

An Educational Overview: The Pathologists' Assistant's Role in Interdisciplinary Awareness Between Microbiology and Surgical Pathology

Izak Jensen

Abstract:

Pathologists' assistants (PAs) are highly trained healthcare professionals responsible for the gross examination and description of surgical specimens removed from patients during medical procedures. In addition to recognizing pathologic findings, they play a critical role in specimen handling and triage.¹ Surgical pathology collaborates with multiple laboratory departments including histology, flow cytometry, microbiology, and more. Pathologists' assistants require broad interdisciplinary awareness with knowledge of various laboratory workflows and specimen requirements as it is essential for recognizing potential issues, facilitating ancillary testing, and supporting accurate diagnostic outcomes.

Microbiology, the department responsible for the identification and analysis of potentially infectious microorganisms, frequently shares specimens with surgical pathology. Despite this overlap, important differences in specimen handling exist. One difference is the use of aseptic technique, a fundamental principle of microbiology that is generally not required in the surgical pathology workflow.

This educational overview examines both the similarities and pertinent distinctions between surgical pathology and microbiology, with the goal of fostering better understanding of microbiological workflows amongst PAs to ensure better patient care.

Background:

Historically, physicians attributed disease to spiritual or idiopathic causes. With advances in cellular and molecular biology, it is now understood that many disease processes arise from infections, environmental factors, genetic mutations, and inherited conditions.² In diagnostic laboratories many of these causes can be tested for. Many specimens suspicious for disease are sent to pathology to be macro- and microscopically examined. It is common that these specimens will have additional microbiological testing, as many pathologies arise from infectious microbes. Although separate departments today, surgical pathology and microbiology are closely entwined, and proper triaging of these specimens are essential to quality patient care as specimens may require vastly different conditions (i.e. fresh vs. fixed).³

Rationale and Hypothesis:

Pathologists' assistants routinely triage specimens within surgical pathology; however, exposure to microbiological principles and specimen requirements are often limited. An increased interdisciplinary awareness between microbiology and surgical pathology is valuable as inappropriate specimen handling can affect diagnostic testing, patient costs, and overall patient care.³ This educational overview was developed to highlight microbiological considerations in specimen triage by the surgical pathology laboratory; specifically, the PA.

Methodology:

This educational overview utilizes a combination of contemporary published textbooks and observational experience related to specimen triaging and excludes materials focusing on specific disease processes.

Findings:

Review of microbiology and surgical pathology materials demonstrated significant interdisciplinary overlap in specimen triaging. However, important differences in specimen handling and triage practices between the two departments remain and must be recognized to provide proper patient care. Considerations discussed are aseptic technique, testing priority and specimen conditions, the PA's role and the limitations of said role within microbiology-related specimen triage.

1 Aseptic Technique:

Arguably the most significant difference between surgical pathology and microbiology is the use of aseptic technique. While both laboratories utilize universal precautions to ensure workplace safety, aseptic technique protects not only laboratory personnel but the integrity of the specimen itself.

The term, aseptic technique, refers to the practice of preventing the introduction of microbes, from the environment or laboratory personnel, into a specimen during handling and processing. This ensures that any organisms recovered in a culture are truly those present in the patient specimen. Contamination can present a significant challenge, as it can be difficult to distinguish between microbes originating from the patient and those introduced during specimen collection or laboratory processing.



Example: A PA receives a fresh surgical specimen from the OR and opens the container to examine the tissue before recognizing that microbiology testing is required. The specimen is recapped and transported to microbiology for culture. The gram stain results show no organisms seen; however, after 18 hours of incubation, two tan-white colonies are seen on the blood agar and identified as *Staphylococcus epidermidis* by MALDI-TOF. No additional growth is observed on other media.

