When barium extravasates into tissue during radiologic procedures such as barium enema, it is uptaken by macrophages and forms a granuloma. The result of this is a tumorous mass, fibrosis, and stricture (1), and a cancerous condition is sometimes wrongly suspected. In almost all cases of barium granuloma there is a history of barium enema, a fact which is helpful in making the correct diagnosis. We report a case of barium granuloma of rectum in a 47-year-old man, who did not have history of barium enema. In rare instance, barium granuloma can occur without a history of barium enema and careful interpretation of radiologic image is essential to make a correct diagnosis.

Barium granulomas usually occur after barium enema within 8 cm of the anal verge probably due to minute laceration of rectal wall by enema tip and extravasation of barium during barium enema. We report a case of barium granuloma of rectum in an 8-year-old man, who did not have history of barium enema. In rare instance, barium granuloma can occur without a history of barium enema and careful interpretation of radiologic image is essential to make a correct diagnosis.

Case Report

A 47-year-old man who for many years had suffered occasional left flank pain due to a ureter stone, was referred for further evaluation of a rectal mass after an attack of colicky pain. For urologic evaluation, KUB (Fig. 1A) and intravenous urography (IVU) were performed at a local hospital; a highly attenuated pelvic lesion, about 1 cm in diameter and with fine strands around it, was found to be present. Colonoscopy and biopsy of the lesion were subsequently performed, but before the results of these were known, the patient decided to visit our hospital. Computed tomography (CT) subsequently revealed that the mass was located in the rectal wall (Fig. 1B). The left flank pain had meanwhile subsided, and was presumed to have been due to the ureter stone.

The patient’s medical history showed that five years earlier, during a routine health check, he had undergone upper gastrointestinal series. Nine months later a colonoscopy was performed to evaluate abnormalities of the large bowel prior to hemorrhoidectomy, but no pathologic abnormality was found in any region, including the rectum. At follow-up colonoscopy, performed four years after the first such examination in the local hospital, a rectal mass was discovered. Symptoms such as diarrhea and weight loss were absent, and because there was no history of barium enema, our preoperative diagnosis was a calcified submucosal tumor such as gastrointestinal stromal tumor, and the possible presence of milk of calcium in a retention cyst was also suggested.

The patient underwent lower anterior resection of the rectum. The mass was almost surrounded by rectal mucosa and the pathologic diagnosis was barium granuloma (Figs. 1C-E).

Discussion

Barium granuloma was first reported in 1954 as a pedunculated rectal mass (2), and by 1986, description of
less than 45 cases had appeared in the literature in English (3). In the most recent report (4), a sigmoid polyp was diagnosed at barium enema and follow-up colonoscopy was performed three weeks later. A rectal barium granuloma was confirmed at subsequent follow-up colonoscopy, one year later.

The fact that most barium granulomas occur within 8 cm of the anal verge strongly suggests that insertion of the enema tip probably lacerates the rectal wall to some degree, enabling the barium to enter deeper tissue (5). An inflammatory reaction ensues, a collection of cells (fibroblasts, multinucleated cells, macrophages, and

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**Fig. 1.** Barium granuloma of the rectum in 47-year-old man.

A. KUB shows radiopaque lesion in pelvis (arrow).

B. Precontrast CT scan demonstrates high attenuation mass with beam hardening artifact in rectal wall (arrow). Fine strands of high attenuation are noted in the periphery of main lesion.

C. Gross specimen shows white round plaque under the rectal mucosa (arrows).

D. Photomicrograph of low power magnification (H & E stain; original magnification, × 10) demonstrates large collection of histiocytes which have a characteristic grayish green birefringence. Note the well-circumscribed margin of granuloma (arrows) and overlying intact mucosa (arrowheads).

E. High power magnification microscopy (H & E stain; original magnification, × 200) shows histiocytic cells containing refractile materials in submucosal layer. Several dystrophic calcifications (arrows) formed by dead barium-laden histiocytes are also seen.
lymphocytes) characteristic of a granulomatous reaction forming around the barium sulfate crystals (6). The initial ulcerations usually heal within eight weeks (7), but in the case reported by Lewis et al. (8), a 1 cm-sized ulcerated lesion 6 cm from the anal verge was detected two years after a barium enema.

Our case is differs from those previously reported in that our patient never underwent a barium enema. The only history of barium contact was during UGIS, and trauma was, therefore, a very unlikely cause of the barium granuloma.

Another possible explanation for the etiology of a barium granuloma without antecedent trauma is an intramural diverticulum. During its early stage of development, a diverticulum may reside in a muscle layer and will later protrude toward the serosa, with an opening to the lumen. Barium can be trapped within an intramural diverticulum and subsequent inflammatory reaction may seal off its orifice and give rise to an intramural barium granuloma. At low-power magnification, the mass in our case was relatively well demarcated, a feature which may support this hypothesis. Another possible explanation is barium leakage through a small occult mucosal injury perhaps caused by passage of a hard stool.

In conclusion, barium granuloma should be considered when a highly-attenuated rectal lesion occurs in a patient previously exposed to barium, even without a history of rectal cannulation; the presence of fine strands at the periphery of the main mass might suggest this diagnosis. Final diagnosis depends on the biopsy findings: to obviate the need for surgery, as in our case, the radiologist should alert the pathologist to the possible presence of barium-laden histiocytes in rectal tissue.

References