

Recurrent Goiters

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ABSTRACT

A recurrent goiter is the regrowth of thyroid tissue after thyroidectomy. The causes of recurrence following surgery for the benign disease can be broadly attributed to inadequate surgery, embryological remnants left behind inadvertently, and the development of a malignancy in the remnant.

Recurrence after surgery for the benign disease should be preventable. Subtotal thyroidectomy (STT) was the main operation for goiters until the 1980s. The main issue with a subtotal surgery is a recurrence. One of the primary reasons why STT fails can be attributed to the fact that STT does not treat the underlying generalized disease adequately. The consensus is emerging that the best surgical option for multinodular goiter is total thyroidectomy. Even after "total" thyroidectomy, there is recurrence, what is left behind is related to the three embryological remnants of thyroid, namely pyramidal lobe recurrences, recurrence of the tubercle of Zuckerkandl, and thyrothymic recurrences. The surgical technique at the initial total thyroidectomy must be meticulous, ensuring that all embryological remnants are excised properly.

Goiter recurrence is a failure of surgical treatment of goiter. Inadequate surgery and failure to excise all thyroid tissues are two preventable causes for recurrence. The technique of reoperative thyroidectomy must include capsular dissection, removal of all embryological remnants, and parathyroid autotransplantation.

Surgery for recurrent goiter is challenging. It is thought to entail a higher complication rate and complication rates may be high in inexperienced hands; low complication rates have been achieved in specialized centers. The fear of complications should not deter experienced surgeons from performing reoperative thyroid surgery. In terms of technique, the lateral approach to thyroid offers a good alternative for recurrent goiters. A meticulous technique and parathyroid autotransplantation will help minimize the complication rate.

Keywords: Recurrent goiter, Thyroid surgery, Total thyroidectomy.

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INTRODUCTION

A recurrent goiter is the regrowth of thyroid tissues after thyroidectomy. This may occur after surgery for benign disease or malignancy of thyroid. While recurrence after surgery for benign disease should be preventable, recurrence after malignant disease depends on many factors.

Recurrences of multinodular goiter (MNG) account for up to 12% of all thyroid operations.¹ Surgery for recurrent goiter is associated with a higher complication rate.

The causes of recurrence can be broadly attributed to:

- Inadequate surgery
- Embryological remnants left behind inadvertently
- Development of a malignancy in the remnant
- Recurrence of a cancer in the thyroid.

It is important to discuss and analyze the reasons for recurrence in order to prevent recurrences.

Inadequate Surgery

From early times, thyroid surgery was embroiled in controversy. First, thyroidectomy was supposed to have been done by Albucasis (El Zahrawi) in 975 AD.^{2,3}

The first credible reports of thyroid surgery came from the School of Salerno in the 13th century, and by 1850 only 14 successful partial or total thyroidectomies had been reported across Europe—results were appalling.^{2,3} In 1850, the French Academy of Medicine banned thyroidectomy due to the fear of complications and uncertainty in histological classification. Subtotal thyroidectomy (STT) was the main operation for goiters until the 1980s. The main issue with a subtotal surgery is recurrence.⁴⁻⁸

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One of the primary reasons why subtotal thyroidectomy fails can be attributed to the fact that STT does not treat the underlying generalized disease process adequately. Multinodular goiter and toxicity are the main indications for thyroidectomy in benign disease. Subtotal thyroidectomy does not offer a curative operation in either of these conditions. Hence, recurrence is to be expected after STT. The practice of offering STT continued for over 100 years due to the fear of complications alluded to the above.

Multinodular goiter is thought to be the result of primarily two factors. The first factor is genetic heterogeneity of follicular cells with regard to function (i.e., thyroid hormone synthesis) and growth. Genetic analysis has identified two chromosomal regions (MNG-1 and Xp 22) in multinodular goiter.⁹

The second factor is the acquisition of new qualities that were not present in mother cells and become inheritable during further replication. The pathological process of MNG disease affects the whole gland. If part of a MNG is removed, the remnant is likely to grow again (Figs 1 and 2).

