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CLINICAL STUDY

REVISION SURGERY FOR NODAL RECURRENCE OF PAPILLARY THYROID CARCINOMA

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SUMMARY

Objectives: Revision surgeries for recurrent papillary thyroid carcinoma (PTC) are contraversial procedures with limited studies, in small groups of patients. We performed a retrospective study of our revision surgery cases to analyze the results of revision surgeries and the factors affecting the complication rates.

Paitents and Methods: Patients, who have recurrent PTC and underwent revision surgeries from 2008 to 2016 were reviewed. Treatments done before the revision surgeries, demographic data, follow-up period time, recurrence criteria, revision surgery techniques and types, results of the revision surgeries were recorded. Instead of continous monitoring intermittant RLN monitoring used in all our revision surgeries which is first in the literature.

Results: We reviewed 43 patients who underwent revision surgery for recurrent PTC. Eight bilateral central neck dissections and 50 lateral neck dissections were performed as revision surgery. Among 50 lateral neck dissections 23 were operated in previous surgeries. None of the patients developed temporary or permenant vocal cord paralysis (VCP). In one patient temporary hypocalcemia was detected (2.3%). Undetectable thyroglobulin (Tg) levels detected in 29 patients (67.4%) and recurrence did not occur in this group during follow-up period with mean of 7.4 years (range, 3-10 years). In 14 patients (32.6%) with detectable Tg levels, recurrence occurred in 4 patients (28.5%) follow up period with mean of 5.75 years (range, 5-7 years).

Conclusion: Revision surgeries for recurrent PTC have life threatening complications like hypoparathyroidism and VCP. Our results demonstrate close follow-up periods, technologic improvements in nerve monitoring and careful dissection will lower complication rates in this group of patients.

Keywords: Papillary; thyroid; cancer; revision

PAPİLLER TİROİD KANSER REKÜRRENSLERİNDE REVİZYON CERRAHİ TEDAVİ

ÖZET

Amaç: Rekürren papiller tiroid kanserlerin (PTK) cerrahi tedavisi hakkında küçük hasta gruplarını içeren az sayıda çalışma bulunmaktadır. Revizyon cerrahi uyguladığımız hastalarımızı retrospektif olarak ele alarak sonuçlarımızı, sonucu ve komplikasyon oranlarını etkileyen faktörleri gözden geçirdik.

Gereç ve Yöntemler: Rekürren PTK için 2008 ile 2016 yılları arasında revizyon cerrahi uyguladığımız hastalar çalışmaya dahil edildi. Revizyon cerrahi öncesi uygulanan tedaviler, hastaların demografik özellikleri, takip peryodu, rekürrens kriterleri, uygulanan revizyon cerrahiler ve revizyon cerrahi sonuçları gözden geçirildi.

Bulgular: Rekürren PTK için revizyon cerrahi uygulanan 43 hasta çalışmaya dahil edildi. Sekiz hastaya bilateral santral boyun diseksiyonu yapıldı. 23'ü daha önce opere edilmiş tarafa ve tamamı aynı taraf santral diseksiyonları içerecek şekilde olmak üzere toplam 50 lateral boyun diseksiyonu yapıldı.Hastaların hiçbirinde geçici veya kalıcı kord paralizisi görülmedi. Bir hastada (%2.3) geçici hipokalsemi gelişti. Tiroglobulin seviyesi anlamlı düşük bulunan 29 hastada (%67.4) takiplerde ortalama 7.4 yılda (3-10 yıl arası) nüks izlenmedi. Postoperatif dönemde tiroglobulin seviyesi yüksek bulunan 14 hastadan (%32.6) ortalama 5.75 yıllık (5-7 yıl) takipte 4 hastada (%28.5) nüks izlendi.

Sonuç: Rekürren PTK revizyon cerrahileri sonrasında hayati komplikasyonlar gelişebilir. Yakın takip, teknolojik gelişmelerin özellikle sinir stimülatörlerinin kullanımı ile birlikte yapılan dikkatli diseksiyonlarla bu hasta grubunda komplikasyon oranları düşürülebilir.

Anahtar Sözcükler: Papiller; tiroid; kanser; cerrahi

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INTRODUCTION

Papillary thyroid carcinoma (PTC) incidence has been increasing for the past 2 decades[1]. This increase may be mostly explained by the improvement of diagnostic techniques, environmental changes, obesity, exposure to endocrine disruptors or low-dose radioactivity. This increase also leads higher recurrence rates. Recurrence rates for PTC ranges from 10% to 30% and usually presents in the form of regional lymph node metastasis[2]. Revision surgeries are

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accepted as one of the treatment options for recurrent disease and as a consequence incidence of revision surgeries for PTC is increasing. Because of distorted anatomy and presence of scar tissue, revision surgeries are technically demanding. Even for skilled surgeons, revision surgeries done for PTC have higher hypoparathyroidism and recurrent laryngeal nerve (RLN) injury risks than primary thyroid and neck operations[3,4]

In this article, our purpose was to present our experience of revision central and lateral neck dissection outcomes for recurrent PTC.

