## **Frozen section procedure**

## Accuracy of intraoperative pathology consultations

Accuracy of intraoperative pathologic diagnosis (IPD) can be increased by:

• providing the pathologist with information regarding: patient demographics, clinical history, imaging results, relevant previous pathologic diagnoses, and clinical impression

- larger specimen sizes when possible
- avoiding artifact created by excessive crushing or coagulation.

Intraoperative pathology diagnoses (IPD) should be considered preliminary. The final diagnosis differs from the IPD in approximately 3–10% of cases  $^{1(2)(3)}$ .

If the IPD does not correlate with the clinical impression, direct discussion with the pathologist may be advisable.

## Techniques for intraoperative tissue preparation

Touch preparation.

Smear preparation.

The frozen section procedure is a pathological laboratory procedure to perform rapid microscopic analysis of a specimen. It is used most often in oncological surgery.

The technical name for this procedure is cryosection.

The quality of the slides produced by frozen section is of lower quality than formalin fixed paraffin embedded tissue processing. While diagnosis can be rendered in many cases, fixed tissue processing is preferred in many conditions for more accurate diagnosis.

The intraoperative consultation is the name given to the whole intervention by the pathologist, which includes not only frozen section but also gross evaluation of the specimen, examination of cytology preparations taken on the specimen (e.g. touch imprints), and aliquoting of the specimen for special studies (e.g. molecular pathology techniques, flow cytometry). The report given by the pathologist is usually limited to a "benign" or "malignant" diagnosis, and communicated to the surgeon operating via intercom. When operating on a previously confirmed malignancy, the main purpose of the pathologist is to inform the surgeon if the surgical margin is clear of residual cancer, or if residual cancer is present at the surgical margin. The method of processing is usually done with the bread loafing technique. But margin controlled surgery (CCPDMA) can be performed using a variety of tissue cutting and mounting methods, including mohs surgery.

Prayson, retrospectively reviewed 424 consecutive meningioma cases (N = 310 females; mean age 57.3 years) to examine concordance between frozen section evaluation of meningioma subtype and grade as compared with the final diagnosis subtype and grade. A discrepancy between frozen section diagnosis and final diagnosis was observed in 114 (26.9%) of cases. Of the WHO grade I subtypes, the most common discrepancy involved transitional meningiomas (N = 31) which were most commonly diagnosed at frozen section as either fibrous (N = 18) or meningothelial (N = 13) meningiomas. None of the grade I tumors were diagnosed as higher grade lesions. Of the higher grade meningiomas (WHO grade II and III) (N = 145) reviewed, concordance between tumor type and grade was seen in only 26.2% of cases; most commonly, 73/98 atypical meningiomas were under-graded as some subtype of WHO grade I meningioma (71/73 cases). In conclusion, discrepancies at frozen section with respect to accurately identifying higher grade meningiomas and higher grade meningioma subtypes are common and are generally due to tumor sampling and heterogeneity <sup>4</sup>.

Intraoperative frozen section assessment, to confirm acquisition of pathological tissues, is used in stereotactic brain biopsy to minimise sampling errors. Limitations include the dependence on dedicated neuro-oncology pathologists and an increase in operative duration.

Thien et al. investigated the use of intraoperative fluorescein sodium, and compared it to frozen section assessment, for confirming pathological tissue samples in the stereotactic biopsy of gadolinium-contrast-enhancing brain lesions.

This prospective observational study consisted of 18 consecutive patients (12 men; median age, 63 years) who underwent stereotactic biopsy of gadolinium-contrast-enhancing brain lesions with intravenous fluorescein sodium administration. Twenty-three specimens were obtained and examined for the presence of fluorescence using a microscope with fluorescence visualisation capability. Positive and negative predictive values were calculated based on the fluorescence status of the biopsy samples with its corresponding intraoperative frozen section and definitive histopathological diagnosis.

Nineteen specimens (83%) were fluorescent and four (17%) were non-fluorescent. All 19 fluorescent specimens were confirmed to be lesional on intraoperative frozen section assessment and were suitable for histopathological diagnosis. Three of the non-fluorescent specimens were confirmed to be lesional on intraoperative frozen section assessment. One non-fluorescent specimen was non-diagnostic on frozen section and histological assessments. The positive predictive value was 100% and the negative predictive value was 25%.

Fluorescein sodium fluorescence is as accurate as frozen section assessment in confirming sampling of pathological tissue in the stereotactic biopsy of gadolinium-contrast-enhancing brain lesions. Fluorescein sodium fluorescence-guided stereotactic biopsy is a useful addition to the neurosurgical armamentarium <sup>5)</sup>.

## 1)

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