Clinico-Pathological Study of Nodular Goiter in Southern Part of Odisha- An Original Research

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ABSTRACT

BACKGROUND : Thyroid gland swelling are common cause of neck swelling. Incidence are more common in females in the younger age group. Swelling, hypothyroidisim and hyperthyrodisim are common complication which impacts the health status of an individual. Ultrasonography with the suspicious reason and FNAC of swelling are the mainstay of diagnosis. Thyroid nodules have reported to be found in 4 – 7% of the population on neck and in 30 – 40% of population by ultrasound. 50.5% of the solitary nodules which are felt on palpation and are actually a part of multinodular Goiter. The incidence of carcinoma has been reported as 5 -10%. The sensitivity and specificity of ultrasound and FANC are more significant by different study groups. Delayed diagnosis and post of complication increase the morbidity and mortality. Histopathological study is the gold standard for diagnosis. Anti thyroid treatment for hyperthyroidism and radio iodine therapy are needed for thyroid ablation. Nodular presentation of swelling are more suspicious. Hence, specific study is needed. **AIM :** To determine the clinicopathological features of nodular goiter and its management. **METHOD :** A prospective cohort study of 50% of thyroid swelling admitted for surgery from May 2017 to May 2022 was done after confirmed diagnosis with Ultrasonography and FNAC of swelling. Different age groups, and clinical features, histopathalogical studies and significance of FNAC and ultrasound were observed. **OBSERVATION :** Most common presentation was neck swelling in all cases with female preponderance (78%). Female : Male ratio was 3.6 : 1, mean age was 39.10 years, above 92% were euthyroid, Ultrasonography was done in all cases followed by FNAC. Colloid Nodular Goiter was found in 64% of cases following by Hashimoto's Thyroiditis. 88% cases were benign and 12% cases are suspicious. 4% of cases were found to be malignant among them papillary carcinoma was most common. Hemithyroidectomy was done in 44 cases followed by total Thyroidectomy in 2 cases. Post of Thyroxine supplementation and calcium was given to prevent hypothyroidism and hypocalcemia. Recurrent swelling were found in one case of papillary carcinoma. **CONCLUSION:** Most common presentation was anterior swelling of neck during the

period of 3rd & 4th decade of life with female preponderance. Majority of patients had solitary thyroid nodule with benign pathology (88%), and rest were malignant (12%). The sensitivity and specificivity of FANC were 88.23% and 100% respectively. The sensitivity and specificity of ultrosonography of thyroid were 93.75% and 81.48% respectively. It also highlights the significance of FNAC, ultrosonography and serological markers like thyroglobulin and its antibodies. Histopathology is the goal standard for management. Early diagnosis of thyroid cancer and improvement of socio-economical conditions can prevent the complication of thyroid swelling.

Key Words : SNG (Solitary Nodular Goiter), MNG (Multiple Nodular Goiter), USG (Ultrasonography), FNAC (Fine Needle Aspiration Cytology)

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Introduction

Thyroid gland is an endocrine gland situated in the anterior side of neck. Its main function is regulation of basal metabolic rate, stimulates somatic and mental growth. Goiter is swelling of thyroid gland which may be solitary or multinodular variety.[1]. Dietary deficiency of Iodine, impairment of hormone synthesis increased iodine clearance from the kidney. Thyroid stimulating immunoglobulin, infection of thyroid gland autoimmune disease, malignancy of thyroid gland leads to case of thyroid swelling [2]. Initially the gland is euthyroid however with increasing in size patient may lead to hypothyroidism or hyperthyroidism [3] [4]. Work-up and diagnosis include elevation of thyroid function test, ultrasound and radioisotopic scanning demonstrate heterogenous thyroid substance. Nodules with poor uptake can present as lesions suspicious for malignancy [5]. Thyroid nodules have been reported to be found in 4 – 7% of the population on neck and in 30 to 40% of population by ultrasound. It has been observed that 50.5% of the solitary nodules which are felt on palpation and are actually a part of Multinodular Goiter[6]. The incidence of carcinoma has been reported as 5 to 10%. Therefore, Fine Needle Aspiration Cytology (FNAC) for diagnosis and resection for suspicious lesions should be considered[7]. Hyperthyroidism may be adequately controlled by antithyroid drugs. Radioactive iodine is reserved for elderly people and those not responding to antithyroid drugs[8]. Subtotal or total thyroidectomy may be performed depending on the involvement of thyroid gland and its pathology[9]. Most common pathologically variant is colloid goiter followed by follicular neoplasm and papillary carcinoma of thyroid[10]. Thyroiditis are also commonly found as a cause of nodular goiter. Most common thyroiditis is Hashimoto's thyroiditis managed medically. Tuberculosis, lymphoma are not uncommon[11]. Malignancy like medullary and anaplastic variant are rarely found. Metastasis to thyroid gland from distant primary source also cause swelling in the thyroid gland[12].

