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Original Research Article

Study of Analgesic Efficacy of Bilateral Superficial Cervical Plexus Block Administrated Before Thyroid Surgery under General Anesthesia - Retrospective Study

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Conflict of interest: Nil

Abstract:

Background: Inadequate pain control in thyroid surgeries increases the level of stress hormones and rate of preoperative complications; hence, general anesthesia alone is often insufficient as postoperative analgesia; most patients require additional doses.

Method: 72 (seventy-two) patients were selected for BSCPB with a saline group of 24 patients. Ropivacaine 0.487 = Group R24 patients; Ropivacaine 0.487 plus 10 µg/mL 5 µg/mL = Group RC 24 patients. Sufentanil was given during the intraoperative period for a 20% increase in arterial mean pressure or heart rate in patients with a bispectral index between 40 and 60. All patients received 4 gm of acetaminophen during the first 24 hours after surgery. The pain score was checked every 4 hours, and Nefopam was given to reduce pain scores >4 on a numeric pain scale.

Results: The comparison of the mean values of demographic characteristics, age, height, and duration of surgery (minutes) remains insignificant ($p>0.001$). Indicates all groups have similar parameters. In the comparison of SBP at the end of resection, extubation had a significant p-value ($p<0.001$). In comparison and operative requirement, sufentanil (mg/kg) had a significant p-value ($p<0.001$) pain score in PACU; a pain score >6 was observed in group P.

Conclusion: It is concluded that group RC (ropivacaine + clonidine) was significantly effective in the management of pain reduction and ideal anaesthetic agents to maintain hemodynamic status.

Keywords: Post-Anesthesia Care Unit (PACU), Ropivacaine, Clonidine, Thyrodectomy, Visual Analgesic Scale.

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Introduction

Thyroidectomy is the most common procedure performed by surgeons. The pain following the thyroidectomy procedure may result from surgical incisions in the neck. Orotracheal intubation or hyperextension during surgery [1]. Post-operative thyroid surgery pain is moderate in intensity, and up to 90% require narcotic analgesics on the first day after surgery.

Inadequate postoperative pain control increases the level of stress hormones and the rate of perioperative complications [2]. General anesthesia alone is often insufficient as postoperative analgesia; most patients require additional doses. Peripheral nerve blocks are simple, safe, and effective postoperative analgesic methods. Superficial cervical plexus block (SCPB) is used as preoperative and postoperative analgesia for neck surgery. SCPB is the easiest and most common nerve block due to its bilateral applicability, but there is significant debate about the application of SCPB in thyroid surgery as postoperative analgesia. It is reported that SCPB reduces the intraoperative and postoperative analgesic requirements on the other hand [3]. It is shown that SCPB does not have this effect in thyroid surgery. Thyroid surgery carries a high risk of postoperative nausea and vomiting, and narcotic analgesics increase these risks [4]. Hence, an attempt is made to study the efficacy of SCPB as an analgesic by measuring the visual analogue scale of postoperative pain and the requirement of analgesics.

Material and Method

72 (seventy-two) adult patients admitted to Government Medical College Hospital Chandigarh-160030 were studied.

Inclusive Criteria: ASA physical status I–II patients undergoing elective thyroid surgery under

general anesthesia who gave their consent in writing were selected for study.

Exclusion Criteria: Patients with allergies to opioid or non-opioid analgesics, corticosteroids or non-steroidal anti-inflammatory drugs, coagulation disorders, pregnancy, age below 18 years, and refusal for general anesthesia were excluded from the study.

Method

Out of 72 (seventy-two) patients, they were classified into three groups by the lottery system: group P received isotonic sodium chloride, and group R received 0.487% ropivacaine. In group RC, ropivacaine 0.487 plus clonidine Sμ gm sufertanil was given during the intraoperative period for a 20% increase in arterial mean pressure or heart rate in patients with a bispectral index between 40 and 60. All patients received 4 gm of acetaminophen during the first 24 hours after the operation. The pain score was checked every 4 hours, and Neopam was given for a pain score >4 on the numeric pain scale.

