Raymond's Paragraph System

An Alternative Format for the Organization of Gross Pathology Reports and Its Implementation in an Academic Teaching Hospital

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• ***Context.*—Traditionally organized gross pathology reports, which are widely used in pathology resident and pathologists' assistant training programs, may not offer the most efficient method of communicating pertinent information to treating physicians. Instructional materials for teaching gross pathology dictation are limited and the teaching methods used are inconsistent. Raymond's Paragraph System, a gross pathology report formatting system, was developed for use at a cancer center and has been implemented at The Methodist Hospital, Houston, Tex, an academic medical center. Unlike traditionally organized reports in which everything is normally dictated in 1 long paragraph, this system separates the dictation into multiple paragraphs creating an organized and comprehensible report. Recent literature regarding formatting of pathology reports focuses primarily on the organization of specimen diagnoses and overall report layout. However, little literature is available that highlights organization of the specimen gross descriptions.**

***Objective.*—To provide instruction to pathologists, pathology residents and fellows, and pathologists' assistant students about an alternative method of organizing gross pathology reports.**

***Data Sources.*—Review of pertinent literature relating to preparation of gross pathology reports, report formatting, and pathology laboratory credentialing requirements.**

***Conclusions.*—The paragraph system offers a viable alternative to traditionally organized pathology reports. Primarily, it provides a working model for medical professionals-in-training. It helps create user-friendly pathology reports by giving precise and concise information in a standardized format. This article provides an overview of the system and discusses our experience in its implementation.**

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In July 2005, A. Kevin Raymond, MD, was a guest speaker at the orientation of the new pathology residents at The Methodist Hospital, Houston, Tex. The topic of the lecture was ''The Paragraph System,'' a gross pathology dictation system that he had developed and successfully used at his own institution, the M. D. Anderson Cancer Center in Houston, Tex.

The rationale behind this system is that gross dictation training is inconsistent; it is not taught, not taught well, or is lacking the follow-up that truly enhances the learning process. From our own experience with pathology residents, fellows, and pathologists' assistant students, traditionally organized gross dictations often result in reports in which pertinent information is buried within long meandering paragraphs.

The purpose of this communication is to share our experience with the implementation of the paragraph system into our general pathology practice that includes a variety of neoplastic and nonneoplastic specimens.

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THE PARAGRAPH SYSTEM

The system is simple in its approach to gross pathology dictation, breaking down the body of the dictated report into at least 5 distinct paragraphs, as follows:

Paragraph 1	Specimen elements
Paragraph 2	Primary pathology
Paragraph 3	Secondary pathology
Paragraph 4	Inking code
Paragraph 5	Section code

Paragraph 1 Specimen Elements

The first paragraph is for listing the organs in the specimen, using the standard protocols of size in 3 dimensions and weight (metric system). Words such as ''measuring'' and ''weighing'' may be eliminated to make the dictation concise. By placing the weights and measurements inside parentheses the reader can more easily find the information at a glance.

One time-saving step is incorporated in the first paragraph; normal tissues or normal structures are described as ''unremarkable'' and are not addressed again in the dictation. This step helps eliminate excessive descriptions about otherwise normal tissues, but it should be used with discretion. It is crucial that the individual doing the gross examination be experienced enough to be able to differentiate normal from abnormal tissues. Pathology residents

and pathology assistant students in their early clinical rotations should be encouraged to initially describe all tissues as they are learning the art of dissection and dictation. With time and with hands-on grossing practice, they can begin to slowly include the ''unremarkable'' phrasing into their gross dictations.

Example A, First Paragraph.—''Received in formalin, labeled 'transverse colon and omentum,' is a segment of large bowel (21 cm length × 4 cm diameter) with abundant pericolic fat and attached unremarkable omentum (15 × 12 × 1.4 cm).''

