Clinical Approach to Management of Solitary Thyroid Nodule, A Concrete Plan in 42 Patients, in a Tertiary Centre

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ABSTRACT

Introduction: A discrete swelling in an otherwise impalpable thyroid gland is termed as solitary thyroid nodule. The chances of malignancy are more in a solitary nodule than in a multinodular goitre. The diseases is more common in women than in men. We have made a concrete clinical plan so that malignancy is not missed during treatment of solitary thyroid nodule.

Materials and methods: Study Site: This hospital based prospective observational study was performed in 42 patients in Surgery Department in SGT Medical College, SGT University, Budhera, Gurugram. Detailed history and focussed clinical examination and investigations like thyroid function tests, thyroid scintiscan, USG, FNAC, other investigations for fitness for surgery and histopathology were done.

Results: On the basis of investigations, diagnosis of hot toxic nodule, warm toxic nodule, cysts, follicular adenoma, colloid goitre and malignancy was made. As per our streamline approach, we treated some patients conservatively, in others hemi thyroidectomy, total thyroidectomy or total thyroidectomy with modified radical neck dissection was carried out.

Disscussion: Because of our streamline approach, we could detect malignancy in two patients of cysts and follicular adenoma each. Clinically it may look very simple to treat a solitary thyroid nodule, but we feel that without a streamline approach, malignancy could be missed. Because of our concrete plan, all our patients are faring well.

Keywords: Solitary, Thyroid, Nodule, Scintiscan, Hemi-Thyroidectomy, Histopathology, Malignancy

INTRODUCTION

A discrete swelling in an otherwise impalpable thyroid gland is termed as solitary thyroid nodule.[1] Current definition of solitary thyroid nodule is, a discrete lesion / nodule within the thyroid gland that is palpably and/or radiologically distinct from surrounding thyroid parenchyma in an otherwise normal thyroid gland.[2] It may also be considered as a cluster of nodules of nontoxic goitre usually of size from 1 cm to 4 cm, but at times much larger. In about 50% to 60% patients, the process is generalized with subclinical nodularity seen in the affected lobe or in the other lobe.[3] It is most common thyroid surgical disease. The true solitary nodule are not uncommon. Though 80% of solitary nodules are benign and about 20% are malignant, but the chances of malignancy are more than in a multinodular goitre. The incidence of palpable thyroid nodules is about 55%.[4] The diseases is more common in women (about 6%) than in men (about 1%). About 30% of solitary thyroid nodules are cystic. Patient presents with localised swelling in the neck. Swelling moves with deglutition. The commonest site of the swelling is junction of isthmus with one or other lateral lobes. If there is haemorrhage in the swelling there is increase in size and pain. Swelling is usually smooth and soft, margins are also regular. But if there is malignancy then these features are disturbed. If the nature of the swelling is benign adenoma then the swelling feels firm. The main causes of solitary thyroid nodules are as follows: a) Thyroid adenomas, b) Malignancy, of which papillary carcinoma is most common, c) colloid goitre d) Cysts, e) hot toxic or warm toxic nodules. For both the patient and the treating physician, primary concern is whether the nodule is benign or malignant. Our main concern is that if the swelling is malignant, it should not be missed. We will find some cysts which may be malignant, some nodules which are thyroid adenoma on fine needle aspiration cytology, may really be malignant. Hence a meticulous planning is required so that, if nodule is malignant, it is known to us clearly. Hence we have made a concrete clinical approach for treatment of solitary thyroid nodule. We applied this plan in 42 cases. Because of this clinical approach, malignancy could not be missed. Reference standard of our study was final histopathology report. Present study was done to access the clinical approach to management of solitary thyroid nodule, a concrete plan in a series of 42 cases.

MATERIAL AND METHODS

The Hospital based prospective observational study was performed in Surgery Department in SGT Medical College, SGT University, Budhera, Gurugram, Haryana, over a period of 2 years and 3 months from September 2016 to December 2018.

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Selection of Subjects (Cases): A total of 42 patients were studied. Informed consent was taken for examination and investigations, giving due respect to maintain the patient's privacy and keep them comfortable.

Ethical Considerations: The Institutional Ethics Committee's approval for Research on Human Subjects was taken. Throughout the study, strict ethical norms were maintained. Written informed consent was taken from patient in their local language (mother tongue).

