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## OUTCOME OF THYROID SURGERIES AT PATAN HOSPITAL

### Objective:

To assess the outcome of thyroid surgeries at Patan Hospital

### Materials and Methods:

It is a retrospective study of in-patient records of patients undergoing thyroid surgeries for various indications from April 2013 to January 2015 at Patan Hospital, Lalitpur.

### Results:

During the period of 21 months, 75 patients underwent thyroid surgeries. Majority of patients underwent hemithyroidectomy (35) followed by total thyroidectomy (28), subtotal thyroidectomy (7) and completion thyroidectomy (5). Out of 28 patients undergoing total thyroidectomy (TT), 11 underwent central compartment clearance (CCC), 5 underwent CCC and lateral neck dissection. Among 5 patients undergoing completion thyroidectomy, CCC was performed in all cases and in one patient lateral neck dissection was also performed. A total of 13 patients developed unilateral recurrent laryngeal nerve palsy (RLN), among them 5 had permanent palsy. Tracheostomy had to be done in immediate postoperative period for stridor following total thyroidectomy (TT) in one case. Temporary hypocalcaemia was observed in 10 (10/28) cases following TT, out of which 8 had undergone CCC. Permanent hypocalcaemia was observed in 7 (7/28) cases following TT out of which 3 had undergone CCC. Chylous leak occurred in one of the patient undergoing left level II-IV neck dissection which was managed conservatively. None of the patient had to be transfused postoperatively.

### Conclusion:

Complications to thyroid surgery are not uncommon. Visualization of recurrent laryngeal nerve alone in our context is adequate in experienced hands. Identification of parathyroid during thyroidectomy is recommended to avoid hypocalcaemia. Meticulous dissection can reduce the complications.

**Key Words:** Hypocalcaemia, Neck Dissection, Recurrent laryngeal nerve, Thyroidectomy.

## INTRODUCTION:

Recurrent laryngeal nerve (RLN) palsy and hypoparathyroidism are major complications associated with thyroid surgery which can be very debilitating to the patient. Unilateral RLN palsy causes hoarseness but some patients may remain asymptomatic whereas bilateral RLN palsy causes either hoarseness or stridor. The incidence of temporary RLN palsy ranges from 3-8% and permanent RLN palsy ranges from 0.3-3% following thyroid surgery.<sup>1</sup> Preservation of parathyroid glands during thyroidectomy is crucial for avoiding the postoperative hypocalcaemia. The incidence of temporary and permanent hypocalcaemia after total thyroidectomy (TT) ranges from 1.6-50% and 1.5-4% respectively.<sup>2</sup> The risks of complications are attributed to various factors e.g. experience of surgeon, surgical techniques, extent of surgery, size of gland, pathology (benign or malignant) etc. The aim of the study is to assess the outcome of thyroid surgeries at Patan Hospital and compare it with the published literature for improvisation in future.

## MATERIALS AND METHODS:

It is a retrospective study of in-patient records of patients undergoing thyroid surgeries for various indications from April 2013 to January 2015 (21 months) at Patan Hospital, Lalitpur. Ethical approval was taken from institutional review committee. All patients operated by ENT surgeons during this period were included in the study. Thyroid function test, ultrasound of neck, fine needle aspiration cytology (FNAC), and in some cases computerised tomography scan were done preoperatively. Records were reviewed regarding indication for surgery, change in voice, vocal cord status, hypocalcaemia and type of surgery. Vocal cord mobility was assessed in majority of

cases by indirect laryngoscopy (IL) or nasopharyngolaryngoscopy (NPL) in preoperative as well as postoperative period. Serum calcium level was measured on first postoperative day and subsequent days as indicated in some cases, after every cases of TT, subtotal thyroidectomy and completion thyroidectomy. Temporary RLN palsy was defined as improvement of vocal cord mobility in 3-6 months period whereas if it persisted beyond 6 months then it was regarded as permanent RLN palsy. Hypocalcaemia was defined as serum calcium level less than 8.5 mg/dL and was regarded as temporary if it normalised in 3-6 months without requiring calcium and vitamin D3. However, if patient required to be supplemented with calcium and vitamin D3 beyond 6 months, hypocalcaemia was regarded as permanent.

## RESULTS:

During the period of 21 months, 75 patients underwent different types of thyroid surgeries (Table 1) with male to female ratio 1:5 and age ranging from 17 to 80 years. As isthmusectomy and cystectomy do not pose any risk to RLN or parathyroid, these surgeries were not included

Table 1: Types of thyroid surgeries and Nerves at risk (NAR)

Types of thyroid surgeries	No. of surgeries	NAR
Completion thyroidectomy	5	10
Isthmusectomy	2	0
Cystectomy	1	0
Hemithyroidectomy	35	35
Subtotal Thyroidectomy	7	14
Total Thyroidectomy	28	56
Total	78	115

for analysing the data. All of the patients planned for thyroid surgeries had mobile vocal cords preoperatively. One of the patient was referred from other centre for completion thyroidectomy when the biopsy report turned out to be papillary carcinoma.