MATERIAL and METHODS

This is a retrospective study. Records of 43 patients who underwent revision surgery for recurrent PTC, operated by the senior author (G.H.) from 2008 to 2016 were reviewed. The approval for this review was obtained from the Institutional Review Board. Data were collected through an electronic database.

All patients had PTC and underwent previous total thyroidectomy; with or without neck dissection, in some cases followed by adjuvant radioactive iodine therapy (RAI).

The retrospective analysis included the age, sex, previous treatments (surgical and/or radioactive iodine) and follow-up period time.

All patients were evaluated by a multidisciplinary team, including endocrinology, radiology, nuclear medicine and otorhinolaryngology departments.

Recurrences were diagnosed by clinical examinations, biochemical measurements, sonographic scannings and computerised tomography imagings and became evident by fine- needle aspiration (FNA) cytology reports.

Sonograhic scannings were done with a high-frequency linear array probe, including neck levels 2-6. The same radiology specialist, based on the FNA-confirmed location of the disease depicted on a diagram for every patient. Round shaped, showing lack of fatty hilum, including punctate calcifications, foci of cystic necrosis and increased vascularity were accepted as suspected nodes and also shown on the diagrams. Different types of revision surgeries were planned on the basis of these diagrams.

As defined by American Thyroid Association (ATA) consensus, removal of all prelaryngeal and pretracheal lymphatic tissue with unilateral paratracheal neck dissections were accepted as unilateral central neck dissections and removal of all prelaryngeal and pretracheal lymphatic tissue with bilateral paratracheal neck dissections were accepted as bilateral central neck dissections[5]. In our revision surgeries all lateral neck dissections also included central dissections of the same side.

There was RLN monitoring for all patients with NIM 3.0 nerve monitoring system. Monitoring performed intermittantly, using the handpiece to stimulate tissues while working close to RLN's anatomic localisation.

Serum thyroglobulin (Tg) levels, anti-Tg antibodies titers and radioactive iodine scan results after revision surgeries were reviewed. In addition, neck ultrasound examination reports, final revision surgery histopathologic reports, follow-up times after our revision surgeries were reviewed.

Fiberoptic laryngoscopy reports, as well as serum calcium levels before and after revision surgeries were also reviewed. RLN palsy, defined as temporary was postoperative vocal cord paralysis associated with hoarseness that resolved within 6 months. Temporary hypoparathyroidism was accepted as total serum calcium level less than 8mg/dL, associated with hypocalcemia symptoms that resolved within 6 months with calcium supplements. If these stiuations persisted more than 6 months, they were considered permanent.

RESULTS

Between 2008 and 2016, 43 patients (29 female and 14 male) underwent revision surgery for PTC with mean age of 36.6 years (range, 23-74). All patients had total thyroidectomy and 23 patients also had neck dissections in previous surgery/surgeries for PTC. The mean number of surgeries, before the last revision surgery for PTC was 1.4 (range, 1-4). Thirty-five patients had RAI therapy previously. The average time between the first surgery and the last revision

surgery was 5.3 years (range, 2.6-8 years). Before the revision surgery 14% (n = 6) had permenant unilateral vocal cord palsy and 4.6% (n = 2) had permenant hypocalcemia. Table 1 shows previous treatment details and complications related to these treatments.

The medical reports of previous surgeries were not detailed about the central dissections, so patients who had total thyroidectomy and only central neck dissections as previous surgical treatment are included in the only total thyroidectomy group.

Twenty patients had only total thyroidectomy as previous surgical treatment. In this group; 3 patients had recurrences in central neck nodes, 13 patients had recurrences in unilateral neck nodes and 4 had recurrences in bilateral neck nodes.

Among 15 patients; who underwent unilateral neck dissection with total thyroidectomy as previous surgical treatment, 4 patients had recurrences in central neck nodes, one patient had recurrences in bilateral neck nodes, one patient had recurrences in central neck nodes and in bilateral neck nodes, 4 patients had recurrences in the non-operated lateral neck nodes, 5 patients had recurrences in the previously operated lateral neck nodes.

Of the 8 cases; who had total thyroidectomy and bilateral neck dissections as previous surgical treatment, 6 patients had recurrences in unilateral lymph nodes, one patient had recurrences in bilateral lymph nodes and one patient had recurrences in central neck nodes.

We performed only bilateral central neck dissections for 8 patients. Totally 50 lateral neck dissections were performed and 23 (46%) of these neck dissections were for the neck sides which have been operated in previous surgeries.

In pathologic evaluations, 1074 lymph nodes were excised and 145 of these lymph nodes were positive nodes with a rate of extranodal extension of 13.7% (n = 20).

Postoperatively, none of the patients developed temporary or permenant vocal cord paralysis. A patient (2.3%) who has three revision surgeries, including total thyroidectomy, central and bilateral neck dissections, temporary hypocalcemie occured. Temporary Horner Syndrome occurred in one patient (2.3%) who had left side lateral neck dissection for the third time. One of the patients had temporary shoulder pain after his third neck dissection for the right lateral neck side. Two patients (4.6%) had temporary chyle leak which resolved with conservative follow-up and 2 patients (4.6%) had neck seroma requiring no treatment.

