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Fatma Alzahraa Ibrahim Alsamahy
Department of Surgical Intensive Care and Pain Medicine, Faculty of Medicine, Tanta University, Tanta, Egypt

Sabry Mohammad Amin
Department of Surgical Intensive Care and Pain Medicine, Faculty of Medicine, Tanta University, Tanta, Egypt

Mohammad Ali Mohammad Abdullah
Department of Surgical Intensive Care and Pain Medicine, Faculty of Medicine, Tanta University, Tanta, Egypt

Mohammad Elsayed Afandy
Department of Surgical Intensive Care and Pain Medicine, Faculty of Medicine, Tanta University, Tanta, Egypt

Corresponding Author:
Fatma Alzahraa Ibrahim Alsamahy
Department of Surgical Intensive Care and Pain Medicine, Faculty of Medicine, Tanta University, Tanta, Egypt

Role of Bilateral ultrasound guided superficial cervical plexus block as a part of enhanced recovery after thyroid surgery

Fatma Alzahraa Ibrahim Alsamahy, Sabry Mohammad Amin, Mohammad Ali Mohammad Abdullah, Mohammad Elsayed Afandy

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Abstract
Background
Methods: The current study was a prospective randomized controlled double blinded study was conducted at Tanta University Hospitals for patients admitted to undergo elective thyroid surgeries for a period of 9 months. Inclusion criteria were patients aged 21 -65 y and ASA physical status I or II, prepared for elective thyroid operation were encouraged to contribute to the study cases were divided to 2 equal groups (50 cases each**)** in a random manner**:**
Group I (Control group): Sham Technique: the cases received general anaesthesia plus US guided Bilateral SCPB with 10 ml NaCl 0.9% were injected on both sides.
Group II (Study group): cases received general anaesthesia plus US guided Bilateral SCPB with a total volume of 10 ml containing Bupivacaine 0.25% was injected (5 ml Bupivacaine 0.5%- and 5-ml NaCl 0.9% bilaterally).
Results: Postoperative QOR-15 score was significantly elevated in group II in comparison with group I; P value less than 0.001. Time to 1st rescue analgesia was significantly higher in group II in comparison with group I; P value < 0.001. VAS was significantly elevated in group I at 30min, 2hrs, 4hrs and 6 hrs in comparison with
Group II: P value less than 0.001. nevertheless, no statistically significant differences were found between both groups at 8hr, 10hr, 12hr, 18hr and 24hr; P value >0.005. Postoperative opioid consumption was significantly reduced in group II in comparison with group I: P value less than 0.001. Pre and post-operative values of diaphragmatic excursion revealed that there was no statistically significant differences either in the same group or between the 2 groups.
Conclusions: Patients undergoing thyroid surgery showed improved global quality of recovery after preoperative US guided BSCPB. It decreased POP score, diminished intraoperative analgesic consumption, reduced postoperative morphine consumption, and maintained diaphragmatic excursion.

Keywords: Bilateral US guided superficial cervical plexus block, enhanced recovery, thyroid, diaphragmatic excursion

Introduction
In fact, the incidence of thyroid gland Surgeries is increasing, it's carried out as an ambulatory procedure in various nations. The wound pain that occurs postoperatively is one of the common complications, in particular within 24 h following thyroid operation that might result in delayed discharge or even unplanned readmission after day of the operation [1]. Therefore, opioids are usually given to reduce pain postoperatively. However, opioid-related adverse influences that included nausea, vomiting, and respiratory supression aren't desirable in operative cases. Pain following surgery is an essential element of quality of recovery (QoR) after operation [2]. Various strategies that include local as well as regional anaesthesia, are currently carried out as cornerstone elements of multimodal analgesics for pain after operations [3].
Sufficient POP relief is essential to ameliorate functional outcomes, enhance rapid ambulation and release from hospitals [4]. Tran *et al*. introduced for the 1st time Ultrasound (US)-guided superficial cervical plexus block (SCPB). The pivotal benefits of US guided SCPB are providing real-time observation of the anatomical structure, reducing volume of local anaesthesia, in addition to avoiding accidental destruction or incidental injury of any blood vessel [5]. Being feasible and efficient, US-guided Bilateral SCPB is an approach to offer appropriate regional analgesia during thyroidectomy with improved recovery of the patient [6].

After anaesthesia, QoR a crucial measure that assess the early health status of cases postoperatively. According to diverse clinical and research experience with the forty-items of QoR (QoR-40), the most potent psychometrically done items from the 5 dimensions of the QoR-40 were used in order to make a short-type version; QoR-15. This form showed good convergent validity with the global QoR visual analog scale. It can provide a valid, broad, and even effective assessment of QoR postoperatively [7].

The aim of the current work was to evaluate US guided BSCPB as a portion of promoted recovery following thyroid operation via the use of QOR-15 score as an approach to assess the QoR.

Patients and Methods

The Current work was a prospective randomized controlled double blinded study performed at Tanta University Hospitals for patients admitted undergoing elective thyroid surgeries for a period of 9 months. We approved this protocol from our institutional ethical committee (Faculty of Medicine Tanta University) with registration on Panafrican clinical trial registry with ID (NCT05476003). An informed written consent was signed by all patients after they received a detailed explanation to the aim of our study, possible side effects and complications.

Inclusion criteria were patients aged 21-65 y and ASA physical status I or II, arranged for elective thyroid operation were encouraged to contribute in the study.

