

Management of Solitary Cold Nodule of the Thyroid Gland

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ABSTRACT

Aim: To highlight the surgical options and malignancy in the solitary cold nodule of the thyroid gland

Study Design: Prospective case series study

Settings: South Surgical Ward Mayo Hospital, Lahore

Duration: June 2018 to November 2019

Methods: All the patients above 12 years of age with the diagnosis of the solitary cold nodule of thyroid gland either referred from the periphery or directly admitted through the Out Patient Department Mayo Hospital, Lahore were included in the study

Results: Age ranged from 13-58 with the mean of 34 ± 9 years and 92% of the patients were female. Right lobe of the thyroid gland was involved in 62% and isthmus in 2% of the patients. All the patients were euthyroid and underwent surgery. FNAC showed adenomatous colloid goiter in 52% and papillary carcinoma of the thyroid gland in 4% of the patients. Lobectomy plus isthmusectomy was performed in 94% and total thyroidectomy in 4% of the patients primarily. Histopathology report showed adenomatous colloid goiter in 44%, papillary carcinoma of the thyroid gland in 8% and follicular carcinoma in 2% of the patients. Completion of total thyroidectomy was carried out in 6% of the patients. Surgical site infection was observed in 4% and transient hypocalcemia in 2% of the patients postoperatively. There was no mortality.

Conclusion: The solitary cold nodule of the thyroid gland is more common in females. Lobectomy plus isthmusectomy is the gold standard surgical option. Papillary carcinoma is the commonest malignancy in the solitary cold nodule of the thyroid gland.

Keywords: Solitary cold nodule, euthyroid, malignancy, lobectomy plus isthmusectomy, papillary carcinoma

INTRODUCTION

The thyroid gland weighs about 20-25 grams with rich arterial supply and extensive lymphatic network, sheaths the upper aerodigestive tract.

The solitary nodules of the thyroid gland are very common and can be detected clinically in 4-7% and with ultrasound in up to 70% of the population. These are more common in women (5%) than men (1%) and are very rare in children^{1,2}.

The incidence of thyroid malignancy is on rise globally³. Eighty percent of the solitary cold nodules of the thyroid gland are benign and 5% functioning or warm nodules are malignant⁴.

Usually, the benign solitary cold nodules of the thyroid gland are smooth, soft and mobile while malignant lesions are firm, irregular, fixed, rapidly growing with hoarseness of the voice⁵.

The ultrasound thyroid is a very sensitive, noninvasive imaging technique and most frequently used modality for the investigation of the solitary nodule of the thyroid gland^{6,7}. CT scan and MRI are not the first line imaging modalities to be used as standard diagnostic tools in the solitary nodule of the thyroid gland^{1,7}. Thyroid function tests especially low or high level of TSH can be the indicator that a nodule is benign or malignant respectively^{1,7,8}. Fine needle aspiration cytology (FNAC) is a minimally invasive, valuable and economical investigation for assessment of a solitary cold nodule of the thyroid gland^{1,2,7}.

Papillary and follicular carcinomas are the most common malignancies in the solitary cold nodule of the thyroid gland while anaplastic carcinoma, medullary carcinoma and lymphoma are the rare entities⁹.

Management plans are multidisciplinary based on clinical, biochemical, radiological and cytological results^{2,4}. Lobectomy plus isthmusectomy for benign solitary cold nodule and total thyroidectomy for malignant solitary cold nodule and total thyroidectomy in high risk patients reduces the risk of local recurrence¹⁰. Radioactive iodine should be used for papillary and follicular carcinomas after total thyroidectomy in high risk patients or with metastasis. Recent minimal invasive techniques in use for the management of the solitary cold nodule of the thyroid gland at their initial stages are percutaneous injection of ethanol, radiofrequency ablation, laser and microwave ablation¹¹.