Paragraph 2 Primary Pathology

The key to the second paragraph is to focus on the primary pathology, painting a mental picture of the color, texture, and consistency of the lesion, the extent of the disease, and its location relative to other anatomical landmarks and margins. In most specimens this will likely be a solitary tumor or lesion. However, it could also be a diffuse process involving an entire organ, such as polycystic kidney disease, a colon with inflammatory bowel disease, or multiple lesions of similar type etiology, such as leiomyomata or metastases. The primary pathology will typically support the preoperative diagnosis or clinical history, which is provided with the specimen. However, there are uncommon instances when the primary pathology is unsuspected by the surgeon; for example, a primary adenocarcinoma in a gallbladder resected for gallstones or invasive ductal carcinoma in a breast reduction specimen.

Example A, Second Paragraph.—''Multiple diverticula are present along the length of the resected segment of bowel. The base of one diverticulum is disrupted, dilated, and hemorrhagic. Ill-defined induration and fibrosis surrounds this diverticulum at the level of the subserosal fat, compatible with changes secondary to rupture of the diverticulum. Serosal adhesions are numerous in this area.''

Paragraph 3 Secondary Pathology

The third paragraph is dedicated to secondary pathology or incidental findings. Secondary pathology may be a process related to the primary pathology, such as lymph node metastases in a mastectomy specimen for breast cancer or polyps in colon cancer resections. In some instances it may be a process unrelated to the primary pathology, such as bulla in a lung lobectomy specimen with adenocarcinoma. Incidental findings encompass everything from polyps in a colon with diverticular disease to diverticula in a colon cancer resection specimen or from a fibroadenoma in a breast resected for cancer to an endometrial polyp in a fibroid uterus. The secondary pathology may or may not be expected or supported by the preoperative diagnosis or clinical history.

Example A, Third Paragraph.—''Multiple small, sessile polyps (0.2–0.4 cm) are scattered throughout the remaining colonic mucosa without involvement of the resection margins.''

If no secondary pathology is present, the third paragraph may be used to describe other information related to the specimen but not related to the primary pathology. For example, cysts or other lesions found in the adnexa of a hysterectomy specimen with bilateral salpingo-oophorectomy resected for uterine leiomyomata could be dictated in the third paragraph. Furthermore, additional studies performed such as harvesting for tissue bank, photography, or tissue submission for special studies (eg, microbiology or molecular studies) may be included in this paragraph.

Paragraph 4 Inking Code

The fourth paragraph is used to indicate inking codes. A very specific format for dictating inking codes is suggested that is based on the way we read, from left to right, and the way that we process information. Based on these physiologic processes, it is logical to always dictate the ink color first followed by a short summary of what the color represents. To further facilitate examination of inked margins, each ink color and its designation should be placed on a separate line.

To illustrate, example B demonstrates the least desirable format for documenting inking codes because the ink code is embedded within the body of the report. In this example, imagine that a pathologist is performing a microscopic evaluation of a breast lumpectomy with a solid nodule. One slide shows the nodule close to the resection margin that is inked red. To determine the involved margin the pathologist performing the microscopic examination must peruse the gross description, line by line, to verify the margin represented by the red ink.

Conversely, example C demonstrates the best format for inking codes. The pathologist will see the ink color under the microscope, briefly scan the ink code and immediately see that red ink indicates the superior margin.

Example B, Traditionally Organized Format.—''Received fresh, labeled 'Right breast biopsy,' is a portion of fibro-fatty breast tissue that measures 4.3 × 3. 2 × 2.4 cm and weighs 34 g. A needle localization wire is located in the center of the specimen and is inserted through the superficial aspect. The tissue is oriented with a long suture-lateral, short suture-superior, and ink-anterior. The margins are inked as follows: lateral-blue, medial-black, superior-red, inferior-yellow, orange-superficial, and deep-green. A circumscribed, gritty, gray-white nodule measuring 2.9 cm is located in the medial half of the specimen and 0.5 cm from the superior margin. The remaining parenchyma is a mixture of soft, lobulated adipose tissue and glistening, off white fibrous stroma in a ratio of 85: 15, adipose tissue to fibrous stroma.''

