

Letters to the Editor

Frozen section experience

Sir,

Frozen section is a critical procedure that plays a major role in therapeutic design. It is a decision making procedure that is required by a surgeon and performed by a qualified pathologist. Frozen section has a wide range of therapeutic implications. Its indications are variable, from obtaining therapeutic decisions at one side, to providing tissue for ancillary study on another side. Other important indications are such things as tissue identification, check margins of resection, determination of the extent of the disease and type of operation. Therefore it requires a highly qualified pathologist to give the right consultation at a critical time. Considering the importance of this useful diagnostic technique, we carried out a retrospective analysis of 274 frozen section cases in a time frame of approximately 3.5 years to compare and match the frozen section diagnosis with the permanent diagnosis for determining the accuracy of this vital technique. Overall 55% of total cases such as 151/274 were benign lesions and 45% such as 123/274 were malignant. The highest frequency of frozen section requests were obtained for the breast 96 cases (35%), 34 cases benign and 62 cases malignant, followed by thyroid 47 cases (17%), 40 cases benign and 7 cases malignant and lymph nodes 33 cases (11%), 15 cases benign and 18 cases malignant. The rest of the organs were small in frequency, for example ovary 27 cases (10%), 15 cases benign, 14 cases malignant, colon 14 cases (5%), 12 cases benign, 2 cases malignant, abdomen 5 cases (2%), 2 cases benign, 3 cases malignant, cervix 5 cases (2%), 2 benign, 3 malignant, brain 5 cases, 2%, 2 benign, 3 malignant, skin 4 cases (2%), 2 benign, 2 malignant, gastric biopsy 4 cases (2%), 2 benign, 2 malignant, spine 4 cases (2%), 2 benign, 2 malignant, parathyroid 4 cases (2%), all benign, uterus 5 cases (2%), 3 benign, 2 malignant, gallbladder 3 cases (1%), 1 benign, 2 malignant, small bowel 3 cases (1%), 2 benign, 1 malignant and among the very rare organs examined are 2 ear biopsy, 2 parotid, 2 placenta, 2 liver, 2 lung, 2 pancreas, one testes, one muscle and one vaginal biopsy. The cases were analyzed to categorize them into accurate diagnoses where the frozen section diagnosis exactly matched the permanent diagnosis; they were determined to be false positive where the lesion was diagnosed positive or malignant on frozen sections but was disagreed on permanent sections, and false negative where the lesion is missed or diagnosed as benign on frozen sections and turned out to be malignant on permanent sections. Cases were completely deferred where the final diagnosis on frozen was deferred until permanent sections were

obtained, and they were partially deferred where a preliminary diagnosis was given at frozen section and the final diagnosis was awaited until the permanent sections. The discrepant cases were classified as those having false positive or false negative cases. We found 4 false negative (1.45%) and no false positive cases. Cases which were deferred during the frozen sections were either completely deferred (2 cases = 0.72%, 1 thyroid and 1 lymph node) or partially deferred. In partially deferred cases, a preliminary diagnosis was given but final assessment was awaited until the permanent sections were examined. There were 30 cases (11%) which were partially deferred. Among these deferred cases, there were 14 thyroid cases (13 partially deferred and 1 completely deferred), 10 breast cases (all 10 partially deferred), 1 ovary case only (partially deferred) and 7 lymph node cases (6 partially deferred, 1 completely deferred). Of the 4 false negative cases, accounting for 1.45% of total frozen sections, each case was individually analyzed and all the slides were re-examined. The first case was soft tissue from the left side of neck, no previous biopsy or fine needle aspiration was available. The frozen section diagnosis was spindle cell tumor, suggestive of benign nerve sheath tumor. However, the permanent section showed pleomorphic spindle cell tumor with fascicular and nodular pattern, with slightly pleomorphic nuclei, and scattered mitosis with abnormal forms. The immunohistochemistry was very helpful in this case, with tumor cells staining positive for vimentin, actin, and negative for neuronal markers. The 2nd false negative case was from the skin. The frozen section diagnosis was wart and the permanent frozen section showed invasion of the dermis by malignant squamous cells. The diagnosis was missed on frozen section as the sections were not deep enough to show invasion of the dermis by malignant cells. The 3rd false negative case was from the stomach, which was signet ring carcinoma that was overlooked at frozen section and interpreted as lymphohistiocytic infiltrate. The problem of missing signet ring cell carcinoma on frozen section biopsies is well documented,¹⁻² as it is very difficult to appreciate the cell membranes of signet ring cells after they have been subjected to rapid freezing. In order to solve this problem in the future, all suspicious cases must undergo rapid alcian blue staining for 2 minutes, which helps in appreciating mucin in the malignant cells.⁴ The 4th false negative case was diagnosed as multinodular goiter on frozen section. However, examination of the permanent sections revealed follicular variant of papillary carcinoma in small foci, in addition to multinodular goiter. In this case the malignancy was missed mainly because of improper sampling. This negative result accounted for 2% of the false negative rate in thyroid (1/47) and it is slightly higher than

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those reported in the literature which ranges between 0.2-2%.³

If we look at the accuracy rate of the frozen section for individual organs, we find that the accuracy rate is variable, from 98%-100% with a mean rate of 100%. These high accuracy rates in our experience at King AbdulAziz University hospital demonstrate the value of frozen section as an accurate and useful diagnostic tool. There were no false positive cases and the false negative cases (4 cases, 1.45%) were within an acceptable range. When we evaluated the deferred cases, a majority of them were found in thyroid and lymph nodes, for example 24% and 3%. These percentages seem to be acceptable when compared to those within the literature.¹⁻² All of the deferred cases of thyroid were follicular lesions with areas suspicious for invasion, limiting the pathologist to give a preliminary diagnosis of follicular lesion and to confirm the final diagnosis on permanent sections. The deferred cases of the lymph nodes were also having a serious suspicion of lymphoma, which

is a justifiable reason for deferring the diagnosis until the permanent sections.

References

1. Silva EG, Balfour-Kraemer B. Intraoperative pathologic diagnosis frozen section and other techniques. Baltimore USA: William and Wilkins; 1987.
2. Silva EG, Bastakis JG. The role of the pathologist in frozen section. Short course of international Academy of Pathology Inc. Anderson Hospital and Tumor Institute, Houston. 1985-1987.
3. Nakazawa H, Rosen P, Lane N, Letters R. Frozen section experience in 3000 cases: Accuracy, limitations and value in Residency Training. Am J Clin Path 1968; 49: 41-51.
4. Rosai J. Ackerman's Surgical Pathology. St Louis: Mosby 1998; 1: 620-630.

Fadwa J. Al-Taf
Ibrahim Mansoor
King AbdulAziz University Hospital
Jeddah
Kingdom of Saudi Arabia