

Barium Granuloma:*

An Anorectal Complication of Barium Enema X-ray Studies

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COMPLICATIONS are rare following roentgenologic examination of the colon after administration of barium enema.** Considering the large number of such studies performed daily, the incidence of complications is practically nil. Hartman and Hills⁵ report two cases of rupture of the colon in infants during administration of a barium enema. Kleinsasser and Warshaw⁷ observed barium entering the peritoneal cavity through a perforation of the sigmoid flexure during barium enema examination. Beddoe, Kay and Kaye³ have reported a foreign body granuloma of the rectum which proved to be due to barium following barium enema studies. This, however, is not the same problem as that presented in this report. Swartz⁸ presented to The American Proctologic Society, in 1955, the first report of a case of the same type. Review of the medical literature reveals that there have been no other cases since then.

Report of Cases

Case 1: A physician, aged 43 years, was seen three hours after barium enema x-ray studies. While evacuating the barium he experienced sharp pain at the rectal outlet. The pain became more severe with the development of swelling. When seen three hours later, there was an area of induration measuring approximately 2.0 by 4.0 by 1.0 cm. in the tissues adjacent to the left anterior anal quadrant (Fig. 1). It had the appearance of an external thrombotic hemorrhoid, but on close examination it was discovered that the supposed hematoma was a mass of barium. The postevacuation x-ray film showed the mass of barium under the perianal skin

(Fig. 2). An operation was performed ten hours after the onset of symptoms. The surrounding tissues were indurated and there was beginning necrosis of the overlying skin. The mass (Fig. 3) was excised and hemostasis established. Recovery was uneventful. Microscopic examination of the surgical specimen demonstrated the barium sulfate crystals in the excised tissue (Fig. 4).

Case 2: A man, aged 47 years, had barium enema x-ray studies four days before appearing for consultation. He experienced sharp pain at the anal opening while evacuating the barium and swelling appeared at the margin of the rectal outlet (Fig. 5). He suffered acute discomfort and was immediately hospitalized. At the time of surgery marked induration and inflammatory reaction was noted about the mass. An elliptical incision was made and a mass of barium was removed. Recovery was uneventful and he was dismissed in four days.

Discussion

Several possibilities present themselves to explain how barium gained entrance beneath the perianal skin. One route may have been through an infected crypt. Another possibility is that the lower rectal mucosa or the integument of the anal canal was traumatized by insertion of an enema tip causing a wound which became a portal of entry. The irritant effect of the barium was manifested by the large area of induration of the adjacent perianal tissue.

A review of medical literature does not indicate that barium sulfate *per se* is toxic. The effects of barium sulfate on the lungs was studied by Willson, Rubin and McGee⁹ who instilled barium into the trachea of 20 dogs. Their conclusion was that the aspiration of barium sulfate usually causes little damage.

Foreign body granulomas caused by perforation of the intestine during barium

* Read at the meeting of the American Proctologic Society, Houston, Texas, April 25 to 27, 1960.

** Hereinafter termed barium enema examination or studies.

studies have been reported by several authors.^{4, 6} Beddoe and co-workers³ who described foreign body granuloma in the rectal wall caused by barium sulfate, reviewed the literature and concluded that there was general agreement that small amounts of barium sulfate may remain indefinitely in the peritoneal cavity without causing local complications or signs of toxicity. Kleinsasser and Warshaw⁷ studied the effects of intraperitoneal injection of barium sulfate in animals. Barium sulfate mixed with feces caused inflammation, adhesions, and usually death, but sterile barium sulfate alone caused no ill effects. Ané and Menville² reported cyst formations around unabsorbed barium sulfate injected subcutaneously in animals. They observed essentially no inflammatory reaction and considered that barium sulfate was virtually a nontoxic foreign body which remained

unabsorbed because the particles were too large to be phagocytized. Adolph and Taplin¹ injected intravenously in rabbits an aqueous suspension of micropulverized barium sulfate in a dosage of 0.5 Gm. per kg. of body weight. No immediate or delayed toxic reaction was encountered. In this study various solutions were injected subcutaneously. In one rabbit, normal saline solution, barium solution, normal saline solution contaminated with feces and barium solution contaminated with feces were used (Fig. 6).

Because most radiologists use a barium sulfate tannic acid solution for routine administration of barium enemas, another rabbit was injected subcutaneously with barium sulfate, barium sulfate tannic acid and barium sulfate tannic acid contaminated with feces.

