**Reexamining Our Routines of Handing Surgical Tissue in the Operating Room**

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In this era of personalized cancer therapies, there has never been a more important value on the availability of high-quality tissue collection for our cancer patients. Current evidence with new biomarkers and gene arrays make it patently clear that our vocabulary of using a single cancer label (eg, breast cancer) based on the light microscopic diagnosis is actually outmoded!

We now know that within that light microscopic diagnosis is a very heterogeneous group of cancers when examined with genetic and molecular approaches. Furthermore, to provide the appropriate cancer treatment, we must calibrate our multidisciplinary treatment plan according to the risk of local recurrences and metastatic disease as reflected in the characteristics of the patients’ own cancer . . . which can vary from very low to very high. The single label based on light microscopic diagnosis and TNM staging criteria provide an initial formulation of metastatic risk, but we can increasingly get into an even more reliable prediction of metastatic risk for an individual patient based on biomarkers, at least for some cancers, such as breast, colorectal, and lung cancers as well as leukemias and lymphomas.

Thus, we are now in an epoch of “targeted cancer therapy,” which has dramatically improved results in cancer clinical trials because of the patient selection that limits the drug or biologic to those whose tumor is expressing the “target” and thus sparing many other patients the morbidity and cost of receiving an agent for which they will derive little or no benefit.

With the rising importance of obtaining molecular and genetic biomarker studies and the value they bring in clinical decision making for our cancer patients, we will need to reexamine our routines in the operating room. How much variability is there in the “warm ischemia time” of our tissues as they are removed from the operating room on Friday afternoon or on the day of the week? For example, what happens to tissues removed from the operating room on Friday afternoon or Saturday morning? Does it stay in formalin fixative longer than a tissue specimen that is processed on Monday morning? Does that make a difference?

It is now time for surgeons and pathologists to reevaluate all the traditions we have used for decades in handling the tissue specimens coming out of the operating room, their transportation to pathology, and how they are managed in pathology to get the most reliable information about the cancer, including at the molecular and genetic level. We know there is a great deal of variability in cold ischemia time, duration of fixation, and other factors that can alter DNA, RNA, and proteins in the specimen that can compromise our ability to examine molecular and genetic signatures from patient specimens. Clearly, there are many obstacles to making the required changes—cost of time and training for staff in the operating room and pathology, lack of extra time for surgeons and pathologists, insufficient reimbursement for the extra time and reagents needed to do more sophisticated pathological studies, barriers to integrating clinical and pathological information for research purposes because of privacy regulations, and insufficient resources to integrate the patient’s clinical status as a prerequisite to having a properly annotated specimen.

On the other hand, constructive and important changes are being made at both the national and the local level. The National Cancer Institute’s Office of Biorepositories and Biospecimen Research under the leadership of Dr Carolyn Compton has facilitated the widespread use of caTissue (NCI Center for Bioinformatics and Information Technology, Bethesda, MD) at many institutions to facilitate a standardized approach for collecting annotated biospecimens. At Johns Hopkins Medical Institution, we have
found caTissue to be useful and practical not only for cancer-related specimens but also for other types of tissues as well. The pilot studies they have funded will help us better understand how to have a consistent approach in the fixation process of surgical specimens coming from the operating room, and where variability may alter various types of biospecimen analyses. Also, the pilot phase starting up now to develop national biospecimen repositories is an essential ingredient in our cancer research efforts, especially for rare or uncommon cancers. Indeed, the rate of progress for Molecular Medicine, at least in regards to research in cancer diagnosis, treatment, and prevention, will be greatly facilitated by these important studies, as well as appropriate process changes in how we handle surgical specimens—in the operating room, in transporting, and in surgical pathology—as well enter this new era of “personalized medicine.”

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