METHODOLOGY

The prospective case series study consisting of 50 consecutive patients was conducted in South Surgical Ward Mayo Hospital, Lahore from June 2018 to November 2019. All the patients above 12 years of age either referred from the periphery or directly admitted through the Out Patient Department Mayo Hospital, Lahore with the diagnosis of the solitary cold nodule of the thyroid gland were included in the study. The patients with the solitary warm or hot nodule were excluded from the study. Diagnosis of the solitary cold nodule was made on the basis of detailed clinical history, thorough physical examination and was confirmed by the ultrasound thyroid, radionuclide scan and TSH level. The laboratory investigations like CBC, blood sugar, urea/creatinine, LFTs,

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hepatitis screening, X ray chest, ECG (where indicated) and specific investigations like ultrasound thyroid, T₃, T₄, TSH levels, radionuclide scan and FNAC were advised in all the patients preoperatively. Informed consent was taken from all the patients. All the patients underwent surgery under general anesthesia. Drain was placed in all the patients. Antibiotics and analgesics were given to all the patients. All the patients were monitored closely in the ward for earlier detection of postoperative complications with their immediate management. Hospital stay varied from 4-7 with the mean of 4.5 days. All the data of the patients was collected on the prescribed proforma individually and analyzed by SPSS 16. Quantitative variable was applied to calculate the mean and ± SD for age of the patients. Qualitative variables like gender were calculated by taking frequencies and percentages.

RESULTS

The series included 50 consecutive patients with the solitary cold nodule of the thyroid gland was expanded over a period of 18 months. Age ranged from 13-58 with the mean of 34 ± 9 years and 92% of the patients were female as in table 1.

Table 1: Demographic distribution

Age in years	n=50	Male	Female
13-20	4	-	4
21-30	18	1	17
31-40	16	1	15
41-50	9	2	7
>50	3	-	3

Duration of swelling on presentation was <1 year in 26% and >5 years in 10% of the patients. Right lobe of the thyroid gland was involved in 62%, left in 36% and isthmus in 2% of the patients. Fine needle aspiration cytology report showed adenomatous colloid goiter in 52% and papillary carcinoma of the thyroid gland in 4% of the patients as in table 2.

All the patients were euthyroid and underwent surgery under general anesthesia. Lobectomy plus isthmusectomy was performed in 94%, total thyroidectomy in 4% and isthmusectomy alone in 2% of the patients primarily. The resected specimens of all the patients were submitted for histopathology which showed adenomatous colloid goiter in 44% and papillary carcinoma of the thyroid gland in 8% of the patients as in table 2.

Table 2: Findings of FNAC and histopathology

Finding	FNAC	Histopathology
Benign lesion		
Adenomatous colloid goiter	26 (52%)	22 (44%)
Nodular goiter	8 (16%)	11 (22%)
Colloid cyst	7 (14%)	5 (10%)
Follicular neoplasm	4 (8%)	-
Hashimoto's thyroiditis	1 (2%)	2 (4%)
Lymphocytic thyroiditis	1 (2%)	2 (4%)
Follicular adenoma	-	2 (4%)
Hurthle's cell tumor	1 (2%)	1 (2%)
Malignant lesion		
Papillary carcinoma	2 (4%)	4 (8%)
Follicular carcinoma	-	1 (2%)

The overall malignancy in the solitary cold nodule of the thyroid gland was 10% as in table 3.

Table 3: Demographic distribution of the thyroid malignancy

Age group	Male	Female	Papillary carcinoma	Follicular carcinoma
13-20	-	-	-	-
21-30	-	1 (2%)	1 (2%)	-
31-40	-	2 (4%)	1 (2%)	1 (2%)
41-50	1 (2%)	-	1 (2%)	-
>50	-	1 (2%)	1 (2%)	-

Six percent of the patients with thyroid malignancy underwent completion of total thyroidectomy after histopathology report. All the patients were monitored closely in the ward for earlier detection and prompt management of the postoperative complications. Surgical site infection was recorded in 4% and transient hypocalcemia in 2% of the patients as in table 4.