Exclusion criteria were cases who refused to share, cases with previous history of allergy to types of local anaesthesia, cases suffering chronic pain on opioid therapy, cases showed mentally dysfunction manifestations, cases with coagulative problems, cases having dermal or soft tissue infections at the suggested region for inserting the needle, cases with COPD or Body Mass Index (BMI) > 40.

Randomization and blindness

Group allocation was carried out via a computer-generated software of randomization entered into sealed opaque envelope approach. All blocks were carried out by the same anaesthesiologist whereas recording of the measurement was done by another anaesthesiologist who had no idea concerning the patient distribution.

Random allocation of cases into two similar groups (50 cases each).

Group I (control): Sham Technique: Patients received general anaesthesia plus US guided Bilateral SCPB with 10 ml NaCl 0.9% was injected on both sides.

Group II (Study group): Patients received general anaesthesia in addition to US guided Bilateral SCPB with injecting a total volume 10 ml that contained Bupivacaine with the concentration 0.25% (five ml Bupivacaine 0.5%- and five ml NaCl 0.9%).

Preoperative workup to patients in both groups:

History taking, clinical examination including cardiopulmonary and respiratory system assessment were done. Routine lab investigations that included CBC, coagulation profile and RBS in addition to thyroid function assessment (free T3&T4, TSH). Patients were fasting (8 hr. for fried foods, fatty foods or meat, 6 hr. for light meals and non-human milk, and 2 hr. for clear liquids).

When arrived the operating room; a peripheral IV line was secured and routine monitor involving non-invasive BP, pulse oximetry, ECG were applied and baseline values of all were recorded. Evaluation of the diaphragmatic functions was done using US while the patients in a semi-recumbent position. A (3-5 MHz) curvilinear probe is placed below the level of the costal margin between the anterior axillary line and the mid-clavicular line with a medial, dorsal as well as cephalic orientation of the probe to view the posterior 3rd of the hemi-diaphragm. The liver on the right as well as the spleen on the left are utilized as an acoustic window. The US was adjusted to motion mode, helping to see the diaphragm thus can be visualized as a white hyperechoic line rippling during the respiratory cycles.

The excursion of the diaphragm that refers to a cranio caudal movement of the diaphragm, was estimated in centimetres during a voluntary 'sniffing test (it's an inspiratory manoeuvre for which the patients are asked to do forceful inhalation nasally in a sniffing manner) Diaphragmatic excursion was measured before procedure (Pre-block) and post-operative in PACU when patient is fully recovered. At every recording time, the largest of 3 measurements of the diaphragmatic excursion was entered. Complete paralysis of the diaphragm means a decreased excursion of the diaphragm ≥ 75 percent when compared to the baseline, or by paradoxical cephalic moving diaphragm. Partly paralyzed diaphragm refers to a decrease of excursion of diaphragm ranging from 25% to 75%.

Anaesthetic management

All cases were premedicated using 2 mg midazolam IV as anxiolytic ten min before the anaesthesia induction. General anaesthesia was induced in the two groups using Fentanyl 2 μg/kg (intravenous) and Propofol 1–2 mg/kg (intravenous). Atracurium 0.5 mg/kg (intravenous) was given aiming at facilitating the endotracheal intubation. Maintaining the depth of anaesthesia was done using Isoflurane 0.8 – 1 MAC in O2–air mixture (50 percent –50 percent), Atracurium 0.1 mg /Kg according to needs and fentanyl was given at top up dose of 50 μg when there was an unexplained increased HR or MAP by ≥ 20% from base line value. Intraoperative fentanyl consumption were measured and Ventilatory settings were adjusted to keep End tidal CO2 between 35 – 40 mmHg. US guided Bilateral SCPB was performed after induction and before surgical incision.

Technique of US guided SCPB

Landmarks and patient positioning

The nerve block was typically carried out in the upright position with turning the head to the opposite direction of the block. Exposure of the neck and upper chest was done thus the relative length and position of the sternocleidomastoid muscle could be evaluated. The nerve block aimed to place the tip of the needle in the fascial layer under the SCM muscle close to the cervical plexus that's contained in between the tissue spaces located between the cervical fascia and posterior sheath of the SCM muscle. Under complete sterilized environment, the linear US transducer was located on the lateral neck, above the SCM at the level of its middle (nearly at the cricoid cartilage). Following the SCM muscle is determined, the transducer was moved to the posterior aspect till observing the tapering edge posteriorly in the middle of the screen. Thereafter, we tried to detect the brachial plexus and/or the interscalene groove that's present midway the anterior and middle scaleni muscle. The cervical plexus could be visualized as a tiny collected hypoechoic nodules just above the prevertebral

fascia and overlying the interscalene groove so, Once the plexus had been identified, the needle was traversed from lateral to medial across the skin, platysmal muscle as well as investing layer of deep cervical fascia where the tip was introduced near to the plexus using In-Plane approach, but usually the components of the cervical plexus are difficult to be determined so, instead sub-SCM technique was used, in which the needle was traversed posterior to the SCM muscle where the tip was adjusted to pass in the space between the SCM muscle and the prevertebral fascia, near the posterior border.

After negative aspiration, 1-2 mL of local anaesthesia was injected to ensure the optimal injection region. The remaining of the LAs (10 ml) was injected where it was seen layering out between the SCM muscle and the underneath prevertebral fascia to envelop the plexus. The procedure was done on both sides and surgery was start ten minutes after performing the block.

