



ORIGINAL RESEARCH PAPER

Surgery

A STUDY OF FINE NEEDLE ASPIRATION CYTOLOGY VS. SQUASH CYTOLOGY IN DIAGNOSIS AND MANAGEMENT OF SOLITARY THYROID NODULE

KEY WORDS: Thyroid nodule, FNAC, USG

Dr. S. R. Kulkarni Professor and Head of the Dept of Surgery, KIMS, Karad

Dr. Agashe Harshwardhan Ballal * Resident, Dept of Surgery, KIMS, Karad *Corresponding Author

ABSTRACT

Nodular thyroid is a common clinical entity. The study to be discussed was undertaken to evaluate the diagnostic accuracy of FNAC of solitary thyroid nodules and by comparing with the gold standard histopathology and that of squash cytology where correlation was possible.

INTRODUCTION- BACKGROUND-

The diseases of thyroid form a major share of head and neck surgery. Clinical examination cannot reliably differentiate between a solitary thyroid nodule and a dominant nodule in a multinodular goiter. USG can determine whether thyroid nodules are solitary and can categorise them into solid, cystic and mixed. The scope of FNAC in selecting cases that require surgery and in providing preoperative morphologic diagnosis has gone a long way in selecting candidates who require surgery^[2]. Intraoperative squash or crush cytology is practised widely accepted sensitivity and specificity in neurosurgical practice.

Crush smears have been found superior to frozen section in terms of cytological evaluation and diagnosis. In surgical situations where repeated FNACs do not yield representative material intraoperative crush cytology is of great help in taking on-table decisions. This study has been undertaken to study the sensitivity and specificity of this potentially valuable technique.

METHODS-

A prospective analytical study was carried out on 60 patients of nodular thyroid swelling between 11-70 years age group referred for FNAC attending the surgery out-patient department in Krishna Hospital. Patients with non-nodular swelling and those who were unfit for surgery were excluded. The FNACs done using 22 or 25 gauge disposable needles without local anaesthesia were smeared and stained with May Grunwald Giemsa when possible and the alcohol fixed smears were stained with Haematoxylin and Eosin (H&E). Smears showing a minimum of six clusters of epithelial cells with more than 20 cells in each cluster were considered adequate. The FNAC results were interpreted as benign, malignant, suspicious or indeterminate. The term indeterminate was used for follicular neoplasms and suspicious thyroid neoplasm. The patients with a malignant or indeterminate cytological result were recommended to undergo surgery, whereas those with a benign diagnosis underwent surgery for rapid growth, local compression symptoms or for cosmetic reasons. In all 60 patients, the resected specimens were submitted for squash cytology.

About a half of apparently viable tissue is placed on the centre of a glass slide. A second labelled glass slide is placed over the first on top of the tissue fragment and sufficient is applied over the two slides with the tips of fingers to spread the tissue to produce two thin well spread smears. At least one slide is immediately fixed in 95% ethanol and stained with H&E stain. The second may be air dried and fixed with Diff Quick or

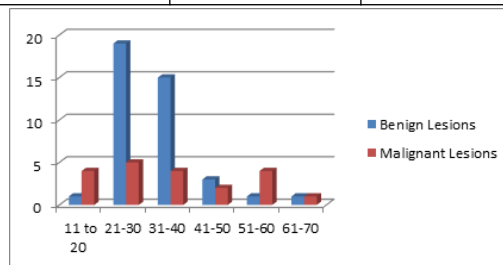
modified Rapid Giemsa stain. The squash smear diagnosis were classified as benign, malignant or deferred. Multiple such smears were examined to make a near possible diagnosis and diagnostic correlations were evaluated with histological diagnosis.

Ethical statement-The study met the standards outlined in the Declaration of Helsinki and Good Epidemiological practices. This study did not change or modify the laboratory or clinical parameters which were present.