Table 2: Indications for total thyroidectomy

Postoperative Diagnosis	Total thyroidectomy
MNG	6
Toxic MNG	1
Toxic MNG with cold nodule	1
Follicular Neoplasm	1
Hurthle cell Neoplasm	1
Anaplastic Carcinoma Thyroid	1
Papillary Carcinoma Thyroid	16
Papillary Carcinoma Thyroid with Grave's disease	1
<b>Total</b>	<b>28</b>

The most common indication for hemithyroidectomy was colloid goitre. Eleven patients, out of 35 undergoing hemithyroidectomy, had disease on left side. Subtotal thyroidectomy was performed for multinodular goitre (MNG) in 5 patients and for toxic MNG in 2 patients. Papillary carcinoma of thyroid was the commonest indication for TT and in one patient Grave's disease was coexisting with papillary carcinoma of thyroid (Table 2). Central compartment clearance (CCC) was combined with TT in 11 patients and in 5 patients lateral neck dissection was also performed along with CCC. CCC was performed in all 5 patients undergoing completion thyroidectomy among which one patient also underwent lateral neck dissection.

None of the patients had to receive blood transfusion or had to undergo re-exploration for hematoma. Postoperative wound infection was not observed in any patients. Chylous leak seen in one of the patients, who had undergone left level II-IV neck dissection and was managed conservatively. One of the patient developed stridor following total thyroidectomy for which tracheostomy had to be performed. The patient had bilateral RLN palsy, despite proper identification and preservation of bilateral RLN which could be due to excessive manipulation or thermal injury. The final histopathology, contrary to the FNAC, report of this patient was suggestive of anaplastic carcinoma. As we expected that the disease would progress rapidly, decannulation was not attempted even though vocal cord mobility was noticed later on NPL evaluation. Unfortunately, we lost the patient in 4 months due to cardiac problems. Out of 35 patients who underwent hemithyroidectomy, 5 patients developed temporary RLN palsy and 1 patient developed permanent RLN palsy (Figure 1). Out of 28 patients who underwent TT, bilateral RLN palsy was noticed in one patient, probably temporary as mentioned earlier whereas unilateral temporary RLN palsy was noticed in 3 patients and unilateral permanent RLN palsy in 4 patients (Figure 2). All of the three patients who experienced unilateral temporary RLN palsy had also undergone CCC. None of the patients undergoing subtotal or completion thyroidectomy developed RLN

