The Frozen Section- Important issues in Pediatric Surgical Pathology

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Frozen section (FS) and/or intraoperative consultations are powerful tools provided by Pathologists in the decision making process of surgical management. The procedure is a professional consultation that needs to be considered at the same level of complexity as any other consultation among physicians; since the time frame in which this consultation takes place is short, usually within 20 minutes, it is crucial that the consultant Pathologist be aware of the relevant clinical questions in the particular case. Requests for FS diagnosis in our Department are frequently done for CNS tumors, soft tissue tumors, and colon biopsies for leveling colostomy in Hirschsprung’s disease, and frequently to check for adequacy of specimen to determine if the material is appropriate for final diagnosis and other indications (see below). It is recommended that the FS be obtained with scalpel or other delicate means and not with electrocautery which may compromise the histology and “readability” of the tissue.

There are essential elements that would make the Pathologist adequately prepared to give the surgeon important information in the decision process of a surgical procedure. These include: 1. Clinical history. The Pathologist is in a better position to give relevant information when the clinical conditions and clinical questions are known. 2. Relevant radiological and image study results. 3. Communication with the surgeon. The surgical team is in the best situation to understand and know what questions need to be addressed before FS procedure is carried out. Knowing what the questions are, the Pathologist may also prepare a differential diagnosis based on the information available and also, if previous procedures were done, he or she may retrieve from the files and review previously obtained diagnostic material. The purpose is to have useful information to make correct decisions during the surgical procedure. By its own nature of being a highly selected sample and its limitations to apply current technology within the FS time frame, the purpose of the FS diagnosis is to help an immediate medical decision; it is subject to further refinement and change when all the facts of the case are gathered, usually when permanent sections are available for final diagnosis. The median FS major discordant diagnosis rate between permanent and FS diagnosis is 1.9% with a range of 1 to 3.7% according to the College of American Pathologists. The sample obviously needs to be representative of the lesion in question. A “deferred” diagnosis happens when the pathologist in charge of the consultation concludes that a FS diagnosis cannot be rendered for different reasons (sample limitations, artifacts, unacceptable uncertainty, etc). One typical example of having to defer a FS diagnosis is in classifying a non Hodgkin’s lymphoma based on an incisional biopsy of a lymph node. In these cases it is advisable to obtain diagnostic material to have optimal fixation of the tissue and samples for cell markers, cytogentetics and molecular studies (gene cell rearrangement for example).

Most experts in the field agree that there are very specific indications for a FS request. There is a very simple question that the surgeon should ask him/herself in deciding whether a frozen section should be done or not: Will the result of the frozen section examination influence in any way the surgical procedure? If the answer is no, the procedure is not indicated. If the FS is requested when the surgery is completed, it is not justified unless there may be a decision to return to surgery- a circumstance that occurs rarely, unless there is a surgical emergency.

Justifiable medical reasons to request a frozen section fall into one, two or all categories:
To establish the presence and nature of a lesion when this information is required for the surgical procedure (malignant versus benign, inflammatory versus neoplastic, extent of resection based on this information, need to sample other structures for staging purposes, etc).

To determine the adequacy of surgical margins (not only requiring microscopic examination but also macroscopic examination; i.e. opening of intestine or cutting a specimen to see if the lesion is in the tissue, etc).

To establish whether the tissue obtained contains diagnosable material (even if the exact diagnosis cannot be made on the frozen sample) or whether additional sampling is indicated.

Frequently FS diagnosis as a medical procedure is confused with Fresh specimen evaluation request. This happens when biopsies or specimens are sent “FRESH” (without fixative but moist in sterile saline) because they require special handling to perform special studies such as microbiological cultures, cytogenetics studies, biochemical analysis, and molecular studies based on DNA or RNA extraction, etc. The need to send a specimen fresh to the laboratory, therefore, is not synonymous of needing a frozen section diagnosis. The Pathologist needs to know why a specimen is sent fresh to determine the best handling of the tissue. Occasionally an intraoperative consultation is needed to examine a specimen in the O.R. for example to evaluate how far a tumor or lesion is from the resection margin without the need to do a FS. This is considered an “Immediate evaluation” which is necessary for a surgical or intraoperative therapeutic decision.

The FS is well known to be one step in the correct clinical management but it is not a substitute for any of the necessary clinical methods in the approach of medical problems. The need for a good medical history, physical exam, and thoughtful use of ancillary and diagnostic tests including radiology, image techniques and laboratory tests continues. Is through these methods that a clinician develops a sound differential diagnosis with a rational and best available evidence approach to a patient’s problems. It has been a good practice to indicate in the OR schedules the cases that will need intraoperative consultation and FS diagnosis.

To conclude, the following is extracted from Rosai’s introductory chapters in Ackerman Surgical Pathology: “By its very nature, surgical pathology depends heavily on the input of clinicians and surgeons who are fully aware of the potentials and limitations of the specialty. They should know that a microscopic diagnosis is a subjective evaluation that acquires full meaning only when the pathologist is fully cognizant of the essential clinical data, surgical findings, and type of surgery. A physician familiar with the case should ideally complete the requisition slip for pathologic study”. “A conversation between the surgeon and the pathologist the evening before a contemplated frozen section may facilitate matters for both the next morning.”

“Pathologists are physicians and human beings. They have as great a capacity for error and susceptibility to subjective distractions as other practitioners of the art of medicine. Because of certain nineteenth century dogmas and because the teaching of pathology used to be relegated primarily to the long-forgotten pre-clinical phase, pathologists traditionally have been regarded to be more scientific than many of their colleagues. A mystic perversion of this assumption prevails among those clinicians who believe that the pathologist, given only a piece of a patient's tissue, has all of the other ingredients necessary to produce a statement of absolute truth at the end of his report. More dangerous to mankind is a pathologist with the same concept. . . .

Incomplete communication between the clinician and pathologist may make diagnosis difficult or impossible. To perform intelligently, a consultant must know all the facts that have any bearing on the case. To render a diagnosis from an inherently puzzling bit of tissue with only vague knowledge of its source and no concept of the clinical problem is as fool-hardy as to undertake an appendectomy on the basis of hearsay evidence that the patient has a pain in his belly.”

Notes from the Histology Laboratory: A crucial step for a correct final interpretation of biopsy slides is to have adequate fixation of the specimens. It is important to remember that the formalin to specimen ratio should be at least 1:10 for adequate fixation. In other words one part corresponds to the tissue amount and at least ten parts (ideally 20) of formalin for appropriate fixation. If these conditions are not feasible please bring this problem to the attention of histology (ext 3827) in order to correct it as soon as possible. There is a set time that the tissue processor runs every day for optimal results. Always notify the Laboratory when a specimen is fresh or without any fixative.