

PARALLEL TISSUE COLLECTION AND PROCESSING FOR CLINICAL AND RESEARCH PRACTICE AT MAYO CLINIC: UTILIZING THE FROZEN SECTION LABORATORY PRACTICE

Susan Rogers, Thomas J. Sebo, M.D., Ph.D., Jolene Summer Bolster
 Department of Laboratory Medicine and Pathology, Division of Anatomic Pathology
 Mayo Clinic, Rochester, MN

Abstract

Introduction

The Tissue Request Acquisition Group (TRAG) was established in mid 2008. Its inception was due to the complex landscape of prospectively collecting thousands of research tissue specimens, while ensuring the integrity of clinical samples for accurate diagnosis. Research tissue collection would be performed in parallel within the unique clinical surgical pathology settings at Mayo Clinic. This abstract summarizes our experience with this process.

Methods

The TRAG composition includes pathologists, pathologists' assistants, laboratory supervisors, laboratory assistants, research coordinators, and a laboratory operations manager. Bimonthly meetings review all IRB approved protocols for tissue collection which will be funneled through Mayo's Frozen Section Laboratories (FSLs), Autopsy Laboratory (AL) and Gross Cutting Laboratory (GCL). TRAG review ensures that the tissue request conforms to the standards of research tissue as deemed by the IRB, Biospecimen Subcommittee, and federal regulations. TRAG approval results in a customized lab logistics plan. Protocol specific tissue templates seamlessly facilitate accurate tissue procurement, which does not interrupt the routine flow of tissue handling for diagnostic purposes. TRAG data, including number of IRB protocols, specimens requested, specimens collected, tissue type, turnaround time (TAT), and reasons for unfulfilled collections are housed in a laboratory database.

Results

At completion of 2009, the first full year of tracking data, there were 3,492 fulfilled collections for 38 protocols. At the conclusion of 2011, fulfilled collections increased to 4,684 for 82 protocols. Tissue types also increased from 43 to 60 in this same time period. In the last 2 years the top 10 tissue types have remained the same, but with varied rank.

Conclusions

We have built a streamlined, effective means of prospectively collecting human tissue for research without compromising diagnosis for our patients. The process has proven successful and has been expanded to include tissue acquisition from our Autopsy and Gross Cutting Laboratories as well.

Objectives

- Ensure research tissue procurement does not compromise diagnostic tissue
- Create efficient means for procuring tissue for research use
- Establish committee structure to review IRB approved protocols
- Initiate a single point of contact for investigators and study staff
- Create institutional awareness of tissue collection via the TRAG and FSL process
- Develop infrastructure for data collection and critical analysis to help improve future research collection

Methods

- Bi-Monthly meetings are held to discuss research tissue requests submitted to the TRAG via a web based tissue request form
- Logistical support is established for the acquisition of research tissue per protocol specifications using a customized lab logistics plan endorsed by the P.I.
- Research tissue is procured in the lab using a customized tissue template, processed and distributed to the researcher according to established logistics
- Database reports provide meaningful results to lab staff and study teams

Surgical Pathology Workflow- Rochester Methodist Hospital Frozen Section Lab (FSL)

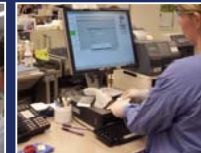
Photographs follow the process of evaluating a prostatectomy specimen for clinicopathologic diagnosis and research tissue collection



Clinical tissue is retrieved by FSL staff directly from any of the 41 OR suites which are located adjacent to the lab



Design of the lab fosters immediate and accurate communication between staff pathologist, tissue grossers, and cutting technicians



Tissue is accessioned and assigned a case number which does not change per subsequent part types submitted



Tissue is given to a certified Pathologists' Assistant, a Resident, or a Fellow for gross anatomic assessment



Tissue sections are placed on trays and given to a technician for the cutting of frozen sections



Technicians generating slides cut 10 µm thick sections using a freezing microtome (often under a minute per slide)



The frozen section slide is stained with Toluidine Blue O and is immediately assessed for microscopy by a staff pathologist and trainee



Microscopic images can be viewed by others in the FSL, including the surgical team, and via digital pathology for immediate feedback from any Mayo staff pathologist



Clinical tissue is then put up for permanent sections (FPPE) and H&E staining for additional pathologist review the following day



Tissue for research is sectioned at the same time by the grosser in a seamless & expeditious fashion and placed on a custom research template



Laboratory assistants process the tissue according to the logistics plan by snap freezing in liquid nitrogen or placing in a fixative/media designated by the P.I.



Pertinent data is entered into the database and includes the pathology case number in order to correlate data from the final pathology report

Results

- At the end of 2011, there were 82 active tissue collections managed by the FSLs in Rochester
- Research collections of tissue have steadily increased by an overall rate of 34% the last 3 years

Conclusions

- In 2009, a Research Coordinator was added to facilitate TRAG meetings and manage the day to day research administrative responsibilities
- Studies utilizing the same tissue type were referred back to their specific departmental disease oriented groups for the determination of collection priority

Acknowledgments

- Staff of Mayo Rochester's Frozen Section, Autopsy, and Gross Cutting Laboratories
- Past and present members of the TRAG

