



## Thyroidectomy using superficial cervical block: a report of 147 cases over 8 years

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### Summary

**Background** The aim of this study was to evaluate the safety and efficiency of thyroid surgery by the experienced surgeon under superficial cervical block anesthesia (SCB).

**Materials and Methods** A total of one hundred forty seven consecutive patients, who underwent a total thyroidectomy under SCB anesthesia for thyroid disorder, between January 2010 and January 2018, were reviewed in this study. Total thyroidectomy was performed in all patients under SCB by the two experienced surgeon

**Results** 75% of patients were female and the remainder 25% male. Mean age 60±14 (±standart deviation) years. Conversion rate to general anesthesia was 4%. The mean operation time lasted 74 ± 24 minutes. Sensorial block 98± 24 started in 24 seconds and continued for 202 ± 18 minutes. During the operation, the patients were asleep and were awake in the postoperative period. SCB reduced analgesic need The most common introporative side effect of SCB was snore in

24.4% of the patients. Patient and surgeon satisfaction was good for SCB. Postoperative complications are bleeding in 2 % of the patients, permanent recurrent nerve injury in 0.6% of the patients and permanent hipoparathyroidi in 2% of the patients.. Hospital stay was 1 ± 0.2 day.

**Conclusion** Total thyroidectomy performed by experienced surgeons in the selected group patients under SCB anesthesia is safe and effective.

**Keywords** Thyroidectomy · Superficial cervical block (SCB) · Loco-regional anesthesia

### Abbreviations

SCB Superficial cervical block

### Introduction

Today, general anesthesia is usually accepted by most surgeons for thyroidectomy. In some cases, local or regional anesthesia may be preferable. Sir Thomas Peel Dunhill, a pioneer Australian surgeon for the thyroid surgery, reported thyroidectomy under local anesthesia for toxic goiter for the first time in 1907 [1]. Over the years, several isolated studies in the literature have reported the feasibility of these techniques [2–4]. Local or regional anesthesia for thyroid surgery was forgotten with the development of anesthetic equipment, drugs and the increasing safety of general anesthesia and reduced historical significance.

In recent years, thyroidectomy under local/regional anesthesia has again gained in popularity [5–8]. With the increasing workloads and limited access to operating time under general anesthesia in developing countries, the revival of thyroid surgery under local/regional anesthesia offers an interesting alternative [9]. In some cases with the contraindication for general anesthesia the use of locoregional anesthesia may

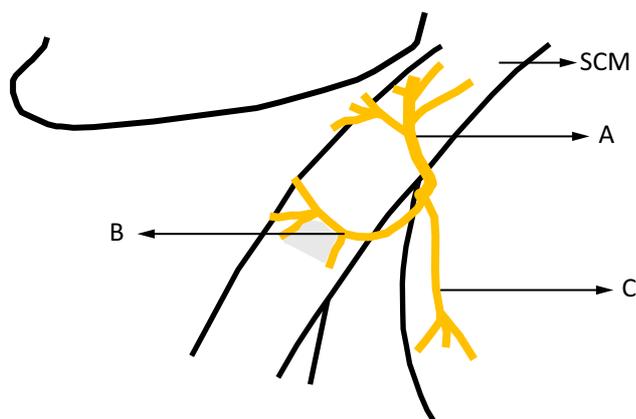
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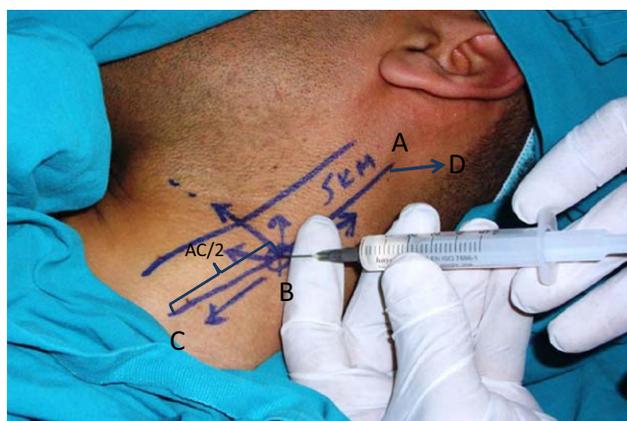
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**Fig. 1** Cervical plexus anatomy. A Great auricular nerve; B Anterior cervical nerve; C Supraclavicular nerve, SCM Sternocleidomastoid muscle



