The Need for Pathology: A Modular Approach to Pathology Integration in the Gross Anatomy Laboratory

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RATIONALE/NEED

Pathology is an integrative medical field that exemplifies the unity of basic science and clinical medicine in patient care. Pathology services are used by virtually all physicians, and it is therefore important that all medical students be exposed to pathology in a meaningful way outside of the classroom to foster understanding of the field and the pathologist's role in medicine.

The autopsy experience has traditionally taken this role, as it offers "on the job" experience with pathologists while reinforcing material learned in the classroom. However, with many institutions converting to "systems-based" curricula, the autopsy experience is not incorporated as broadly as it once was. For this reason, many institutions are seeking other ways to incorporate pathology experiences. The gross anatomy laboratory has emerged as a suitable environment for these interventions because the students are relatively new to the concept of pathology and witness a variety of lesions.

However, few methods currently exist for how to effectively incorporate elements of pathology into the gross anatomy laboratory. Those that exist require the direct presence of pathologists in the laboratory, which is not always practical due to scheduling conflicts and a lack of standardization. In this project, we plan to introduce a novel digital pathology module component into the gross anatomy laboratory.

The purpose of the modules is to introduce students to pathology by teaching them how to describe lesions and the laboratory correlates needed for diagnosis. This project will assess knowledge gain and student use and utility. The results will guide further developments in the integration of introductory pathology in the Medical Gross Anatomy and Embryology course during the M1 year.

METHODS

Medical students entering the class of 2022 and 2023 were/will be recruited via e-mail to participate in the research study on a voluntary basis. Four interactive pathology modules were designed in Microsoft PowerPoint under the guidance of members of the Department of Pathology and Laboratory Medicine. Each module was tailored to the specific organ system being studied in the gross anatomy dissection lab. Module topics included Osteoporosis (Spine), Grave's Disease (Head and Neck), Myocardial Infarction (MI; Thorax), and Muscular Dystrophy (Lower Limb).

Each module contains the following elements:

1) Learning objectives
2) Review of the basic anatomy and histology associated with the organ system under study (e.g., the cardiovascular system)
3) Introduction to a standard pathology diagnosis algorithm (simplified)
4) One specific pathology and histopathology correlate (e.g., myocardial infarction)
   a) Gross findings of the lesion (e.g., infarction of the inferior wall of the left ventricle)
   b) Histopathological findings of the lesion (e.g., coagulative necrosis)
   c) Relevant laboratory data with explanations (e.g., troponin)
5) Post-module quiz of knowledge gain
6) Survey to assess student feedback of the modules and alignment with the three consensus guidelines

RESULTS

Data collected to date for the modules are limited (n=4) across five surveys, which presents a challenge in interpreting and drawing conclusions. Two out of four modules were utilized most often by students in the gross anatomy course (Grave's disease and MI) and two students completed the end-of-course survey to date.

MODULE PREVIEW

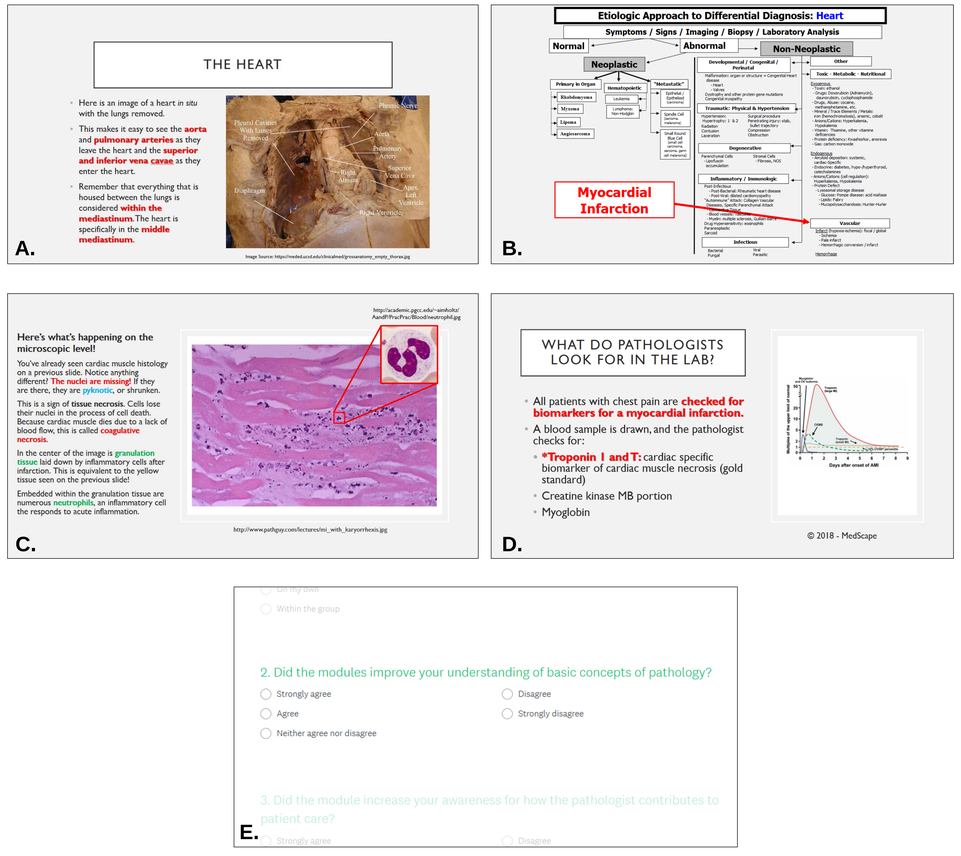

Figure 1. Samples from Interactive Pathology Module. A. Example slide describing the basic anatomy of the heart. B. Standard pathology algorithm for characterization of diseases of the heart (Courtesy of Philip Boyer, M.D., Ph.D.). C. Example slide showing and describing basic histopathology of an MI. D. Example side describing pertinent lab values for an MI. E. Excerpt from the end-of-module survey.

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ACTION PLAN

Further efforts will be taken in future cohorts to increase student participation, such as recruiting students in-class, via e-mail, and with the help of the course director. With more data, these modules may emerge as a practical and cost-effective way to help students gain insight into how a pathologist contributes to patient care.

ANTICIPATED IMPACT

We anticipate that the digital modules trialed in this experiment will enhance students' understanding and appreciation for pathology as a medical field. With further trials and evaluation, these modules can provide an open-access framework for similar applications at other institutions.

Future directions include making the modules available as a resource for other students for application in other institutions.

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