The rate of recurrence after our revision surgery was 9.3% (n = 4) during follow up period with mean of 7.1 years (range, 2-9 years).

Postoperative Tg levels of all cases were available. Overall 67.4% (n = 29) of patients had postoperative undetectable Tg levels (<0.04 ng/ml). Anti-Tg antibody was detected positive in 2 of 29 patients (6.9%). Ten of these patients (23.3%) had RAI treatment after revision surgery. Among these 29 patients, recurrence did not occur in follow up period with mean of 7.4 years (range, 3-10 years).

In 32.6% of patients (n = 14) Tg levels detected between 0.04-53ng/ml, 16.3% (n = 7) of these patients had RAI treatment after revision surgery. In this group, none of the patients had positive Anti-TG antibody test results. In patients with detectable Tg level, recurrence occured in 28.6% of patients (n = 4) during follow up period with mean of 5.8 years (range, 5-7 years).

Table 1: Baseline characteristics of previous surgery types, additional treatments and complication rates. (**RAI**: Radioactive iodine therapy, **RLN**: Recurrent laryngeal nerve)

Prior surgeries	RAI (+)	Permenant Hypocalcemia	Permenant RLN Palsy
Only Total Thyroidectomy (n=20)	13 (30.2%)	0 (0%)	1 (2.3%)
Total Thyroidectomy + Unilateral Neck Dissection (n=15)	14 (32.5%)	0 (0%)	1 (2.3%)
Total Thyroidectomy+ Bilateral Neck Dissection (n=8)	8 (18.6%)	2 (4.6%)	4 (9.3%)

DISCUSSION

Central compartment revision surgery rates will probably increase with the increase of PTC and PTC reccurences. The anatomy of the region becomes more complicated after previous surgeries and as a consequence the revision surgeries may have higher major complication rates[6]. RLN damages, sometimes resulting permenant tracheostomy, is one of these major complications. Lahey showed that during thyroid operations, dissection of RLN reduces the risk of RLN injury in 1938[7]. Then many studies have been published confirming his findings[8,9] Continuous RLN monitoring, throughout thyroid surgeries makes identification of RLN easier and reduces the risk of RLN paralysis[10,11]. Revision surgeries are undoubtedly more dangerous for the RLN damages than primary surgeries[12]. We used intermittant RLN monitoring during all our revision surgeries. This is the first study performed with intermittant RLN monitoring instead of continous monitoring. None of our patients had temporary or permenant vocal cord paralysis. Related with mostly carefull dissection during surgery, intermittant RLN monitoring also reduces the risk of RLN damage as continous RLN monitoring. We also recognized that, identification of the RLN and safety of working with an intermittant monitoring system during the operation determines extensive dissection; resulting decreased reccurrence rates perhaps in shorter hours. Shortaning the operation duration with RLN monitoring should also be worked in the future in revision thyroid surgeries.

In addition just one of our patients (2.3%) had temporary hypocalcemia. During the operation, treating every single parathyroid gland as the patient's only gland and preservation of the vascular pedicle of the parathyroid glands will reduce the risk of hypoparathyroidism especially in revision thyroid surgeries[13]. These two major adverse event rates compare favorably to the ones reported in the literature[13,14].

After revision surgeries for PTC, TG level decreases are important cornerstones of monitoring for thyroid cancer. In our series, 9.3% of patients recurrence occurred in the follow up period with mean of 5.75 years (range, 5-7 years). All of these patients were in the group whose Tg levels were detected between 0.04-53ng/ml (14 patients, 32.55%).

Phelan et al described 7.6% recurrence rate with mean of 2.5 years[2]. Salari et al reported 5% recurrence rates with mean of 3.4 years[11]. In our study 9.3% of patients recurrence occurred and this is mostly higher when compared similar studies, but the the follow up period of our study is (7.1 years) also longer which leads up to diagnose later recurrences[15].

The male/female ratio is similar in such studies, but mean age of our patients are also younger when compared. As a consequence factors like gender and age should be kept in mind affecting disease free survival rate[16].

Moreover, it has been reported in the literature that, early detection of thyroid cancer reccurence significantly decreases the local metastasis extension and distant metastasis rates[17,18]. In our instution, a close follow-up of programme including TG level measurement and neck ultrasonography in every 6 months in the first 2 years for thyroid papillary cancer patients after the surgery is done. With early detection of the local disease, more limited revision surgeries with lower complication rates are also possible.

Nevertheless postoperative complication rates interpretion is difficult in this group of patients. Firstly; the earlier operations, the surgical approach differences between institutions, follow up period methods and durations are not uniform. Also like our study, in remaining studies patient populations are very small. Studies in larger groups are needed.

CONCLUSION

Revision surgeries for PTC recurrences have life threatening complications like VCP and hypoparathyroidism. RLN monitoring can lower complication rates in revision surgeries. Close follow-up periods will reduce the extension of the revision surgeries and lower complication rates.

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No financial disclosures.

Conflict of interest:

None

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