Observations-

1. Distribution of cases as per the age:

Age (years)	Benign Lesions	Malignant Lesions
11-20	1	4
21-30	19	5
31-40	15	4
41-50	3	2
51-60	1	4
61-70	1	1
Total	40	20



2. Presenting complaints: All the patients came with complaints of swelling in the anterior aspect of neck.

3. Histopathological diagnosis of cytologically inadequate smears:

FNAC	Squash cytology	Histopathology	No. of Cases
Unsatisfactory	Adenomatous nodule	Adenomatous nodule	3

4. Cytological diagnoses:

Cytological Diagnosis	Number of cases
Thyroglossal cyst	2
Hashimoto's thyroiditis	2
Adenomatous nodule	26
Follicular neoplasm	6
Papillary Carcinoma	9
Suspicious Follicular Neoplasm	3

Suspicious Thyroid Neoplasm	9
Unsatisfactory	3
Total	60

Follicular neoplasms include both follicular adenomas (FA) and follicular carcinomas (FC) and no attempt was made to distinguish between the two entities cytologically.

The original FNAC results were classified as 'diagnostic' when the smears were classified into one of the diagnostic categories and as 'indeterminate' when a definite cytological diagnosis was not made (i.e. when a neoplasm could not be ruled out). The definition of indeterminate is based is on the fact that what determines the need for surgery is a diagnosis of neoplastic versus non-neoplastic lesion; the study that cannot be used to make this distinction. 12 out of the 60 FNACs were reported as indeterminate.

1. The squash correlation of the indeterminate cytology cases revealed 7 benign and 5 malignant.
2. The risk of malignancy in indeterminate lesions was 44%.

In 30 benign lesions of FNA cytology which was incorrect in 6 cases (19.3%). FNAC indicated a malignant lesion in 9 cases but final histological diagnosis was benign in 2 of those cases (22%). In 18 cases indeterminate diagnosis was made and definitive final histological assessment was malignant in 8 of these cases (44%). FNAC was unsatisfactory for diagnosis in 3 cases which were diagnosed benign by histopathological diagnosis. FNAC identified malignancies in 7 patients preoperatively (33.33% of total thyroid carcinomas).

DISCUSSION-

Clinical assessment for thyroid malignancy by means of physical examination, thyroid scan and USG is not completely reliable.

FNAC is cost-effective, safe, and accurate test in preoperative evaluation of thyroid nodules. It can be used to segregate cases of thyroid nodules into those that can be clinically followed up due to low probably of malignancy, from those requiring immediate surgical intervention. Adequate specimen is however necessary for its interpretation. An unsatisfactory result was obtained only in 5% cases in this series. It's positive predictive value for malignancy was 77% with two false positive results diagnosed as papillary carcinoma. It's negative predictive value was 80% in this series.

Squash cytology showed a positive predictive value of 94.11% , negative predictive value of 85.71% and an accuracy rate of 88.88%.

Malignancy was virtually diagnosed when both the above tests were concomitantly positive for malignancy, only associates with 6% false negative results accounted for by the small size of the tumours (all four specimens being of occult carcinoma).

In case of discordant results between the two tests where surgical decision making is difficult, Squash cytology is more reliable with 80% accuracy.

CONCLUSION-

FNAC is a reliable pre-operative test for the evaluation of thyroid nodular disease and helps to distinguish between malignant from benign lesions for the purpose of selecting lesions that need surgical intervention but intra-operative squash cytology is a more valuable procedure for confirming the cytological diagnosis and especially important in identifying malignancies in cases with an intermediate and unsatisfactory FNAC diagnosis.

Cell morphology is well maintained in squash cytology in comparison with frozen section in which freezing artefacts are observed. Quality of cytological evaluation is significantly

superior to frozen section. Moreover frozen section is expensive and also entails a delay of 10 minutes. With squash cytology as an intraoperative tool, unnecessary extensive thyroid surgery is avoided and the need for a completion thyroidectomy is considerably reduced.

Expertise, refinement and continuous practice of rapid cytological technique as squash cytology will solve most of the cases of intra-operative dilemma.

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