
Problems in Family Practice

Rectal Bleeding

James Graham, MD
Springfield, Illinois

The diagnosis and management of rectal bleeding problems varies with the urgency of the situation, the age of the patient, and the applicability of available diagnostic methods. Every instance of rectal bleeding is a problem that demands investigation by endoscopic, radiographic, and laboratory means. A physician can be misled by the patient's understatement or underobservance of bleeding. A good history obtained as quickly as possible in urgent circumstances and in great detail under more relaxed circumstances is of immeasurable diagnostic value.

The manner of investigating a rectal bleeding problem will depend upon:

1. The urgency of the situation, ranging from exsanguinating hemorrhage with physiologic crisis and shock, to a patient's simple observation of a small amount of blood on the toilet tissue.
2. The general history and symptoms.
3. The character and quantity of the blood observed, whether red, dark, clotted, or tarry, and the nature of the bleeding, whether on the tissue, in the water, or mixed with the stool.
4. The age of the patient.
5. The applicability of available diagnostic methods.

This paper presents a logical and practical clinical approach to the patient with rectal bleeding with particular reference to the urgency of the situation, history, age of the patient, and applicability of available diagnostic methods.

Urgency

Massive gastrointestinal hemorrhage, either red, maroon, or tarry, with a drop in levels of blood pressure, hemoglobin, and hematocrit, the presence of pallor, and a rise in pulse rate demands emergency action. Replacement by blood transfusions is begun immediately. Diagnostic testing is initiated simultaneously. The diagnostic effort is directed first toward distinguishing between upper and lower gastrointestinal tract hemorrhage. Vomiting of blood is conclusive for upper gastrointestinal tract bleeding. In the absence of vomiting, a nasogastric tube must be passed. Blood through the tube will establish that bleeding is proximal to the ligament of Treitz. Rarely, blood in the duodenum may not escape through a nasogastric tube.

Digital rectal and proctoscopic examinations will confirm the color of the blood. These examinations will rarely establish, however, the origin of massive hemorrhage simply because bleeding of this amount ordinarily is from a site higher than the examiner can feel or see.

The history may suggest peptic ulcer or diverticular disease. A history of previous bleeding episodes of similar pattern may be elicited, such as presence of cramping or absence of pain, presence or absence of hematemesis, constipation or diarrhea, or fever. X-ray studies will depend upon

From the Springfield Clinic and Southern Illinois University School of Medicine, Springfield, Illinois. Requests for reprints should be addressed to Dr. James Graham, Springfield Clinic, 1025 South Seventh Street, Springfield, IL 62703.

the state of the abdomen, whether painful or distended. If pain and distention are present, scout x-ray films may show gas patterns diagnostic of obstruction. This is important because a normal film precludes obstruction. Free air, indicating perforation, is a rarity except with trauma. Massive escape of blood from the rectum occurs generally when the stomach and intestine are unobstructed, except for intussusception. With this condition there may be both voluminous bleeding and obstruction. The cause of massive rectal hemorrhage from the unobstructed gut is most likely to be peptic ulcer, varix, gastritis, colonic diverticular disease, polyp, or a Meckel diverticulum. There are numerous less frequent causes.

The character of the blood may offer a clue to the site of bleeding. Although blood may vary between tarry and red from any place in the stomach or intestine, blood from the left colon more often is red, right colonic blood generally is maroon, and upper gastrointestinal blood is mostly tarry. It is transit time that makes the difference. A 60-minute rush of blood from the stomach or duodenum may slide through the hyperperistaltic intestine, reach the rectum with its hemoglobin unchanged, and then bolt out through the anus still red rather than tarry.

Sequence of Investigations, Urgent

Upper gastrointestinal bleeding

If first efforts have placed the site of bleeding in the upper tract, the next diagnostic measures should be endoscopic or angiographic. Esophagogastrosocopy will determine the level of bleeding and the nature of the lesion. It will indicate the advisability of ice water cooling, medications, electrocoagulation of a vessel, or removal of a polyp, if such is discovered as the cause of the hemorrhage. Angiography can be diagnostic of the location of bleeding but not of the nature of the pathologic process. In addition to being diagnostic, angiography allows infusion of vasoactive substances. Table 1 summarizes the sequence of investigations for upper gastrointestinal bleeding.