Example C, Paragraph System Format.—''Received fresh, labeled 'Right Breast biopsy, long suture-lateral, short suture-superior, ink-anterior,' is a portion of fibro-fatty breast tissue (4.3 × 3.2 × 2.4 cm, 34 g) with a centrally placed needle localization wire inserted into the superficial surface.

''In the medial half of the specimen is a firm, circumscribed, gritty, gray-white nodule (2.9 cm). The nodule is 0.5 cm from the superior margin, 0.6 cm from the medial margin, and 1.0 cm from the deep and lateral margins.

''The remaining parenchyma is a mixture of soft, lobulated adipose tissue and glistening, off white fibrous stroma in an adipose to fibrous tissue ratio of 85:15.

''Ink code:

Blue—Lateral margin
Black—Medial margin
Yellow—Inferior margin
Red—Superior margin
Orange—Superficial margin
Green—Deep margin''

The paragraph system, regarding the inking code, highlights an important objective about gross dictations; they should be directed at the end users, the pathologists and the treating physicians. Example C is most efficient because it clearly delineates a proper location for measurements, primary pathology, and ink codes. This format does not require the pathologist or treating physician to waste time mentally dissecting the report to find pertinent information. On the other hand, example B, although complete in the information it conveys, is much less efficient. This format, with all the information combined together in 1 paragraph, requires the pathologist and treating physician to spend additional time hunting through the report for pertinent information.

Paragraph 5 Section Code

The section code or block code is dictated in the fifth or last paragraph. The format used is similar to that used in the inking code: cassette number followed by a brief description of the submitted tissue. All tissue blocks submitted, either frozen section or permanent section, should be recorded in the section code and not embedded in the body of the report.

The same rationale applies to the section code as the inking code; efficiency is the key. However, useful and detailed information should not be sacrificed in the name of efficacy nor should the gross description be restated in full verse when providing details for each individual block. Rather, by using terminology that is succinct yet comprehensive, a section code acts as the road map with which the pathologist can easily navigate a specimen.

When dictated correctly, the section code provides information about the type of tissue submitted and, if needed, its relationship to resection margins, adjacent anatomical structures, or closely approximated normal and abnormal tissues. With larger, complicated specimens, it is optimal when the section code mirrors the gross description by submitting samples of the primary pathology first, followed by samples of the secondary pathology and finally by random samples of required tissue specific to site.

Example D, Fifth Paragraph.—''Representative tissue is submitted as follows:

BFS1	Distal pancreatic resection margin, frozen section
BFS2	Common bile duct margin, frozen section
B1	Tumor with respect to common bile duct
B2	Tumor with respect to pancreatic duct
B3	Tumor with respect to ampulla of Vater
B4	One peripancreatic lymph node, bisected
B5	Five peripancreatic lymph nodes
B6	Proximal gastric resection margin
B7	Distal duodenal resection margin
B8	Uninvolved pancreatic tissue''

APPLICATION

The paragraph system is primarily designed for the dictation of larger, complicated specimens that require orientation and inking or that generate multiple tissue blocks submitted for histologic examination. It is very useful for dictations of cancer resection specimens such as breast; solid organs like kidney, liver, and lung; female and male genitourinary specimens; skin tumors; and gastrointestinal resections. The system can also be used when dictating benign processes in larger organs such as uterine leiomyomata, inflammatory bowel disease, adenomatous thyroid nodules, or end-stage lung disease.

Example E.—''¶1 Received fresh for intra-operative consultation, labeled 'Right breast and axillary contents,' is a right mastectomy specimen (387 g, 20 × 16 × 5.5 cm) with overlying tan skin ellipse (12 × 4.5 cm), central areola (3.3 cm), inverted nipple (1.2 cm), and attached axillary tail (6.4 × 3.2 × 1.5 cm).

