

# Modified Radical Neck Dissection in Thyroid Malignancy and Its Complications

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## ABSTRACT

**Objective:** To assess the complications of Modified Radical Neck Dissection in thyroid Malignancy.

**Study Design:** Cross-sectional descriptive study

**Place and Duration of Study:** This study was conducted at the Department of Surgery, Jinnah Postgraduate Medical Centre, Karachi from April 2011 to April 2021.

**Materials and Methods:** A total of 198 cases of thyroid malignancies treated with modified radical neck dissection surgery were included. Type of Thyroid malignancy was classified as papillary carcinoma, follicular carcinoma, and medullary carcinoma. Surgeries carried out were classified as isolated MRND, thyroidectomy with MRND and completion thyroidectomy with MRND. Outcome of MRND was assessed by complications which were recorded as transient hypocalcemia, permanent hypocalcemia, temporary change in voice, permanent hoarseness, wound infection, seroma formation, and thoracic duct injury.

**Results:** Out of 198 cases 135 were females with mean age of presentation of 41years and males were 47 with mean age of 46years. Female to male ratio was nearly 2:1. Papillary carcinoma was found in 165 (84.1%) cases, Medullary carcinoma in 19 (9.7%) cases, and follicular carcinoma in 14(5.6%). Isolated MRND was performed in 33 (16.7%) cases, total thyroidectomy with MRND in 87(43.9%) cases and completion thyroidectomy with MRND in 78(39.4) cases. Most common postoperative complication was found to be transient hypocalcemia in 16 (8.1%) cases followed by seroma formation and wound infection.

**Conclusion:** MRND is a safe procedure with low rate of complications when performed by experienced and skilled surgeon in a dedicated endocrine surgery unit.

**Key Words:** Thyroid Malignancy, MRND, Complications

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## INTRODUCTION

Thyroid disorders are one of the commonest disorders found in every part of the globe. Around 27 million Americans have thyroid pathology and more than half are still undiagnosed. Thyroid malignancy which accounts for 11% of total malignancies in USA remains to be the most common endocrine malignancy<sup>1</sup>. Females get affected more often than male with ratio of 3:1. The number of people who are told they have cancer has risen dramatically in recent years. This is because x-rays, which can sometimes show nodules in glands, are becoming increasingly common. Thyroid cancer can only be diagnosed with absolute certainty with a FNA biopsy.

About 88% of primary thyroid cancers are papillary carcinoma, while 8% are follicular carcinoma, 1% are medullary carcinoma, and 1% are anaplastic. Despite the rarity of squamous cell carcinoma, lymphoma, and sarcoma, which are all included in the third clause. Papillary and follicular carcinomas are well differentiated thyroid carcinomas with better prognosis and 10year survival rate of 95% and 85%<sup>4,5</sup>. Medullary carcinoma arise from neuroendocrine parafollicular cells 3:1. These have 10-year survival rate of 75% while the anaplastic carcinomas are undifferentiated and have aggressive course with low survival rate<sup>6</sup>. Risk factors of thyroid malignancy vary according to the histological type. Hereditary and environmental factors play important role like family history of thyroid cancer are associated with familial medullary thyroid carcinoma while ionizing radiation is highly associated with papillary carcinoma<sup>7</sup>. Treatment option for the thyroid cancer depends upon the stage whether it is localized or have already metastasized. Most commonly it metastasizes to nearby lymph nodes mainly cervical group in 30-80%. Surgery remains the mainstay of treatment with total thyroidectomy. Other treatment options are radioactive iodine therapy, thyroid suppression therapy, chemotherapy and external beam radiation therapy.