Lower gastrointestinal bleeding

In urgent situations in adults, scout x-ray films are taken first if the patient has abdominal pain or if the abdomen is distended. In the absence of these symptoms, digital and proctoscopic exam-

Table 1. Sequence of Investigation, Upper GI Bleeding

1. Gastroscopy
2. Angiography
3. Barium x-ray (later)

Table 2. Sequence of Investigation, Lower GI Bleeding

1. Digital rectal examination
2. Proctoscopy
3. Angiography
4. Barium x-ray (later)
5. Colonoscopy

inations have priority. These investigations are followed by angiography, not colonoscopy or barium enema x-ray as one might be led to think. Angiography yields 75 percent positive results of working diagnostic value so long as the patient is bleeding actively at the time of the examination.¹ The diagnostic yield (about five percent) of barium x-ray studies for massive hemorrhage from lesions distal to the ligament of Treitz is so poor as to be negligible.¹ Colonoscopy is of no value in these circumstances because stool and blood cannot be cleared from the colon through the seven and nine French suction channels of colonoscopes. As in upper bleeding, the vascular catheter, which in this case is left in the inferior mesenteric artery, may be used to arrest colonic bleeding by perfusion of vasoactive agents in solution. Table 2 summarizes the sequence of investigations for lower gastrointestinal bleeding.

Other tests

Intestinal tube tests and fluorescein string tests are not only of questionable value but are too time consuming and too uncomfortable for a patient who is bleeding profusely.²

Surgery, Urgent

A decision for surgical treatment may have to be made before a diagnosis is forthcoming, if bleeding does not stop within a reasonable period of blood replacement. The method of making this determination, however, should be a variable one. It may be based upon either a predetermined number of blood replacement units with failure to

maintain satisfactory blood pressure and hematocrit levels, or upon a time period during which there is continuous but ineffective replacement of blood, either slow or pressurized. Age, general physical condition, and medications make differences here. A young and pliable artery is more likely to contract and thereby control hemorrhage than an old and sclerotic vessel. Likewise, a young and resilient vessel will be more responsive to vasoactive infusions.

While rigid rules for volume replacement and time can encourage haste and lead to dangerous decisions, procrastination is similarly dangerous. The important concerns are maintenance of blood pressure and hematocrit levels while a diagnosis evolves or until all reasonable diagnostic measures have been pursued. The final decision may be for either medical or surgical management.

Exploratory laparotomy in the absence of a diagnosis can be very unsatisfactory and harmful. The surgeon may not find the bleeding vessel even though it is tempting to think this would be easier to find during active bleeding. Bleeding may stop during the administration of anesthesia so that the surgeon can open a viscus at the most proximal point of intraluminal blood and clear out the clots but not find the bleeder. This may be the experience in 25 percent of cases.²

Slowing and cessation of bleeding are determined by diminishing rectal output of blood together with maintenance of blood pressure and hematocrit levels as blood replacement is reduced and discontinued.

Nonurgent Situations

Rectal bleeding in most instances is a nonurgent matter encountered among ambulatory patients in an office or outpatient setting.

The causes of rectal bleeding are both minor and grave, numerous and varied. The minor and grave are disconcertingly capable of simulating each other very closely. The physician, therefore, must continue investigation of the problem until the site and nature of the bleeding have been determined or until all pertinent diagnostic measures have been considered. Every instance of rectal bleeding demands careful search by endoscopic, radiographic, and laboratory means.

All of this is generally recognized. It is also recognized that a rectal bleeding problem cannot be

solved from a patient's history alone and that a rectal examination is necessary. Yet, despite such recognition, a physician can be led into slighting, or even omitting, a rectal examination because of the patient's understatement or underobservance of bleeding: "It was bright red blood, of course"; "It was just a couple of times"; "It was only on the toilet paper."

It is worth keeping in mind that even in the face of such understatements, if a patient comes in because of bleeding, it was blood that brought him or her to the physician for examination. Furthermore, if a history of bleeding is elicited from the physician's direct question about rectal bleeding, the likelihood of understatement is still greater.

General History

Several symptoms and signs may provide helpful clues in searching for the cause and location of rectal bleeding. Among significant symptoms are: (1) pain, (2) change in bowel pattern, and (3) color of stool and mixture with blood and mucus.

