The local anesthesia in thyroid surgery is rarely used, only in selected patients. Majority of centers performing thyroid surgery with local anesthesia have possibility to convert to the general anesthesia. The aim of the study was to present our experiences with partial thyroidectomy under local anesthesia performed in 49 consecutive subjects in the Central African Republic (bilateral subtotal strumectomy, total resection of the one lobe, subtotal resection of the one lobe).

Material and methods. All admitted patients with clinically significant goiter were accepted for surgical treatment. For infiltration anesthesia 1% lignocaine was used. Because of the shortage of medical resources, potential conversion to the general anesthesia was impossible. Before the operation patients had received an oral sedation and antibiotic. In 16 patients general anesthesia was used, in other 33 it was impossible.

Results. Subtotal bilateral thyroidectomy was performed in 37 patients, 12 patients underwent lobectomy or partial lobectomy of the affected portion of the gland. There were no intraoperative and postoperative complications noticed in the reported group, including complications related to laryngeal nerve injury. The mean duration of the procedure was 127 minutes and mean medical follow-up was 3 days. General condition of all patients on the day of discharge from hospital was good.

Conclusions. Surgery for goiter under local anesthesia may be a safe alternative where general anesthesia is not available or contraindicated for medical reasons. The infiltration anesthesia is simple to perform and reduces the number of complications potentially occurred at the C2-C4 neck plexus block.

Key words: thyroid surgery, local anaesthesia, goitre

Local anesthesia is used in the surgery for minor, short lasting surgical procedures such as surgical treatment of hernia or closure of colostomy (1, 2). Vast majority of surgical procedures in the treatment of thyroid diseases are performed under general anesthesia. Recently there has been a growing interest in local anesthesia in surgical procedures involving the thyroid gland, including more extensive ones. Eligibility criteria for local anesthesia include mainly contraindications for general anesthesia, such as severe pulmonary disease, malignant fever (3), morbid obesity or ASA ≥3 (4). Need for selectivity with regard to decision to qualify patients to local anesthesia is commonly emphasized as well as for using this anesthesia in selected patient groups (5).

Commonly 0.5% bupivacaine solution is used for local anesthesia (5), usually as C2-C4 neck plexus block. This anesthetizes the whole surgical field although it carries a risk of injection of the drug to internal carotid artery or injury to vagus nerve (6). This risk can be reduced when a superficial block of the neck plexus is performed that seems as effective as the deep block (7).
Infiltration anesthesia can be an alternative to the neck plexus block (8). Premedication is commonly used before the procedure (3). Some centers have also experience in combining general anesthesia with superficial C2-C4 neck plexus block that results in marked reduction of doses of drugs used for general anesthesia and alleviation of pain in the postoperative period (9).

Criteria of qualification to general anesthesia include patient confidence with the method and operator, good cooperation, low anxiety level. History of good tolerance of local anesthesia, e.g. with dental procedures, may be helpful, too (3).

Comparison of results of thyroid surgery under local and general anesthesia demonstrates lack of any significant differences with complications, procedure duration or results of surgical treatment. However, local anesthesia is markedly cheaper (4). It is commonly emphasized that thyroid surgery under local anesthesia should be performed at centers experienced in endocrine surgery (10) where conversion to general anesthesia is possible, if required (11).

Our analysis involved patients who underwent surgical treatment during a medical trip to Rafai in Central African Republic. Due to technical reasons, general anesthesia was impossible, so the procedures were performed under local anesthesia in some cases combined with intravenous analgesedation. A total of 57 patients underwent surgical treatment, including 49 patients who underwent various types of resection of the thyroid gland.

### MATERIAL AND METHODS

Medical services were provided at the territory of mission health care facility in Rafai in Central African Republic in 2002. Surgical procedures as well as any medical activities received written approval from Ministry of Health of Central African Republic, issued for all 8 members of the medical team. The medical team included 7 surgeons from Department of General, Gastroenterological and Endocrinological Surgery, Medical University in Poznań and 1 surgeon from Department of Surgery, ZOZ in Środa Wielkopolska.

Table 1 presents types of performed surgical procedures.