Large thyroid swelling and malignant variants present clinically with compressive symptoms and signs with respiratory distress. Retrosternal, accessory thyroid and ectopic thyroid gland which are confirmed by C.T. Scan of neck and chest[13]. Thyroid abscess though rare can present as thyroid nodular swelling which requires urgent intervention[14].

Aim and Objective

To determine the clinicopathological features of nodular goiter and its management.

Materials and Methods

A prospective cohort study of 50 patients were conducted in the department of general surgery, M.K.C.G. Medical College & Hospital, Brahmapur, Southern Odisha from

May 2017 to May 2022. The patients were diagnosed with thyroid swelling were admitted with detail history taking, clinical examination, investigations such as complete blood count, thyroid profile, FNAC, USG of neck, chest X-ray, and X-ray of neck, and indirect laryngoscopy. Radio isotope scanning of thyroid, C.T. Scan of neck and chest are done to exclude Toxic or not toxic nodule. Thyroid profile includes serum T_3, T_4, and TSH level are assessed preoperatively and post operatively. Thyroid hormone assessment within 1 month and every 6 months are done post operatively to know any thyroid complication. Serum thyroglobullin measurement provides important information about the presence or absence of residual, recurrent or metastatic diseases in patient with thyroid cancer. Normal serum thyroglobullin ranges from 3 to 30 ng/ml. whereas serum thyroglobullin more than 10 ng/ml in a thyrotic individual suggest any recurrent, residual or any malignancy[15]. Pre-operatively ultrosonography of thyroid includes Thyroid Imaging Reporting and Data system (TIRAD) is done. This utilize a systemic scoring system for reporting of thyroid nodules. It includes composition, echogenecity, shape, margin and echogenic. Each score from 0 to 3 consequently name as TR_1, TR_2, TR_3, TR_4 and TR_5 indicates benign, not suspicious, mild suspicious, moderately suspicious and highly suspicious respectively[16]. After surgery the patients were followed up for any complication and recurrence. Complication like recurrent laryngeal nerve injury, hypoparathyroidism, hypothyroidism and hyperthyroidism were followed and management subsequently. Repeatedly thyroid status, serum calcium and thyroglobullin were measured. The resected specimen after thyroidectomy were sent for histopathological examination and reports were recorded. Inclusion criteria were the patients of age more than 15 years with thyroid swelling admitted in surgery department. Exclusion criteria were pregnant women, patient less than 15 years. Statistical measures such as age distribution, common clinical presentation and its percentage and the thyroid status, sensitivity and specificity of FNAC test and USG of thyroid swelling were compared. P-value was deducted for statistical significance by Chi-square Test. Histopathological reports of different individuals were reported in percentage with the help of the Bethesda system which is widely accepted[17]. All the statistical analysis was done with the help of SPSS 22.

