IS FROZEN SECTION OBSOLETE
Gayathri M. N1, Divya R. K2, Ramya M3, Bharathi M4

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ABSTRACT: Frozen section enjoys popularity among surgeons worldwide, as a preoperative investigation and is preferred over paraffin sections because of its less time consuming nature, cost-effectiveness and for immuno histochemistry. If through inspection of the specimen and selection of the most suspicious area during examination. Taking more than one sample would make frozen section diagnosis more accurate. Avoid areas of necrosis, hemorrhage, calcification, cystic areas and highly friable tissues prior fixation because they lead to technically poor preparation of slides and more probable sources of errors.

KEYWORDS: Frozen Section, Paraffin Section, Cryostat, Thyroid lesions.

INTRODUCTION: Frozen sections study is aimed at intra-operative diagnosis of thyroid lesions,(1,2) to correlate the accuracy of frozen sections finding with paraffin sections and to evaluate sensitivity, specificity, positive predictive value, negative predictive value and accuracy rate. It is an integral part of the proper management of the surgical cases.(3,4) It provides optimal parameters for the care of patients. This procedure serves the surgeon by providing diagnosis, extent of resection and also evidence of metastasis. Thus it helps in taking therapeutic decision.(5,6)

Even though Karnataka state is a non-endemic area for goiter, still in a referral hospital like Krishna Rajendra Hospital Mysore, we come across cases of goiter frequently. The majority being nodular goiter, less common are toxic goiter and carcinomas of thyroid. Some benign thyroid lesions which can be managed by a medical line of treatment are often treated surgically because they are clinically confused with a neoplastic process.

Following types of surgical procedures are usually carried for thyroid neoplasms.(7)

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lobectomy</td>
<td>Follicular Adenoma</td>
</tr>
<tr>
<td>Subtotal thyroidectomy</td>
<td>Minimally invasive follicular Carcinoma</td>
</tr>
<tr>
<td>Total thyroidectomy</td>
<td>Papillary carcinoma</td>
</tr>
<tr>
<td>Radical neck dissection</td>
<td>Medullary carcinoma</td>
</tr>
</tbody>
</table>

Many thyroid carcinomas remain small and inconspicuous and the surgeon’s desire to know the type of lesion at the time of surgery. Other conditions may produce a clinically apparent solitary nodule in the thyroid like a dominant nodule of nodular goiter or carcinoma thyroid. It is thus important to distinguish these three conditions and it is here that frozen section technique comes into the picture. It also minimizes the danger of implanting carcinoma in the operative field. It is an useful method for immediate diagnosis in surgical pathology. If intra-operative frozen section diagnosis is accurate the surgeon can be assured that the treatment rendered is optimum.
MATERIALS AND METHODS: This study was conducted in the department of pathology, Mysore Medical College and Research institute over a period of two years. During which 130 thyroid specimens were submitted for frozen section diagnosis. Appointment were given beforehand and registered along with clinical history, probable pre-operative diagnosis and previous FNAC reports if present. Clinical details were noted on a proforma. The cryostat apparatus was switched ON several hours prior to obtain operating temperature (-18 degree centigrade). The specimen was collected without delay in normal saline from the operation theatre and was brought to the cryostat room immediately.

EQUIPMENT: Cryostat instrument from Funeralia Company 2000, (Fig. 2). Optimal compound temperature (OCT) is used to fix the tissue on the chuck. Glass slides measuring 7.5x2.5x1 mm, labeled on one end with diamond pencil. 10% hot formalin for rapid fixation of tissue. Rapid haematoxylin and eosin stain is used. DPX as mounting media and special stains as and when required.

Excised thyroid tissues were examined thoroughly. Gross features noted and bits were taken from the suspicious sites, placed in fixative for 1-2 minutes. Bits are trimmed with a sharp scalpel, tissues were placed on the chuck with OCT compound and kept for freezing on the cryostat base. The cabinet was kept closed for tissue to freeze, adequacy of freezing was tested with probe.

The chuck was placed on holder, locked and aligned with that of knife. Antiroll plate positioned and 6-8 micrometer thickness sections were cut using slow and even motions. Sections were taken on the slides and stained with rapid haematoxylin and eosin. Frozen sections of the thyroid lesions were assessed. Hand written report forms were dispatched, as well communicated through telephone.