Anesthesia was standardized. Patients were premedicated with hydroxyzine (1.5 mg/kg orally) 2 hours before surgery. General anesthesia was induced using propofol (2–3 mg/kg) and sufentanil (0.3 μkg/kg). Tracheal intubation was facilitated by the administration of atracurium 0.5 mg kg^{-1}.General anesthesia was maintained with sevoflurane (0.5-1.8%) in an oxygen/nitrous oxide mixture (60/40%).

The sevoflurane was adjusted to maintain a bispectral index (BIS: Aspect Medical Systems, Newton, MA, USA) between 40 and 60. Additional doses of sufentanil (0.15 μg/kg) were administered for variations of systolic blood pressure (SBP) and heart rate (HR) of more than 20% when compared with the values measured before operation. All the patients were admitted to PACU (post-anesthetic care unit). SBC PB (bilateral superficial cervical plexus block) was performed under general anesthesia before incision using a three-point injection technique. 10 ml of the prepared mixture were injected into each side using the same puncture orifice. A 23-gauge SC short beveled needle was inserted 2 cm above the clavicle along the posterior border of the clavicular head of the sternocleidomastoid muscle.

After an aspiration test, an S.C. injection of 6 ml of the prepared mixture was performed in the cephalic direction. Then the needle was reoriented in the medial direction above the sternocleidomastoid muscle, and 3 ml of the prepared mixture was injected. These first two injections allow anesthesia of the greater auricular and transverse cervical nerves. Finally, 1 ml of the mixture was injected S.C. at the point of puncture to block supraclavicular nerves. The depth of the mixture injection was not greater than 5 mm. In order to prevent blockage of the phrenic nerve or recurrent laryngeal nerve, a postoperative laryngoscope was performed to evaluate laryngeal palsy before the transfer to PACU. Intraoperatively, SBP and HR were recorded by computer at induction, incision, the end of resection, and extubation. The duration of surgery and sufentanil requirements were also recorded. The post-operative pain score in PACU and the number of patients who had a pain score >6 were also recorded.

The duration of the study was November 2017 to May 2019.

Statistical Analysis: mean value of characteristics of patients from different groups and comparison of SBP in different groups Intraoperative and postoperative pain scores were compared with an ANOVA test, and significant values were noted. The statistical analysis was carried out in SPSS software. The ratio of males and females was 1:2.

Observation and Results

Table 1: Comparison of mean value of demographic characteristics of patients

- Age: 46 (± 11.5) in group p, 48 (± 9.5) in group R, 48 (± 8.5) in group RC, F value 0.41 and p>0.723.
- Height (cms): 164.3 (± 8.2) in group P, 165.4 (± 8.5) in group R, 167.5 (± 8.2) in group RC, F value 0.92 and p>0.403.
- Duration of Surgery (in minutes): 182.2 (± 11.2) in group P, 184.5 (± 12.4) in group R, 208 (± 15.2) in group RC, F value 28.6 and p>0.001 (p value is highly significant).

Table 2: Comparative study of systolic Blood pressure (SBP) mm/Hg (median range) recorded at induction, insision end of resection and extubation

- Induction: 159 (± 10) in group P, 151 (± 11) in group R, 159 (± 12) in group RC, F value 4.20 and p<0.001.
- Incision: 119 (± 8) in group P, 119 (± 8) in group R, 159 (± 12) in group RC, F value 4.13 and p<0.02.
- End of resection: 144 (± 9) in group P, 137 (± 10) in group R, 122 (± 15) in group RC, F value 30.1 and p<0.001.
- Exturbation: 165 (± 11) in group P, 153 (± 10) in group R, 141 (± 8) in group RC, F value 36.3 and p<0.001

Table 3: Comparative study of Intra-operative and post-operative requirement and pain scores

- Intra-operative supplementary sufentanil (μg/kg -1): 0.619 (±0.05) in group P, 0.476 (± 0.09) in group R, 0.325 (± 0.08) in group RC, F value 85.9 and p<0.001.
- Pain score in PACU was 5 (8-9) in group P, 3 (0-11) in group R, 3 (0-9) in group RC.

