Papillary Thyroid Carcinoma (PTC) is a slow growing, least aggressive and most curable cancer. PTC represents 85% of thyroid carcinoma and occurs at any age, often multifocal and frequently metastasized to cervical lymph nodes. Its annual incidence varies worldwide from 0.5-10 per 100,000 population and is diagnosed with confidence by Fine Needle Aspiration (FNA) biopsy. Although, PTC most frequently involves lymph nodes from the central compartment (paratracheal/oesophago-tracheal), yet the involvement of the lateral and posterior triangle lymph nodes have been reported.

The first site of metastasis from PTC is the central nodes and then the lateral lymph nodes of neck. In 35% of patients, occult metastasis in tracheo-oesophageal groove is also present. In some studies, occult metastasis to lateral cervical nodes is found in 38-90% of PTC. However, in low risk patients, cervical lymph adenopathy do not adversely influence the survival rate.

Papillary thyroid carcinoma is often multifocal and may spread through lymphatics. The goal of surgery is to remove all tumour tissue along with the lymph nodes involved.

Studies have been reported on the successful use of sentinel lymph node biopsy in patients with papillary thyroid cancer to guide regional lymph node dissection, demonstrating high degree of positive frozen section intra-operative diagnosis.

The surgeons have the options to choose a suitable surgery or dissection for PTC. Usually two procedures are used for PTC, radical neck dissection and modified neck dissection.

This retrospective study was conducted to know the choice of dissection procedures for PTC. The study was also aimed to determine the neck level of lymph nodes involvement in PTC.
METHODOLOGY

This retrospective study was done in the Surgical Department of the Khyber Teaching Hospital, Peshawar, from July 1998 to July 2005. Thirty eight patients, who had clinically palpable and fine needle aspiration positive lymph node of papillary thyroid carcinoma, were studied and divided in 3 groups on the basis of dissection during surgery. Group-1 involved patients who underwent bilateral modified neck dissections for bilateral disease, Group-2 patients who underwent unilateral radical neck dissections on one side where structures were involved and Group-3 involved patients undergoing unilateral modified neck dissections with preservation of three-neck structure (accessory nerve, internal jugular vein and sternomastoid muscle).

The clinical and pathological records as well as the histological reports of the dissected lymph nodes were reviewed to ascertain the persistence and distribution of cervical metastasis by dissection procedure according to the neck level nomenclature proposed by Sloan Catterning Cancer Center in USA (American Joint Committee for Cancer). According to it, level I represents submental and submandibular region of neck lymph nodes. Level II, III and IV represents the upper, middle and lower jugular neck nodes respectively and level V represents the posterior triangular of cervical lymph nodes. The nodes taken from the neck level on the dissected specimens were marked individually by the surgeon with sutures of various lengths for identification by the pathologist as shown in Figure 1 and neck level shown in Figure 2.

All neck dissections were therapeutic in nature as all were clinically positive. A total of 40 (pathological positive) specimens were obtained from 38 patients having clinically palpable and FNA positive nodes besides other nodes. Patients were considered to have a positive level when one or more nodes in the particular level were reported to contain tumour.

RESULTS

The study group comprised 38 patients, with 26 females (68.42%) and 12 males (31.57%). The age ranged from 23 to 70 (mean 32 ± 2.5) years. Thirty (80%) patients had total thyroidectomy and the remaining 8 (20%) patients underwent unilateral lobectomy with isthmusectomy. Twenty eight (71.7%) patients had thyroidectomy and neck dissection at the same sitting, while 10 (28.3%) had a metachronous dissection (i.e. dissection later on when patient developed clinically positive nodes).

Eighty-five nodes in different levels were taken from these patients. Out of these, 40 nodes were histologically positive.

Number of positive specimens in each group are shown in Figure 3.

In group 1 (bilateral modified neck dissection), out of total 22 lymph nodes obtained from 10 patients, 5 (41.6%) exhibited level III involvement, 3 (25%) had level II and 2 (16.6%) had level II. Histologically positive nodes were 12 (30.0%, Tables I and II).

In group 2 (unilateral radical neck dissection), out of total 23 lymph nodes obtained from 8 patients, 4 (59%) had level III, 2 (25%) had level II and 1 (12.5%) had level IV involvement respectively, and only 8 specimens were histologically positive (Tables I and II).

