ORIGINAL ARTICLE

Correlation of Intra-Operative Frozen Section Consultation With the Final Diagnosis At a Tertiary Referral Center in Dhaka.

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Introduction

The correlation of intra-operative frozen section diagnosis with the final histopathological diagnosis on permanent sections should form an integral part of quality assurance activities in the surgical pathology laboratory. Few institutes in Bangladesh routinely practice frozen section diagnosis, thus there are very few studies or data available.

Intra-operative frozen section examination has great value as a diagnostic method and usually two categories of errors are responsible for the majority of disagreements, which are most commonly false negative.[1]

Internationally published studies have confirmed the over all accuracy of intra-operative frozen section examination.[2,4] A study sponsored by college of American pathologist showed a concordance rate of 98.58%. Of the discordant cases 67.8% were false-negative diagnosis.[5] In terms of turn around time, a large multi-centered study conducted by CAP showed that 90% of the frozen section were completed within 20 minutes.[6]

Apollo Hospitals Dhaka, is a tertiary referral 450 bedded hospital has been conducting frozen section for the last 6 years on routine basis. The number of frozen sections has been increasing gradually.

This study was done to determine the frozen section and routine section correlation, causes of discrepancies and turn around time for the cases done in a period of three and half years in this institute.

Materials and Method

During this study, epidemiological data and pathology slides of 176 cases of frozen sections reported at the histopathology department between 1st January 2008 and 31st May (2011) were reviewed.

Information regarding surgical pathology cases and epidemiological data were retrieved from Hospital Information System (HIS). Cases were categorized by tumor site, indications of frozen section, discordance and concordance status.

The frozen section specimen as per laboratory routine had been evaluated using rapid Hematoxylin and Eosion stains. Frozen sections were cut on a Sandon cryotome machine. Subsequently, for the permanent section, the specimen was fixed overnight in 10% buffered formalin, grossed and adequate representative sections were taken according to the standardized guidelines.

The number and type of discrepancies were compared including sampling and interpretation errors. We also checked the turn around time by reviewing the records of all cases.

Results

During the period of three and half years, 176 cases of frozen section were performed. It was among the 9441 surgical pathology cases.

The most common pathological processes encountered were verification and categorization of neoplasm, assessment of tumor margin, confirmation of tissue type and lymph nodes for metastasis. Among these 176 cases, 3 cases were found to be discordant (1.70%) (Table-1) and (Table-2)

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Table 1:
Frozen sections according to site, number, concordant and discordant cases.

Site	Number of cases	Discordant cases (%)	Concordant cases (%)
Ovary and adnexal mass	43	0	43
Breast	42	01	41
Thyroid	18	01	17
Head and neck (oral cavity, tongue larynx, ear, nose, nasopharynx)	15	01	14
Kidney	12	00	12
Surgical margin	10	00	10
CNS (Central Nervous System)	09	00	09
Soft tissue	05	00	05
Ganglion cell	04	00	04
Lymph node	04	00	04
Bone	03	00	03
Stomach	03	00	03
Ureter	03	00	03
Para-thyroid	03	00	03
Testis	01	00	01
Endometrium	01	00	01
Total	176	03 (1.70%)	173 (98.3%)

Table-2:
Number and percent of discordant cases according to site

Site	Number of cases	Discordant cases (%)
Breast	42	01 (2.38%)
Head neck	15	01 (6.66%)
Thyroid	18	01 (5.55%)
Total	75	03 (4%)

Almost all the cases were reported within 20 minutes (turn around time). The sensitivity of frozen section as a diagnostic test was 98.85% and the positive predictive value was 98.42%.

Discussion

The accuracy of frozen section diagnosis at the histopathology department of Apollo Hospitals Dhaka is comparable to international quality control statistics for frozen section. The discord tant frequency in our study was 1.7% and the concordant rate was 98.3%. As per CAP study,the discordant rate in different laboratories has been in a range of 1% to 5%.[7,8] Results from other countries like UK show accuracy of 97.4% [9], Japan 96%[10]and China 92.6%.[11]

The first discordant case was from head neck region tumor. In frozen section we have reported the tumor as spindle cell tumor (Fig1a), which was latter, proved to be embryonal rhadomyosarcoma in routine sections.