Figure 1: RLN palsy in hemithyroidectomy

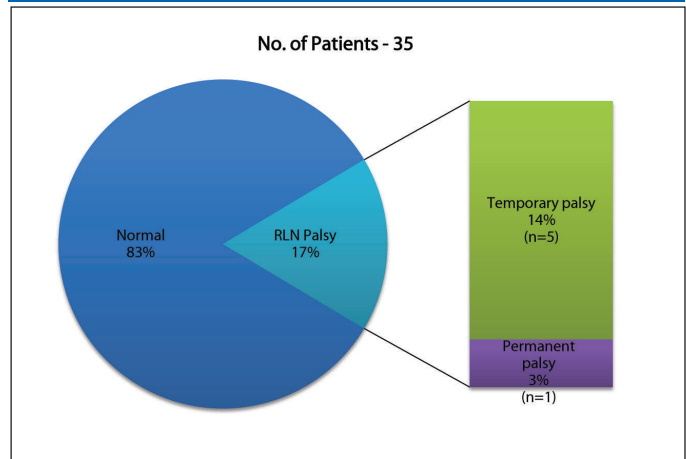


Figure 2: Unilateral RLN palsy in total thyroidectomy

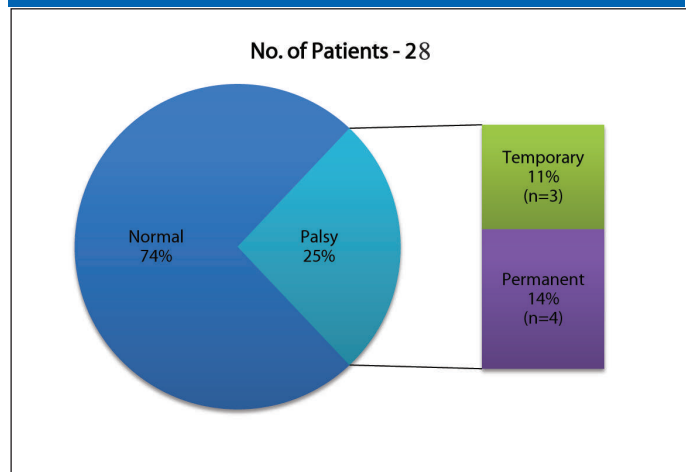
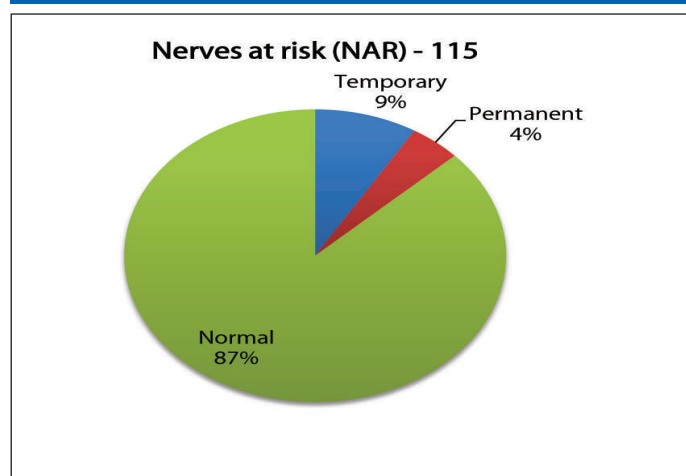


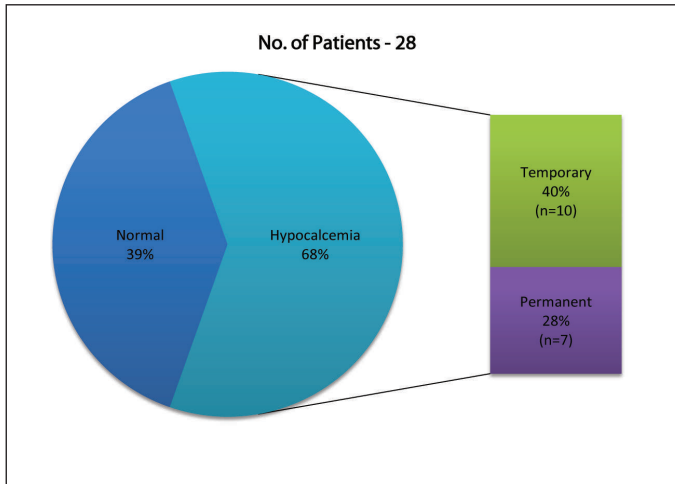
Figure 3: RLN palsy following thyroidectomy in terms of NAR



palsy. Out of five patients with permanent RLN palsy following thyroidectomy, in two patients RLN was sacrificed as it was involved by the tumour and in three patients RLN could not be identified because of distorted anatomy by large size of goitre, one of whom had retrosternal goitre.

Hypocalcaemia was noticed in 17 (17/28) patients undergoing TT (Figure 4). Ten patients had temporary whereas 7 had permanent hypocalcaemia following TT. CCC was also performed in 8 patients (8/10) with temporary hypocalcaemia and 3 patients (3/7) with permanent hypocalcaemia. None of the patients undergoing hemithyroidectomy, subtotal thyroidectomy or completion thyroidectomy developed hypocalcaemia.

Figure 4: Hypocalcaemia in TT



## DISCUSSION:

RLN palsy and hypocalcaemia are still the most feared complications of thyroidectomy, even after the revolution in surgical technique in later half of the nineteenth century, which can be very distressing for the patients lifelong. Mortality rate used to be more than 20% and hence thyroidectomy was limited only to life threatening conditions before Kocher described the surgical technique by virtue of which mortality rate dropped down to 0.18%.<sup>3</sup> With better understanding of anatomy and pathology of thyroid and shift towards capsular dissection than to lateral dissection, injury to RLN and parathyroid has been minimised.<sup>4</sup> Postoperative hematoma or re-bleeding mandating re-exploration was not observed during the study period. Bergenfelz et al has mentioned about postoperative hematoma requiring intervention up to 2.1%<sup>5</sup> whereas Rosato et al has mentioned up to 1.2%.<sup>6</sup> Blood transfusion was not necessary in any of the patient though we routinely arranged blood before surgery and this fact may guide for the policy whether to arrange blood in every case is mandatory or not mandatory. Wound infection was not observed in any case during the study period. We routinely administer intravenous antibiotics for 3-4 days in postoperative period though several studies have shown that antibiotics do not influence the incidence of infection.<sup>6</sup> The incidence of temporary and permanent RLN palsy as reported in the literature ranges from 5-8% and 0.3-3% respectively.<sup>1,7</sup> Various mechanisms for the nerve injury that has been suggested includes complete or partial transection, traction, contusion, crushing injury, thermal injury by electrocautery, misplaced ligature or compromised blood supply.<sup>8,9</sup> The risks to RLN during surgery depends on