Following completing the surgical technique, Inhalational anaesthesia was stopped, and the patient was extubated following complete reversal of muscle relaxant with 0.05 mg/kg neostigmine and 0.01 mg/kg atropine.

Following operation, all cases received Paracetamol 1 gm/6 hrs I.V. infusion as a regular analgesia and Morphine 3 mg I.V when VAS > 3 as a rescue analgesia.

Measurements

Demographic data (Age, gender, weight) and the operation time, Hemodynamic data that included heart rate and mean ABP (Baseline prior to induction, following induction and after skin incision then/15 min till finishing the operation). The QoR was evaluated at 24 hrs postoperatively by QoR-15. The QoR-15 is composed of 15 items I) Breathing II) Food III) Rest IV) Sleep V) Hygiene VI) Communication VII) Support VIII) Return to work IX) Feeling comfortable and in control X) Feeling of general well-being XI) Moderate pain XII) Severe pain XIII) Nausea/Vomitting XIV) Worry/Anxiety XV) Feeling sad or depressed. Each item was evaluated via an eleven-point numerical rating scale. The total score of QoR-15 ranged between zero (Extremely poor recovery) to one hundred fifty (all excellent recovery).

Post-operative pain was assessed using the VAS score thirty minutes following reaching the recovery room thereafter after 2, 4, 6, 12, 24 hrs. When VAS was > 3, morphine 3 mg was given, when VAS was < 3, 1 g paracetamol was given with maximum dose 4 g per day.

Time till administration of first rescue analgesics, Total morphine consumed in the 1st 24 hours postoperatively, and Diaphragmatic excursion was measured preoperative in the preparation room and 30 minutes after complete recovery, In PACU.

The primary outcome was improvement of the QoR assessed via the QoR-15. The secondary outcome was Post-operative analgesia defined according to the VAS score. Opioid consumption in the 1st 24 hrs post-operative. Diaphragmatic Excursion assessed by US.

Sample size calculation

The sample size and power analysis were estimated by Epi-Info software statistical package approved by WHO and centre for DCO, Atlanta, Georgia, USA version 2002. The criteria used to calculate the sample size were ninety-five percent confidence limit, eighty percent power of the study. Expected outcomes in favourable therapy group ninety percent in comparison with least favourable therapy group is 65%. The sample size according to the aforementioned criteria was determined at N>44 in each group. We increased the sample size to 50 to compensate for missing data.

Statistical analysis

Statistical analysis was carried out by SPSS v27 (IBM©, Chicago, IL, USA). Shapiro-Wilks test and histogram were utilized to assess the normality of the distribution of data. Quantitative parametric results were presented as mean and SD and were analysed using the unpaired student t-test. Quantitative non-parametric results were introduced as the median and IQR and were analysed by Mann Whitney-test. Qualitative variables were presented as frequency and percentage and analysed by the Chi-square test or Fisher exact test when appropriate. ANOVA with repeated measures was utilized for normally distributed quantitative results, for the comparison between ≥2 periods, and Post Hoc test (Bonferroni adjusted) for pairwise comparison. Friedman test was used for abnormally distributed quantitative variables, for comparing between ≥2 periods and Post Hoc Test was used for pairwise comparison. A two-tailed P value < 0.05 was considered statistically significant.

Results

In the present study, 123 cases were assessed for eligibility, 23 cases were ruled out, of them 17 patients didn't meet the inclusion criteria [ASA more than II (n=4), BMI > 40 kg/m2 (n=6), COPD patients (n=2), History of chronic pain (n=3), Mental dysfunction (n=2)], and 6 cases refused participation in the study. The remaining 100 cases were randomly distributed into two groups (50 cases in each one); Group I (control group): Sham Technique, Group II (Study group): Patients received general anaesthesia plus US guided Bilateral SCPB. All 100 cases were followed-up and analysed statistically.

All cases characteristics and surgical data were comparable in the two groups (Table 1).

Table 1: Patients' demographics and surgical data

	Group I (Control) (n = 50)	Group II (Study) (n = 50)	P value
Age (y)	41.84±6.99 (28 – 55)	42.38±7.48 (26-56)	0.71
Gender			0.838
-Male	19 (38%)	20 (40%)	
- Female	31 (62%)	30 (60%)	
ASA physical status			0.508
- I	32 (64%)	36 (72%)	
- II	18 (36%)	14 (28%)	
BMI (kg/m^2)	27.4±4.1 (21.4-36.1)	28.5±3.6 (22.8-36.9)	0.61
Duration of surgical procedure (min)	106.4±15.23 (89-135)	115.7±15.43 (91-138)	0.34