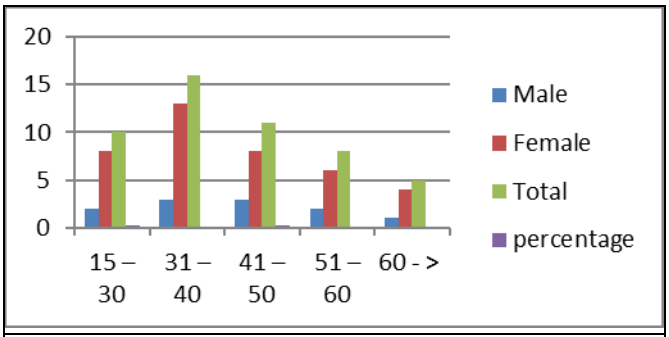
Results

In our study, among the fifty cases majority cases were in the 31 – 40 years of age group and 78% of cases were females (Table – 1) female male ratio 3.6 : 1. mean age calculated 35+ SD 4.1.

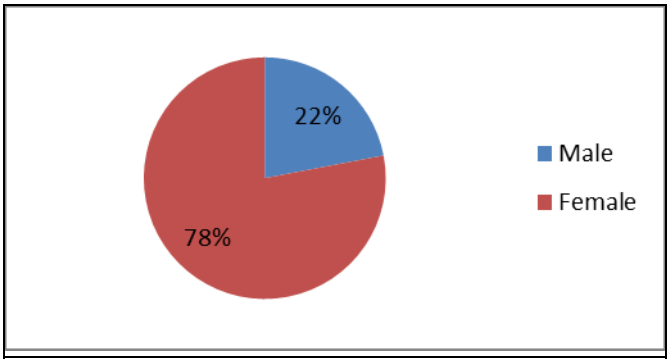
Age Distribution of Nodular Goiter

Age	Male	Female	Total	percentage
15 – 30	02	08	10	20%
31 – 40	03	13	16	16%
41 – 50	03	08	11	22%
51 – 60	02	06	08	16%
> 60	01	04	05	10%

Table 1: Age Distribution of Nodular Goiter



Graph 1

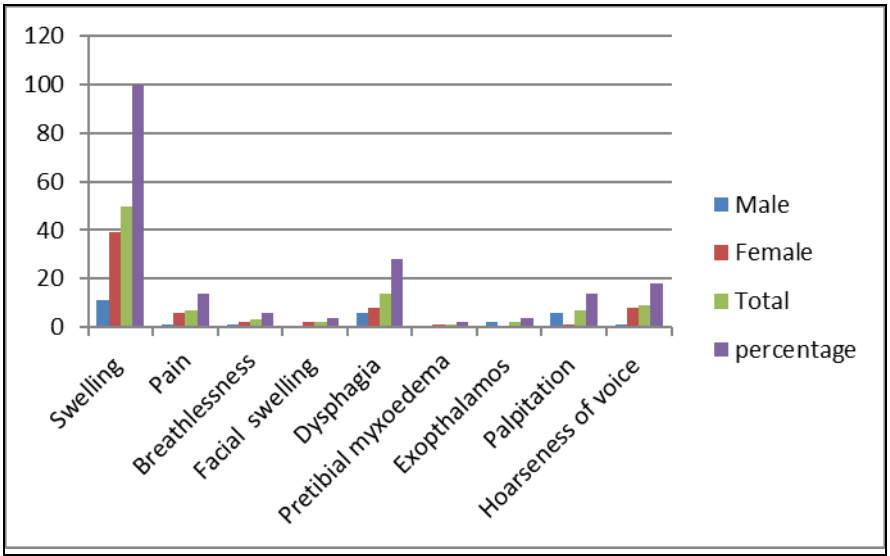


Graph 2

Table 2: Various Clinical Presentation

Symptoms and sign	Male	Female	Total	percentage
Swelling	11	39	50	100
Pain	01	06.	07	14
Breathlessness	01	02	03	6
Facial swelling	00	02	02	4
Dysphagia	06	08	14	28
Pretibial myxoedema	00	01	01	2
Exopthalamos	02	00	02	4
Palpitation	06	01	07	14
Hoarseness of voice	01	08	09	18

Table 2: Various Clinical Presentation



Graph 2

The presenting complain was a swelling in the anterior aspect of neck in all cases studied.