''¶2 Situated in the subareolar tissue is a firm, stellate, gray-white, gritty mass (2.7 × 2.1 × 1.7 cm). The tumor is 1.2 cm from the deep margin, 1.1 cm from the superficial margin, and greater than 5 cm from the remaining margins. The remaining breast parenchyma is predominantly soft tan-yellow adipose tissue with minimal fibrous stroma with a fat to fibrous ratio of 90:10.

''¶3 Thirteen axillary lymph nodes (0.6–1.4 cm) are dissected from the axillary tissue. The largest low axillary lymph node is firm, gray-white, and almost entirely replaced by metastatic tumor. Fresh tissue is harvested for tumor bank.

''¶4 Ink code:

Blue—superficial superior
Green—superficial inferior
Black—medial deep
Red—lateral deep

''¶5 Representative tissue is submitted as follows:

A1	Tumor with overlying nipple
A2–A5	Tumor with adjacent breast parenchyma
A6	Closest deep margin
A7–A10	Axillary lymph nodes submitted from lowest to highest
A7	Largest lymph node, trisected
A8	Six lymph nodes
A9	Five lymph nodes
A10	Highest lymph node
A11	Upper outer quadrant
A12	Lower outer quadrant
A13	Lower inner quadrant
A14	Upper inner quadrant''

The system works equally as well for large specimens, which have no readily apparent pathology or pathology that is homogenous and diffuse, such as cirrhotic livers, polycystic kidneys, or lungs with cystic fibrosis.

Example E—''Received in formalin, labeled 'Liver' is a hepatectomy specimen (889 g, 22 × 17 × 7.8 cm) with attached intact gallbladder (6.8 × 5.5 × 2.2 cm).

''The liver parenchyma and capsule is tan-brown and diffusely nodular with nodules ranging from 0.2 to 0.6 cm. Thin, fibrous tissue septa surround the parenchymal nodules, resulting in a rubbery, dense cut surface. No discrete masses are present.

''The gallbladder is filled with green-brown bile and contains four gray-green, multifaceted stones (0.7–1.2 cm). The mucosa is velvety tan-green and the wall is 0.1 cm thick.

''Gross photographs are obtained.

''Representative tissue is submitted as follows:

A1	Hepatic duct and vascular resection margins
A2–A5	Right lobe
A6–A7	Left lobe
A8	Caudate lobe
A9	Quadrate lobe
A10	Gallbladder''

An adapted version of the system can also be used for dictating smaller specimens, such as, gallbladders, appendices, uterine adnexa, or skin ellipses.

Example G.—''Received fresh for frozen section diagnosis, labeled 'Right ovary and fallopian tube,' is a unilocular, cystic ovary (15 g, 3.5 × 2.6 × 2.0) with attached, unremarkable fallopian tube (5.8 cm in length × 0.5 cm diameter).

''The ovarian cyst is filled with clear, serous fluid and lined by a glistening tan-gray membrane with no papillary excrescences. Residual ovarian parenchyma is present around a portion of the cyst and ranges from 0.2 to 0.4 cm thick.

''Representative tissue is submitted as follows:

AFS Ovarian cyst wall, for FS
A1–A3 Cyst wall
A4 Fallopian tube''

Conversely, small routine specimens that can be described with a few brief sentences, aggregates of similar-looking tissues, such as prostate chips or products of conception, and biopsies can be dictated in 1 short paragraph or sentence.

Example H.—''Received in formalin, labeled 'prostate chips,' are multiple irregular pieces of rubbery, tan-gray tissue admixed with scant blood (22 g, 3.5 × 2.5 × 1.4 cm). The tissue is submitted entirely in cassettes A1–A7.''

IMPLEMENTATION

In our implementation of the paragraph system, we used the basic foundation proposed by Dr Raymond but made some adaptations to address our stylistic preferences. For example, some pathologists may not prefer the use of parentheses around measurements and weights because it is an unusual departure from traditional dictations and can be somewhat distracting. As an alternative, one can use commas to offset the weights and measurements from the organ.

