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Selective Neck Dissection in N0 Papillary Thyroid Carcinoma

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ARTICLE INFO **ABSTRACT** **ORIGINAL RESEARCH ARTICLE**

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Background: Papillary thyroid carcinoma is the most common form of well differentiated thyroid cancer and constitutes 1% of all solid tissue cancers with a female predominance. Surgical intervention helps in removal of lesion. Lymph node metastasis in cervical compartments is the main reason of recurrence of disease. Personalized risk stratified prophylactic neck dissection at initial thyroidectomy in Papillary thyroid carcinoma with no clinical, sonographic or per-operative evidence of lymph node metastasis has been advocated, though not unanimously. Compartment oriented lymph node dissection in patients with PTC reduces recurrence and improves survival. **Objectives:** The aim of this study is to determine the Role of selective neck dissection in case of N0 papillary thyroid carcinoma. **Methods:** A cross-sectional prospective study was conducted in the Dept of Otolaryngology and Head neck surgery, BSMMU, Dhaka for one and a half years from September/2021 to February/2023, with 35 patients underwent total thyroidectomy with selective neck dissection (level VI, III, IV, II) for N0 Papillary thyroid carcinoma. All patients were evaluated by complete clinical head & neck examination, thyroid hormone profile, ultrasonography finding, fine needle aspiration cytology, radiology and histopathology report were recorded. Data were analyzed statistically by using by Statistical Package for Social Scientist (SPSS-24). **Results:** The age was ranged from 22 to 70 years with mean age was 47.77±14.8 years. Male to female ratio was 1:2.2. 17.4% patients had multiple number of nodules and 82.86% patients had solitary nodule. 11.43 % patients had involvement of both lobes, 31.43 % had involvement of left lobe, 57.14% had involvement of right lobe. More than three-fourth (88.57%) patients, tumor size >4 cm and in case of 11.43% patients, tumor size is within 0- 4 cm. 8.6% patients had mixed echo consistency

and 91.4% had solid echo consistency. **Conclusion:** Most of the patients were in 6th and above decade and female predominant. Solitary nodule, right lobe involvement, size more than 4cm and solid echo consistency were more frequent. Regarding selective neck dissection; 17.1% had metastasis at level VI and no metastasis at level II, III, IV. In brief, 17.1% patients had metastasis on histopathology after neck dissection and 82.9% patients had no metastasis on histopathology after neck dissection. It can be said that, Central compartment neck dissection has role in detecting metastasis at N0 stage of Papillary thyroid carcinoma but Lateral neck dissection has no role in detecting metastasis at N0 stage of Papillary thyroid carcinoma.

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INTRODUCTION

Thyroid carcinoma is the commonest endocrine malignancy. Thyroid carcinoma is divided into four main histologic type: 1. differentiated, 2. undifferentiated, 3. medullary thyroid carcinoma, 4. Thyroid Lymphoma. [1] Differentiated thyroid carcinoma is the predominant pathological type of thyroid cancer, approximately 80%-90% of all cases. [2] Differentiated thyroid carcinoma include Papillary thyroid carcinoma and Follicular thyroid carcinoma. [3] About 80% of all thyroid carcinoma cases are papillary thyroid cancer. [4] Most commonly, papillary thyroid cancers are totally asymptomatic. However, the most common symptom is a mass in the neck. It typically arises as a solid, irregular or cystic mass that comes from otherwise normal thyroid tissue. It is the most treatable carcinoma in comparison to other thyroid malignancies leading to survival rate of 93% at 10 years. About 30%-40% of Papillary thyroid carcinoma metastasize to regional lymph nodes. [5]

