

THE AXILLARY ACCESS IN THYROID RESECTION

Kai Witzel

NESA, BERLIN, GERMANY AND DEPARTMENT OF SURGERY, PARACELUSUS MEDICAL UNIVERSITY, SALZBURG, AUSTRIA

Introduction

In the course of this study we wanted to find out if a resection of the thyroid using a 20 mm axillary access and a 3.5 mm incision in the jugulum is possible, thus avoiding a front neck scar. The technique was successfully applied in thyroid operations of corpses and living pigs before. At present, our results show that this technique is likely to become an alternative to open thyroid surgery in well selected patients.

Patients and Methods

Patients included in this proof-of-concept study had to meet requirements: Scintiscan and ultrasound examination showed only one individual node in the thyroid gland. The volume of the thyroid gland had to be less than 30 ml.

Only patients with a unilateral node of not more than 2 x 2 x 4 centimetres were included. Endocrinologically inactive nodes were histologically examined after puncture. Only patients with no evidence of malignancy were included. None of the included patients took thyreostatic medicaments or suffered from hyperthyrosis. T3 and T4 were within the reference values.

A 20 mm incision in the anterior axillary line provides the access for the ipsilateral resection. The modified axilloscope with a 12 degree optic (Wolf Endoskopie – Knittingen, Germany) is subsequently introduced. This instrument, consisting of two telescoped tubes, is pushed hypodermically forwards to the jugulum under visual control so that unnecessary injuries are avoided. When the jugulum is reached, the inner tube with its transparent top is removed so that the ultrasonic scissors (5mm Ultracision Ethicon Endosurgery©) can be introduced for preparation. The space for preparation is created by inflating CO₂-Gas at 6mm pressure. Next, a 3.5 mm incision is made to permit the introduction of a trocar. The Medtronic© neuro-monitoring system (Jacksonville, USA) permits to prove the recurrent laryngeal nerve. When the nerve has been identified we start to dissect the thyroid using ultrasonic scissors. The resected tissue is extracted via the 20mm tube. The endoscopic procedure was approved of by the ethics committee of the LAEK Hessen (No.32005).

Results

We have operated on 12 patients (11 female, 1 male) according to the above described technique, using a left-side access with 8 and a right-side access with 4 patients. The patients were between 34 and 64 years old (av. 42.8 years).

Of these 12 patients, 6 had antero-lateral isthmus nodes removed, so that it was very difficult to reach the nerve with the inflexible and straight probe of the neuro-monitoring system. However, in two cases we performed a hemithyroidectomy, using the neuro-monitoring system to prove the identification of the recurrent laryngeal nerve. In one case two nodes in the lower pole were resected by an enlarged resection of the lower pole with the neuro-monitoring system being used for

Fig. 1 The hypodermic approach from the axilla to the jugulum using the visually identified recurrent laryngeal nerve. In the other three operations we made a subtotal resection including the isthmus. In one of these cases, the neuro-monitoring system was successfully used; in the other cases we were certain to have identified the recurrent laryngeal nerve visually. Because of the necessity of an additional incision for the exact positioning of the neuro-monitoring probe we decided against using the system. The average operation time was 120.5 minutes (88 to 151 minutes).

	Number of Patients	Blood loss till 24 hours after beginning of the procedure (ml)	Average weight of resected tissue (g)	Average operation time (minutes)	Identification of the recurrent laryngeal nerve (in %) with neuro-monitoring-system	Visual endoscopic identification of the ipsilateral recurrent laryngeal nerve (in %)
hemithyroidectomy	2	18 (15, 21)	26	148 (141-151)	100	100
unilateral subtotal resection	3	20 (7, 11, 42)	23	130 (114-142)	33	100
unilateral lower pole resection	1	12	24	142	100	100
isolated resection of isthmus nodes	6	12 (3 to 22)	15	103 (88-111)	0	100

Table 1: Data on operation type, blood loss, weight, operation time and identification of the recurrent laryngeal nerve in 12 patients

The average weight of the resected tissue was 19.6 g. In all cases it was possible to extract the thyroid tissue via the 20 mm tube without its touching other tissue and without enlarging the incision. No complications whatsoever – bleeding, infection – were observed with any of these 12 patients, and none had a persisting subcutaneous emphysema.

The patients stayed in hospital for an average of 3.4 days (3-6 days). Our subjective impression is that patients suffer less from perioperative pain than after open surgery. Ultrasonic controls after the operation (day 2,7,14 and 30) and a histological examination of the resected tissue showed the correct resection of the pathological tissue in each case. The function of the recurrent laryngeal nerves in all 12 patients was shown by postoperative laryngoscopy. The scintiscan of the patients eight weeks after surgery and the follow up examination

with ultrasound examination six months after surgery proved the complete resection of the nodes and regular results.



Fig. 2: Modified axilloscope for endoscopic thyroid resections

At that time the patients' cosmetic results were very good: the small incision scar in the front neck region had disappeared, there was no other scar here and the axillary scar was small and hidden in the armpit (figure 4).

Discussion

Cosmetic aspects have become increasingly important in thyroid surgery. On these grounds it makes sense, and is important, to develop endoscopic or minimally invasive techniques of operating on the thyroid and parathyroid gland, since scars are particularly prominent in the front neck region. Young women in particular consider such scars as disturbing or even disfiguring, even when they are quite small and unobtrusive. It is the aim of such procedures to achieve an optimal cosmetic result while keeping the access trauma acceptable.

The resection of an isolated node is contrary to the demands of endocrine surgery, but more easily realized with endoscopic techniques than a complete resection. It follows that the measure of resection must be the same in endoscopic or minimally-invasive endocrine surgery as in conventional operation techniques, which was not the case in our study, since in our opinion the pre-operative examinations and the benefits that were to be expected justified a deviation from these standards.

The neuro-monitoring system is seen as quite helpful if such identification proves to be difficult, and thus more and more often asked for. This is another aspect which has not yet been given due consideration in endocrine endoscopic surgery. The instrument we developed for this technique and the operation technique itself make it easy to find and identify the recurrent laryngeal nerve: the surgeon here profits from the benefits of endoscopic surgery.

The result of the operation was optimal, and would not have been any better had we opted for open surgery: if the scars in the front neck region disappear, this should not entail larger scars in other places that are bigger than those caused by open surgery. It was possible to resect the specimen of thyroid tissue in all. The extraction of the resected thyroid tissue via the modified axilloscope was comfortable and is one of the big advantages of the described procedure, because the resected thyroid tissue does not have any contact with other tissue in the access channel.



Fig. 3: The trachea and the recurrent laryngeal nerve after complete thyroidectomy skin. Identifying the recurrent laryngeal nerve is easier than in open surgery, since the pictures transmitted by the camera are enlarged.

The preparation with the ultrasonic scissors permits resection without any bleeding. All vessels can be cut without clipping. A problem might be the temperatures the ultrasonic scissors produces when cutting. Possibly 15 percent of all patients may be operated in such an endoscopic technique in the future. With getting more experience in this technique the operation time could be reduced in future. The realistic aim should be an endoscopic standard procedure as a hemithyroidectomy



Conclusion

To sum up we can say that this procedure is appropriate for the resection of unilateral nodes of the thyroid gland. Our study shows that endoscopic thyroid surgery can approximate the norms of endocrine neck surgery. The presented technique may become standard in thyroid surgery for patients with single nodules and a small thyroid gland.

Dr. Kai Witzel, Namslauer Strasse 4, D-36039 Fulda/Germany

Literature: www.witzel-chirurgie.de