Methodology: The patients were taken from outpatient department and emergency department of General surgery. A detailed history and focussed clinical examination was done. Special care was taken to check for cervical lymph nodes, compressive symptoms and voice problems. Investigations done were thyroid function tests. If T3 and T4 were high and TSH was low in those cases thyroid scintiscan was done. Thyroid scintiscan was not routinely done as it is not sensitive and specific for malignancy.[5,6] It was advised when TSH was low, which indicated the possibility of a hot or warm nodule. Thyroid ultrasound was done in all cases. Information gathered were like this. Whether the echotexture is solid, cystic or mixed. Other non-palpable nodules are present or not. Cervical lymph nodes are seen. Whether the nodule is having hypo-echoic texture or marked hypo-echoic texture and irregular margins. Whether the nodule is taller than wider. Whether micro-calcification is present. Extra thyroid extension, if any was noted. USG is very useful but it cannot tell us about the underlying pathology. Though ultrasound has high sensitivity but it cannot differentiate between benign and malignant nodule.[7,8] Fine needle aspiration cytology was done in all the cases. It is in fact, the investigation of choice. It was done like this. A 22 gauge needle was mounted on 20ml syringe, nodule was immobilized by fixing between fingers and thumb, needle inserted, piston syringe retracted, needle moved back and forth, material fixed by air drying, stained with giemsa, pap stain. FNAC reports were classified into 6 groups, based on Bethesda system. Non diagnostic, benign, atypia of undetermined significance, follicular neoplasm, suspicious malignancy and malignancy. The limitation of fine needle aspiration cytology is that, it cannot differentiate between a follicular adenoma or carcinoma for which histopathology is the answer. FNAC can accurately differentiate colloid nodules, thyroiditis, medullary carcinoma, anaplastic carcinoma, papillary carcinoma and lymphoma.[3] FNAC is very cheap and has high accuracy.[9,10] Investigations like Hb, BT, CT, TLC, DLC, Platelet Count, Blood Sugar, Blood Urea, Serum creatinine, HCV, HIV, HBs Ag, X-Ray Chest PA view and ECG were done for fitness for anaesthesia purpose. If investigations revealed a cyst, it was aspirated. The aspirated material was sent for cytology examination. If the cyst recurred, again aspiration was done up to a maximum of 3 times. If any time during this working the cytology of aspiration fluid revealed malignancy or cyst recurred even after 3 times of aspiration, then total thyroidectomy. If on workup of solitary thyroid nodule, the cause found was colloid goitre, and the size was < 3cm, they were kept under observation. Patients were evaluated every 3 months for 12 months. Patients were advised, that if there was any increase in size of swelling they should report back. In patients of colloid goitre with size > 3 cm, hemi thyroidectomy was done. The patients who turned out to be thyroid adenoma, in them hemi thyroidectomy was done. In patients who turned out to be toxic adenoma, as the size was bigger, hence hemi thyroidectomy was done. In patients who turned out to be malignant, it was checked whether cervical lymph nodes were involved or note. If cervical lymph were not involved, total thyroidectomy was done. Where cervical lymph nodes were also involved, total thyroidectomy with modified radical neck dissection was done. Complete excised specimen was sent for histopathology examination. Final histopathology report was our reference standard.

STATISTICAL ANALYSIS

The data were collected properly, and entries were made, and statistical analysis was carried out using simple mathematical expressions like, percentage. The data was subjected to appropriate statistical test wherever applicable.

RESULTS

In our study there were 33 (78.57%) female patients (Figures 1 to 4) and 9 (21.43%) male patients. The ratio of female to male patients is 3.67:1.00 (Table 1). Right side (22 patients, 52.38%) was little more involved than left side (16 patients, 38.09%) (Figure 1 and 4). Isthmus (Figure 3) was involved in 4 (9.52%) patients Table 2. Compressive symptoms were

Figure-1: showing left solitary thyroid nodule; size 5 cm; **Figure-2:** showing large colloid nodul

Figure-3: showing solitary nodule at isthmus; **Figure-4:** showing left solitary thyroid nodule; size 4 cm

Sex	No. of Patients	Percentage %
Male	9	21.43%
Female	33	78.57%

Table-1 Showing Sex Distribution

Side	No. of Patients	Percentage %
Left	16	38.09%
Right	22	52.38%
Isthmus	4	9.52%

Table-2 Showing Involvement of Side

Clinical Characteristic	No. of Patients	Percentage %
Compressive Symptoms	2	4.76%
Voice Change	1	2.38%