Cervical lymph node metastasis is a common and also a frequent finding in Papillary thyroid carcinoma, in Follicular carcinoma, lymph node metastasis is much less frequent. Traditionally, lymph node metastasis has not been thought to be a significant prognostic indicator but recently it is observed that this is not the case in high-risk patients and death rates are significantly higher. [6] The incidence of cervical lymph node metastasis in PTC can be 40%-90%. Cervical lymph node metastasis is the main risk factor for higher recurrence in Papillary thyroid carcinoma. In general, lymph node metastasis occurs in the central compartment first, then involves the lateral compartment, but also has the property of skip metastasis. Therefore, a reasonable and comprehensive initial surgical treatment can decrease the recurrence rate and re-operation complication. [7] Papillary thyroid carcinoma with regional lymph node metastasis correlates with higher rate of recurrence and mortality, therefore, necessitating surgical intervention which consists of Thyroidectomy with therapeutic neck dissection followed by adjuvant treatment with radio-iodine. [8]

Regarding N0 Papillary thyroid carcinoma, there is an ongoing debate related to the utility of neck dissection. Regarding Central neck dissection in N0 Papillary thyroid carcinoma, some authors documented that, Prophylactic central LND is a safe procedure with an acceptable incidence of complication, which allows for more accurate staging of tumour and reduces incidence of recurrence. [9] Some authors mentioned that prophylactic central LND is recommended in, T3 andT4 tumor, T1 and T2 tumor related to high-risk prediction factor of recurrence and prophylactic central LND is not recommended in case of low-risk tumour or tumour <4cm or

absence of extra-thyroidal extension. [10] Regarding Lateral neck dissection in N0 papillary carcinoma, some authors mentioned that Selective lateral neck dissection with Total thyroidectomy for patient with Papillary carcinoma and negative nodes has beneficial role in preventing recurrence and it improves Lateral node recurrence free survival for patient with T>3cm with positive extra-thyroidal extension. [11] Some authors recommended that Selective lateral neck dissection and central neck dissection be performed in N0 Papillary thyroid carcinoma patients and concluded that prophylactic lateral neck dissection on contralateral side is useless. [12] Most authors mentioned that Selective lateral neck dissection is not routinely recommended, it has no role in management of Papillary carcinoma and there is no evidence of benefit from doing a prophylactic lateral neck dissection with no overt lateral neck disease. [13] So, as it is mentioned earlier that there is ongoing debate related to the role of selective neck dissection at N0 stage of PTC; the purpose of this present paper is to investigate the role of selective neck dissection in N0 Papillary thyroid carcinoma.

METHODOLOGY

This cross-sectional Prospective study was carried out in the Department of Otolaryngology and Head Neck Surgery, Bangabandhu Sheikh Mujib Medical University (BSMMU), during September 2021 to February 2023. A total of 35 patients were participated in the study. The study included patient aged >18 years with clinically and radiologically N0 Papillary carcinoma who had been treated by thyroidectomy with selective neck dissection. After taking consent and matching eligibility criteria, data were collected from patients on variables of interest using the predesigned structured questionnaire by interview, observation. Statistical analyses of the results were be obtained by using window-based Microsoft Excel and Statistical Packages for Social Sciences (SPSS-24).

RESULTS

Table I: Distribution of the study patients according to Age (n=35)

Age in years	N=35	%
<18	0	0
18-55	4	11.43
>55	31	88.57
Mean ± SD	47.77	±14.8
Range (min, max)	22	70

Table I shows the distributions of the study patient by demographic variable. It was observed that, 88.57 % patients belonged to age group of >55 years. The mean age was found 47.77±14.8 years with ranged from 22 to 70 years.

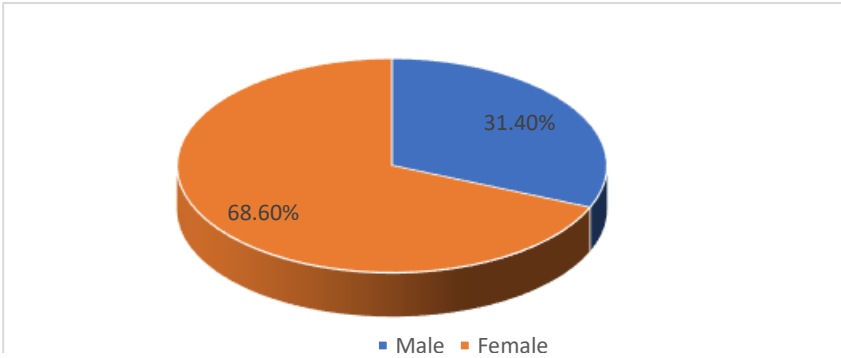

Figure I: Distribution of the study patients according to sex (n=35)

Figure I show the distributions of the study patient by age. More than two third 24(68.8%) patients were female and 11(31.4%) were male.