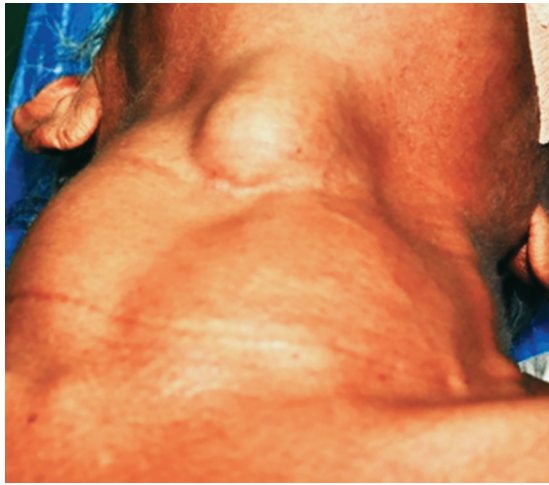


Fig. 1: Recurrence

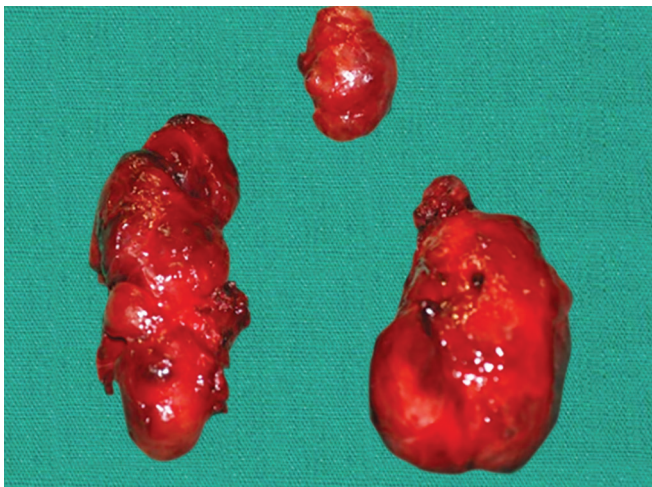


Fig. 2: Operative specimen

Administration of thyroxine has been tried to minimize the risk of recurrence following STT. There is a flaw in the theoretical basis for the administration of thyroxine. It assumes that the regrowth of thyroid tissues depends primarily on the action of thyroid stimulating hormone (TSH) on the thyrocytes. While TSH is an important stimulator of thyrocyte growth, there are several other factors that will cause regrowth of thyroid tissues.^{10,11}

Studies from non-endemic countries like Scandinavia reported no preventive effect on recurrence by thyroxine.⁵ On the contrary, studies from endemic regions have shown that thyroxine administration has been useful.¹² This dichotomy highlights the multifactorial nature of the origin of MNG—TSH is NOT the only stimulus for pathological growth of thyrocytes; hence, TSH suppression is not a reliable way of preventing recurrence.

The consensus is emerging that the best surgical option for multinodular goiter is total thyroidectomy.^{13–18} Unfortunately, recent reviews have shown that there is a recurrence rate even after total thyroidectomy.^{19,20}

This raises a pertinent question—How could recurrence occur after total thyroidectomy? The answer is simple. Though the surgeon believed that it was a total excision, there were remnants of thyroid tissues left behind. How is this possible?

Surgery for Recurrent Goiter

Studies^{19,21} have shown that what is left behind is related to the three embryological remnants of thyroid, namely, pyramidal lobe recurrences (Figs 3 and 4), recurrence of the tubercle of Zuckerkandl, and thyrothymic recurrences. These may occur as isolated recurrences or combined recurrences (Fig. 3).

In up to 50% people, the inferior end of the thyroglossal duct (failure to obliterate) persists. The tubercle of Zuckerkandl is found in about 80–95% of patients and the incidence varies between right and left sides.^{22,23} Rests of the thyroid tissues within the thyrothymic area are relatively common (50%), often mistaken for lymph nodes or parathyroids. About 80% of identified rests are attached to the thyroid properly by a pedicle of thyroid tissues.²⁴

The surgical technique at the initial total thyroidectomy must be meticulous, ensuring that all embryological remnants are excised properly. Dissection must be done beyond the thyroid notch superiorly, down to the sternal notch inferiorly, and the carotid sheath laterally.