- Number patients who had pain score >6 – 11 (45%) in group P, 6 (25%) in group R, 4 (16.6%) in group RC.

Table 1: Comparison of mean value of demographic characteristics of patients (Total No of patient: 72)

Characteristics	Group P (24)	Group R (24)	Group RC (24)	F value	P value
Age (year)	46 (±11.5)	48 (±9.5)	48 (±8.5)	0.326	p>0.723
Height (cms)	164.3 (± 8.2)	165.4 (±8.3)	167.5 (±8.2)	0.921	p>0.403
Duration of surgery (min)	183.2 (±11.2)	184.5 (±12.2)	208.5 (± 15.2)	28.6	P<0.001

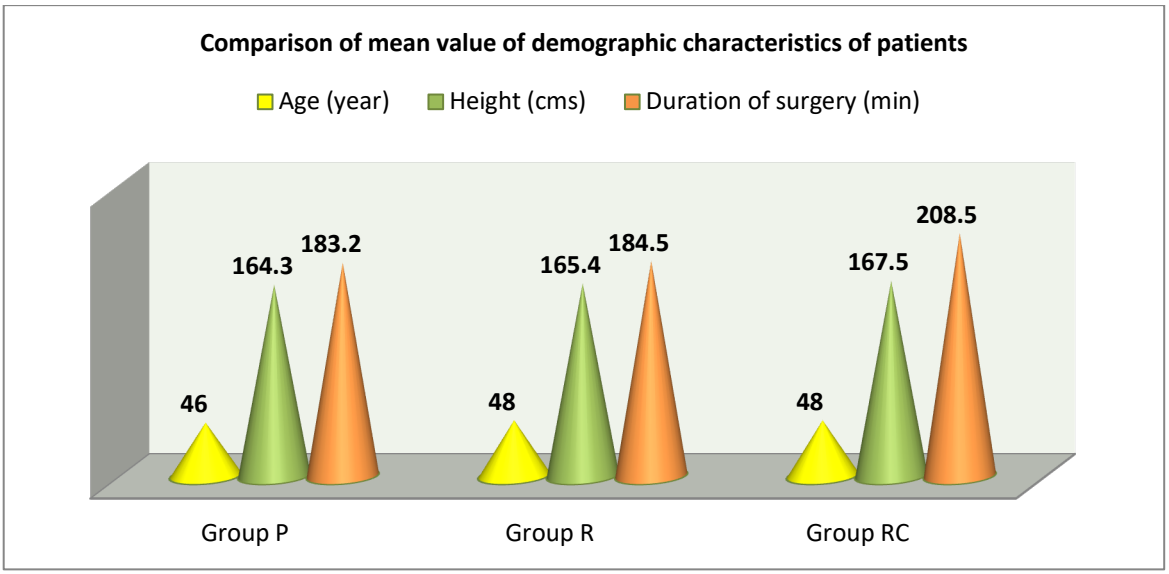

Figure 1: Comparison of mean value of demographic characteristics of patients

Table 2: Comparative study of systolic Blood pressure (SBP) mm / Hg (median range) recorded at induction, incision, end of resection and extubation (Total No of patient: 72)

Details	Group P (24)	Group R (24)	Group RC (24)	F value	p value
Induction	159 (±10)	151 (±11)	159 (±12)	4.20	P<0.001
Incision	119 (±8)	119 (±8)	113 (±9)	4.13	p>0.02
End of resection	144 (±9)	137 (±10)	122 (±11)	30.1	P<0.001
Extubation	165 (±11)	153 (±10)	141 (±8)	36.3	P<0.001