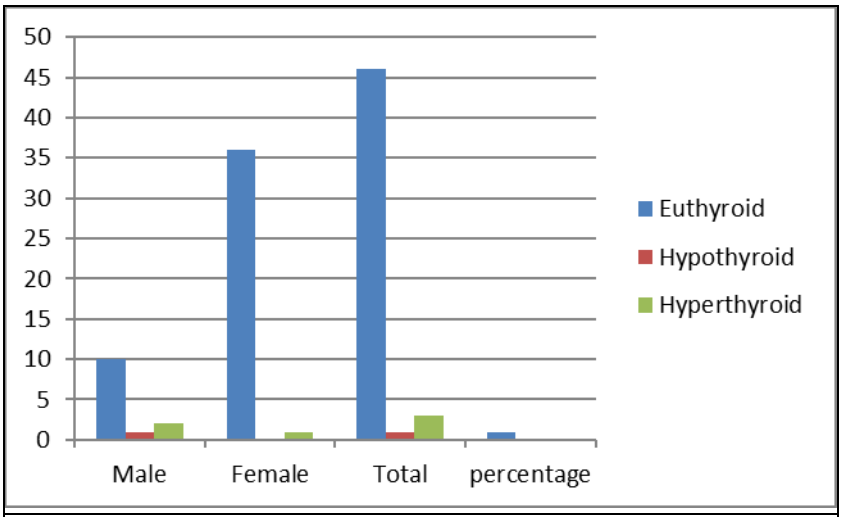
Picture – A : neck swelling

Picture – B : neck swelling

THYROID STATUS

Status	Male	Female	Total	percentage
Euthyroid	10	36	46	92%
Hypothyroid	01	00	01	2%
Hyperthyroid	02	01	03	6%

Table 3: Thyroid Status



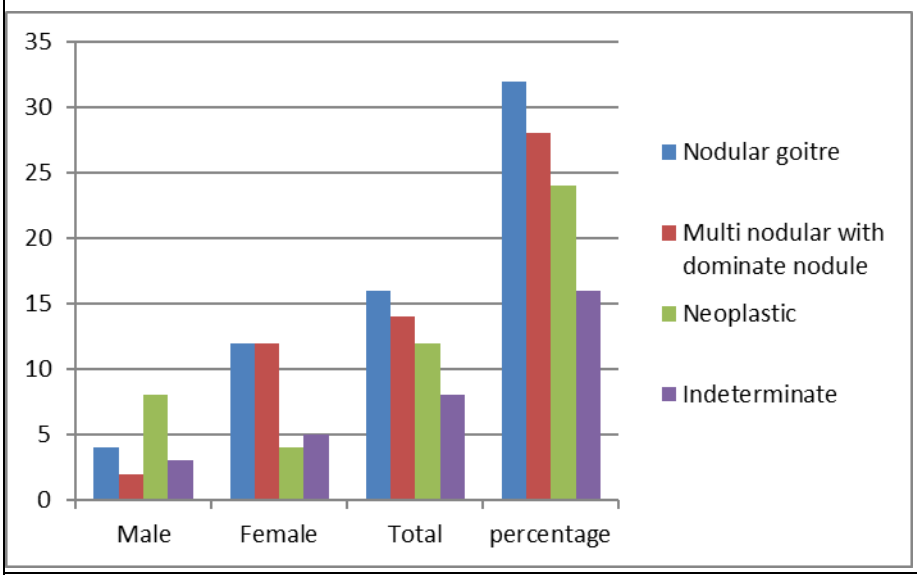
Graph 3

92% were Euthyroid, 6% were hyperthyroid and 2% were Hypothyroid preoperatively. RIA was done in two cases with hyperthyroid where one case of toxic nodule was found.