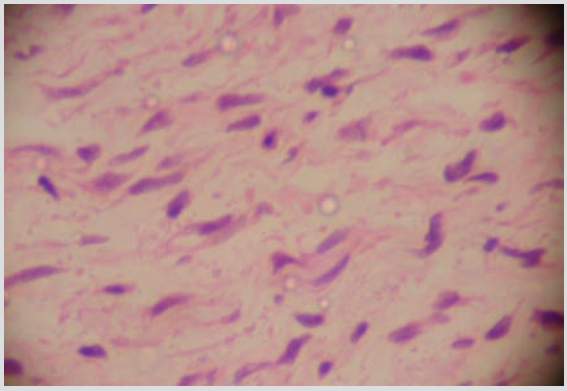

Figure 1(a): Frozen section show proliferated area of bland spindle shaped cells.

Embryonal rhabdomyosarcoma is composed of round to spindle cells with hyperchromatic nuclei and larger rhabdomyoblasts with eosinophilic cytoplasm (Fig1b). The spindle cell variant, characterized by spindle cells in fascicular to storiform growth pattern can be deceptively bland and difficult to categorize as malignant [12] which happened in this case. Therefore, in this case, the reason for discrepancy was interpretative.

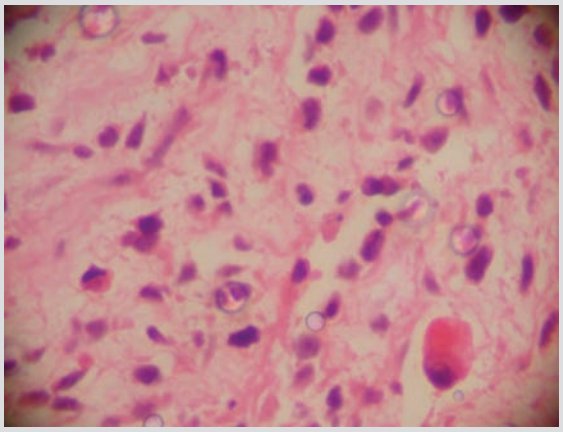

Figure 1(b): Permanent section shows embryonal rhabdomyosarcoma composed of anaplastic round to spindle shaped cells with rhabdomyoblast

The second discordant case was invasive lobular carcinoma of breast, which we failed to confirm as unequivocally as malignant in frozen section. Lobular carcinoma of breast is composed of uniform, round, small to medium sized cells with round and normochromic nuclei expanding the lobules and infiltrating the surrounding stroma as single cell or Indian file pattern accompanied by fibrosis and lymphocytes which may mask the picture of malignancy.[3] Moreover, if sampling is not done adequately, the infiltrating component can be missing. Due to lack of cellular atypia, necrosis, atypical mitosis and improper sampling area, the discrepancy resulted. In this case, both interpretative and sampling error was responsible for the discrepancy. The third discordant case was from thyroid. In frozen section, it was reported as positive for malignancy. The tumor was composed of mostly hurthle cells with moderate pleomorphism arranged in follicles associated with tumor giant cells. After taking more routine sections from frozen remnants, it shows a well capsulated (2 cm in diameter) hurthle cell neoplasm associated with areas of Hashimoto's thyroiditis and reported as hurthle cell tumour in benign spectrum. The criteria for malignancy in hurthle cell neoplasm is larger size (>4 cm), capsular and vascular invasion which was absent in this case. In this case, the discrepancy is also both interpretative and sampling.

The average turn around time of frozen section diagnosis in our center was within 15-20 minutes. Almost all the cases, were reported in less than 20 minutes which is comparable with other western studies.[6]

Correlation between frozen section and routine section diagnosis is an important quality parameter for any surgical pathology laboratory. In addition, long tern monitoring of frozen - permanent section correlation improves performance. The overall error rates and turn around time of our institute are within the range of international standard. However, improving more accurate interpretation, careful sampling and better communication with clinician can reduce the rate more.

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