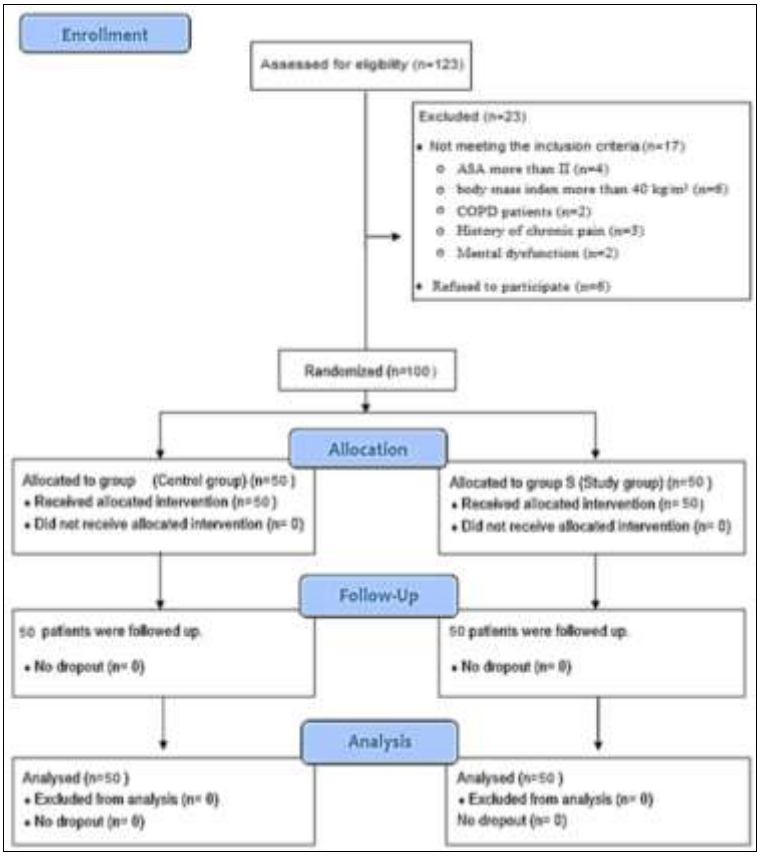

Fig 1: Consort flow chart for the studied patients

Data are presented as mean± SD (range) or count (%)
SD: standard deviation. P value < 0.05 indicates statistical significance. BMI: body mass index. ASA: American Society of Anesthesiologists. MAP showed significant increase in group I than group II after skin incision with P value <0.001, While it was comparable for all patients at all study times in both groups.HR showed significant increase in group I than group II after skin incision with P value <0.001, While it was comparable for all patients at all study times in both groups.

Table 2: Mean ABP and HR in the studied groups

MAP	Group I (Control) (n = 50)	Group II (Study) (n = 50)	P value
Baseline	78.54±9.59 (60 – 96)	79.04±9.01 (58 – 93)	0.789
After induction	88.36±9.24 (76 – 103)	90.42±8.28 (78 – 104)	0.243
After skin incision	103.04±9.14 (89 – 118)	84.22±8.96 (69 – 99)	<0.001
30 min.	79.80±10.01 (56 – 98)	82.08±9.33 (59 – 101)	0.242
45 min.	81.80±10.96 (66 – 103)	82.64±10.62 (62 – 103)	0.698
60 min.	81.42±10.34 (62 – 103)	79.86±10.89 (60 – 102)	0.464
75 min.7 75 min	82.90±9.34 (67 – 99)	79.48±10.29 (63 – 106)	0.085
90 min.	81.26±8.32(69 – 97)	84.24±10.76 (62 – 104)	0.182
105 min.	79.75±8.89 (69 – 92)	82.85±11.86 (63 – 107)	0.356
120 min	81.13±8.89 (65 – 92)	81.88±7.28 (74 – 90)	0.86
135 min.	81.88±7.28 (74 – 90)	81.13±8.89 (65 – 92)	0.856
HR (Beats/min.)	Group I (Control) (n = 50)	Group II (Study) (n = 50)	P value
Baseline	70.58±6.11 (60 – 78)	70.56±6.61 (60 – 85)	0.540
After induction	81.94±5.77 (72 – 91)	82.70±6.55 (72 – 105)	0.987
After skin incision	105.76±5.99 (85 – 103)	73.3±6.22 (63 – 85)	<0.001
30 min.	70.46±7.64 (60 – 89)	71.80±6.99 (60 – 88)	0.362
45 min.	72.44±6.93 (60 – 86)	74.10±6.80 (63 – 88)	0.230
60 min.	72.02±7.74 (51 – 85)	72.80±7.56 (60 – 87)	0.611
75 min.	69.94±6.09 (54 – 83)	71.26±7.96 (54 – 88)	0.354
90 min.	70.08±6.33 (61 – 85)	72.18±8.08 (61 – 86)	0.210
105 min.	69.35±7.18 (60 – 83)	71.75±7.14 (62 – 82)	0.296
120 min	70.63±6.99 (60 – 79)	70.75±5.20 (65 – 82)	0.97
135 min.	70.75±5.20 (65 – 82)	70.63±6.99 (60 – 79)	0.968

Data are presented as mean ± SD (range). SD: standard deviation. P value < 0.05 indicates statistical significance. MAP: Mean arterial pressure, HR: Heart rate.

Intraoperative fentanyl consumption ranged between 100 to 200 µg with mean value 141±34.54 µg in group I and ranged between 0 to 50 µg with mean value 9±19.4 µg in group II. Intraoperative fentanyl consumption showed significant decrease in group II in comparison with group I; P value < 0.001 (Table 3)

Table 3: Intraoperative fentanyl consumption

Intraoperative Fentanyl consumption (µg)	Group I (Control) (n = 50)	Group II (Study) (n = 50)	p
Mean±SD	141±34.54 (100 – 200)	9±19.4 (0 – 50)	<0.001

Data are presented as mean± SD (range). SD: standard deviation. P value < 0.05 indicates statistical significance.

In group I; The median value of postoperative QOR-15 score was 106.5 with IQR (105-110), while in group II; The median value of postoperative QOR-15 score was 122 with IQR (120 – 124)

Postoperative QOR-15 score was significantly increased in group II in comparison with group I; P value less than 0.001 (Table 4)

Table 4: Postoperative QOR-15 score in the studied groups.