- 49 patients, including 42 women and 7 men, at an average age of 38 years (range 19-74) underwent surgical treatment. In 16 cases the goiter was classified as very large, corresponding to grade III according to WHO classification (a goiter visible from the distance, head flexion was impossible, a goiter exceeding the jaw line in the transverse diameter, marked neck deformation, additional symptoms such as dyspnea or dysphagia) (fig. 1). Subtotal bilateral thyroidectomy was performed in 37 patients, 9 patients underwent partial lobectomy and 3 patients — lobectomy of the affected portion of the gland.

### Table 1. Indications for surgical treatment and types of surgical procedures in patients undergoing surgical treatment under local anesthesia with intravenous analgesedation in Rafai, in the Central African Republic

<table>
<thead>
<tr>
<th>Indication</th>
<th>Procedure type</th>
<th>Number of patients</th>
<th>Average age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nodular goiter</td>
<td>bilateral subtotal thyroidectomy</td>
<td>37</td>
<td>36 years (19-74)</td>
</tr>
<tr>
<td>Obstructive ileus</td>
<td>correction of volvulus</td>
<td>2</td>
<td>38 years</td>
</tr>
<tr>
<td>Massive uterine hemorrhage – risk of hypovolemic shock</td>
<td>resection of myometrium uterus</td>
<td>2</td>
<td>27 years</td>
</tr>
<tr>
<td>Hydrocele testis</td>
<td>total mass resection (teratoma)</td>
<td>1</td>
<td>14 months</td>
</tr>
<tr>
<td>Giant, partially infected mass in the sacral area, with signs and symptoms of sepsis</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
to surgical treatment had nodular goitre that impaired or made impossible normal functioning (dyspnea, dysphagia, restriction of neck mobility, pain, discomfort). Neither patient with grade II or III goitre according to WHO was disqualified from surgical treatment.

Patients who were qualified to surgical treatment, were informed in detail about anticipated extent of the procedure, its progression and possible complications. After receiving full information, patients signed consent form for the procedure; illiterate subjects expressed their oral consent in the presence of at least two witnesses.

Patients were fasting on the day of the procedure. As a premedication, 15 mg of 15 mg midanium (Dormicum) was administered 0.5-1 h before the procedure. Due to nature of postoperative conditions (facilities with very low level of hygiene, high temperature outside), antibiotic prophylaxis was also used – ciprofloxacin hydrochloride (Cipropol) at a dose of 500 mg, administered 2 hours before the procedure. Before the procedure, each patient had a cannula inserted to one of his/her veins on the upper limb. Throughout the procedure a slow infusion of 0.9% NaCl was given; blood pressure and pulse were monitored every 15 minutes.

During the procedure the patient was supine, with his/her head flexed dorsally by 10% (permanent table position). After standard preparation of the surgical field, local anesthesia was started with 10-20 ml of subcutaneous 1% lignocaine. After the skin incision, subsequent local anesthesia was performed using

infiltrative method; on average 37.5 (20-45) ml 1% lignocaine was used during each procedure (fig. 2, 3). Each procedure was performed by 2 surgeons and assistants. After the procedure, suction Redon drain was left for 1 day in 34 patients, for 2 days in 7 subjects and in 8 patients no drain was left due to small extent of the procedure.

At least 2 specimens were collected from each resected thyroid fragment that were subsequently fixed in 10% formalin for histopathological testing. Collection and transport of the whole resected preparation to Poland was impossible for technical reasons. Histopatho-

Fig. 1. A female patient with grade III goiter according to WHO classification, immediately prior to surgical procedure. Inflammatory lesions in the skin and scars are visible

Fig. 2. Neck preparation under local anesthesia

Fig. 3. Resection of a large, cystic thyroid lobe – administration of another injection of local anesthesia
logical tests were performed after completion of medical services, at Department of Clinical Pathomorphology, Poznań University of Medical Sciences, Poland.

The other patients without nodular goiter were operated using intravenous analgesedation (Ketanest) and local infiltration anesthesia in the consecutive layers of abdominal wall. After laparotomy, radix of the mesentery and consecutive anatomical structures were injected with an anesthetic, depending on type of the procedure.

Continuous monitoring of oxygen saturation and pulse was performed in all patients. At least one physician monitored the anesthesia with periodic monitoring of blood pressure and respiration. Throughout the procedure, the patients received a slow crystalloid infusion, depending on the type of the procedure and its duration.

