgical outcome and duration of rehabilitation after major knee surgery. *Anesthesiology*. 1999; 91:8-15.
17. Bonnet F, Marret E. Influence of anaesthetic and analgesic techniques on outcome after surgery. *Br J Anaesth.* 2005;95:52-8
18. Eisenach JC, De Kock M, Klimscha W. á2-Adrenergic Agonists for Regional Anesthesia: A Clinical Review of Clonidine (1984-1995). *Anesthesiology* 1996; 85:655-74
19. Shih ML, Duh QY, Hsieh CB, Liu YC, Lu CH, Wong CS, Yu JC, Yeh CC. Bilateral Superficial Cervical Plexus Block Combined with General Anesthesia Administered in Thyroid Operations. *World J Surg.* 2010 Oct; 34(10): 2338-2343
20. Yoshitomi T, Kohjitani A, Maeda S, Higuchi H, Shimada M, Miyawaki T. Dexmedetomidine enhances the local anesthetic action of lidocaine via an alpha-2A adrenoceptor. *Anesth Analg.* 2008; 107:96-101.
21. Esmaoglu A, Yegenoglu F, Akin A, Turk CY. Dexmedetomidine added to levobupivacaine prolongs axillary brachial plexus block. *Anaesth Analg.* 2010; 111:1548-51.
22. Obayah GM, Refaie A, Aboushanab O, Ibraheem N, Abdelazees M. Addition of dexmedetomidine to bupivacaine for greater palatine nerve block prolongs postoperative analgesia after cleft palate repair. *Eur J Anaesthesiol.* 2010; 27:280-4.
23. Rancourt MP, Albert NT, Cote M, Letourneau DR, Bernard PM. Posterior tibial nerve sensory blockade duration prolonged by adding dexmedetomidine to ropivacaine. *Anesth Analg.* 2012; 115:958-62.
24. Eskandar AM, Ebeidb AM. Effects of epidural dexmedetomidine and low-volume bupivacaine on postoperative analgesia after total knee replacement: *Ain-Shams Journal of Anesthesiology* 2014, 07:193-197.
25. Sonner JM, Hynson JM, Clark O, KatzJA. Nausea and vomiting following thyroid and parathyroid surgery, *J Clin Anesth,* 1997, vol. 9 (pg. 398-402)

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