Postoperative QOR-15	Group I (Control)	Group II (Study)	P value
Median (IQR)	106.5 (105– 110)	122 (120-124)	<0.001

Data are presented as Median (IQR). IQR: Inter quartile range. P value less than 0.05 means statistical significance.
QOR : Quality Of Recovery.

Table 5: Time to 1st rescue analgesic in the studied groups

Time to 1st rescue analgesia (hr)	Group I (Control)	Group II (Study)	P value
Median (IQR)	4 (2 – 4)	12 (10 – 12)	*p*<0.001

Data are presented as Median (IQR). IQR: Inter quartile range. P value < 0.05 indicates statistical significance.

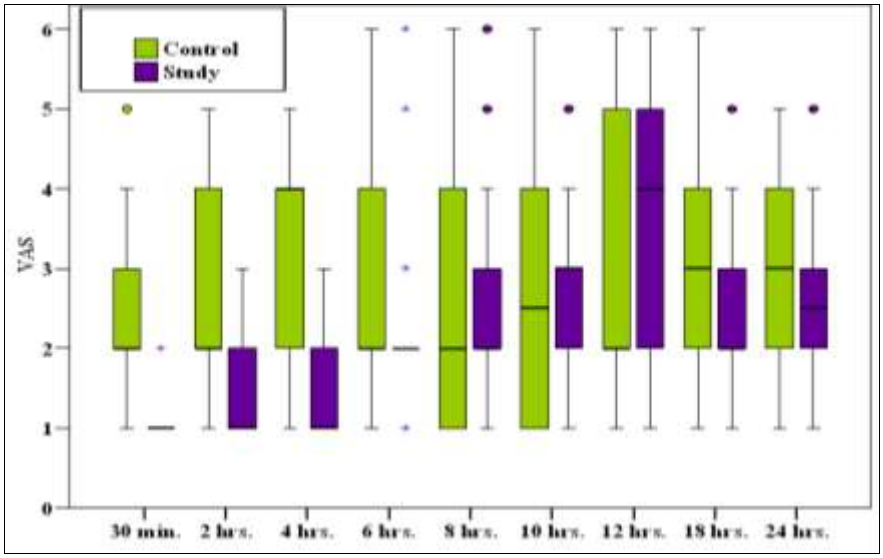

Fig 2: Change in VAS in the 2 studied groups.

In group I; The median value of time to 1st rescue analgesic was 4 hrs with IQR (2 – 4) hr, whereas In group II; the median value of time to first rescue analgesia was 12 hrs and IQR (10-12) hr. Time to 1st rescue analgesics was significantly increased in group II in comparison with group I; P value < 0.001 (Table 5).

VAS showed significant increase in group I at 30min, 2hrs, 4hrs and 6 hrs in comparison with group II; P value greater than 0.001. nevertheless, non -statistically significant differences were found between both groups at 8hr, 10hr, 12hr, 18hr and 24hr; P value >0.005 (Figure 2).

In group I; The median value of postoperative opioid consumption was 9 mg with IQR (9 – 12), while In group II; The median value of postoperative opioid consumption was 3 with IQR (3 – 6). Postoperative opioid consumption was significant decrease in group II in comparison with group I ;P value less than 0.001 (Table 6). Table 6: post-operative opiod consumption (mg) in the two studied groups. Post-operative Opiod consumption (mg) Group I (Control) Group II (Study) P value Median (IQR) 9(9-12) 3.0(3-6)<0.001 Data are presented as Median (IQR). IQR: Inter quartile range. P value < 0.05 indicates statistical significance.

Diaphragmatic Excursion (DE)

No statistically significant difference between preoperative and postoperative values in the 2 groups was found. Also, no statistically significant difference was determined between the two groups either pre or postoperatively (Table 7).

Table 7: Diaphragmatic excursion in both studied groups:

Cases No.	Diaphragmatic excursion (cm)			
	Group I (Control)		Group II (Study)	
	Before	After	Before	After
Mean ± SD	4.34±0.63 (3.19 – 5.84)	4.30±0.58 (3.25 – 5.9)	4.60±0.54 (3.54 – 5.72)	4.62±0.53(3.59 – 5.75)
p	0.253		0.498	

Diaphragmatic excursion	Group I (Control) (n = 50)	Group II (Study) (n = 50)	p
B Before			
Mean ± SD.	4.34±0.63(3.19 – 5.84)	4.60±0.54(3.54 – 5.72)	0.272
After			
Mean ± SD	4.30±0.58(3.25 – 5.9)	4.62±0.53(3.59 – 5.75)	0.536

Data are presented as mean± SD (range). SD: standard deviation. P value < 0.05 indicates statistical significance.

There was no statistically significant alterations regarding the incidence of complications between both groups concerning hypotension or bradycardia.

Infection, hematoma and toxicity by the local anaesthesia weren't determined in the studied groups as shown in table (8).

Table 8: Complication between the studied groups

Complication	Group I (Control) (n=50)		Group II (Study) (n=50)	
	No.	%	No.	%
Hypotension	1	2%	1	2%
Bradycardia	0	0%	0	0%
Infection	0	0%	0	0%
Hematoma	0	0%	0	0%
Local anesthetic toxicity	0	0%	0	0%

Discussion

Thyroid surgery might lead to extensive pain and discomfort for the patients postoperatively. In addition, managing postoperative pain (POP) following thyroid operation become highly important as thyroid operation is currently done on a day case basis [7].