Table II: Distribution of the study patients by USG findings (n=35)

USG findings	N=35	%
Number of nodules		
Multiple	6	17.14
Solitary	29	82.86
Involvement of lobe		
Right	20	57.14
Left	11	31.43
Both Lobes	4	11.43
Tumor size		
0- 4 cm	4	11.43
>4 cm	31	88.57
Echo consistency		
Solid	32	91.4
Mixed	3	8.6

Table II shows the distributions of the study patient by USG findings. It was observed that 17.14% of the patients had multiple number of nodule and 82.86% had solitary nodule. 57.14% patients had involvement of Right lobe, 31.43% had involvement of left lobe, 11.43% had involvement of both lobes. In case of 88.57% patients, tumor size >4 cm and in case of 11.43% patients, tumor size is within 0- 4 cm. More than three-fourth (91.4%) patients had solid echo consistency and 8.6% had mixed echo consistency.

Table III: Distribution of the study patients by histopathological findings of thyroid gland (n=35)

Histopathological findings	Mean ± SD	(min., max.)
Size of Rt Lobe	6.23±2.68	2,12
Size of Lt Lobe	5.43±1.96	3,10
Size of isthmus	1.41±0.68	1,4
Size of tumour	4.8±1.18	3,7

Table III shows the distributions of the study patient by histopathological findings. The mean size of Rt lobe was found 6.23±2.68 with ranged from 2 to 12. The mean size of Lt lobe was found 5.43±1.96 with ranged from 3 to 10. The mean Size of isthmus was found 1.41±0.68 with ranged from 1 to 4. The mean Size of tumour was found 4.8±1.18 with ranged from 3 to 7.

Table IV: Distribution of the study patients by cervical lymph nodes (n=35)

Cervical Lymph Node	N=35	%
Level II Total		
Two	3	8.6
Three	17	48.6

Four	12	34.3
Five	2	5.7
Six	1	2.9
Mean ± SD	3.46 ± 0.85	
Range (min, max)	2,6	
Metastasis		
Absent	35	100
Present	0	0
Level III Total		
One	1	2.9
Three	5	14.3
Four	14	40.0
Five	12	34.3
Six	1	2.9
Seven	2	5.7
Mean ± SD	4.34 ± 1.4	
Range (min, max)	1,7	
Metastasis		
Absent	35	100
Present	0	0
Level VI Total		
Five	1	2.9
Seven	10	28.6
Nine	11	31.4
Ten	6	17.1
Twelve	7	20.0
Mean ± SD	9.09 ± 1.92	
Range (min, max)	5, 12	
Metastasis		
Absent	29	82.9
Present	6	17.1

Table IV shows the distribution of the study patients by cervical lymph nodes. It was observed that, under level II, nearly a half (48.6%) of the patients had three followed by 34.3% four, 8.6% two, 5.7% five, 2.9% six and the mean level II total was 3.46±0.85 varied from 2 to 6. None of the patients had metastasis. Under level III total, 40.0% patients had four, followed by 34.3% five, 14.3% three, 5.7% seven, 2.9% one & six and the mean level III total was 4.34±1.14 varied from 1 to 7. No patients had metastasis. Under level IV total, 48.6% patients had five, followed by 22.9% seven, 20.0% four, 8.6% three and the mean level IV total was 5.09±1.22 with varied from 3 to 7. None of the patients had metastasis. Under level VI total, 31.4% patients had nine, followed by 28.6% seven, 17.1% ten, 2.9% five and the mean level VI total was 9.09±1.92 varied from 5 to 12. 17.1% had metastasis and 82.9% had no metastasis.

