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DIAGNOSTIC ACCURACY OF FROZEN SECTION IN CORRELATION WITH ROUTINE HISTOPATHOLOGICAL DIAGNOSIS –AN INSTITUTIONAL EXPERIENCE

Pathology

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ABSTRACT

In frozen technique, fresh tissue is rapidly frozen, and the tissues become firm owing to ice acting as embedding medium. Thus, sections are produced without the use of dehydrating solution, clearing agent or wax embedding. Intra-operative frozen section plays an important role in the management of surgical patients and yet it must be used prudently to avoid the indiscriminate usage of this important technique. The surgeon may want to know if the margins of his resection for a malignant neoplasm are clear before closing, or an unexpected disease process may be found and require a definite diagnosis to decide what to do next, or it may be necessary to determine if the appropriate tissue has been obtained for further workup of a disease process. This can be accomplished through use of a FS. The limitations FS can be poor sampling of tissue, artefact when compared with routine tissue processing.

KEYWORDS

Frozen section, Cryostat, Routine histopathological diagnosis.

INTRODUCTION

Frozen section technique was first used by William H Welch from John Hopkins Hospital in 1891 for intra-operative consultation. The frozen section procedure is a pathological laboratory procedure to perform rapid microscopic analysis of a specimen (1, 2). Intra-operative consultation by frozen section technique plays an important role in the immediate diagnosis and management of surgical patients. The technical name for this procedure is cryosection.

MATERIALS AND METHODS

Frozen section of 47 cases from (October 2015 to November 2017) received from Surgical Departments for intra-operative consultations were studied. Fresh tissue was sent in a clean plastic container without any fixative or saline (to avoid fixation artifacts / degenerative changes) along with requisition form with complete clinical details from the operation theatre. Indication of frozen section was recorded. Tissue specimens sent for frozen section were frozen and cut by Leica cryostat machine. Sections were cut at a thickness of 4-5µ and the sections were fixed on glass slides and stained by rapid Hematoxylin and Eosin (3, 4). The remaining tissues were fixed in 10% formalin, processed, embedded in paraffin and stained with H&E (4). Frozen section diagnosis was made by consensus of 2 pathologists, including one senior pathologist in correlation with appropriate clinical details (5, 6). It was immediately conveyed to the operating surgeon through intercom.

RESULTS

Frozen section was performed on 47 cases, and its diagnosis was compared with final conventional histopathology diagnosis in terms of qualitative morphology, diagnostic accuracy and limitations. Histopathological diagnosis of forty-seven cases included neoplastic lesions (34%) and non-neoplastic lesions (66%). While diagnostic accuracy of frozen section was 96.2% (44/47 cases) when compared with permanent section, 3/47 cases (6.38%) were discordant with false negative diagnoses.

Table 1 Comparison of frozen and final diagnosis in false negative cases:

Site(No. of cases)	Frozen diagnosis	Final diagnosis
Bone	Fibrous dysplasia	Osteoid osteoma
Skin	Benign adnexal proliferating trichilemmal cyst	Malignant proliferating trichilemmal cyst
PNS	Paraganglioma	Small round cell tumor

Out of 47 cases most of cases were from CNS 16/47 cases (34.04%), followed by from ovary 10/47 cases (21.28%), from bone 5/47 cases (10.64%), each 4 cases from thyroid and PNS 4/47 cases (8.51%), each 3 cases from uterus and skin 3/47 cases (6.38%) and 2 cases from other organs 2/47 (4.26%). Out of 47 cases benign condition constituting of 31/47 cases (65.96%) and malignancies 16/47 cases (34.04%).

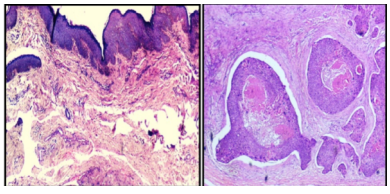

Figure 1 Malignant proliferating trichilemmal tumour of Skin with islands of tumour cells arranged in lobular and diffuse pattern Which is given as benign adnexal proliferating trichilemmal cyst.

DISCUSSION

Frozen sectioning is a multistep process involving from the surgical resection to intra-operative preparation of slides and their microscopic examination, communicating frozen section diagnoses to surgeon and processing the remaining tissue for further workup. Quality of prepared sections during cryostat sectioning plays an important role in frozen section diagnoses.

Technical issues leading to alteration in cytological or architectural features necessary for establishing accurate diagnoses during processing of frozen sectioning may pose difficulty (5). However, use of frozen section with limitations in mind make it a highly sensitive and specific technique playing critical role in management of patients (7).

The most common indication for frozen section in the present study was to determine presence/typing of neoplasm to rule out malignancy (34%). Presence/typing of neoplasms are important to operating surgeon, as this will decide the type of operative procedure or further sampling.

Limitations of FS need to be taken into consideration when requesting for this procedure, in order to avoid grave mistakes that will be detrimental to the patient's management. These limitations can be poor sampling of tissue / limitation of the surgeons that will lead to major discordance of the diagnosis.

Table 2 Comparative studies of Concordance and Discordance rate in frozen section:

Studies	Study Period (year)	Number of Cases	Concordance Rate %	Discordance Rate%
Shrestha S et al., (1)	5	404	94.6	5.4
Patil P et al., (8)	2	100	96.9	3.1
Ahmad Z et al., (9)	1	342	97.1	2.9
Khoo JJ et al., (10)	4	215	97.5	2.5
Present study	2	47	93.6	6.38

Intra-operative frozen section diagnosis is a valuable, reliable and rapid diagnostic tool. It has a high specificity and is highly efficacious procedure. The intra-operative consultation using frozen section is a very useful but one needs to be aware of its indication and limitations.

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