Enhanced recovery after surgery (ERAS) are particularly designed multimodal perioperative care pathway that aimed at attaining fast recovery following operation via supporting preoperative organ functions and reducing the stress response that result from surgical trauma [7].

Actually, POP) affects the quality as well as length of patients' recovery duration postoperatively, and thus, the quality of life as well. One of the essential elements of ERAS is to properly control the POP, and multimodal analgesics seem to be the appropriate method for this purpose [7].

Locoregional anaesthesia including local anaesthesia wound infiltration, BSCPB, SCPB and deep cervical plexus block, can efficiently decrease the POP in cases subjected to thyroid surgery [8, 9].

The current study was a prospective randomized controlled double blinded study conducted at Tanta University Hospitals on 100 patients underwent elective thyroid surgeries. All patients were grouped into 2 equal groups: Group I (control): Sham Technique, received general anaesthesia plus US guided BSCPB with 10 ml NaCl 0.9% was injected on both sides and Group II (Study group) received general anaesthesia plus US guided BSCPB with a total volume 10 ml that contained Bupivacaine 0.25% was injected. The aim of the current work was to evaluate US guided BSCPB as a component of enhanced recovery following thyroid operation via the use of QOR-15 scale as a way to assess QOR (1ry outcome) and also assessment of postoperative analgesics determined by VAS score, 24hr Opioid consumption and diaphragmatic excursion assessed by US (2ry outcome).

Regarding postoperative QOR and by assessment of the postoperative quality of QOR-15 score, the QOR-15 score was significantly elevated in group II in comparison with group I indicating better quality of recovery in group II in comparison with group I.

In coherence with the current results Yao *et al*., [10] assessed the effects of BSCPB on QOR in cases subjected to thyroid cancer operations, the study was carried out on seventy-four cases scheduled for elective unilateral thyroid lobectomy in conjunction with central-compartment neck dissection using GA. Cases were allocated into 2 equal groups in a random manner; 37 each to receive BSCPB with either ropivacaine 0.5% or NaCl 0.9% 10 ml bilaterally. They reported that the global QoR-15 score at 24 hrs following operation was markedly increased in the SCPB group in comparison with the controls.

As regard POP assessed by VAS, It was significantly decreased in group II in comparison with group I at PACU, 2, 4, 6 hours after surgery. However, no significant differences were determined between the 2 groups at 8, 10, 12, 18 and 24 hours.

In line with the current study Yao *et al*., [10] assessed the impacts of BSCPB on QoR in cases subjected to thyroid cancer operation and revealed that VAS score was reduced in the SCPB group in the first 8 hours postoperatively. Yet, no statistical differences in VAS score were determined at the 24 hrs time points postoperatively.

In consistency with the results of our study Kannan *et al*., [11] assessed the influences of BSCPB on sevoflurane use during thyroid operation, they enrolled 50 cases equally distributed into 2 groups BSCPB and control groups 25 each. They found that cases were pain-free for a prolonged duration in study group in comparison with control group as the median VAS scores were less in study group in comparison with control group (at 30& 60 min, 2 hrs, and 3 hrs).

Woldegerima *et al*., [12] in similar study to evaluate the analgesia efficiency of BSCPB for thyroid operation under GA. In this study, they enrolled 37 patients in BSCPB group to whom BSCPB with 10 ml of 0.25% bupivacaine were administered immediately prior to induction and 37 patients in control group. The study revealed that pain scores "NRS-11 scores" were significantly less in the block group immediately then at 2nd, 6th, 12th and 24th hr postoperatively.

Karthikeyan *et al*., [13] in similar study on the efficiency of BSCPB in thyroidectomy in which cases (n = 60) subjected to thyroidectomy were classified into three groups (n = 20 each) received BSCPB through 15 mL of 0.25% bupivacaine (group B) or 0.25% bupivacaine with 1 µg/kg clonidine (group BC) or 0.9% NaCl (group S) on bilaterally following induction, they revealed that POP scores were significantly decreased in block groups in comparison with the controls.

Also, Ozgun *et al*., [14] aimed at comparing the impact of bilateral SCPB on postoperative analgesics requirement following thyroid operation. 30 patients received BSCPB and 30 not. They found that NRS score in the recovery room was significantly reduces in study group in comparison with controls.

Mayhew *et al*., [6] studied the analgesics efficiency of BSCPB for thyroid operation and they also reported that there was improvement in VAS scores in the BSCPB group.

On the contrary to our study Sardar *et al*., [15] in a study to evaluate the analgesia efficiency BSCPB following thyroid operation, 60 cases were classified into 2 groups; BSCPB

with 0.25% bupivacaine 15ml bilaterally was done in Group I, whereas in the control group no regional block was utilized. The study revealed that VAS scores weren't different between the groups.

Eti *et al*., [16] studied the analgesics influence of BSCPB following thyroid operation. In this study forty-five cases were classified into 3 groups (15 cases in each group). In the 1st Group, BSCPB with 0.25% bupivacaine 15 mL was injected on each side, in the 2nd Group, local wound infiltration with 20 mL 0.25% bupivacaine were carried out by the same anaesthesiologist while in the 3rd Group (controls) no regional block was utilized. They denied the efficacy of BSCPB as the block hadn't succeed to detect the decrease pain scores as there was no difference in VAS scores amongst the groups at all-time intervals. They suggested the results by pain arising from deep and muscular components, pain from positioning as well as wound drainage.