Pain, if it accompanies rectal bleeding, may offer a strong lead to the lesion. Intestinal muscular layers are sensitive to tension from spasm such as occurs in intussusception, and to stretching from obstructed gas or stool. Colonic pain, often relieved by passage of flatus, is usually experienced in the hypogastrium either to the right or left depending upon the location of the lesion. Discomfort that stems from the rectosigmoid area may be located just above the symphysis; pain that arises in the rectum is referred to the sacral area or the perineum. The location of abdominal pain then may offer a lead to the site of bleeding.

Tenesmus, or voluntary inhibition of a strong urge to defecate with tightening of the gluteal and perineal muscles, occurs frequently with ulcerative proctitis and with ulcerative rectal neoplasms. The character of the bleeding lesion thus may be suggested by tenesmus.

Anal canal pain caused by cryptitis and hemorrhoids is dull with a pressure element. Pain is constant and throbbing with a thrombosed hemorrhoid and it diminishes once bleeding sets in. Fissure pain is severe, like a knife, and is at its worse during the 15 or 20 minutes following a bowel movement.

Peptic ulcer pain has its own characteristics, post-prandial and referred to the sternal area.

Change in bowel pattern

There are some characteristics of constipation and diarrhea that may point to the site of bleeding. Constipation of recent date when associated with bleeding, but without pain or vomiting, suggests a site in the distal colon, often an annular, constricting carcinoma. Polypoid neoplasms, on the other hand, being intraluminal rather than intramural, are more likely to produce diarrhea in association with bleeding. If a polyp is large and on a stalk, it may be forced along the lumen to produce an intussusception, with cramps accompanying the bleeding.

Severe constipation such as in megacolon or debilitating disease allows impaction of hard stools that produce stercoral ulcers with bleeding. This is a distal colon phenomenon. Hard and large stools accompanied by pain at the anal area during and after bowel movement are indicative of anal lesions such as fissures. Itching about the anus with blood on the underclothing or on the toilet tissue suggests perianal dermatitis.

A normal colon may be deluged with a large volume of blood entering it suddenly as in massive upper gastrointestinal hemorrhage. Here, the volume of each stool passed per rectum will be large, "large stool diarrhea," an indication that bleeding is from the stomach or small intestine, sometimes from the cecum.

Quite the opposite situation pertains with inflammatory disease, as in ulcerative colitis. Here, the threshold for stimulation by intraluminal content is lowered and the accumulation of even small amounts of stool is not tolerated. Small quantities of stool are passed frequently, "small stool diarrhea." The patient so afflicted may experience frequent urge to stool with passage of only a small amount of feces together with some blood, and with or without mucus. Here is a clue pointing to the distal colon or the rectum as the site of bleeding.

Color of stool and mixture with blood or mucus

Bright red blood has its origin in the distal colon or rectum unless hemorrhage is massive and the stools are large, loose, and frequent. When large stools come frequently, a rapid transit time can be assumed. In this circumstance blood from the right

Table 3. Order of Frequency of GI Bleeding in Children

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| <ol style="list-style-type: none"> 1. Anal conditions (fissures) 2. Rectal and colonic polyps 3. Peptic ulcer 4. Meckel diverticulum 5. Intussusception 6. Systemic diseases 7. Other conditions |
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colon, or from the ileum in the case of bleeding from a Meckel diverticulum with aberrant gastric mucosa, or even from the stomach and duodenum, may pass quickly through the distal colon and, still red, on out through the anus.

Generally, a tarry stool is produced from blood that originated in the stomach or duodenum with hemoglobin changing in composition and color during transit through the jejunum and ileum over a period of several hours. Very dark red stools, almost tarry, may, however, arise in the right colon or even in the left colon in the presence of severe constipation when blood can be held back in the bowel for excessively long periods of time. Blood on a formed stool rather than in the stool signifies a lesion distal to the sigmoid where a stool takes its form. Mucus originates in goblet cells and more so in the distal colon and rectum, where goblet cells are more numerous. For this reason, a mixture of mucus with blood indicates that the lesion is more likely to be found in the rectum, the sigmoid, or the descending colon.