Table-3: Showing Compressive Symptoms and Voice Change

Mobility	No. of Patients	Percentage %
Mobile	38	90.47%
Restricted Mobility	3	07.15%
Fixed	1	02.38%

Table-4: Showing Mobility of Nodule

Lymph Node Characteristic	No. of Patients	Percentage %
No Lymph Node	40	95.24%
Lymph Node Present	2	4.76%

Table-5: Showing Lymph Node Involvement

Echogenicity	No. of Patients	Percentage %
Hypo echogenicity	1	02.38%
Marked Hypo echogenicity	4	09.53%
Isoechoic Nodule	37	88.09%

Table-6: Showing Echogenicity of Nodules

Calcification	No. of Patients	Percentage %
Microcalcification	4	09.52%
No Calcification	38	90.48%

Table-7: Showing Calcification of Nodules

Composition	No. of Patients	Percentage %
Solid Lesion	4	09.52%
Mixed Lesion	29	69.05%
Cystic Lesion	9	21.43%

Table-8: Showing Composition of Nodules

Margins	No. of Patients	Percentage %
Irregular	4	09.52%
Well-circumscribed	38	90.48%

Table-9: Showing Margins of Nodules

Shape	No. of Patients	Percentage %
Taller Than Wide	4	09.52%
Wider Than Tall	38	90.48%

Table-10: Showing Shape of Nodules

Diagnosis	No. of patients	Percentage%
Toxic Adenoma	2	4.76%
Warm nodule	3	7.14%
Cysts	9	21.43%
Follicular Adenoma	10	23.81%
Colloid goitre	14	33.33%
Malignant	4	9.52%

Table-11: Results as per Thyroid function Test, Thyroid Scintiscan, USG and FNAC

Type of Operation	No. of Patients	Percentage %
Hemi Thyroidectomy	24	57.14%
Total Thyroidectomy	6	14.28%
Total Thyroidectomy With Modified Radical Neck Dissection	2	04.77%
Only Single Aspiration of Cysts, No Surgery	7	16.67%
Only Observation, for colloid Goitre < 3 cm	3	7.14%

Table-12: Showing Various Treatment Modalities

present in 2 (4.76%) patients and voice change was present in 1 (2.38%) patient (Table 3). In 38 (90.47%) patients, the solitary nodule was mobile, in 3 (07.15%) patients, the mobility was restricted. In 1 (2.38%) patient, the nodule was fixed (Table 4). The patients in whom, the mobility was restricted or nodule was fixed belonged to malignant categories. Cervical lymph nodes were palpable in 2 (04.76%) patients (Table 5). Ultrasonography findings were like this. In 37 (88.09%) patients, the nodules were isoechoic, in 1 (02.38%) patient it was hypo-echogenic, in 4 (09.53%) patient there was marked hypoechogenocity (Table 6). Micro calcification was present in 4 (09.52%) patients (Table 7). In 4 (09.52%) patients the nodules were solid, in 9 (21.43%) patients, they were cystic and in 29 (69.05%) patients, nodules were of mixed pattern, having solid and cystic components (Table 8). Margins were irregular in 4 (09.52%) patients and well circumscribed in 38 (90.48%) patients (Table 9). The nodules were taller than wide in 4 (09.52%) patients, wider than tall in 38 (90.48%) patients (Table 10). From the results of thyroid function test, thyroid scintiscan, USG and FNAC, we diagnosed our series like this. Toxic adenoma was in 2 (04.76%) patients. Here thyroid scintiscan revealed hot nodule and the rest of thyroid gland was supressed. In hot nodule the chances of malignancy are very less (<1%). In cold nodule the chances of malignancy are about 20%. Warm nodules was finding in 3 (07.14%) patients. In 9 (21.43%) patients, cyst was diagnosed. In all these patients, cysts were aspirated and cystic fluid was examined for cytology. In 7 patients after single aspirations cyst disappeared. Aspiration cytology of the fluid was benign. There was no recurrence of cysts. These patients were followed up only with due instructions to the patients. In one patient, cyst recurred even after 3 aspirations. This patient was subjected to hemi thyroidectomy as per our plan. This revealed malignancy.