Regarding time to first rescue analgesia, the current study showed that cases were pain-free for a prolonged time in study group in comparison with control group as Time to 1st rescue analgesics was significantly postponed in the 2nd group compared to the 1st group.

In agreement with the current study Yao *et al*., [10] detected the effect of BSCPB on QoR in cases subjected to thyroid cancer operation and it was revealed that the median time to 1st rescue analgesics was longer in the SCPB group compared with the controls. In consistency with our study Kannan *et al*., [11] determined the effect of BSCPB on consuming sevoflurane during thyroid operation and revealed that cases in study group had a prolonged duration of analgesics when compared to controls. Similar to our study Woldegerima *et al*., [12] in their study to detect the analgesics efficiency of BSCPB for thyroid operation under GA, they revealed that the 1st analgesic request time was noticeably prolonged in the block group in comparison with the non-block one.

In harmony with the current study Karthikeyan *et al*., [13] assessed the efficiency of BSCPB in thyroidectomy and they revealed that 1st analgesia requirements time was noticeably prolonged in block groups in comparison with control one. Sardar *et al*., [15] in a similar study to evaluate the analgesia efficiency of BSCPB following thyroid operation they revealed that the 1st analgesia requirement time in block Group was significantly more in comparison with the other group.

Regarding 24-hr. morphine consumption, it was significantly reduced in group II in comparison with group I. The same as our study Karakış *et al*., [17] showed that the tramadol required postoperatively was significantly decreased in the BSCPB group in comparison with the controls. Karthikeyan *et al*., [13] in their study on the efficacy of BSCPB in thyroidectomy also revealed that morphine requirement postoperatively was significantly less in block groups in comparison with controls.

Similar to our study Ozgun *et al*., [14] aimed at comparing the effect of BSCPB on analgesics required postoperatively after thyroid operation when they revealed that the use of tramadol for PCA at 2, 6, 12, and 24 hours postoperatively and the numbers of cases who used tenoxicam as rescue analgesics were noticeably less in study group in comparison with the controls.

In consistency with our study, Mayhew *et al*., [6] studied the analgesia efficiency of BSCPB for thyroid operation where they reported a reduction in analgesics requirements in BSCPB group in comparison with the control group.

Gürkan *et al*., [18] assessed analgesics impact of US guided SCPB in cases subjected to thyroid operation postoperatively among 50 cases allocated to SCPB using 10 mL 0.25% bupivacaine or control group with the use of 10 mL NaCl 0.9% bilaterally. In harmony with the current study, Postoperative morphine utilization was less in SCPB group than the controls.

On the other hand, Sardar *et al*., [15] in a study to assess the analgesics efficiency of BSCPB after thyroid surgery, they revealed that IV analgesia dosage weren't different between the studied groups. Similar to our study Hu *et al*., [19] studied the impacts of US-guided BSCPB on the QoR of 82 uremia cases with SHPT after parathyroidectomy and found that the total use of remifentanil was noticeably reduced in the BSCPB group than the controls. Moreover, Karakış *et al*., [17] investigated the analgesia efficiency of BSCPB in the intraoperative and postoperative times on 46 cases undergoing thyroidectomy, they showed that remifentanil required intraoperativly were significantly less in the BSCPB group in comparison with the controls.

Regarding haemodynamic measurements MAP and HR, it was proved that no significant differences were detected in the mean values of MAP and HR between both groups at all study times.

In consistency with our study Kannan *et al*., [11] revealed that hemodynamic parameters including HR and MAP trends were similar in the two groups. In agreement with our study Ozgun *et al*., [14] aimed at comparing the effect of BSCPB on analgesics requirement postoperatively after thyroid operation and they revealed the hemodynamic values were the same between the study and controls.

Regarding diaphragmatic excurtion, it was found that there were no statistically significant differences between both groups of the study. In a similar study done by Pikasi *et al*., [20] on diaphragmatic function assessment and block role following ICPB for POP control in thyroid operation, the study revealed that postoperative diaphragmatic excurtion showed statistically and clinically insignificant decrease in both groups.

In contrast with the current study Han *et al*., [21] studied the impacts of unilateral ICPB on the functions of the diaphragm in cases subjected to thyroidectomy on one side, it was revealed that the incidence of dysfunction of the diaphragm on the block side of ICPB group was more in comparison with that of control group at forty minutes following block. Nevertheless, the incidence of dysfunction of the diaphragmatic was similar between both groups at four hours following block placement. They explained that dysfunction of the diaphragm following ICPB was because of LAs that penetrates the prevertebral fascia and thereafter block the phrenic nerve although the degree of permeability of prevertebral fascia to local Anastasia remains contradictory they also explained that their contradictory results might be due to by the diverse diagnostic criteria of dysfunction of the diaphragm as they diagnosed it according to the abnormal values of each indicator representing diaphragmatic function as they assessed the diaphragmatic thickness on both sides, DTF and diaphragmatic excursion during normal as well as deep inspiration.

The study had some limitations: the current study was limited by the small sized sample, being single centre study and some results were subjective as it was self-reported.

Conclusions: With respect to the incidence of complications in this No significant differences were determined between the 2 groups as regards infection, hematoma, local anaesthetic toxicity, hypotension and bradycardia. Patients undergoing thyroid surgery showed

improved global quality of recovery after preoperative ultrasound guided bilateral SCPB. It reduced POP score, diminished analgesics consumption intraoperatively, reduced postoperative morphine consumption and maintained diaphragmatic excursion.

