

A Redirection of Laboratory Resources for Better Value-based Surgical Pathology, a Quality Assurance Pilot Study

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Abstract

Background: The efficient use of hospital resources and healthcare dollars is paramount in today's healthcare environment. Submission of unnecessary tissue blocks may lead to increased costs to the surgical pathology laboratory and a loss of efficiency in both the technical and professional aspects of gross and histologic evaluation of a particular specimen. We sought to evaluate the cost of submitting excess tissue blocks on small bowel and/or colon resections for benign diagnoses and benign appendices.

Results: Overall, in both groups 60% and 38% of cases had extra blocks submitted, respectively.

Conclusion: The extra blocks rarely cause a financial loss. Most importantly, in all cases, the extra blocks did not change the pathologic final diagnosis but did increase work and therefore, likely decreased efficiency.

Keywords: Grossing; Extra tissue blocks; Value-based surgical pathology; Quality assurance

Introduction

In the past decade, a drastic change has faced health care in general and laboratory medicine in particular with an increased emphasis on value-based care and improved efficiency “doing more for less”. The surgical pathology laboratory is amongst the most labor intense laboratories; however, surgical pathology laboratory efficiency and cost effectiveness are rarely mentioned in the literature [1,2]. Quality measures in the surgical pathology laboratory report are accuracy, timeliness, and completeness. In most manufacturing realms this quality also includes some measure of cost. Our goal was to evaluate these elements in our surgical pathology laboratory in a cost-benefit analysis, using extra blocks submitted for small bowel and/or colon resection specimens and appendices as an initial step [3].

Methods

Since this is a study on quality and efficiency in the laboratory, institutional review board approval was waived. We searched our 2018 surgical pathology laboratory information system for small bowel and/or colon specimens resected for benign reasons including trauma, inflammatory bowel disease (IBD), necrotizing *enterocolitis*, diverticular disease, pseudomembranous colitis, bowel obstruction, ischemia, perforation, fistulae, perforated appendix with right *hemicolectomy*, or volvulus (01/01/2018-12/31/2018). We also searched our 2018 surgical pathology laboratory information system for a matching number of consecutive resected benign appendices (01/01/2018 through 02/28/2018). Cases with either a *clinicoradiologic* or pathologic impression of a mass, IBD with a previous biopsy diagnosis of dysplasia, adenomas, or *syndromic* patients were excluded from the analysis. Three gastrointestinal

pathologists (CLW, CB, ARH) met prior to the analysis to define the ideal number of block submission based on the specimen surgical diagnosis, gross findings, and specimen length which are summarized in (Table 1). We additionally analyzed the labor and financial cost of blocks' submission and compared this to our reimbursement rate for an 88307 for the resection specimens and 88304 for the appendices which are summarized in (Table 2). The labor cost was analyzed based on the salaries and the time needed per block by the different involved individuals (pathologists' assistant, *histotechnical* staff, slide coordinator, and pathologist). The time needed per block was calculated based on the average time required for two senior GI pathologists and pathologists' assistant to accomplish reviewing a slide and sectioning/submitting a block, respectively. The time needed for embedding and sectioning was based on the average number of blocks a *histotechnologist* can perform in one year (our group of regular *histotechnologists* process approximately 500, 000 blocks per year). Financial cost to include reagents, charged slides and cassettes were also included.

Diagnosis	Ideal number of blocks
Normal	Up to 3 (Up to 6 in Right <i>Hemicolectomy</i>)
Fistula	2 to 3
Volvulus	Up to 6
Diverticular disease/Ischemia/Perforated Bowel/Diversion Colitis/Chronic Intestinal Pseudo-obstruction/Pseudomembranous Colitis	Up to 6
Perforated Appendix/Right <i>Hemicolectomy</i>	8
IBD (no dysplasia)	1 per 10 cm, 1 Lymph Node, Margins ± Appendix

Trauma	Margins and Defects
Necrotizing Enterocolitis	Margins and Defects
Appendix	1

Table 1: Agreed upon blocks to submit per case.