From a grossing standpoint, implementation of the system is slightly more complex. The primary difficulty stems from the fact that using the paragraph system requires the prosector to change the way he or she dictates and to alter his or her work processes at the grossing station. Prior to implementation of the new system we used the traditionally taught method in which the individual performing the gross examination dictates as he or she dissects. The prosector works from the outside to the inside of the specimen, describing the different parts of the organ, the dissection technique used, the inking codes, section codes, and the pertinent information and measurements as they are exposed. This method is very efficient for the prosector because the dictation and dissection are completed simultaneously. On the other hand, when using the paragraph system, the person performing the gross examination is required to dissect the specimen first to reveal the pathology prior to dictating the body of the report. At times this necessitates the prosector to stop and take notes of measurements and weights or ink designations. Initially, these small steps can significantly slow down the grossing process. With time and practice, using the paragraph system may speed up the overall grossing process because of the timesaving steps built into the system.

The second difficulty of implementation is retraining experienced pathologists, pathology residents, fellows, and pathologists' assistants. From our observations as instructors, many experienced prosectors have either memorized previously used institutional protocols or have developed their own personally preferred dictation protocols for a variety of specimens. They can literally churn out these dictations in their sleep, they are so ingrained. For these individuals, changing the dictation format is most difficult because it requires them to basically relearn their own dictations; it can be a slow process. This is an ongoing problem in academic institutions, like ours, with residency and fellowship programs, as many of these individuals have previous grossing experience and must adapt to a new system. However, with continual feedback, mostly in the form of monthly quality assurance conferences and one-on-one instruction, we have made tremendous strides in implementing the new system department-wide.

One last area must be addressed when discussing implementation: transcription. It would be ideal to think that transcriptionists type exactly what they hear and therefore, any change in the dictation style should not have a negative impact. In reality, they too can fall into a comfortable pattern of transcribing dictations and may vocalize their discontent when the format suddenly changes. Initially, we experienced this problem to a degree, mostly in the form of noncompliance with the new format. Perhaps better communication prior to implementation would have helped the transition for the transcriptionists.

Implementation of the paragraph system has resulted in positive long-term outcomes in our pathology department. The primary effect is that our pathology reports now have a standardized appearance regardless of the experience of the prosector. Monthly quality assurance conferences document greater than 95% compliance with the paragraph system format in the reviewed cases.

COMMENT

The primary problem with traditionally organized gross pathology reports is that they often are poorly organized with pertinent information embedded in long drawn-out paragraphs. A second problem is a lack of standardization of gross pathology reports. Furthermore, a significant issue with the traditional method of teaching gross pathology dictation is that there is no set standard for training; therefore, there is no right way of dictating. So, if there is no right way of organizing a dictation, some may rationalize that there is no wrong way, which leads to ''whatever works'' type of gross reports.

The lack of standardization within gross pathology reports exacerbates an existing ''communication gap''[1] between treating physicians and pathologists. Powsner et al[1] found a 30% discordance rate for surgeons and surgical residents when interpreting results from 3 versions of a written pathology report. The test subjects were provided with the original version of a report, a modernized version, and a new standardized version of the original. They expected to find that standardization would increase comprehension of medical records but instead they found the opposite. Their study data showed that standardization of reports decreased comprehension and increased the discordant rate.

We find the results of the study by Powsner et al[1] inconclusive, although we agree with the basic premise that clinicians do not always accurately comprehend the information presented in pathology reports. The primary problem with the study is that the test subjects were familiar with the original version of the report having ''read reports in the original format for years.'' The authors addressed this detail but minimized it by stating that ''we

suspect it takes a year to establish short-term preference based on format.''[1] Yet, they did concede that standardized reports may prove to be superior if report disorientation is eliminated.

