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Esophago-gastric ‘Foam-Bezoar’ – report of a new entity

Introduction

Bezoars are collections of indigestible material like hair, vegetable or fiber, that accumulate in the gastrointestinal tract. They are encountered usually in the stomach and present with myriad complaints ranging from subtle symptoms like epigastric pain, nausea and vomiting to serious complications like outlet obstruction and perforation. We report a unique case of an upper gastrointestinal bezoar due to “foam”; possibly the first human case report of a bezoar which had taken the shape of esophagus and stomach. The bezoar was successfully removed and the patient is doing well on follow-up.

Case report

A 21-year-old air conditioning mechanic was referred from our Toxicology Department with history of retrosternal discomfort, upper abdominal pain and fullness. He had attempted suicide 24 hours prior to admission, by consuming several chemical fluids used as insulation in freezers, refrigerators and for building construction.

Systemic examination was unremarkable. Abdominal examination revealed a firm, smooth movable mass in the epigastrium. X-ray chest and abdomen did not contribute to the clinical assessment. Plain CT scan of the abdomen and chest showed a filling defect extending across the esophagus

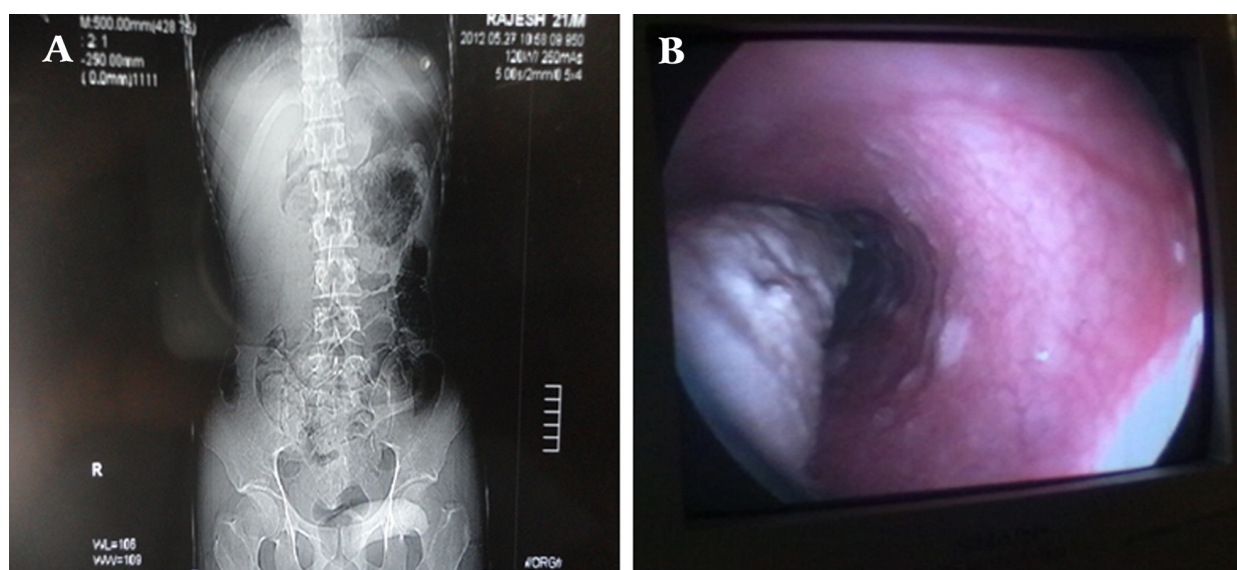


Figure 1: A) CT scan showing filling defect in the stomach, B) upper GI endoscopy showing whitish cylindrical foreign body in the esophagus