Table 4: Postoperative complications with management

Postoperative complication	%age	Management
Surgical site infection	4	Wound opened, culture/sensitivity and dressings
Transient hypocalcemia	2	Calcium and vitamin D
Recurrent laryngeal nerve palsy	2	Conservative

All the patients who underwent total or complication of total thyroidectomy for thyroid malignancy were referred to the Oncology Department for further management after required workup. No death was recorded. Hospital stay ranged from 4-7 with the mean of 4.5 days.

DISCUSSION

The solitary nodule of the thyroid gland is rather a common endocrine disease with the incidence of 4-7% and most of them are benign. The solitary cold nodule of the thyroid gland remains a diagnostic challenge because of a higher risk of malignancy than multiple nodules. The malignancy in the solitary cold nodule of the thyroid gland ranges from 10-35%¹². Because of this reason, surgeons tend to treat them with high degree of suspicion and plan treatment in a systematic manner.

Radionuclide scan has been the mainstay in the evaluation of the solitary cold nodule of the thyroid gland since 1939 when Hamilton and Soley demonstrated that malignant thyroid tissue concentrates less radioactive iodine than the normal thyroid tissue. Fine needle aspiration cytology (FNA) is an accurate and cost effective to differentiate the malignant from benign solitary cold nodule of the thyroid gland^{1,2,9}.

The main concern of solitary cold nodule of the thyroid gland lies in excluding the malignancy and to operate on as few patients as possible. The optimal evaluation and management are still controversial.

The solitary cold nodule of the thyroid gland is a common clinical entity that occurs more commonly in females. In the study, age ranged from 13-58 with the mean of 34 ± 9 years and 92% of the patients were female

which is in comparison with the study conducted by Akhtar N, et al¹³ where the age range was from 13-63 with the mean of 33.45 ± 6.32 years and 76.6% of the patients were female.

Lobectomy plus isthmusectomy is the mainstay to treat the solitary cold nodule of the thyroid gland. In the series, lobectomy plus isthmusectomy was performed in 94% and total or complication of total thyroidectomy in 10% of the patients which compares with the study conducted by Bhuyar SA, et al¹⁴ where 88% underwent lobectomy plus isthmusectomy and total thyroidectomy in 12% of the patients.

Papillary and follicular carcinomas comprise the vast majority (90%) of all the thyroid malignancies. In the study, the overall malignancy in the solitary cold nodule of the thyroid gland was 10%. Papillary carcinoma was the most common thyroid malignancy with the contribution of 8% followed by follicular carcinoma 2% which is in near resemblance with the study carried out by Shashikala V, et al¹⁵ where the overall malignancy in the solitary cold nodule of the thyroid gland was 12.5% with the papillary carcinoma 11.3% and follicular carcinoma 1.2%.

Morbidity and mortality are the part and parcel of the surgical management. In the series, the morbidity rate was 8% with no mortality which is in comparison with the study conducted by Rahman MM, et al¹⁶ where the morbidity rate was 12% without mortality.

CONCLUSION

The solitary cold nodule of the thyroid gland is more common in the females of reproductive age. Lobectomy plus isthmusectomy is the treatment of choice for benign lesions and total thyroidectomy for malignant lesions in the management of the solitary cold nodule of the thyroid gland. Indications for surgery are cosmetic effects, pressure symptoms, follicular neoplasm and malignancy. Papillary carcinoma is the most common malignancy in the solitary cold nodule of the thyroid gland. Poverty, lack of thyroid clinics and delay in definitive diagnosis need consideration.

Suggestions: Aggressive surgery may be regarded as an excessive treatment, so determining the nature of the solitary cold nodule of the thyroid gland is of utmost importance. Public awareness through media channels and seminars, establishment of thyroid clinics, competent pathologist especially for FNAC and frozen section facility in the operating rooms will definitely result in accurate

diagnosis and timely intervention to avoid the second surgery as well as oncological intervention. All these measures will ultimately reduce the morbidity to the minimum with no mortality and may play a part in decreasing the malignancy as well in the solitary cold nodule of the thyroid gland.

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