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With the recent advancement and awareness, challenges are faced by the surgeons. As, nowadays quality of life of patient is of paramount importance along with the survival rate<sup>8,9</sup>. For the definitive and effective treatment, neck dissection play an important role as this can directly affect the post-operative quality of life of the patients. Radical neck dissection remained the mainstay of cervical lymphadenectomy for the treatment of thyroid malignancy with adjacent lymph node metastasis. Martin, in 1952, began to address the morbidity associated with radical neck dissection (RND) like shoulder discomfort and other post-operative complications. With more public awareness of RND's risks, surgeons looked for ways to refine time-honored procedures. For this reason, a variant of the radical neck dissection technique was developed (MRND). RND most frequently causes discomfort, stiffness, and impaired range of motion in the shoulders and neck. While MRND did not have quite as many of these negative effects, it was still effective against cancer<sup>10</sup>. Thyroidectomy is a common procedure in endocrine surgical departments and can be performed with or without neck dissection. The purpose of this research is to determine the incidence of complications during a modified radical neck dissection for the treatment of thyroid cancer.

## MATERIALS AND METHODS

Participation in this study took place at the Jinnah Postgraduate Medical Centre's Department of Surgery in Karachi, Pakistan. This is a cross-sectional, descriptive study. Patients in this study ranged in age from 12 to 70, and all had been diagnosed with thyroid cancer, necessitating a treatment known as modified radical neck dissection. The data was compiled by reviewing surgical procedure records from April 2011 to April 2021. The institution's ethical review board gave permission to retrieve the data, so that it could be studied.

Thyroid carcinoma that had spread to the lymph nodes was diagnosed in all cases. Thyroid solitary nodules were sorted into their proper categories using the Bethesda System for Reporting Thyroid Cytopathology (TBSRTC). Each patient had a CT scan before surgery to assess the effects of the enlarged gland on the patient's trachea, esophagus, and other major blood vessels. Patients' ages and sex identities were recorded at the time of diagnosis. Thyroid cancer can manifest as one of three distinct forms: papillary carcinoma, follicular carcinoma, or medullary carcinoma. The microscopic characteristics of the malignancy were used to classify it into these subgroups. The operation was performed by a top consultant with over ten years of experience in thyroid surgery. After getting a signed consent form from the patient, the surgeon went through with the procedure. In terms of surgery, you might choose between MRND alone, thyroidectomy

with MRND, or whole thyroidectomy with MRND. Serum calcium concentration was determined three times: the day before surgery, 24 hours after surgery, and 14 days later. There were several postoperative problems for the patient, including hypocalcemia (both temporary and permanent), voice alteration (temporary and permanent hoarseness), wound infection, seroma formation, and thoracic duct injury. The patient also suffered from lifelong hoarseness and a brief change in voice. The information was collected using a pre-made Performa.

SPSS version 25 was used for the data analysis. Quantitative variables were measured with mean and standard deviation. Quantitative and qualitative factors were measured by frequency and percentage, respectively.

## RESULTS

This study included 198 cases of MRND including both genders aged between 12 to 70 years. Females were 135(68.18%) with age of presentation as low as 12years and as high as 70 years.

Mean age of female patients 41 years. Males were 63(31.8%) with age of presentation between 17 to 70 years with mean age of 46 years. Female to male ratio was found to be 2:1. Based on histopathology, papillary carcinoma was the most common thyroid malignancy found in 165 (84.6%) cases, followed by Medullary carcinoma in 19 (9.7%) cases, and follicular carcinoma in 14(5.6%) Total thyroidectomies with MRND was done in 87(44.6%) cases, completion thyroidectomy with MRND in 75(38.5) cases and Isolated MRND was performed in 33 (16.9%) cases. The most common Post-operative complication in all methods was found to be transient hypocalcemia (Table).

Transient hypocalcemia was found in 6(6.89%) cases of total thyroidectomy with MRND, 7(8.97%) cases of completion thyroidectomy with MRND, and 3(9.09%) cases of Isolated MRND. While, permanent hypocalcemia was not found in any of the case. Temporary change in voice was found in 2(2.29%) cases of total thyroidectomy with MRND, 3(3.84%) cases of completion thyroidectomy with MRND, and 1(3.03%) case of Isolated MRND. While permanent hoarseness was not found in any of the case. Wound infection was found in 3(3.44%) cases of total thyroidectomy with MRND, 4(5.12%) cases of completion thyroidectomy with MRND, and 2(6.06%) cases of Isolated MRND. Seroma formation was found in 3(2.29%) cases of total thyroidectomy with MRND, 4(5.12%) cases of completion thyroidectomy with MRND, and 1(3.03%) cases of Isolated MRND. Thoracic duct injury was found in 2(2.29%) cases of total thyroidectomy with MRND, 4(5.12%) cases of completion thyroidectomy with MRND, and 1(3.03%) case of Isolated MRND.