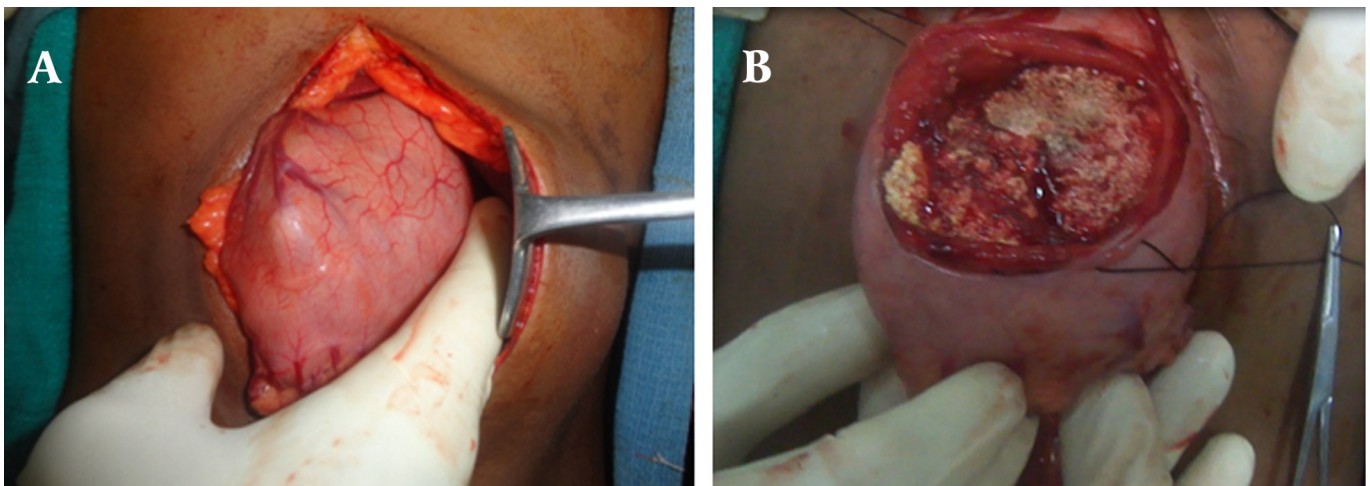


Figure 2: A) Intra-operative picture, B) foam bezoar being extracted via an anterior gastrotomy



Figure 3: Fully retrieved specimen of the esophago-gastric foam bezoar

and stomach (**Figure 1A**). Upper gastrointestinal endoscopy showed a white mass occupying the entire esophagus and stomach. The scope could be passed along the mass up to the duodenum as it was not adherent to the wall (**Figure 1B**). Attempts at endoscopic removal failed. He was taken up for surgery with a supra-umbilical midline incision. There was a movable mass in the entire stomach extending into the esophagus (**Figure 2A**). With an anterior gastrotomy, the entire mass which was in the shape of esophagus and stomach was removed in-toto (**Figures 2B & 3**). The gastrotomy was closed in a single layer using interrupted 00 vicryl sutures. The patient made an uneventful recovery. Analysis of the material retrieved showed it to be a combination of agents used to prepare polyurethane foam.

Discussion

Polyurethane polymers are formed by combining two or several bi- or higher functional monomers. When they combine by the process of condensation they form a highly resilient foam.¹ These are used for foam seating, rigid foam insulation panels, microcellular foam seals and gaskets, durable elastomeric wheels and tyres, automobile suspension bushings and many other purposes. There are two important components which constitute polyurethane foam, isocyanate and polyol. Polyurethane can be made in a variety of densities and hardness by varying the type of monomers used and adding other substances to modify their characteristics notably density or enhance their performance. In industrial practice various catalysts and polyols are used to synthesize “memory foam” which is supposed to be softer at skin temperature than at room temperature. Fully reacted polyurethane polymer is chemically inert.²

We conducted an in vitro experiment by mixing the two liquids which the patient had consumed. We found that it expanded 30 times its initial volume over a period of 3 minutes, became hard and took the shape of the container used (**Figure 4**). The external temperature during the reaction, measured using an industrial thermometer was 94°C. But it did not cause any thermal injury to our patient’s esophagus or stomach and it solidified taking the shape of the esophagus and stomach. Extensive literature search did not reveal any similar report involving the esophagus and stomach. There is one case of rectal impaction by epoxy resin following self administration of a liquid used as masonry adhesive for anal sexual gratification.³