The lateral approach to thyroid is a good technique in our experience. It is a good alternative to the standard anterior approach.²⁵ The key is the development of the plane between



Fig. 3: Pyramidal lobe recurrence



Fig. 4: Operative specimen

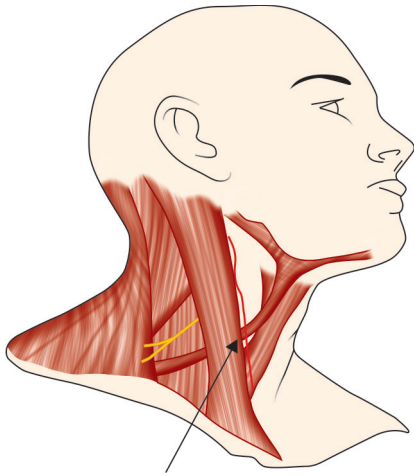


Fig. 5: Plane of dissection

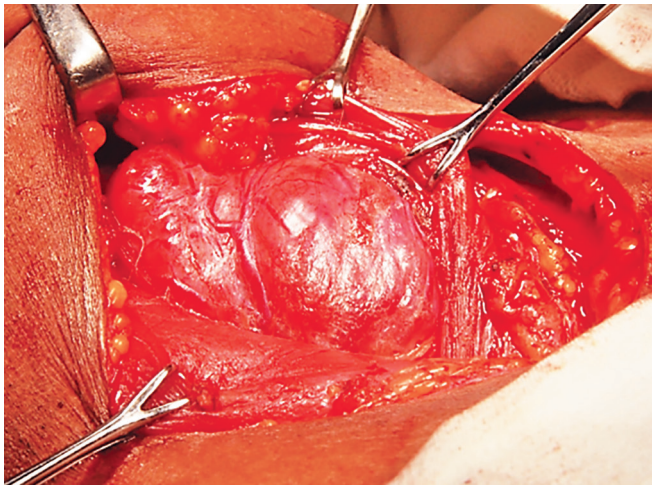


Fig. 6: View during surgery

ipsilateral sternomastoid and strap muscles (Figs 5 and 6) as it is a "virgin" plane. Active parathyroid autotransplantation tends to minimize hypocalcemia.

COMPLICATIONS

Reoperative surgery can be performed with minimum morbidity in high volume centers.^{26,27}

The complication rate of 1–2% which is considered to be acceptable for primary surgery can be achieved in reoperative surgery in experienced hands. While less extensive surgery may be associated with a lower complication rate, the risk of recurrence is much higher with a lesser procedure. Fear of complications is not a reason to deny reoperative surgery, but the surgery should be done by experienced surgeons who work in high volume centers.^{26,27} The role of intraoperative neuromonitoring (IONM) in reoperative thyroid surgery is debatable due to increased cost, poor positive predictive value, and lack of reliability in detecting nonfunctioning nerves intraoperatively.²⁸ INOM needs further evaluation in reoperative thyroid surgery.

CONCLUSION

Goiter recurrence is a failure of surgical treatment of goiter. Inadequate surgery and failure to excise all thyroid tissues

are two preventable causes for recurrence. The technique of reoperative thyroidectomy must include capsular dissection, removal of all embryological remnants, and parathyroid autotransplantation.

Surgery for recurrent goiter is challenging. It is thought to entail a higher complication rate and complication rates may be high in inexperienced hands; low complication rates have been achieved in specialized centers. The fear of complications should not deter experienced surgeons from performing reoperative thyroid surgery. In terms of technique, the lateral approach to thyroid offers a good alternative for recurrent goiters. A meticulous technique and parathyroid autotransplantation will help minimize the complication rate.

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