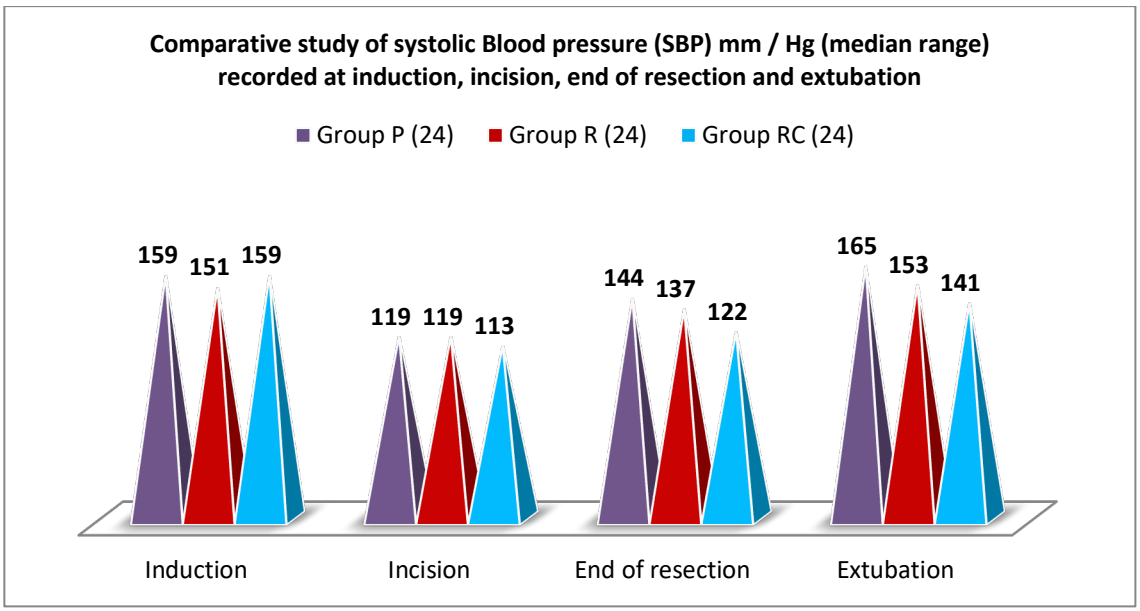

Figure 2: Comparative study of systolic Blood pressure (SBP) mm / Hg (median range) recorded at induction, incision, end of resection and extubation

Table 3: Comparative study of Intra operative and post-operative requirement and pain scores (Total No of patient: 72)

Details	Group P (24)	Group R (24)	Group RC (24)	F value	p value
Intra-operative supplementary sufentanil(μ kg $^{-1}$)	0.619 (±0.05)	0.476 (±0.09)	0.325 (±0.08)	85.9	P<0.001
Pain score in the PACU	5 (0-9)	3 (0-11)	3 (0-9)	--	--
Number of patients who had pain score >6	9 (45.8%)	6 (25%)	4 (16.6%)		