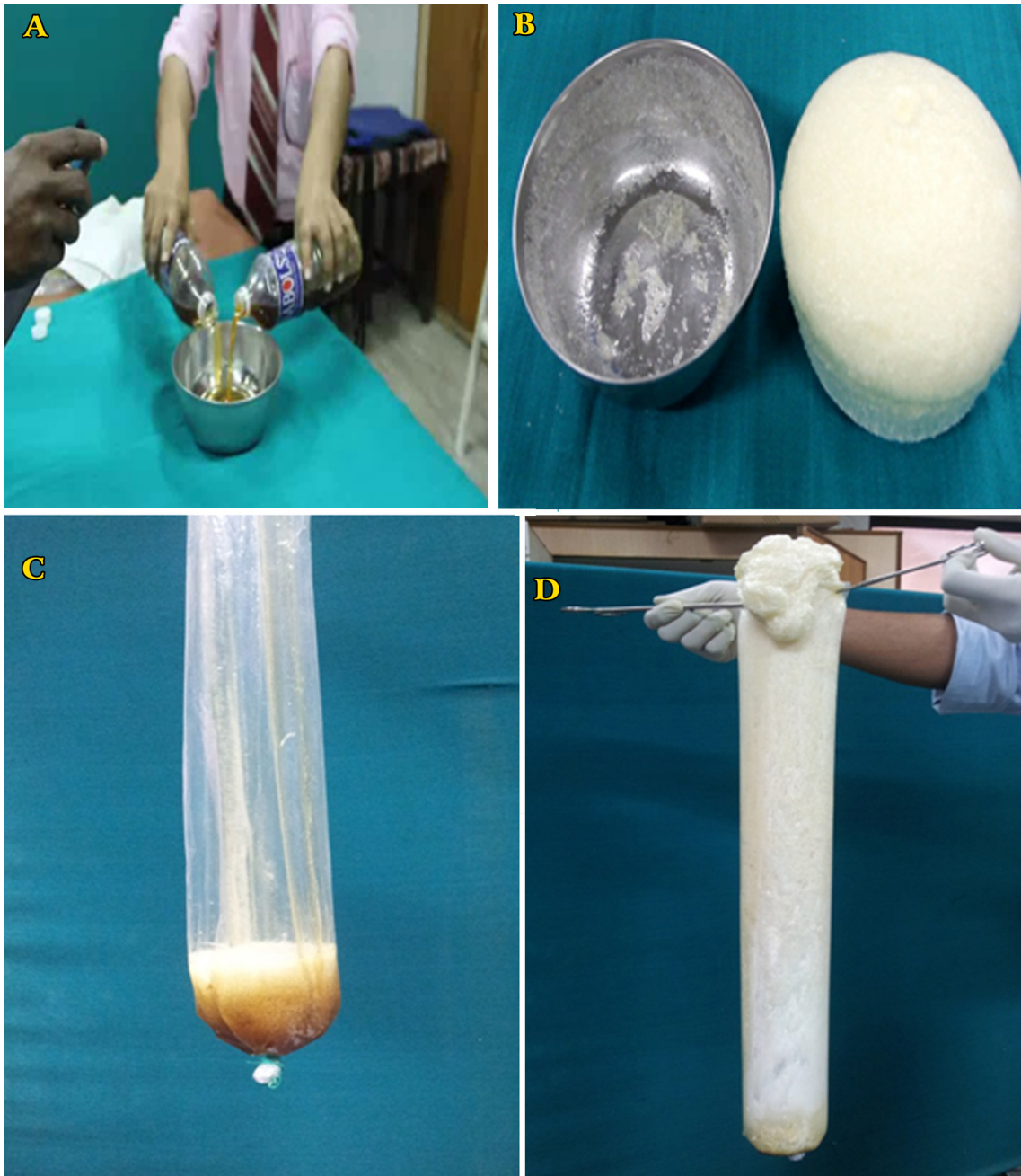


Figure 4: (A-D) Ex-vivo mixing of desmodur (di-isocyanate) and desmophen (polyhydroxy ester) forms a memory foam

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