Ultrasonography of Thyroid

Status	Male	Female	Total	percentage
Nodular goitre	4	12	16	32
Multi nodular with dominate nodule	2	12	14	28
Neoplastic	8	4	12	24
Indeterminate	3	5	8	16

Table 4: Ultrasonography of Thyroid



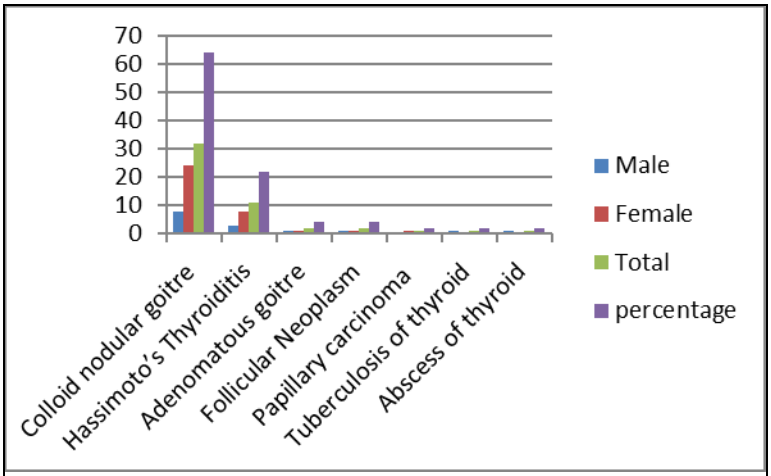
Graph 4

Nodular goiter 32% and multi nodular with dominate nodule was found in 28% cases, highly and moderately suspicious as Neoplastic found in 24% and 16% respectively.

FNAC REPORTS

Pathology	Male	Female	Total	percentage
Colloid nodular goitre	08	24	32	64
Hassimoto's Thyroiditis	03	08	11	22
Adenomatous goitre	01	01	02	4
Follicular Neoplasm	01	01	02	4
Papillary carcinoma	00	01	01	2
Tuberculosis of thyroid	01	00	01	2
Abscess of thyroid	01	00	01	2

Table 5: FNAC Reports



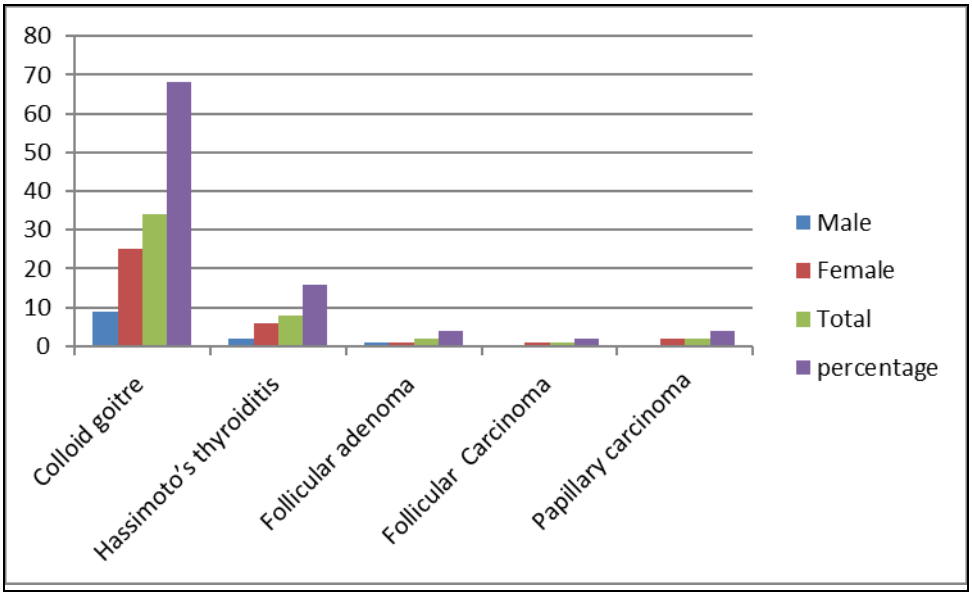
Graph 5

The FNAC reports of the 64% cases showed nodular colloid goiter as the most common finding followed Hashimoto's throiditis 22%. Follicular neoplasm 2% and papillary carcinoma 2% were reported. One case of TB of thyroid is found and was treated with ATT for 6 months whereas another case of abscess was found which was treated with incision and drainage with proper antibiotic.