Age

Children

Although children are subject to almost all of the conditions that cause rectal bleeding in adults, from esophageal varices to rectal cancer, the order of incidence differs with children: anal conditions, polyps, peptic ulcer, Meckel diverticulum, intussusception, and systemic diseases (Table 3).

As with adults, a rectal bleeding problem in a child must be pursued until a diagnosis is reached or until all applicable diagnostic measures have been explored. Grave conditions closely simulate minor ones. Massive hemorrhage in particular demands an aggressive approach to diagnosis and treatment because the relatively small blood volume of children allows a child to bleed out quickly.

Anal fissures

Most anal fissures bleed. They are observed in association with diarrhea or with severe constipation and hard stools. The blood is quite red and bowel movements are painful and are held back. Examination is difficult because of extreme tenderness. Examination under anesthesia may be necessary. The anesthetic may be of additional help in that it allows dilation of the anal sphincters and excision of the fissure, if this appears indicated.

Polyps

The polyps encountered most frequently in childhood are of the juvenile type. The highest incidence is at about age four. Juvenile polyps are inflammatory in nature and have a tendency to disappear later in life. Bleeding, rarely profuse, occurs in episodes, due perhaps to intermittent and irregular trauma from stools. The usual juvenile polyp is single, round, smooth, and on a stalk. Such polyps arise generally in the distal colon and rectum. Some prolapse through the anus. Most of them can be removed by sigmoidoscopy or colonoscopy.

Other types of polyps, such as adenomatous polyps and polypoid carcinomas, are unusual in children. Polyp formation, as a manifestation of familial polyposis or of Gardner syndrome, makes its appearance for the most part after puberty. These latter two conditions, which are viewed as precursors of cancer or which eventually may require proctocolectomy with permanent ileostomy, are unusual in childhood. Peutz-Jeghers polyposis on the other hand is quite likely to begin during childhood. This condition does not have malignant potential. A non-neoplastic form of bleeding polyposis seen in both children and adults is lymphoid polyposis. The lesions, usually sessile, may be scattered or they may carpet the mucosa. They represent enlarged lymphoid follicles or aggregates of lymphocytes.³ They can be mistaken for adenomatous polyps during either endoscopic or radiologic examinations. Lymphoid polyposis is probably inflammatory in nature. Even though the polyps bleed, the condition need not be treated surgically. The distinction of lymphoid polyposis from bleeding, familial polyposis is, therefore, im-

portant. The condition may disappear spontaneously.⁴

Since any polyp may begin early in life, it is of importance to identify its type. Then therapy can be properly conservative or radical. Fragmentary biopsies of polyps can be misleading; removal of an entire polyp for examination by the pathologist is safer.⁵

Peptic ulcer

In Spencer's series of 476 instances of rectal bleeding in hospitalized infants and children, 54 of them bled from an ulcer of the stomach or duodenum.⁶ Half were infants less than one year of age. The mortality in this group was 65 percent because of the high proportion of stress ulcers that were associated with other critical illnesses.

Meckel diverticulum

Bleeding in this condition may be small in amount and intermittent, or massive and critical. Blood mixed with stool varies from brick red to tarry. Aberrant gastric mucosa in the diverticulum is the most frequent cause of profuse and painless lower gastrointestinal hemorrhage in an apparently healthy infant.⁶ Bleeding can be the same in older children.

However, after age two the margin of safety from hemorrhage grows wider with each added year of growth.⁷

The most important diagnostic test is abdominal scanning with sodium pertechnetate Tc 99 m, which is selectively taken up by gastric mucosa in the diverticulum. Barium studies by x-ray either by swallow or enema are unlikely to demonstrate a Meckel diverticulum.⁸

Intussusception

Rectal bleeding is an early symptom of intussusception because of venous stasis in the submucosa with extravasation of blood through the mucosa. The mesenteric vessels are pulled in between the tightly telescoped layers of the bowel. Blood flows in slowly under arterial pressure but cannot escape through the blocked veins.