**Fig. 2** Cervical block application. A Processus mastoideus, B Midpoint of the posterior border of sternocleidomastoid, C Clavícula, D Posterior border of sternocleidomastoid

be obligatory [10]. On the other hand, thyroidectomy is now frequently performed as an outpatient surgery for the reduction of hospitalization time [11]. The present study was undertaken to review our experience with thyroidectomy under superficial cervical block (SCB) and with regard to its safety and outcome.

### Materials and methods

A total of 147 consecutive patients (age range 40–84 years) who had thyroid surgery under SCB were reviewed in this retrospective study from 1 January 2015 to 31 December 2018. The study was approved by the director of Karadeniz Technic University Farabi Hospital (Registration Number: ([2748EBYS] from 19 April 2016)). All patients were informed about the operative procedures. Information was obtained from the database at the Department of General Surgery, Karadeniz Technical University, Farabi Hospital, Trabzon, Turkey. Electronic medical records including anesthetic, operative, nursing, and outpatient clinic records were reviewed. Exclusion criteria were patient apprehension of the procedure, communication

**Table 1** Consciousness scale

0	Fully awake
1	Lightly sedated
3	Asleep
4	Sleep but can be aroused
5	Deep sleep, can't wake up

barriers such as dementia, a language barrier, mental retardation, reoperation or secondary procedures, lateral neck dissection or multiple procedures, sternotomy, retrosternal goiter, locally invasive cancer, morbid obesity, history of sleep apnea, claustrophobia and allergy to local anesthetic agents. All of the thyroidectomies were performed by two experienced surgeons for thyroid surgery (E. Alhan, A. Cinel).

Patients entered the operation theater without any premedication. After standard equipment such as electrocardiography, noninvasive arterial blood pressure, and pulse oximetry monitoring were applied, peripheral venous access was introduced for drug and fluid infusion. During surgery, 0.9% NaCl was administered at 10 cc/kg/h. SCB was performed using 100 mg 0.25% bupivacaine 40 ml [12]. Propofol (0.5–2 mg/kg/h) was given to the patients for sedation (Figs. 1 and 2). After the SCB, sensorial block was controlled with a 21 gauge needle with pin-prick test. The time from the injection of the bupivacaine to the beginning the sensorial block was defined as sensorial block beginning time. The sensorial block finish time was defined as the time from the beginning of the sensorial block to the finish of the sensorial block. Consciousness level of the patient was measured with the scale from 0 to 5 (Table 1). During the operation and after the operation hemodynamic changes and consciousness levels were recorded at 5, 10, 15, and 30 min, and also after 1 and 2 h. During the peri-operative and postoperative period, complications such as convulsion, nausea and vomiting, dizziness, headache, tremors, tinnitus, drowsiness and respiratory depression were recorded. After the operation the patients were delivered to the postanesthesia care unit. Patients were discharged from the postanesthesia care unit if hemodynamic changes were stable and the consciousness score was less than 3. Paracetamol (500–1000 mg) was recommended to all patients for postoperative analgesia. The time from the end of the operation until the first analgesic was recorded as total analgesia time (within the first 24 h). After surgery, the surgeon and patient were asked if they were satisfied with the anesthesia on a 3-point scale (bad–okay–good). Operative time was measured in minutes from start of incision to completion of the closure. Postoperative data were collected during hospitalization and at the outpatient clinic 4 weeks after discharge.

