

Case Report

Fatal Hypersensitivity Reaction During a Barium Enema

Peter J. Feczko,¹ Stuart M. Simms, and Nihat Bakirci

Barium contrast examinations of the gastrointestinal tract are considered relatively innocuous procedures; most major complications result from perforation of the bowel. Allergic reactions to the contrast material have long been considered extremely rare, although there have been increasing reports of allergic complications due to the contrast material or glucagon [1, 2]. Most reports have described fairly mild allergic reactions with pruritus, urticaria, and some edema [1, 2]. Occasionally, the reactions have been more serious, and respiratory distress has occurred [3]. At least one well-substantiated death, which appeared to be due to an anaphylactoid response, has occurred during a barium enema [4]. We report a case of a woman with an extensive history of allergy who had a fatal anaphylactoid reaction during a single-contrast barium enema.

Case Report

The patient was a 49-year-old woman who had a colonic examination performed for occult blood in her stool. The patient had no other history of intestinal problems and had never undergone a contrast-enhanced study of the gastrointestinal tract. Pertinent clinical information included a history of atopic dermatitis, allergic rhinitis, and asthma for which the patient was receiving medication. A single-contrast colonic examination was undertaken by the staff radiologist, and no glucagon was given to the patient. The barium sulfate suspension used was Sol-o-pake (E-Z-Em, Inc., Westbury, NY). Tap water was used to make the suspension. The barium column had reached approximately the level of the splenic flexure a few minutes after the examination began, when the patient began to complain of itching and warmth over her upper extremities. The patient indicated to the radiology personnel that she felt she was getting an allergic

reaction, and the study was terminated at that point. Within minutes the patient began to experience increasing dyspnea, and the emergency room was notified. A full-time emergency room physician and personnel arrived while the patient was still conscious. The patient was sitting up gasping for breath and wheezing; then she lay back on the table, became cyanotic, and may have had a slight seizure. The patient was then intubated and resuscitative efforts were undertaken, including IV epinephrine and cardiopulmonary resuscitation, but these attempts were unsuccessful.

An autopsy was performed on the cadaver by the medical examiner. It showed severe mucous plugging of the bronchi, along with pulmonary edema and emphysema. No evidence of pulmonary emboli, coronary artery disease, or damage to cardiac muscle was seen. The colon was thoroughly examined at the autopsy and was intrinsically normal, with no evidence of colitis, inflammation, neoplastic processes, or other disease. There were no tears or perforations evident in the mucosa. Review of radiographs that were obtained during the initial part of the study showed no abnormalities. A toxicologic analysis of the barium used during the study did not show any unusual substances. The final cause of death was attributed to acute asthmatic bronchitis occurring during a barium enema examination.

Discussion

Until the last few years, it was considered relatively rare for a patient to develop an allergic reaction during a barium study of the gastrointestinal tract. More recently, several series of patients have been reported that have had various types of allergic reactions during barium studies [1-3]. One article specifically requested a major manufacturer of barium to review their allergic reactions and found that the frequency of

Received March 13, 1989; accepted after revision April 26, 1989.

¹ All authors: Department of Diagnostic Radiology, Henry Ford Hospital, 2799 W. Grand Blvd., Detroit, MI 48202. Address reprint requests to P. J. Feczko.

any type of reaction was approximately 1 in 750,000 examinations performed [2]. Another survey was performed that included a large number of physicians, the commercial suppliers of barium, the Food and Drug Administration, and a review of the literature. This study concluded that reactions during barium studies are extremely unusual and typically are mild [5]. A few occurrences of severe allergic reaction during a barium enema have been reported, but the patients were resuscitated [2, 3]. One case report is known in which the patient had an anaphylactic type of reaction during an air-contrast barium enema which led to death [4]. In that case, the patient had received IV glucagon.

The presence of pruritis, urticaria, and bronchospasm in this patient suggests an allergic or anaphylactic type of response [6]. Because similar chemical mediators are released during reactions to contrast medium and during anaphylactic reactions, many like to categorize these as anaphylactoid reactions [6, 7]. Although these reactions are typically seen with intravascular administration of medications or contrast agents, it should be remembered that the rectum serves as a route of administration.

As noted earlier, most reactions during barium studies are relatively mild. However, our patient experienced a more severe hypersensitivity reaction, with increasing shortness of breath and wheezing. This reaction was produced by bronchospasm as well as by an increase in lung secretions, which was evident at autopsy. This airway dysfunction during an anaphylactoid reaction is one of the most serious complications. Forty percent of the deaths related to anaphylactoid reactions have been due to respiratory compromise [6]. Although our patient was given the appropriate therapy consistent with an anaphylactoid reaction, the patient did not respond. This is not unusual, however, because patients with

chronic asthma receiving long-term medical therapy become desensitized and are less likely to respond to the usual doses of epinephrine than would a normal patient [6].

Although barium sulfate itself is not the agent responsible for the reaction, many additives are present within the mixture. One agent in question is methylparaben, which was shown as a possible source of reaction in a previous study [1]. However, in another article, it is stated that methylparaben is no longer used as an additive for barium studies [4]. In our case, we have not been provided with a written list of additives by the manufacturer and thus cannot evaluate for possible allergens. Glucagon also has been implicated, but in our case, the patient did not receive glucagon, and therefore it is not an issue.

Although this type of complication is extremely rare, any type of complaint or observable reaction by a patient during a barium study must be attended to promptly, particularly if the patient has a history of allergies.

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