Table 4. Order of Frequency of GI Bleeding in Adults

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| <ol style="list-style-type: none"> 1. Hemorrhoids 2. Fissure 3. Polyps 4. Proctitis 5. Peptic ulcer 6. Colorectal cancer 7. Ulcerative proctocolitis 8. Gastritis 9. Diverticular disease 10. Systemic diseases |
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Sudden colic in a well-nourished infant followed quickly by a normal stool and then a currant jelly-like stool of mucus and blood constitutes the classical picture of intussusception. In older children and adults the intussusciptions may be led by a pedicled polyp or a malignant neoplasm. Because of the obviously obstructed character of the symptoms of intussusception, a barium enema is used rather than angiography. Reduction of intussusception is frequently accomplished by fluoroscopic control of the barium enema.

Adults

With adults the most frequent causes of rectal bleeding in the lower tract are anorectal vascular and inflammatory conditions, colorectal neoplasms, either polyps or cancers, ulcerative proctocolitis, diverticular disease, and systemic diseases (Table 4). In the upper tract, ulcer, gastritis, and varices are most frequently responsible for massive hemorrhage. Bleeding with these conditions may also be minimal and chronic. The bleeding associated with gastric carcinoma and polyps generally is occult.

Anorectal conditions

Bleeding from hemorrhoids and fissures is rarely serious in itself. The danger lies in assuming that all rectal bleeding subsequent to the time of diagnosis of the benign condition is still due to the same benign condition. When these patients continue to bleed, regularly or intermittently, the

anorectum must be checked by endoscopic examination at six-month intervals. Each time, a benign condition must be confirmed as the cause of bleeding and a malignant lesion ruled out.

Patients dangerously assume they are "still bleeding from the hemorrhoids." Physicians, unfortunately, fall into the same trap.

Polyps

Rectal and colonic polyps bleed episodically, usually in amounts large enough to color the water in the toilet bowl but rarely in sufficient volume to alter the hemoglobin and hematocrit levels. These neoplasms can and should be removed through a sigmoidoscope or colonoscope, if only to eliminate a source of bleeding that might later cause confusion in differential diagnosis.

Bleeding is a chief sign of cancer. If the gastrointestinal tract can be kept clear of benign bleeding lesions, bleeding then is more likely to arouse suspicion of cancer. While the majority of colorectal carcinomas arise de novo from normal mucosa or from villous adenomas, prevailing opinion allows the possibility of metamorphosis of simple colorectal adenomas to invasive adenocarcinomas.⁵

Colorectal cancers

Bleeding from cancer of the rectum and rectosigmoid is frequently visible and red. Blood is the common presenting sign of low lying cancers. Right colon cancers bleed, but blood is more often occult; the patient visits the physician because of weakness and anemia, and the chemical stool test then shows blood.

Ulcerative proctocolitis

Bloody stools with mucus are characteristic of ulcerative proctitis and ulcerative colitis. The stools may be loose and frequent, or they may be formed and even constipated. Bleeding is rarely the sole symptom of this disease. Other signs usually accompany the bloody stools: cramps, tenesmus, fever, arthralgia, dermatitis.

Diverticular disease

Minimal and occult bleeding are not often encountered in diverticular disease. Ordinarily when bleeding occurs it is massive. Angiography is the prime tool for diagnosis. With a barium x-ray examination the radiologist can confirm the presence of diverticula, but he/she cannot demonstrate that the source of bleeding is or is not in the colon.

Systemic conditions

Systemic conditions of wide variety may be responsible for rectal bleeding. There is nothing characteristic about the blood, which may be bright or dark, moderate, massive, or occult. Either hematochezia or melena may be the first symptom or systemic disease, but more often rectal bleeding will follow in the wake of other signs and symptoms. Petechiae, ecchymoses, jaundice, enlarged lymph nodes, enlarged liver and spleen, melanin spots on the skin or mucous membranes, any of these signs may appear as leads to a diagnosis of blood dyscrasia, lymphoma, or coagulopathy. Platelet count, partial thromboplastin time, or prothrombin time may be abnormal. The history of medications may yield important diagnostic clues.