In cases where the superficial cervical block method was insufficient or inadequate, general anesthesia was used.

**Table 2** Demographic data of patients

	Values ( <i>n</i> = 141)
Age (years)	60 ± 14
Sex	
Female	75%
Male	25%
BMI (kg/m <sup>2</sup> )	26 ± 6
ASA PS	2 ± 0.4
Pathology	
Benign	65.9%
Adenoma	12.7%
Malignant	21.4%
Type of the operation	
Total thyroidectomy	100%

Values are presented as mean ± standard deviation (SD) or number of patients or number of patients (%)  
 BMI body mass index, ASA PS American Society of Anesthesiologist Physical Status

**Table 3** Perioperative data

	Values ( <i>n</i> = 141)
Duration of surgery (min)	74 ± 24
Sensorial block beginning time (s)	98 ± 21
The sensorial block finish time (min)	306 ± 92
Consciousness level	
At the beginning	0 ± 0.2
During surgery	3 ± 0.4
Postoperative 30 minutes	0 ± 0.3
Total analgesia time (min)	202 ± 18
Intraoperative adverse events	
Cough	17%
Snore	24.4%
Nausea	2.8%
Vomiting	2
Bradycardia	0.6%
Stridor	0.6%
Patient satisfaction (bad–okay–good)	80% good 20% okay
Surgeon satisfaction (bad–okay–good)	84% good 16% okay
Hospital stay (day)	1 ± 0.2

Values are presented as mean ± standard deviation (SD) or number of patients (%)

Data were analyzed using statistical package SPSS 13.01 for Windows (SPSS, Chicago, IL, USA). Results are presented as the mean ± standard deviation (SD). Values of  $P < 0.05$  were accepted as being significant. Blood pressure analysis was tested by using repeated measures variance analysis and least significance difference (LSD) was used as the post hoc test.

## Results

A total of 147 patients were investigated in this study, whereby 6 patients (4%) were converted to general anesthesia. The remainder of the patients were re-

**Table 4** Postoperative complications

	Number	%
Hemotoma	3	2
Seroma	4	3
Transient hypoparathyroidism	14	9.5
Permanent hypoparathyroidism	3	2
Transient recurrent nerve injury	3	2
Permanent recurrent nerve injury	1	0.6

viewed in this study. The causes of the conversion are failure of SCB ( $n=3$ ), inadequate exposure of surgical field due to tracheal deviation or pressure on the trachea ( $n=2$ ), and local invasion of tumor was discovered during the procedure ( $n=1$ ). Demographic data are summarized in Table 2. Total thyroidectomy was performed in all patients.

Mean blood pressure at the beginning of the operation was  $133 \pm 18$  mmHg, at 30 min it had decreased significantly to  $116 \pm 22$  mmHg ( $p < 0.01$ ) and at 45 min had increased to  $142 \pm 22$  mmHg ( $p < 0.01$ ). No additional treatment was applied for these changes and no significant changes were found for the other hemodynamic measurements.

Consciousness level at the beginning of the operation was  $0 \pm 0.2$  (Table 3). But 5 min after the beginning of the operation, it was  $3 \pm 0.4$ . During the operation, the consciousness level at postoperative minute 0 was  $3 \pm 0.4$ , at postoperative minute 15 was  $1 \pm 0.2$  and at postoperative minute 30 was  $0 \pm 0.3$ . Sensorial block beginning time was  $98 \pm 21$  s (Table 2). Sensorial block finish time was  $306 \text{ min} \pm 92 \text{ min}$  (Table 3) and total analgesia time was  $200 \pm 41$  min. Patient satisfaction (bad–okay–good) was good in 80% of the patients, okay in 20% of the patients (Table 3). Surgeon satisfaction (bad–okay–good) was good in 84% of the patients and okay in 16% of the patients. Operative time was  $74 \pm 24$  min (Table 3).