**Table No.1: Post-Operative Complications after MRND**

Complication	Procedure			Percentage
	Total Thyroidectomy+MRND (n=87)	Completion Thyroidectomy+MRND (n=78)	MRND (n=33)	
None	72	57	25	77.8%
Transient Hypocalcemia	6	7	3	8.1%
Permanent hypocalcemia	0	0	0	0
Temporary Change in Voice	2	3	1	3%
Permanent Hoarseness	0	0	0	0%
Wound Infection	3	4	2	4.5%
Seroma Formation	2	3	1	3%
Thoracic Duct Injury	2	4	1	3.5%
Total	87	78	33	100%

## DISCUSSION

The results of this study suggest that females, in comparison to males, are at greater risk of acquiring thyroid cancer. The number of males taking part in this survey was about equal to the number of women. Patients tended to be relatively young. Similar results were found by Unnikrishnan AG et al. 11 in India. The men outnumbered the women by a factor of 1.18 to 1. There were 3.3 males for every female in Europe, as found by Owens PW et al. 12. Tsegaye B et al. 13 found that the prevalence of the condition was 1.41 times higher among women than among men. Despite a 3:1 male to female ratio, Nguyen QT and his 2 coworkers all reached the same conclusion.

Based on the histopathological classification, Papillary carcinoma was found to be the most common malignancy of thyroid gland (84.6%) in this study followed by medullary (9.7%) and follicular carcinoma (5.6%) (Table 1). Nguyen QT et al.<sup>2</sup> also found the papillary carcinoma in his study (70-80%), follicular carcinoma (14%) and medullary (3%) and anaplastic carcinoma (2%). In our neighbor country India, Unnikrishnan AG et al.<sup>11</sup> found the same trend of thyroid malignancy with papillary carcinoma on the top followed by follicular carcinoma. In another study conducted in USA, Davies L et al.<sup>14</sup> also found the papillary carcinoma to be the most common malignancy. In china, Du L et al.<sup>15</sup> also found the same result with papillary carcinoma (92.3%). Tsegaye B et al. conducted study in Ethiopia, where he also found the same results<sup>13</sup>

In our setup, the incidence of the postoperative complications was found to be 22.2% following MRND. The most common complication following

MRND was found to be transient hypocalcemia (8.1%), followed by wound infection (4.5%), thoracic duct injury (3.5%), seroma formation (3%), and temporary change in voice (3%). Permanent hoarseness and permanent hypocalcemia were not found in any of the case. In one study conducted by Cheah WK<sup>16</sup>, which included 115 surgeries, he found transient hypocalcemia in 23%, with permanent hypocalcemia and permanent hoarseness. In one study conducted in Bulgaria conducted by Rossen S. Dimov<sup>17</sup>, found transient hypocalcemia in 24% of the cases. In another study conducted by Filho JG<sup>18</sup> in Brazil including 316 patients, transient hypocalcemia was found to be the most common complication (27.5%) followed by permanent hypocalcemia in 5.1% which was not found in this study. In another study which also correlated to this study was conducted by Jandee Lee including 128 patients in which he found transient hypocalcemia in 34.8%, followed by wound infection and seroma formation in 6.1%, temporary change in voice in 4.5%.

## CONCLUSION

Modified radical neck dissection is worldwide accepted technique for thyroid malignancy. it is safe with few complications in skilled surgical hands.

### Author's Contribution:

Concept & Design of Study: Sadam Hussain  
 Drafting: Zahid Mehmood  
 Data Analysis: Shoaib Malik, Naseem Baloch  
 Revisiting Critically: Sadam Hussain, Zahid Mehmood  
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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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