Essential elements for submitting blocks	Total Cost/Block
Histotechnical Staff Labor (Embedding/Sectioning)	\$ 5.33
Reagents/Reagent Rentals and Other Consumables	\$ 2.00
Pathologists' Assistant Labor	\$ 1.44
Slide Coordinator Labor	\$ 0.14
Charged Slide	\$ 0.28
Cassette	\$ 0.18
Previewing by Pathology Fellow	\$ 0.83
Sign-out by Attending Pathologist	\$ 2.00
Total Cost/Block	\$ 12.20

Table 2: Total cost per block.

Results

We evaluated a total of sixty-four benign small bowel and/or colon resections (n=64) for the number of extra blocks submitted, based on our estimation of ideal number of block submission per diagnosis and/or case type. The estimated average cost per block was \$ 12.20. More than 30% of the total submitted blocks were deemed extra or unnecessary (174/506) and more than 60% of the cases (n=39) had extra blocks submitted ranging from one to twenty-six extra blocks per case. These extra blocks consisted mainly of unnecessary extra lymph nodes and extra small bowel and/or colon representative sections (such as 1 section per 5 cm of the length of the specimen for IBD cases instead of the agreed upon standard of 1 per 10 cm among the three pathologists). None of the additional submitted blocks were supplemental based on a specific suspicion. Using \$ 262 as reimbursement for an 88307 (benign colon), 5 cases were financial short falls. We then also retrospectively evaluated sixty-four benign appendices (n=64) for the number of extra blocks submitted over the ideal number agreed upon of one block per case. Twenty-four (24/64, 38%) cases had extra blocks submitted ranging from 1-4 extra blocks submitted. Using a global reimbursement rate of \$ 40 for an 88304, 4 cases would result in financial short falls. None of these extra submitted blocks in the small bowel and/or colon resection or *appendiceal* groups altered or added to the final pathology diagnosis. No pathologic diagnosis was found in any of the submitted lymph nodes [4-6].

Conclusion

Pathologists' workload has traditionally been based on numbers of specimens or number of slides, as in our department. During the 1980's much attention was paid to physician reimbursement and a resource-based relative value scale (RBRVS) was developed for

physician services, which was viewed by the government policymakers as a guide to the payment of physicians. This was set in motion by a growth of the annual rate of health care costs becoming nearly double the gross national product between 1975-1987. This system attempts to give a "physician value" to a particular task which may include time, mental effort, and judgement. In the United Kingdom, the Kim unit (KU) was developed in 1998 as a method for calculating pathologists' workload based on specimen type and numbers. For example, in this system, an appendix including gross dissection, microscopic evaluation, and reporting would be given a KU of 1, while a mastectomy specimen would be given a KU of 4. These systems are similar and provide a value for the pathologists' workload and effort. In our study, the extra effort expended by the pathologist to examine extra slides for specimens of relatively low-complexity and little to no decision making or mental effort would mostly fall into the category of a KU 1. Grossing surgical pathology specimens is the first step in the pathologic evaluation of a specimen and should be performed with intent and clear goals based on the type of specimen. The extra effort from submitting extra, often unnecessary blocks extends not only to the pathologists' but also each individual involved in the laboratory and may eventually lead to decreased efficiency. We have, at our institution, a standardized grossing manual utilized by residents and pathologists' assistants to guide them in the number of blocks to submit for a particular case. This manual specifies that one block be submitted for a benign appendix and three blocks for a benign small bowel and/or colon resection. The extra blocks submitted at our institution were attributed mainly to habits and lack of agreement amongst pathologists' assistants and residents. However, if the both pathologists' assistants and residents were to follow the guidelines set forth in the surgical pathology grossing manual; this would be less likely to happen.

Although our results demonstrate only a small number of total cases with a financial shortfall (9/128, 7%), if one were to extrapolate that approximately 7% of the total volume of surgical pathology cases for a given year resulted in financial loss, this is not insignificant. Our study also demonstrates that submitting extra blocks might be a waste of resources with no additional clinical or pathologic contribution. If the individual performing the gross examination and submission of blocks were to follow our established grossing guidelines and manual the submission of extra blocks might be alleviated. Reduction of the number of blocks submitted, on these types of cases, might be achieved by re-educating both pathologists' assistants and residents to utilize standard grossing protocols and manuals. In an era of value-based surgical pathology, human and financial resources should be invested and redirected toward delivering a more valuable outcome.

Competing Interests

The authors declare no conflicts of interest and did not receive funding for this work.

Authors' Contributions

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