RESULTS

All the scheduled surgical procedures were completed; neither patient was disqualified from the surgical treatment and neither procedure was interrupted. There were no intra-operative or postoperative complications.

Mean duration of the surgical procedure was 127 minutes (range 55-225) in patients treated for nodular goiter. Postoperative assessment was based on clinical examination. Each examination included respiratory passage, trial of phonation and evaluation of fluid and solid food swallowing and the patients were asked about tingling and paresthesia. Neither of the operated patients had evidence of injury or praxia of recurrent, upper laryngeal nerve or hypoparathyroidism. Furthermore, no significant postoperative bleeding was found that would require surgical intervention or blood transfusion. Condition of the operated patients allowed them to resume complete independent functioning 4-6 hours after the procedure. No significant differences were found with regard to progression of the operation and postoperative period between patients with grade III goiter according to WHO classification (16 patients) versus other operated patients.

The patients underwent medical follow-up on average for 3 days (range 1-6), undergoing daily changes of dressings and removal of skin sutures on day 1 (35 patients), day 2 (7 patients) or day 3 (7 patients) after the surgery.

Micro- and macrofollicular colloid goiter was the dominant pathological diagnosis, with cystic changes and parenchymal fibrosis; hyalinization foci were also often observed. This image corresponded to iodine-deficiency goiter.

There was a single case of follicular thyroid carcinoma and two cases of histological evidence of hyperthyroidism.

Partial follow-up examination was performed in 26 (53%) patients, i.e. all patients that could be reached. Two years after the procedure, one of the missionary men conducted interview examination and approximate physical examination. None of the assessed patients was found to have recurrent goiter. All patients considered their health as at least satisfactory, better than before the surgical procedure. Visual assessment did not demonstrate signs of recurrent goiter, approximate examination and interview did not indicate evidence of hypothyroidism. Due to the nature of medical services, political situation in this region and very limited technical options, more complete assessment of operated patients was impossible.

DISCUSSION

First thyroidectomy procedures were performed under local anesthesia. Probably Thomas Peel Dunhill was the first to perform this operation in 1907 (11). Rapid progress in anesthesiology and widespread use of more and more safe general anesthesia caused thyroid procedures under local anesthesia to become obsolete. Rare use of local anesthesia was restricted to resection of solitary, often superficial thyroid lesions (12). There were also case reports of total or subtotal thyroidectomy when his procedure was performed due to life threatening situation while there were absolute contraindications to general anesthesia (13). Recently there were analyses of utility and safety of local anesthesia in the thyroid surgery. Authors emphasize that local anesthesia can be a safe alternative to general anesthesia (4). Slightly longer duration of the procedure and possible transient bradycardia (14) or arrhythmia (8) have to be accepted with local anesthesia. However, this is compensated by lower costs of the procedure and lower rate of
complications involving injury of the recurrent laryngeal nerve (14). According to some authors, lower rate of this nerve injury may be attributable to conversation with the patient, being a type of “monitoring” (14).

In our case, use of local anesthesia was mainly determined by technical conditions that precluded use of general anesthesia. A decision was taken to proceed with infiltration anesthesia, used as a first line anesthesia also by other authors (6,8), due to lack of experience in regional anesthesia C2-C4 that, if done incorrectly, carries a risk of complications such as injection of an anesthetic into the internal carotid artery or injury of the vagus nerve (6). This anesthesia was very well tolerated by the patients, certainly due to premedication, recommended by vast majority of authors. Midazolam is the most commonly used agent (used also by us), while thiopental is used less commonly (3).

To improve tolerance or local anesthesia and reduce interprocedural stress, intravenous medications can be administered, such as dexmedetomidine that have beneficial analgesic and sedative effects but do not depress respiratory function and preserve patient ability to cooperate (15). According to atypical and interesting observation, 5 patients from our group consumed 250-300 ml manioc alcohol (approximately 25% ethanol) after the premedication and before the procedure, without informing us. Except for increased somnolence during and after the procedure, we did not observe any health consequences. This practice was abandoned after we explained the risk of such behavior to the other patients. Universality of this method must be emphasized when we analyze possibilities of local anesthesia.