several factors. Higher incidence of up to 2-30% RLN palsy has been reported in reoperative surgery for thyroid.<sup>10</sup> Following completion thyroidectomy, none of the patient experienced RLN palsy in our study probably either because the remaining thyroid lobe was small or there was less scarring due to fibrosis as we operated within 2-3 weeks of first surgery. Surgery for cancer poses more risk to RLN as nerve may be encased by tumour and dissecting the nerve intact will be difficult. Skeletonising the nerve during CCC may compromise vascularity causing generally temporary RLN palsy.<sup>1</sup> Extent of surgery also influence the chance of nerve injury as less RLN palsy is noted following subtotal than total resection.<sup>1,11</sup> Surgeons experience and size of the goitre particularly retrosternal also influence the chances of nerve injury. Right RLN is more commonly injured, because of its anatomical variation, as reported by some authors<sup>12</sup> but others do not support the dominance of right palsy.<sup>13,14</sup> Intraoperative identification and capsular dissection is crucial near the berry's ligament in the final 2 cm of extralaryngeal portion where it is covered by tubercle of Zuckerkandl and vascular fascial layer containing tertiary branches of inferior thyroid artery.<sup>15</sup> Anatomical variations e.g. medial or anterior displacement of the nerve, bifurcation of the nerve at the inferior thyroid artery, non-recurrence and more importantly extralaryngeal bifurcation, the commonest, are also the contributing factors for nerve injury by traction.<sup>16,17</sup> Intraoperative nerve monitoring (IONM) is being used at various centres in developed countries as an adjunct to visual identification and dissection of RLN to minimise the injury. Several studies support the use of IONM over visual identification alone with minimal reduction in RLN palsy.<sup>18,19</sup> The support for IONM appear stronger in low volume centre<sup>11</sup> when used in high risk procedures such as reoperative thyroid procedures and surgery for malignancy.<sup>19</sup> The incidence of temporary (9%) and permanent (4%) RLN palsy in terms of NAR in our study is within the range reported across the literature from large volume centres. As we did not routinely identify the superior laryngeal nerve (SLN) and documentation of typical symptoms of SLN injury (vocal fatigue and difficulty in producing the high pitch tones) postoperatively was lacking, incidence of injury to SLN could not be commented upon. The incidence of temporary and permanent hypocalcaemia following thyroidectomy varies widely across the literature ranging from 1.6 to 50% and 1.5 to 4% respectively.<sup>2,20,21</sup> Surgical trauma, devascularisation and inadvertent parathyroid excision are major etiologic factors contributing to hypocalcaemia.<sup>2</sup> The postoperative hypocalcaemia which is generally evident in 2-5 days, prolongs the hospital stay needing repeated biochemical testing and exogenous administration of calcium.<sup>20</sup> Variation in the differences in reported incidence of hypocalcaemia could be due to definition of hypocalcaemia, type of thyroid disease and surgical technique. In our study, none of the patients undergoing hemithyroidectomy complained of symptoms of hypocalcaemia. As we did not routinely measure postoperative calcium level in these patients, we may have missed biochemical hypocalcaemia. Temporary (40%) and permanent (28%) hypocalcaemia

following TT was very high but none of the patient developed hypocalcaemia following subtotal (0/7) or completion thyroidectomy (0/5) in comparison to other studies. If we combine TT, subtotal and completion thyroidectomy then the incidence of temporary and permanent hypocalcaemia drops down to 18% (10/40) and 12% (7/40) respectively. The risk factors for hypocalcaemia in thyroidectomies include CCC, operation due to re-bleeding, postoperative wound infection, surgery for thyroid malignancy, few number of parathyroid glands preserved, low preoperative serum calcium level, revision surgery, autotransplantation of parathyroid glands.<sup>5,20</sup> Number of parathyroid glands needed to be preserved to avoid hypocalcaemia is still controversial as some recommends single functioning gland is sufficient<sup>22</sup> whereas others recommend at least three has to be preserved.<sup>20</sup> Performing more radical surgery for thyroid malignancy and TT rather than subtotal or near total thyroidectomy for MNG, apart from differences in surgical technique among various surgeons, may have contributed to higher rate of hypocalcaemia in our study. Preoperative hypocalcaemia due to vitamin D deficiency, though not measured, is common in our population, could be one of the reasons for higher temporary hypocalcaemia.<sup>23</sup>

## CONCLUSION:

Complications to thyroid surgery are not uncommon. Visualization of recurrent laryngeal nerve alone in our context is adequate in experienced hands. Identification of parathyroid and preservation with vascular pedicle during thyroidectomy is recommended to avoid hypocalcaemia. Meticulous dissection can reduce the complications.

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