Completion total thyroidectomy was done. In 1 patients, after aspiration, the cytology revealed malignancy. In this patients also, total thyroidectomy was done. Follicular adenoma was diagnosed in 10 (23.81%) patients. All these 10 patients were subjected to hemi thyroidectomy. On histopathology examination of excised specimen, in 2 patients malignancy was found. In these 2 patients revision total thyroidectomy was done. Colloid goitre was found in maximum number of patients, i.e. 14 (33.33%) patients (figure 2). In this study the size of colloid goitre in 3 patients was < 3 cm. These patients were kept under observation. These were followed up every 3 months for a period of 12 months. They were advised to report back, if there was any increase in size of the swelling. Malignancy was found in 4 (9.52%) patients (Table 11). We carried out hemi thyroidectomy in 24 (57.14%) patients, total thyroidectomy in 6 (14.28%) patients and total thyroidectomy with modified radical neck dissection in 2 (04.77%) patients, in 7 (16.67%) patients of cysts, single aspiration solved the problem and in 3 (7.14%) patients of colloid goitre of size < 3 cm, only observation was made, no surgery was carried out (Table 12).

DISSCUSSION

This was a hospital based prospective observational study. The study was performed in Surgery Department in SGT Medical College, SGT University, Budhera, Gurugram, Haryana, over a period of 2 years and 3 months from September 2016 to December 2018. A total of 42 patients were studied. Informed consent was taken for examination and investigations, giving due respect to maintain the patient's privacy and keep them comfortable. This study is an effort to execute our concrete plan of management of solitary thyroid nodule. For both the patient and the treating physician, primary concern is whether the nodule is benign or malignant. There are some guidelines which suggest higher chances of malignancy in a solitary thyroid nodule, e.g. nodule in a very young or very old age, history of short duration, nodule is hard without much calcification, restricted mobility and hoarseness of voice, clinically palpable cervical lymph nodes, history of previous head and neck irradiation and family history of thyroid cancer. Our main concern is that if the swelling is malignant, it should not be missed. For this we made a concrete plan of management of solitary thyroid nodule. The plan was based on pilot studies and standard protocols. Our concrete plan was like this. We had 2 patients of toxic adenoma each of size, about 4 cm. Patients were of younger ages, and in these 2 patients, we conducted hemi thyroidectomy. There are reports that Italian surgeon treat toxic adenomas with injection of ethanol in the nodule.[13,14,15,16] They have claimed good results, but this has not been universally accepted. We had 3 patients of warm nodules. In past, the trend was to give thyroid suppression therapy for warm nodules, but this trend could mask the well differentiated thyroid carcinomas which are hormone dependent. We performed surgery in these patients. Thyroid scintiscan was done to know the exact location of warm nodule i.e. anterior, posterior, upper or lower part and right or left lobe or both the lobes. In our study the warm nodules were unilateral and hemi thyroidectomy involving that side was done. By our meticulous plan for management of solitary nodules presenting as cysts, we could find malignancy in 2 patients of cysts. In 1 patient aspiration cytology revealed malignant cells and in 2nd patient, there was recurrence of cyst even after 3 aspiration. In both these patients malignancy was confirmed on histopathology. In our case the malignancy was in 22.22% patients. Usually approximately 15% of cysts are malignant.[2] We had 10 patients of follicular adenoma on FNAC. We straightway did hemi thyroidectomy in all these patients. We did not go for frozen sections, true cut biopsy and impression cytology, because they have their own demerits. Out of these 10 patients, on histopathology examination of hemi thyroidectomy specimen, in 2 patients malignancy was found, in these completion total thyroidectomy was done. All patients are doing well on follow ups. We had 14 patients of colloid goitre, in 3 patients, the size of goitre was < 3 cm. We observed these patients. In rest 11 patients, size was 4 cm or more, in these, hemi thyroidectomy was done. In our 4 patients, on FNAC, malignancy was found. In 2 of these patients cervical lymph nodes were palpable. We performed total thyroidectomy in all these 4 patients, along with modified radical neck dissection in patients where cervical lymph nodes were palpable. All the patients were followed up every 3 months for a period of 12 months. Our 9 patients were lost in follow up. 33 patients came for follow ups. All these 33 patients are doing very well on follow up.

CONCLUSION

Clinically it may look very simple to treat a solitary thyroid nodule, but we feel that without a streamline approach, malignancy could be missed. It was because of our concrete plan that we could find malignancy in 2 patients of cysts and 2 patients of thyroid follicular adenoma. Our all patients are faring well.

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