Case Reports

How Safe are the Xenogeneic Hemostats? — Report of a Case of Severe Systemic Allergic Reaction

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Abstract: We report herein the unusual case of a 55-year-old woman who developed a severe systemic allergy to Avitene (microfibrillar collagen hydrochloride), a xenogeneic agent sometimes used for topical hemostasis in laparoscopic cholecystectomy. The patient developed fever, general fatigue, mild liver dysfunction, and prominent eosinophilia postoperatively. A skin allergy test confirmed that these abnormal findings were attributable to an allergic reaction to Avitene.

Key Words: Avitene, allergic reaction, laparoscopic cholecystectomy

Introduction

Since laparoscopic cholecystectomy was first documented in 1990,1 many surgeons have performed this procedure, and laparoscopic surgery has now become widely practiced throughout the world. However, one of the major disadvantages of laparoscopic cholecystectomy is the crucial problem of blood loss. Especially troublesome is achieving hemostasis in the hepatic bed near the neck of the gallbladder or the cystic duct due to the risk of injuring the adjacent tissues. To circumvent this problem, several materials have been developed and used as reinforcement devices for hemostasis.2-4 Avitene (microfibrillar collagen hydrochloride, Alcon, Humacao, Puerto Rico),4 is a most powerful device for hemostasis. Although Avitene is prepared from edible bovine skin, to our knowledge, there has never been a report of systemic allergic reaction. We present herein the case of a patient who developed a severe systemic allergic reaction following the intraoperative use of Avitene.

Case Report

A 55-year-old woman was admitted to our department for surgical treatment of cholecystolithiasis. She underwent laparoscopic cholecystectomy without any problems during the procedure. After surgery, Avitene 1g was scattered over the liver bed to ensure hemostasis. Her postoperative course was uneventful until 5 days after surgery, when she complained of general fatigue, nausea, and mild right hypochondralgia. The patient developed a fever of 38°C and pathological examinations revealed moderate leukocytosis and mild liver dysfunction without jaundice, which lasted for more than 3 weeks (Fig. 1). Because an abdominal abscess was suspected, abdominal echography and computed tomography (CT) were performed. The echogram demonstrated a high-density area, possibly due to an Avitene mass in the liver bed after the gallbladder had been removed (Fig. 2A). The CT scan demonstrated a high-density area which contained a partly low-density area at the liver bed, indicating the presence of a foreign body in the liver bed from where the gallbladder had been removed (Fig. 2B). Severe eosinophilia was noted 2 weeks postoperatively, which lasted for 2 weeks. All these abnormal findings subsided without additional surgical treatment 5 weeks after the initial laparoscopy. Since an allergic reaction against a foreign substance was highly suspected, a skin allergy test against the antibiotics used and Avitene was performed. Avitene was dissolved in saline at a concentration of 0.1g/ml. After centrifugation, the soluble fraction was taken and used in the skin test. A 0.1-ml volume of Avitene, at concentrations varying from 0.02 to 0.1mg/ml, was injected subcutaneously into the patient, as were the saline and antibiotic solutions. The skin test revealed a notable allergic reaction to Avitene, but not to the other substances (Fig. 3). After the skin test, the fever and eosinophilia recurred, but spontaneously subsided 2
days later. The patient revealed no past history of having ever received xenogeneic serum or of any episode of an allergic reaction to a foreign substance. An IgE-RAST (radioallergosorbent test) against bovine serum albumin revealed that the antibody titer in the patient's serum was less than 0.34 UA/ml (normal <0.34 UA/ml). She was discharged 47 days after her operation without any sequelae.

Discussion

According to previous reports, Avitene disappears within 2–3 months, induces minimal tissue reaction, and its clinical use in the peritoneal cavity is considered safe. Thus, despite the fact that it is prepared from bovine skin, its clinical use appears to be safe, although a few reports of granuloma formation have been documented. However, the patient whose case is presented here exhibited a severe systemic allergic reaction against Avitene. To our knowledge, this clinical report provides the first description of a systemic allergy to Avitene.

We initially diagnosed our patient as having an abdominal abscess in the liver bed after the cholecystectomy, but an abdominal echogram and CT scan could not definitely reveal the presence of an abscess in the peritoneal cavity. Moreover, remarkable eosinophilia occurred 10 days after the manifestation of infectious signs such as fever and leukocytosis. A skin allergy test against several foreign materials, including the antibiotics used, revealed that the patient had manifested a systemic allergic reaction against Avitene. This allergy was considered to be a Type IV allergic response since the IgE RAST against Avitene was negative.

The recent increasing popularity of laparoscopic surgery around the world requires more refined supplementary devices during surgical procedures. Control of bleeding is a historically important surgical variable, and all factors that contribute to hemostasis should be performed in tractable bleeding. During laparoscopic surgery, the surgeon is unable to employ such maneuvers as suture fixation as in conventional laparotomy. Thus, any material available for hemostasis should be applied if it induces no adverse effects. On the other hand, our experience provides a caution to surgeons against the use of xenogeneic hemostatic agents. However, the growing number of laparoscopic cholecystectomies being performed has increased the demand for a strong hemostat such as Avitene, and