Table V: Distribution of the study patients by metastasis on histopathology (n=35)

Metastasis	N=35	%
Metastasis absent on histopathology after neck dissection	29	82.9
Metastasis present on histopathology after neck dissection	6	17.1

Table V shows the distribution of the study patients by metastasis absent and present. It was observed that, in 17.1% patients, metastasis present on histopathology after neck dissection and in case of 82.9% patients, metastasis absent on histopathology after neck dissection.

DISCUSSION

This cross-sectional prospective study was carried out with an aim to see the incidence of metastasis in the cervical lymph node histopathologically and to reduce the physical and financial burden related to the second look surgery. A total of 35 patients aged more than -18 years with clinically N0 Papillary carcinoma who had been treated by Total thyroidectomy with selective neck dissection, in the Otolaryngology and Head Neck Surgery department of Bangabandhu Sheikh Mujib Medical University, Dhaka, during September 2021 to February 2023, were included in this study. Papillary Thyroid Carcinoma with neck node metastasis, follicular Carcinoma and Anaplastic Carcinoma were excluded from the study. The present study findings were discussed and compared with previously published relevant studies.

In this present study it was observed that 88.57% patients belonged to age >55 years. The mean age was found 47.77±14.8 years with ranged from 22 to 70 years. Suresh study found that 62.0% under 45 years of age and rest 38.0% were more than or equal to 45 years of age. [14] Chowdhury study observed that the peak incidences were in 3rd, 4th and 5th decades with a female predominance. [15] Mean age of the patients were 43.81 years, and among them 48.6% belonged to the under 45 years age group, which are comparable with the current study. In this current study it was observed that female predominant, where 68.6% and 31.4% patients were female and male respectively. Similarly, Chowdhury study also found 78.6% were female and rest 21.4% were male indicating a female predominance, which is similar to the current study. [15]

In this present study it was observed that 17.14% patients had multiple number of nodule and 82.86% had solitary number of nodules. 11.43% patients had involvement of both lobes, 31.43% had involvement of left lobe, 57.14% had involvement of right lobe. More than three-forth (88.57%) found with tumor size >4 cm and 11.43% patients found with tumor size within 0-4 cm. 8.6% patients had mixed echo consistency and 91.4% had solid echo consistency. In Chowdhury study found the longest diameter of tumor was <1 cm in 44.3% cases and in 44.2% of cases tumor was >1- <3 cm in longest diameter. [15] Suresh mentioned in their study that the median size of primary tumor was 1.4 cm varied from 0.1–4.0 cm, 85.0% patients had a primary tumor ≤1 cm, and 15.0% had a primary tumor >1 cm. In their study, tumor size >1 cm was an independent predictive factor of ipsilateral CLN metastasis in cases of PTC, which was statistically significant. [14]

In this current study it was observed that the mean size of Right lobe was found 6.23±2.68 with ranged from 2 to 12. The mean size of Left lobe was found 5.43±1.96 with ranged from 3 to 10. The mean size of isthmus was found 1.41±0.68 with ranged from 1 to 4. The mean size of tumor was found 4.8±1.18 with ranged from 3 to 7. Suresh study observed that the median size of primary tumor was 1.4 cm varied from 0.1–4.0 cm.

tumor was found 4.8±1.18 with ranged from 3 to 7. [14]

Regarding the cervical lymph nodes in this present study, it was observed under level II, nearly a half (48.6%) of the patients had three followed by 34.3% four, 8.6% two, 5.7% five, 2.9% six and the mean level II total was 3.46±0.85 varied from 2 to 6. None of the patients (0%) had metastasis. Under level VI total, 31.4% patients had nine, followed by 28.6% seven, 17.1% ten, 2.9% five and the mean level VI total was 9.09±1.92 varied from 5 to 12. 17.1% had metastasis and 82.9% had no metastasis. Chowdhury study observed that 71.4% patients presented with lymphadenopathy indicating thyroid carcinoma with local metastasis. [15] One case presented with voice change indicating compression of the recurrent laryngeal nerve and in 2 cases large swelling caused difficulty in swallowing. 41.4% dissected lymph node had histopathological evidences of metastasis.