Some side effects of SCB were observed in this study (Table 3). Three patients were operated again under general anesthesia due to postoperative hemorrhage. The other complications are presented in Table 4. The histopathological findings were benign in 65.9% of the patients, adenoma in 12.7% of the patients and malignant in 20.4% of the patients (Table 1). The length of the hospital stay was  $1 \pm 0.2$  day (Table 3).

## Discussion

We investigated the effect of SCB for thyroidectomy based on the clinical data and patient satisfaction in this retrospective study. General anesthesia has some advantages such as a total loss of awareness, stable surgical field and the correct maintenance of airway. However, general anesthesia also has some disadvantages such as the prolongation of the postoperative recovery, adverse effects such as nausea and vomiting, irritation of throat and vocal cords.

Many clinical studies with local or local/regional anesthesia with thyroid surgery have reported good results in the literature [5–9, 13–21]. Those studies confirmed that the thyroid surgery under local or locoregional anesthesia is feasible, safe and effective. The study of 1025 cases published by Spanknebel et al. is the most well-known study on this subject [7]. In this study, total thyroidectomy in 589 patients was applied with 3.3% conversion rate to general anesthesia, 72 min operation time, 3.8% morbidity and 80% of patients had a 6 h hospital stay [7]. The similar findings with 4% conversion rate and 74 min operation time were achieved in our study. In addition, we found good patient satisfaction for thyroidectomy in the presented study.

Local/regional anesthesia begins after a short time of about 90 seconds as we saw in our study and protects the patient from unintended side effects and unpredictable effects of general anesthesia. The patients with the diagnosis of amiodarone-induced hyperthyroidism or severe Graves' disease and associated cardiac problems and malign hyperthermia have great risk in thyroidectomy under general anesthesia [7, 10]. We have no similar patients in our study. On the other hand, general anesthesia results in perioperative and postoperative nausea and vomiting and pain. Local/regional anesthesia reduces these symptoms as seen in our study [7, 19–21]. The long sensorial block time with 306 min and total analgesia time with 202 min in our study support the long anesthetic effect of the local/regional block.

We observed some symptoms such as cough and snoring during the perioperative period in our study. Those symptoms have been not reported in the similar studies [19–21]. These symptoms may be related to the surgical trauma, the use of propofol, or the extent of thyroidectomy.

Some complications such as bleeding, recurrent nerve injury, or hypoparathyroidism may be seen after thyroidectomy. These complications were not different between thyroidectomy local anesthesia or general anesthesia [7, 15–21]. Our results are similar to the literature. Locoregional anesthesia provides control of recurrent nerve injury during surgery. But these complications were not different between thyroidectomy using local anesthesia or general anesthesia [7, 15–22].

In recent years, local/regional anesthesia for thyroid surgery has emerged as an alternative route to provide early awakening, to reduce hospital stay, and to provide surgery in developing countries that do not have general anesthesia in the operating room [7, 14–22]. In our study, our patients were fully awake 30 min after the end of the operation. Our average hospital stay is one day. In the Spanknebel et al. study, they discharged 80% of the patients 6 h after the operation [7, 8, 19–21].

In the present study, SCB was performed in selected group by two experienced surgeons. Thyroid surgery

under local/regional anesthesia in the literature has been reported by one or two experienced surgeons except the study by Spanknebel et al. [7, 15, 18–21]. This means that time and new studies are required for the acceptance of this method.

We have some limitations in this study. Our study is a retrospective study. We did not have a control group and SCB was performed in a selected group of patients. However, in our study, we confirmed that in 96% of the patients SCB was applicable, safe and effective.

In conclusion, it can be said that thyroidectomy performed by experienced surgeons in the selected group patients under SCB anesthesia is safe and effective.

#### Compliance with ethical guidelines

**Conflict of interest** A. Usta, E. Alhan, A. Cinel, S. Tayar and E.N. Duman declare that they have no competing interests.

**Ethical standards** The local ethics committee confirmed that formal approval was not required for this retrospective audit of practice.

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