A mean duration of our surgical procedure was 127 minutes (range 55-225 minutes). Data provided by other authors are mainly influenced by the extent of resection and size of the goiter. For subtotal resection of the one lobe or total resection of the one lobe, this duration usually is approximately 80 minutes (5,8). With larger procedures, such as subtotal resection of both lobes, this time is longer, on average 112 minutes (14). Relatively long duration of our surgical procedures may be related to technical environment (often electrocoagulation was unavailable), size of the goiter and high “surgical carefulness” related to awareness of problems in the event of severe complications and lack of possibility of conversion to general anesthesia. Extensive scars in the skin, subcutaneous tissue and even thyroid parenchyma in some patients, were another factor that prolonged mean duration of the surgical procedure. These were a result of shaman practices involving goiter puncture with various sharp objects such as needles, sharp sticks, fishbone. In sporadic cases, technical difficulties induced episodes of cough in operated patients that required high degree of carefulness and required immediate interruption of preparation at the onset of the cough.

Therefore we suggest that possibility of cough should be taken into consideration when patient eligibility to procedures under local anesthesia is assessed (history, upper respiratory infections) and the procedure should be delayed or codeine should be considered. It also could be useful to monitor air humidity around patient’s head, in particular when the temperature of the environment is very high.

It must be emphasized that we qualified to the surgical treatment all 49 patients who had clinical indications for strumectomy. Each patient was discussed by the whole medical team and any pros and cons for surgical treatment were considered. The decision to proceed with surgical treatment was based on socioeconomic situation in the Rafai region. Patients who attended the mission to undergo surgical treatment, had no other treatment option available, in particular surgical treatment, in the foreseeable future. Disqualification from surgical treatment would result in further growth of the goiter and development of related complications. Pharmacotherapy (hormonal substitution, thyrostatic drugs) was also impossible due to administrative and financial constraints. These factors as well as technical conditions sometimes enforced unconventional actions or even incompatible with accepted standards. Extent of resection may be a good example here. Nature of the lesion (diffuse nodular lesions in both thyroid lobes) was an indication to total thyroidectomy. While the standard management of our patients involved requirement for leaving some thyroid tissue to protect the patients from hypothyroidism. Results of histopathological testing (only one case of thyroid cancer) as well as good long-term results assessed in 53% patients seem to support correctness of such management.
Another issue is duration of patient hospitalization after the surgical procedure. One of the presumable advantages of thyroid surgery under local anesthesia is a relatively short hospitalization after the procedure. Very short hospitalizations, 8-10 hours, have been reported (16, 17) and some authors recommend prolongation of hospitalization to approximately 8-10 hours (18). Authors who suggest longer hospitalization, emphasize the risk of postoperative complications, such as hematoma and related dyspnea (6), but on the other hand such complications usually appear within 4 hours of the procedure (19) and their risk does not preclude earlier patient discharge.

Our patients were hospitalized for much longer and were discharged on average on day 3. However, this was related to administrative specificities of local health care system – patients had to stay at the medical center until removal of sutures and until good wound healing was ensured due to impossible medical follow-up outside our medical center. However, general patient condition enabled them fully independent functioning as early as within a few hours after the procedure; furthermore, we did not find any postoperative complications. Thyroid surgery under local anesthesia enables relatively early patient discharge, provided that an efficient and safe system of postoperative care is available in the outpatient setting.

Experience of our team and good effects of treatment of patients with thyroid goiter under local anesthesia inspired another medical teams in this part of Africa. Several years later Missionary Hospital Saki in Nigeria started performing surgical procedures of the thyroid under local anesthesia. Medical team who were performing these procedures, declared them safe for the patient after performing more than 100 operations (20). Another step was to start this type of procedures in health facilities outside hospital facilities, inside so called interior. The results were assessed as very good, no life threatening complications were reported (21). According to data available to us, these activities are being continued with clear benefit for patients when other therapeutic options are unavailable.

**CONCLUSIONS**

1. Local anesthesia in the thyroid surgery can be a safe alternative for general anesthesia when the latter is contraindicated or unavailable.
2. The progression of thyroid surgery under local anesthesia and its complications do not differ from that under general anesthesia.
3. Administration of codeine should be considered before the start of thyroid surgery under local anesthesia to eliminate cough during the procedure.

**REFERENCES**


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