<table>
<thead>
<tr>
<th>Neck level</th>
<th>Group 1 (n=10)</th>
<th>Group 2 (n=8)</th>
<th>Group 3 (n=20)</th>
<th>Total number of lymph nodes taken in each level</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>II</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>III</td>
<td>7</td>
<td>6</td>
<td>13</td>
<td>26</td>
</tr>
<tr>
<td>IV</td>
<td>6</td>
<td>7</td>
<td>11</td>
<td>24</td>
</tr>
<tr>
<td>V</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>23</td>
<td>40</td>
<td>85</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Neck level</th>
<th>Group 1 (n=10)</th>
<th>Group 2 (n=8)</th>
<th>Group 3 (n=20)</th>
<th>Number of positive L. nodes</th>
<th>Percentage positive nodes in level</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>1 (8.3%)</td>
<td>0 (0%)</td>
<td>1 (05%)</td>
<td>2</td>
<td>05.0%</td>
</tr>
<tr>
<td>II</td>
<td>3 (25%)</td>
<td>2 (25%)</td>
<td>5 (25%)</td>
<td>10</td>
<td>25.0%</td>
</tr>
<tr>
<td>III</td>
<td>5 (41.6%)</td>
<td>4 (59%)</td>
<td>7 (35%)</td>
<td>16</td>
<td>40.0%</td>
</tr>
<tr>
<td>IV</td>
<td>2 (16.6%)</td>
<td>1 (12.5%)</td>
<td>5 (25%)</td>
<td>8</td>
<td>20.0%</td>
</tr>
<tr>
<td>V</td>
<td>1 (8.3%)</td>
<td>1 (12.5%)</td>
<td>2 (10%)</td>
<td>4</td>
<td>10.0%</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>8</td>
<td>20</td>
<td>40</td>
<td>47.058%</td>
</tr>
</tbody>
</table>
While in group 3 (unilateral modified neck dissection), 40 lymph nodes were taken from 20 patients. Seven (35%) involved level III, 5 (25%) involved level II, while 5 (25%) involved level IV so only 20 were positive specimens (Tables I and II).

Out of 3 lymph nodes taken from level I, only 2 lymph nodes were positive showing extensive disease. Similarly, level V nodes were not involved in isolation, but with level III and IV disease as well. Thirty specimens (80%) showed nodal disease at multiple levels.

Irrespective of the type of neck dissection performed, the anterolateral nodes (levels II, III and IV) were the most involved in metastatic disease clinically and histologically. Within the anterolateral chain, level III nodes then level II and lastly level IV nodes were involved. Levels V and I were involved in extensive disease.

DISCUSSION

Papillary Thyroid Carcinoma (PTC) is the most common epithelial thyroid tumour and accounts for approximately 85% of all thyroid carcinoma. The overall prognosis is very good and the average 10 years survival exceeds 92%. Radiation exposure in childhood is the main risk factor for development of PTC. Patients with PTC tends to be young, and cervical metastases are not uncommon. Several rare and aggressive subcategories of PTC, including the tall columnar and insular variant are also present.

The mean age of the patients was 32 ± 2.5 years, which is comparable to other studies. In a study done by Muzzaffar et al. at AFIP in 1998, the mean age for PTC was 27 years. The female to male ratio was also similar to other studies as 2:25:1.

This study reported on observations made in patients who underwent neck dissections for metastasis from papillary thyroid carcinoma by defining lymph node involvement with respect to neck level defined by Sloan–Kettering Cancer Center in USA. The optimal initial surgical treatment remains controversial. In children, total thyroidectomy with selective lymph node dissection gives appropriate surgical treatment with no complications.

There is little doubt that some form of neck dissection is indicated in patients with palpable cervical lymph adenopathy, however, it should include nodes at greatest risk and FNA positive nodes. Prophylactic neck dissection is not indicated for PTC but modified neck dissection is indicated for patients with palpable cervical lymph nodes or FNA positive nodes.

Analysis from this series of patients yielded that majority of patients (82%), with lateral neck diseases, presented with multiple level of nodal involvement. The anterolateral group of nodes (level II, III, IV) is at great risk of metastasis disease with level III nodes being the most frequently involved seen in other studies. Level I and V nodes were never found to be involved in isolation, but always in association with diseases at multiple level. Level I was rare (4%) with extensive metastatic disease, similar to other studies.

The study indicated that 12% of lymph nodes were dissected by bilateral modified neck dissection (Group I), 8% were by unilateral radical dissection (Group II) and 20% were by unilateral modified dissection (Group III), indicating that group III is a preferable practice in PTC patients. The distribution of positive lymph nodes in neck level is shown in Table II. Lymph nodes of neck level III and II are mostly involved followed by IV, V and I.

Large proportion of patients with lateral neck disease harbors multi-level involvement; other researchers have also pointed that the optimal procedure for patient with palpable cervical lymphadenopathy from PTC should be modified neck dissection.

This is also the practice of our department as it ensures complete clearance of all lateral neck disease as well as it preserves all the vital neck structures. If level V and I are involved, they should also be removed.

CONCLUSION

PTC involved levels II, III and IV most commonly in this series. In extensive disease, levels V and I were also involved. Modified neck dissection is recommended in all such patients.

REFERENCES

Pattern of anterolateral cervical lymph nodes involvement in papillary thyroid carcinoma


17. Das DK. Age of patients with papillary thyroid carcinoma: is it a key factor in the development of variants? *Gerontology* 2005; 51:149-54.