Bleeding may arise at a single site or in multiple areas, either as extravasations or as frank bleeding from ulcerated mucosa. A mucous membrane ulceration can be the first sign of a leukemic process. Although the mouth is the commonest site of such lesions in agranulocytosis, aplastic anemia, and the other neutropenias, the anorectal region may similarly show breakdown of the mucosa or anoderm.⁹

Applicability of Diagnostic Methods

Gastrointestinal x-rays

Barium x-ray studies are of limited value for localizing the site of gastrointestinal bleeding under the urgent conditions of massive hemorrhage. The barium x-ray demonstration of esophageal varices, peptic ulcer, or diverticula can be of value in these situations, but it does not provide a conclusion upon which the physician can act to control bleeding. The physician cannot be certain from the barium study that the demon-

strated abnormality represents the site of bleeding. Nonurgent situations are a different matter; barium studies in that case provide the most significant resource, a high degree of accuracy, and a relatively noninvasive technique that is expedient, adapted to ambulatory conditions, and economical.

Angiography

This technique is of value chiefly in emergency situations. Successful, selective angiography of the superior mesenteric and inferior mesenteric vessels for hemorrhage requires active bleeding at the time of the study. Additionally, to be successful, vascular radiography must come as a first test. A barium enema will preclude satisfactory visualization and interpretation for several days. If a bleeding point is identified on the diagnostic angiogram, perfusion of a vasoactive substance such as vasopressin or epinephrine can be started immediately. Increasing concentrations of perfusate can be added as the effects are checked at intervals of 20 to 30 minutes. Catheters can be left in place for continuous perfusion over a 24-hour period, depending upon the clinical status of the patient as measured by blood pressure and hematocrit levels and stool output.¹

Angiography is of great help with nonurgent bleeding problems that require vascular definition. Gastrointestinal arteriovenous abnormalities, some of which are responsible for previously unexplained rectal bleeding, are readily demonstrated by angiography.¹⁰

Occult blood

There is a lack of relationship between the amount of blood that is bled into the stomach or intestine and the gross appearance of blood in the stools. As much as 100 ml of blood may be present in a specimen without being visible to the naked eye.¹¹ To determine the amount of blood required for tarry stools, experimental analyses have been made on healthy subjects who swallowed measured quantities of citrated and fresh blood.^{12,13} In some persons 100 ml of ingested blood appeared in the stools as gross blood, either red or maroon and without tarry aspect. In one subject 1400 ml produced tarry stools for five days. The minimal amount of blood for tarry stools appears to be

about 100 ml. The coloring effect on stools depends upon the number of stools, the volume of separate evacuations, and the time intervals between stools.

Tests for occult blood may be positive for ten days after bleeding. Persistence of tarry stools or occult blood does not necessarily indicate continuation of bleeding.

Tests for occult blood in the stools may be done either on a problem oriented basis as indicated by a patient's history or on a routine screening basis. Simple, random clinical tests for occult blood have not been trustworthy. For reasons unexplained, normal persons may lose as much as 3 ml of blood in the stools daily.¹⁴ A single specimen taken from the gloved examining finger is of little value when negative. Tests should be repeated several times under controlled conditions. A patient should be on a meat free diet for four days prior to testing. Specimens may be collected at home as small smears placed on glass slides, such as Hemocult.* An electrophoretic filter paper impregnated with guaiac is developed with a solution of hydrogen peroxide and denatured alcohol.

Endoscopy

Esophagogastrosocopy is employed successfully under emergency and elective conditions. The stomach can be cleared effectively by lavage in cases of massive bleeding to provide satisfactory visualization. Endoscopy is a first measure in upper tract bleeding. Biopsy and photography accomplished with upper tract endoscopy establish an exact diagnosis of gastric lesions. The fiberoptic scopes are used therapeutically to arrest gastric bleeding, making use of both fulgurating tips and snares. Colonoscopy exposes all areas of the colon to the eye for photography, for biopsy, or for removal of polypoid tumors by snare and electrocoagulation. Direct observation of the colonic mucosa is of inestimable value in assessing the extent and degree of ulcerative colitis. Colonoscopy is only elective.

*Hemocult: Smith Kline Diagnostics

No diagnosis

Not infrequently, a clear-cut demonstration of the cause of rectal bleeding is not forthcoming despite the application of all suitable diagnostic measures and cessation of bleeding. If there is recurrence of massive bleeding from the lower tract, a concerted effort should be made to repeat angiography as quickly as possible. If hemorrhage is obviously from the stomach or duodenum, endoscopy would be preferable as a first step. With nonurgent bleeding the physician is in a position to assure the patient that a serious illness has not turned up. If bleeding continues, selected examinations and tests can be repeated at reasonable intervals.

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