Histopathological Report in Resected Specimen

HP Report	Male	Female	Total	percentage
Colloid goitre	09	25	34	68
Hassimoto's thyroiditis	02	06	08	16
Follicular adenoma	01	01	02	4
Follicular Carcinoma	00	01	01	2
Papillary carcinoma	00	02	02	4

Table 6: Histopathological Report in Resected Specimen



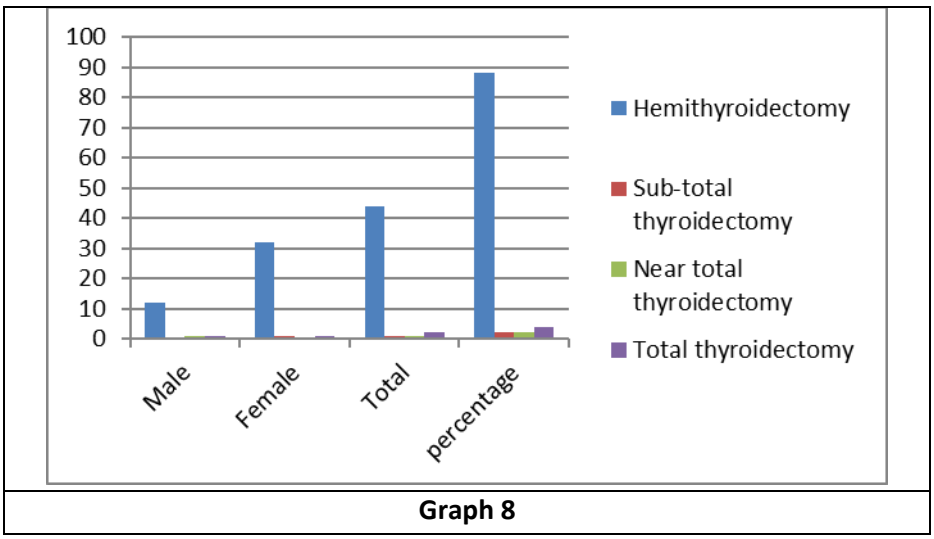
Graph 6

The HPC reports of 68% of cases were colloid nodular goiter and 16% had features of suggestive of Hashimoto's thyroiditis. There was one case of foliicular carcinoma and two case of papillary carcinoma.

Types of Surgery

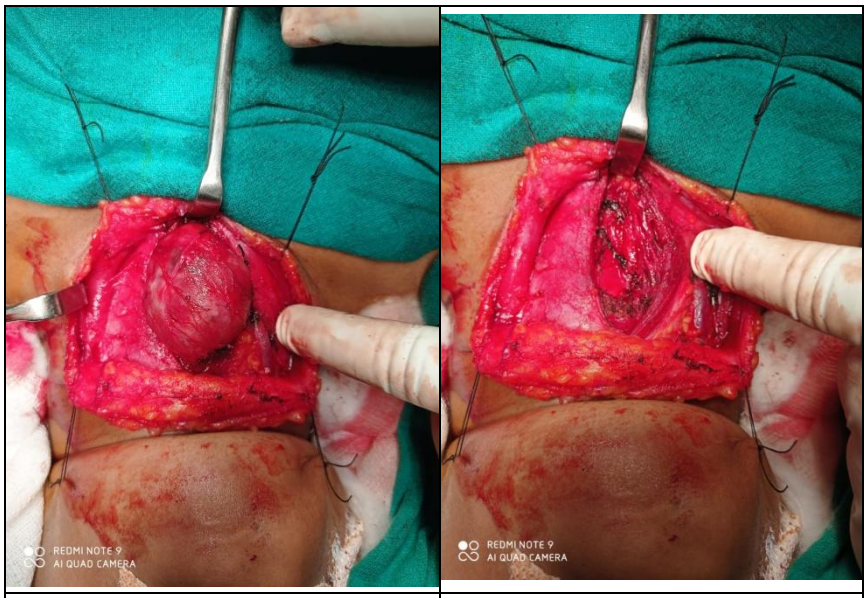
Surgery	Male	Female	Total	percentage
Hemithyroidectomy	12	32	44	88
Sub-total thyroidectomy	0	1	1	2
Near total thyroidectomy	01	00	01	2
Total thyroidectomy	1	1	2	4