One reason why treating physicians may misinterpret pathology reports is that pathology reports vary greatly and typically reflect individual or institutional preferences. Compton[2] suggests that standardization of pathology reports, specifically for oncology patients, is inevitable in the near future. The reason for these changes is primarily to reinstate the gold standard of cancer medicine and produce pathology data that are ''reliable, reproducible, unbiased, and immutable.''[2]

Lack of standardization can also be seen when comparing specimen gross description training in pathology residency programs. In his survey, Horowitz[3] found consensus within a group of community pathologists who felt that newly trained pathologists had poor grossing and dictation abilities. He surmised that the primary culprit for this lack of training could be the increased use of pathologist's assistants in residency training programs. A contributing factor is the fact that gross pathology dictation is not formally taught in many institutions and there are few textbooks that address the subject at length. Historically, gross pathology dictation training is learned at-the-bench with upper level prosectors mentoring junior level prosectors in the grossing room. The teaching material is commonly information passed by word-of-mouth or often as well worn photocopies of old dictations. Institutional procedure manuals,[4] which are required by the College of American Pathologists, can be helpful in the training process but are typically cumbersome to use and, thus, are often underused.[5] These teaching methods provide an array of end results from excellent to substandard, depending on the information that is shared and the amount of mentoring provided.

Resources for teaching gross pathology dictation are somewhat limited. The few pathology textbooks and dissection manuals that describe gross pathology dictations support many of the same ideas that are recommended in Raymond's Paragraph System. Lester[6] provides the most comprehensive text regarding the subject. Her chapter on specimen processing includes multiple pages of very useful suggestions, most of which mirror our proposal. She details 6 components of a gross description and provides examples of how to and how not to dictate certain elements of the gross report. Westra et al[7] offer many similar suggestions, such as to eliminate verbose gross descriptions of normal tissues and to remove descriptions of routine dissection mechanics. They suggest that the gross description should ''enable the reader to mentally reconstruct the specimen'' and that it should ''serve as a slide index,'' or section code, ''to correlate each slide to a precise location on the specimen.'' Rosai[8] notes that the gross dictation can be performed either during, *pari passu,* or following dissection, but that ''the latter often results in a more cohesive description.'' It is thus apparent that there are others in the field who have a similar philosophy about gross pathology dictation and have stressed this in their textbooks.

Zhenhong and Ghorbani[9] created an interactive Web site that offers prosection guidelines, procedures, and dictation protocols for approximately 100 specimen types. The sample dictations are based on the traditionally organized gross reports and make extensive use of fill-in-the-blank and multiple choice options. As a teaching tool, this Web site contains an easily accessible and extensive compilation of dictation protocols. However, the protocols have the same flaws the paragraph system attempts to eliminate: embedded ink codes and a format in which entire specimens are described in 1 long paragraph.

Of the reviewed and available dissection manuals, textbooks, and electronic manuals only Lester[6] provides a workable dictation format that an inexperienced prosector could use as a learning tool. The Paragraph System advances Lester's dictation process a step further by separating the components into distinct paragraphs and adding paragraph indentations to accentuate the different elements. It also defines a precise format for ink codes and College of American Pathologists mandated section codes,[10] which standardizes reports. Valenstein[11] supports these format modifications by stating that communication effectiveness is increased by using ''indentations and white space,'' basically paragraphs, within long reports. He also stresses standardization of reports with respect to layout as this hastens the ''transfer of information.'' Individuals familiar with the standardized layout will automatically focus on a defined area when searching for needed information.

How does this simple reformatting procedure aid the learner? It does so, primarily, by forcing the prosector to mentally organize the report elements prior to dictating. Instead of starting the dictation blindly, the prosector must first investigate the specimen to answer specific questions. What is the makeup of the specimen? What are the measurements? Is there an identifiable primary pathology and where is it located? What structures are involved in the process? Is there additional pathology? Secondarily, the paragraph format requires that all details regarding the primary pathology be dictated together. This eliminates the meandering dictations by directing the prosector to dictate each element in an organized manner. Lastly, for novice prosectors, the paragraph format answers one commonly voiced question: where do I begin?

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