Subsequently more bits from other representative areas were fixed in 10% formalin and processed for paraffin sections. Findings were evaluated and correlated with cryostat section diagnosis.

STATISTICAL ANALYSIS: Data processing was performed by using the software packages, SPSS version 11 for windows. Data were expressed as means±SD. Statistical analysis performed using student’s paired t-test, Fisher’s exact tests and analysis of variance. The probability level of P <0.05 was set for statistical significance.

OBSERVATION: Among 130 cases 35 were neoplastic and 95 non-neoplastic lesions. The age of the patients were between 15 and 75 years, majority of them are in third and fourth decades and their distribution is as shown in the (Table 1 & 2), also shows female predominance. The ratio of female to male is 6:1. Majority of patients presents with history of swelling in front of the neck only two of them presented with hoarseness of voice and dysphagia.

Gross Features; the size of the biopsy varied, it ranged from 1–3cms, majority were grey tan two cases showed papillary excrescences. One case showed cystic and hemorrhagic areas. One case lymph node (Fig. 7) was sent.
Distribution of thyroid lesions based on frozen sections study is shown in the pie chart as well in the table (1 and 2). Follicular carcinoma is very difficult to diagnose intra-operatively because multiple areas have to be sampled it is a time consuming procedure. In the present study one case of medullary carcinoma has been reported, which showed spindle cells, round to oval hyperchromatic nuclei indistinct cell border dispersed against pink amorphous material (Fig. 8), congo red stain showed extensive area of brick red acellular material infiltrated by tumor cells. Other thyroid lesions are showed in Fig. 3 to 6. Diagnosis was confirmed on paraffin sections.

<table>
<thead>
<tr>
<th>Total No. of cases subjected to frozen sections</th>
<th>No. of Females</th>
<th>No. of Males</th>
</tr>
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<tbody>
<tr>
<td>130</td>
<td>111</td>
<td>19</td>
</tr>
</tbody>
</table>

Table 1: Sex distribution in thyroid lesions

<table>
<thead>
<tr>
<th>Age group</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 10</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11-21</td>
<td>3</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>21-30</td>
<td>5</td>
<td>42</td>
<td>47</td>
</tr>
<tr>
<td>31-40</td>
<td>4</td>
<td>43</td>
<td>47</td>
</tr>
<tr>
<td>41 -50</td>
<td>4</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>51-60</td>
<td>1</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>61-70</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>71-80</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19</strong></td>
<td><strong>111</strong></td>
<td><strong>130</strong></td>
</tr>
</tbody>
</table>

Table 2: Age and sex distribution of 130 patients
Fig. 3. FS Hashimoto’s thyroiditis showing dense lymphocytic infiltrate with general center and sheets of Hurthle cells (H & E Stain, X40).

Fig. 4. FS Hashimoto’s thyroiditis showing dense lymphocytic infiltrate with general center and sheets of Hurthle cells (H & E Stain, X10).

Fig. 5. FS; Follicular Adenoma showing capsule, neoplastic follicles (below) and compressed thyroid tissue above (H & E Stain X 10)
Fig. 6. Follicular Carcinoma-Thyroid

Fig. 7. FN: Lymphnode showing metastatic deposits of papillary carcinoma with Pautrier's body & calcification (H & E Stain X 4)

Fig. 8. FN: Medullary carcinoma thyroid Congo Red stain showing brick red amyloid deposits and tumor cells dehiscence. (Congo Red stain X10)
DISCUSSION: Thyroid lesions are the most common endocrine lesions. Study was conducted with interest and because of well-established Cryostat frozen section technique. According to Ackerman et al \(^{(8)}\) and Fazilet et al \(^{(9)}\) a definitive diagnosis of thyroid lesions by frozen sections was possible in a high percentage of instances. Sensitivity was 94.29\%, specificity 100\%, positive predictive value 100\% and negative predictive value was 99\%.

CONCLUSION: Thyroid disease prevalence made the surgical requirement for urgent intra-operative diagnosis. There is always a danger of unnecessary thyroidectomy with false positive clinical and cytological diagnosis. Therefore intra-operative cryostat section diagnosis is recommended as routine method for management of thyroid lesions. Periodic survey of cryostat sections diagnosis should be an integral part of the quality assurance programme and educate both pathologist and surgeons to improve the management which is the ultimate goal.

REFERENCES:
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