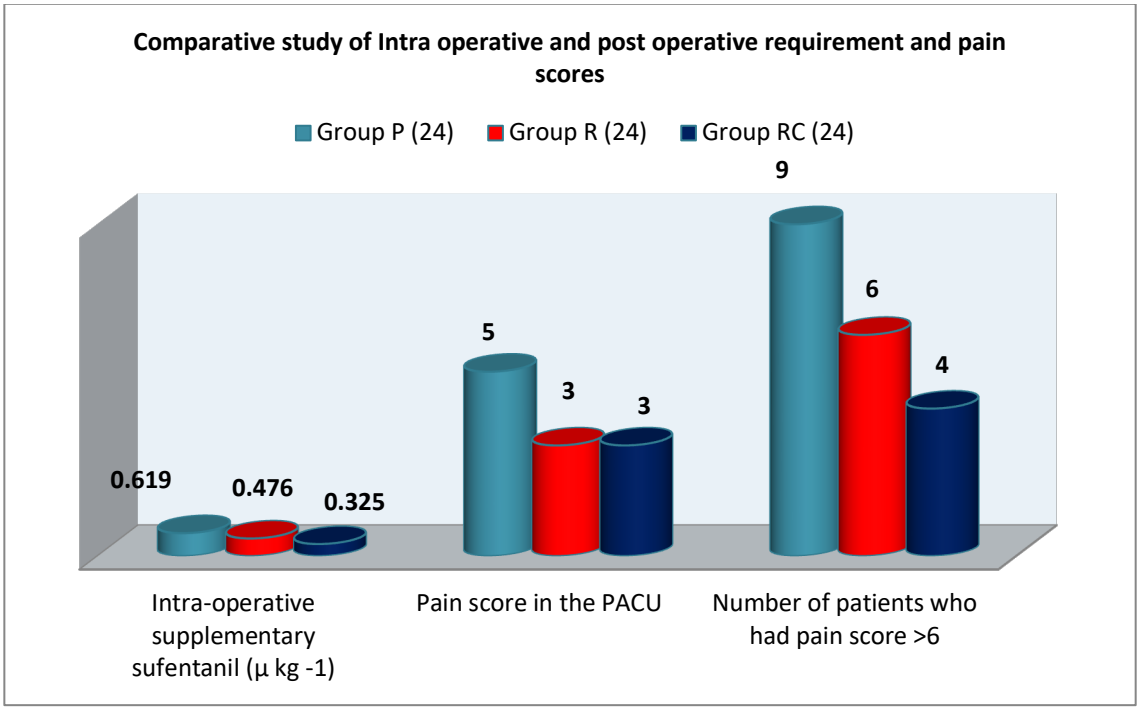

Figure 3: Comparative study of Intra operative and post operative requirement and pain scores

Discussion

Present study of the analgesic efficacy of bilateral superficial cervical plexus administered before thyroid surgeries under general anesthesia. In a comparative study of mean values of demographic characters of patients of different groups, there was a significant p-value in the duration of surgery (minutes) (p<0.001) (Table 1).

In a comparative study of systolic blood pressure (SBP) mm/Hg (median, range) at the induction incision end of resection and extubation in three groups, there was a significant p-value (p<0.001) (Table 2). In the comparison of intraoperative supplementary sufentanil (mg/kg), which had a significant p-value (p<0.001), the pain score was 5 (0-9) in group P, 3 (0-11) in group R, and 3 (0-9) in group RC. The number of patients who had a pain score >6 was 11 (45.8%) in group P, 6 (25%) in group R, and 4 (16.6%) in group RC (Table 3). These findings are more or less in agreement with previous studies [5,6,7]. This study confirmed that BSCPB with general anesthesia reduced postoperative pain and analgesic consumption in patients who underwent thyroid surgery. Compared to those who received only general anesthesia (8). VAS was considerably reduced in BSC PB patients during intraoperation and post-surgery. The efficacy of post-thyroidectomy BSC PB in opioid consumption is a matter of debate. This study also found the block group required less sufentanil than the general anesthetic group (9).

Severe postoperative pain control increases the level of stress hormones and the rate of perioperative complications; hence, general anesthesia alone is often insufficient as postoperative analgesia, and additional doses can manage the postoperative pain. It is also reported that PSCPB significantly reduces nausea and vomiting in the postoperative period [10]. Hence, in the present study, not a single case of nausea and vomiting is reported. It is suggested that BSCPB did not provide optimal pain treatment for postoperative analgesia, but general anesthesia was prolonged to manage to reduce the VAS score, or pain score [11].

For the successful blockage, injecting superficially on the superior bronchial plexus is recommended in previous studies [12], as in the present, a three-point blockade was performed to get satisfactory results intraoperatively and postoperatively to manage the pain score.

Summary and Conclusion

Present study of the analgesic efficacy of BSC PB under general anesthesia. The patients administered ropivacaine and clonidine had improved intraoperative analgesia.

These combinations were quite efficient in managing the VAS score by reducing the analgesic requirement after thyroid surgery.

The present study demands that such clinical trials be conducted on a larger number of patients in high-tech hospitals to combat the adverse effects and confirm the significant findings of the present study.

Limitation of study: Owing to the remote location of the research center, the small number of patients, and the lack of the latest techniques, we have limited findings and results.

This research work was approved by the Ethical Committee of Government Medical College Hospital Chandigarh-160030.

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