Observation of Rabbit 1 four days fol-

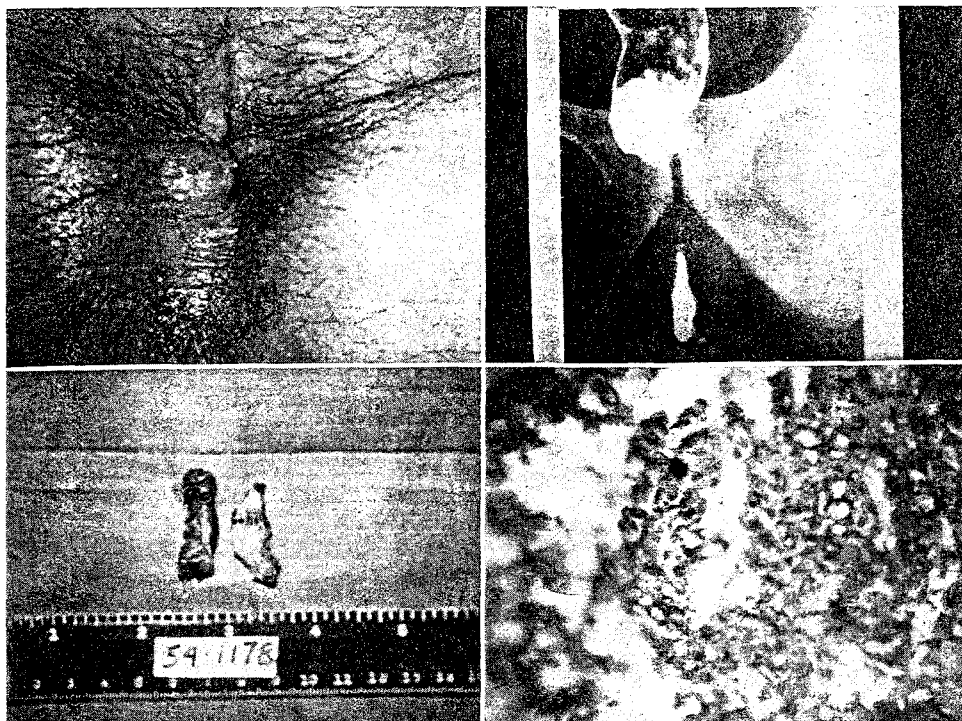


FIG. 1. (Top left) The lesion immediately prior to surgery. Note similarity to thrombosed hemorrhoid. FIG. 2. (Top right) Postevacuation x-ray, showing mass of barium under the perianal skin. FIG. 3. (Lower left) Excised mass. FIG. 4. (Lower right) Note the barium sulfate crystals in the tissue (high power).



FIG. 5. (Top) Deformity prior to excision. Note the white appearance. FIG. 6 (Center) Rabbit No. 1 immediately after injection. FIG. 7. (Bottom) Rabbit No. 2 four days after injections. The most marked reaction is at the site of injection of barium sulfate tannic acid contaminated with feces.

Following injection showed no reaction at the site of injection of normal saline solution. The barium was present as a foreign body with no reaction. The site of injection of normal saline solution contaminated with feces showed the anticipated moderate re-

action as did the site of injection of barium solution contaminated with feces.

Observation of Rabbit 2 four days following injection (Fig. 7) gave similar findings. The barium again was present as a foreign body with no reaction. There was slightly more reaction at the site of injection of barium sulfate tannic acid, but not as much as the reaction of Rabbit 1 to normal saline solution with feces or barium sulfate contaminated with feces. The reaction at the site of injection of barium sulfate tannic acid contaminated with feces appeared earlier and was by far the most violent.

Summary

Two cases of barium granuloma, an anorectal complication of barium enema x-ray studies are presented. The author has searched available medical literature and can find only one other case of the same type reported.⁸ It is believed that these are cases two and three. After subcutaneous injection of various solutions in rabbits it is concluded that barium sulfate itself is not toxic when deposited under the perianal skin. Barium sulfate contaminated with feces is toxic and causes considerable induration. Barium sulfate tannic acid solution contaminated with feces is the most toxic with the reaction appearing much earlier.

A rare proctologic complication of barium enema x-ray studies is presented for information and no condemnation of present x-ray technic is intended.

References

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Appointment

The following two paragraphs are quoted from a letter sent, on February 26, 1962, to Dr. Garnet W. Ault by R. T. Hewitt, Secretary of the Section of Proctology of the Royal Society of Medicine:

"It gives me much pleasure to inform you officially that you have been elected an Honorary Member of the Section of Proctology of this Society.

"This is the highest honour which the Section, with the approval of the Council of the Society, can bestow, and it is our sincere hope that the election will bring you pleasure."

Diseases of the Colon and Rectum applauds The Royal Society of Medicine for the excellence of its judgment and salutes "Gar" Ault in recognition of another of his achievements.