Table 7: Types of Surgery



Graph 8

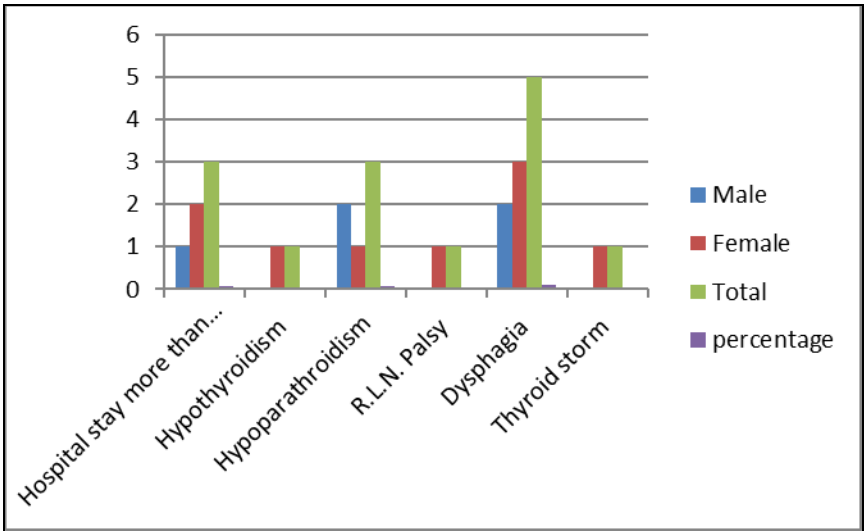
2 cases were not posted for surgery due to, thyrotoxicosis and another for TB as per the FNAC report. And rest were operated.



Picture– C : Intra op finding of Thyroid nodule	Picture : D – After hemithyroidectomy

Complication	Male	Female	Total	percentage
Hospital stay more than 10 days	01	02	03	6%
Hypothyroidism	00	01	01	2%
Hypoparathroidism	02	01	03	6%
R.L.N. Palsy	00	01	01	2%
Dysphagia	02	03	05	10%
Thyroid storm	00	01	01	2%

Table 8: Post Operative Complication



Graph 9

The average Post operative stay among 50 cases was 5.4 days and 76% of the cases were discharged between 4th & 6th post operative day. The most common complication occurred are

dysphagia 10%, Hypoparathrodism 6%, Hypothroidism 2%, R.L.N. Palsy 02% and Thyrodi storm occurred in one case

Picture – E : Subcuticular stitches for better wound healing

Post Operative Follow-Up

Parameters	<15 days	13 – 30 days	1 to 12 month	12 month to 5 year
Facial palsy	1	1	Recovered	Normal
Serum Calcium (decrease)	1	0	2	00
Thyroglobullin (increase)	0	0	2	3
T_3, T_4 (increase)	0	0	1	1
T_3, T_4 (decrease)	0	0	1	1

Table 9: Post Operative Follow-Up

Facial palsy seen in one case but recovered within one year. One case was found with recurrent swelling and thyroglobullin assessment was done in three cases it was increased upto Five years. Recurrent Papillary carcinoma after two years were found, there was prolonged hypothyroidism in one case and hyperthyroidism in one case were found and subsequent thyroxin and anti thyroid drugs were given for treatment . Serum calcium level decreased with 15 days in one case, and hypocalcemia found till one year in two cases those were treated with calcium supplementation.

Discussion

In this study 42 patients diagnosed in Multi Nodular Goiter (MNG) and 8 patients diagnosed as Solitary Nodular without any evidence of Malignancy were evaluated in terms of History taking

and clinical examination. Relevant investigations were performed and surgery was undergone after FNAC & the HPC of the specimen was done. The results were collected, compelled and analyzed. In our studies 74% cases were females, majority of cases were in the 31 – 40 age group followed by the age group of 41 – 50 years and female : male is 3.6 : 1. That is compared to the results of Jamudio at.al.[18] which showed 89% incidence in female and in the age group 31 – 40 years.