Based on our conclusion, we recommend that US guided bilateral SCPB represents a good regional blockade choice to enhance recovery after thyroid surgery. Further comparative studies with larger sample size is needed to confirm our results and to identify risk factors of adverse events.

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References

1. Suh YJ, Kim YS, In JH, Joo JD, Jeon YS, Kim HK. Comparison of analgesic efficacy between bilateral superficial and combined (Superficial and deep) cervical plexus block administered before thyroid surgery. Eur. J Anaesthesiol. 2009;26:1043-7.
2. Borrell-Vega J, Humeidan ML, Bergese SD. Defining quality of recovery-What is important to patients? Best Pract. Res Clin. Anaesthesiol. 2018;32:259-68.
3. Yao Y, Li J, Hu H, Xu T, Chen Y. Ultrasound-guided serratus plane block enhances pain relief and quality of recovery after breast cancer surgery. A randomised controlled trial. Eur. J Anaesthesiol. 2019;36:436-41.
4. Nimmo SM, Foo ITH, Paterson HM. Enhanced recovery after surgery: Pain management. J Surg Oncol. 2017;116:583-91.
5. Tran DQ, Dugani S, Finlayson RJ. A randomized comparison between ultrasound-guided and landmark-based superficial cervical plexus block. Reg. Anesth. Pain Med. 2010;35:539-43.
6. Mayhew D, Sahgal N, Khirwadkar R, Hunter JM, Banerjee A. Analgesic efficacy of bilateral superficial cervical plexus block for thyroid surgery: meta-analysis and systematic review. Br J Anaesth. 2018;120:241-51.
7. Stark PA, Myles PS, Burke JA. Development and psychometric evaluation of a postoperative quality of recovery score: The QoR-15. Anesthesiology. 2013;118:1332-40.
8. 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. Anesth. Analg. 2001;92:1538-42.
9. Aunac S, Carlier M, Singelyn F, Kock DM. The analgesic efficacy of bilateral combined superficial and deep cervical plexus block administered before thyroid surgery under general anesthesia. Anesth Analg. 2002;95:746-50. Table of contents.
10. Yao Y, Lin C, He Q, Gao H, Jin L, Zheng X. Ultrasound-guided bilateral superficial cervical plexus blocks enhance the quality of recovery in patients undergoing thyroid cancer surgery: A randomized controlled trial. J Clin. Anesth. 2020;61:109651.
11. Kannan S, Surhonne NS. Effects of bilateral superficial cervical plexus block on sevoflurane consumption during thyroid surgery under entropy-guided general anesthesia: A prospective randomized study. Korean J Anesthesiol. 2018;71:141-8.
12. Woldegerima YB, Hailekiros AG, Fitiwi GL. The analgesic efficacy of bilateral superficial cervical plexus block for thyroid surgery under general anesthesia: A prospective cohort study. BMC Res Notes. 2020;13:42.
13. Karthikeyan VS, Sistla SC, Badhe AS, Mahalakshmy T, Rajkumar N, Ali SM, *et al*. Randomized controlled trial on the efficacy of bilateral superficial cervical plexus block in thyroidectomy. Pain Pract. 2013;13:539-46.
14. Ozgun M, Hosten T, Solak M. Effect of Bilateral Superficial Cervical Plexus Block on Postoperative Analgesic Consumption in Patients Undergoing Thyroid Surgery. Cureus. 2022;14:e21212.
15. Sardar K, Rahman SH, Khandoker MR, Amin ZA, Pathan FH, Rahman MK, *et al*. The analgesic requirement after thyroid surgery under general anaesthesia with bilateral superficial cervical plexus block. Mymensingh Med J. 2013;22:49-52.
16. Eti Z, Irmak P, Gulluoglu BM, Manukyan MN, Gogus FY. Does bilateral superficial cervical plexus block decrease analgesic requirement after thyroid surgery? Anesth Analg. 2006;102:1174-6.
17. Karakış A, Tapar H, Özsoy Z, Suren M, Dogru S, Karaman T, *et al*. Perioperative analgesic efficacy of bilateral superficial cervical plexus block in patients undergoing thyroidectomy: A randomized controlled trial. Revista Brasileira de Anestesiologia. 2019;69:455-60.
18. Gürkan Y, Taş Z, Toker K, Solak M. Ultrasound guided bilateral cervical plexus block reduces postoperative opioid consumption following thyroid surgery. J Clin. Monit Comput. 2015;29:579-84.
19. Hu S, Shu T, Xu S, Ju X, Wang S, Ma L. Ultrasound-guided bilateral superficial cervical plexus block enhances the quality of recovery of uremia patients with secondary hyperparathyroidism following parathyroidectomy: A randomized controlled trial. BMC Anesthesiol. 2021;21:228.
20. Pikasi I, Tileli M, Makris A, Kalampokini A, Arvis S, Bina A, *et al*. B408 Intermediate cervical plexus block for postoperative pain control in thyroid surgery: a prodromal randomized study of diaphragmatic function evaluation and block effectiveness. Regional Anesthesia and Pain Medicine. 2022;47:A277-A.
21. Han C, Shao P, Li H, Shi R, Wang Y. Effects of Unilateral Intermediate Cervical Plexus Block on the Diaphragmatic Function in Patients Undergoing Unilateral Thyroidectomy: A Randomized Controlled Study. J Pain Res. 2022;15:2663-72.

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