Since tissue obtained from a normally sterile surgical site is expected to be free of contaminating organisms, these findings must be reported by the medical lab scientist—even if it is likely to be a contaminant. Clinicians may interpret positive culture results as evidence of infection, even when clinical correlation is minimal or absent. If the organism were introduced during specimen handling, the subsequent results could lead to unnecessary diagnostic testing, treatment and increased costs to the patient.

2 Testing Priority and Specimen Conditions:

In microbiology, specimen triage is based on a priority system that ensures cerebrospinal fluid, sterile body fluids, surgical, and other STAT specimens are processed first. The remaining specimens are routine cultures which should be set up within 30-60 minutes upon arrival in the laboratory. When immediate processing is not possible, specimens may be refrigerated to slow microbial degradation and preserve organism viability.⁴

A similar concept exists in surgical pathology and is referred to as cold ischemic time.³ However, the focus of preservation remains different between the departments. Surgical pathology is primarily concerned with preserving tissue morphology and antigenicity by adding 10% buffered formalin as soon as possible, whereas microbiology seeks to culture as soon as possible to maintain microbial viability for accurate culture and identification.^{3,4}

Specimen conditions are vastly different between surgical pathology and microbiology. Microbiology specimens should not be placed in formalin or alcohol-based fixatives, as these substances destroy microorganisms.^{3,4} When a specimen requires evaluation by both microbiology and surgical pathology, it should be transported in a sterile container and kept moist with sterile saline.⁴ Microbiology testing should be done first to preserve organism viability and minimize contamination. Following microbiology processing, the specimen may then be transferred to surgical pathology for formalin fixation and gross examination.

3 The PA's role and Limitations:

The role of the PA in specimen triage is crucial, requiring a keen eye and a broad understanding of laboratory workflows. When a specimen is submitted fresh, the PA must first determine the reason it has not been fixed. Fresh submission may indicate the need for a frozen section, microbiologic culture, molecular testing, or other ancillary testing that must be performed prior to fixation. If the requisition does not dictate the reason for fresh submission, the PA should review the patient chart and laboratory orders to identify any pending ancillary testing requirements.³

The PA is not responsible for independently ordering microbiologic testing; however, they play a key role in ensuring that specimens with existing orders are recognized and promptly routed to the microbiology laboratory before surgical pathology manipulation occurs. Timely and appropriate specimen triage preserves organism viability, minimizes the risk of contamination, and helps provide optimal patient care.⁴



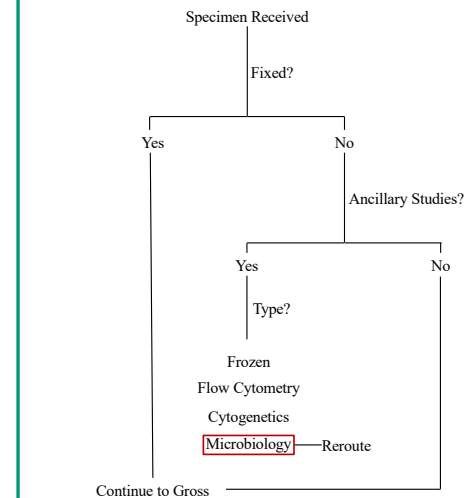
Discussion:

Never forget the basic microbiological principles while triaging by becoming a microbiology FAN.

Fast
Aseptic technique
No formalin

By identifying the need for microbiological testing and rerouting the specimen **fast**, performing **aseptic technique** (observing the sample under a BSC or not uncapping), and ensuring the specimen does **not get put in formalin**. The patient will be more likely to receive optimal care without unnecessary charges and additional testing.

Simplified Sample of PA Triage



Conclusion:

As integral members of the surgical pathology laboratory, PAs will encounter specimens requiring appropriate triage considerations and preparations. Educational familiarity of microbiological principles relevant to specimen triage may strengthen interdisciplinary collaboration, support laboratory workflow and ultimately benefit patient care. Insufficient knowledge may result in compromised diagnostic outcomes, repeat specimen collections, and increased financial and physical burden to the patient.

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