The mean age of incidence was 39.10 years and they present as anterior neck swelling in all cases. But as per Patel S et.al[19]. mean age was 40.82 years and mostly female 86% with female male ratio 6.14 : 1. Pressure symptoms were present in 28% of cases which is comparable to the study of Rios et.al[20] who had result of 28.5% of cases presenting which pressure symptoms.

The FNAC report showed that nodular colloid goiter 64% as the most common pathology followed by Hashimoto's, thyroiditis in 22% of cases. Follicular neoplasm found in 2 cases and Papillary carcinoma in one case. So total thyroidectomy were performed in those cases. All the cases with Euthyroid were taken up for surgery. 88% cases underwent Hemithyroidectomy, 4% cases underwent total thyroidectomy and 2% cases underwent sub-total thyroidectomy. As per compared to Choudhary et. al.[21] benign thyroid diseases were 68% cases, malignant in 6% and probale benign in 16% cases. In our study benign cases 86%, malignant 12% and probable benign 12%.

Ultrasound thyroid in our studies shows colloid nodular 32%, multinodular 28%, Neoplastic 24%. It shows sensitivity and specificivity 93.75% and 81.48% respectively. As compared to Santosh et.al[22] sensitivity 97.44% and specificivity 45.48% and PPV 86.36%.

Comparative Pathological Study

Lesions	Benign (%)	Malignant (%)
Nagori et.al[23]	79%	11%
Kirshnan et.al.[24]	83.7%	15.3%
Khadilkar et.al.[25]	79%	21%
Tsegeye and Ergete et.al.[26]	79%	21%
Patel S et.al[19]	77%	23%
present study	88%	12%

In our study 88% cases were benign and 12% are malignant which is comparable with Krishnan et.al[24]. which had shown benign thyroid disease 83.7% and malignant 15.3% respectively with P-value 0.003 which significant

SENSITIVITY & SPECIFICITY OF FNAC

	Sensitivity	Specificivity	PPV	NPV
Crusick et.al.[27]	76	58	72	64
Kessler et.al.[28]	79	98.5	98.7	76.6
Gupta et.al.[29]	80	86.6	86.6	80
Present study	88.23	100	100	90

In our present study FNAC showed sensitivity 88.23%, specificivity 100%, PPV 100% and NPV 90% respectively. which is compared to Gupta et.al[29] which had sensitivity 80%, specificity 86.6%, PPV 86.6% and NPV 80% respectively with P-value 0.001 which is significant.

Sensitivity and Specificity Of Ultrasonography of Thyroid

	Sensitivity	Specificity	PPV	NPV
Santosh et.al[22]	97.44%	45.48%	86.36%	83.33%
Shukla et.al[30]	88.9%	98%	88.9%	98%
Present study	93.75%	81.48%	80.95%	58.82%

In the present study the sensitivity and specificity of Ultrasound of Thyroid are 93.75%, 81.48%, PPV 80.95% and NPV 58.82% respectively, which was comparable to Shukla et.al.[30] which had shown sensitivity 88.9%, Specificity 98%, PPV 88.9% and NPV 98% respectively with P-value 0.005 which is significant.

Conclusion

Most common presentation was anterior swelling of neck during the period of 3rd & 4th decade of life with female preponderance. Majority of patients had solitary thyroid nodule with benign pathology (88%), and rest were malignant (12%). The sensitivity and specificivity of FANC were 88.23% and 100% respectively. The sensitivity and specificity of ultrosonography of thyroid were 93.75% and 81.48% respectively. Among the benign diseases colloid goiter was most common followed by Hashimoto's Thyroiditis and among malignant disease papillary carcinoma was the most common. The nature of thyroid nodule should be described based upon history, clinical examination, ultrosonography features, best with TIRAD System and FNAC. It also highlights the significance of FNAC, ultrosonography and serological markers like thyroglobulin and its antibodies. Histopathology is the goal standard for management. Early diagnosis of thyroid cancer and improvement of socio-economical conditions can prevent the complication of thyroid swelling.

The authors declare no conflict of interest regarding publication of this article.

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