In this present study, it was observed that 17.1% patients had metastasis on histopathology after neck dissection and 82.9% had no metastasis on histopathology after neck dissection. This metastasis was found in the specimen obtained by central neck dissection. No metastasis was present in the specimen obtained by Lateral neck dissection. Kadhim had done a prospective study and analyzed benefit of prophylactic selective unilateral cervical lymph node (LN) dissection with Total thyroidectomy in 41 patients who have papillary thyroid carcinoma (PTC) and negative cervical lymph nodes metastasis. [16] Patients were submitted to a total thyroidectomy and prophylactic selective one side ipsilateral lateral and central lymph nodes dissection (level II, III, IV, and V). The result showed that from the total 41 patients, two groups are positive and negative lymph nodes metastasis 24.4% (10) and 75.6% (31). Medas had done a retrospective study and assessed whether prophylactic central LND is effective in reducing the incidence of recurrent disease and secondarily estimated the incidence of postoperative complications in patients who underwent prophylactic central LND and to evaluate the prognostic value of occult node metastases. [9] In their study, patients with preoperative diagnosis of DTC and clinically uninvolved lymph nodes (cN0) were included. The patients were divided into two groups, depending on the surgical approach: total thyroidectomy alone (TT group) or total thyroidectomy and prophylactic central LND (p-CLND group). Three hundred and ninety-nine patients were included in this study, 320 (80.2%) in the Total Thyroidectomy group and 79 (19.8%) in the Total thyroidectomy with prophylactic central LND group. Occult lymph node metastases were found in 20 (25.3%) patients in the prophylactic Central LND group. Their study concluded that, 'Prophylactic Central Lymph Node Dissection' was effective in improving disease-free survival in patients with intermediate and high risk of disease recurrence. Chowdhury study found that 58.6% had no metastasis, 38.6% central lymph node metastasis and 2.8% lateral lymph node metastasis. [15] Suresh had done a retrospective study and examined the pattern of Central LN metastasis in 143 patients diagnosed with unilateral cN0 PTC. [14] The presence of metastatic LNs in the central compartment was accurately assessed by standard histologic examination of dissected neck specimens. Among them 41.0% had ipsilateral CLN metastasis and 14.0% had bilateral CLN metastasis. Altiner had done a retrospective study on 255 patients of PTC with no clinical and radiological evidence of lymph node metastasis(N0). [10]

Limitations of the study

The present study was conducted in a very short period due to time constraints and funding limitations. The small sample size was also a limitation of the present study.

CONCLUSION

This study was undertaken to see the evidence of metastasis at N0 stage and reduction of risk of further surgery. Most of the patients were in 6th and above decade and female predominant. Solitary nodule, right lobe involvement, size more than 4cm and solid echo consistency were more frequent. Regarding selective neck dissection; 17.1% had metastasis at level VI and no metastasis at level II, III, IV. In brief, 17.1% patients had metastasis on histopathology after neck dissection and 82.9% patients had no metastasis on histopathology after neck dissection. It can be said that, Central compartment (Level VI) neck dissection has role in detecting metastasis at N0 stage of Papillary thyroid carcinoma but Lateral neck (Level II, III, IV) dissection has no role in detecting metastasis at N0 stage of Papillary thyroid carcinoma.

RECOMMENDATION

This study can serve as a pilot to much larger research involving multiple centers that can provide a nationwide picture, validate regression models proposed in this study for future use and emphasize points to ensure better management and adherence.

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The wide range of disciplines involved in selective neck dissection in N0 papillary thyroid carcinoma research means that editors need much assistance from references in the evaluation of papers submitted for publication. I would also like to be grateful to my colleagues and family who supported me and offered deep insight into the study.

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