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Shock-Wave Therapy of Gastric Outlet Syndrome Caused by a Gallstone

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A patient with gastric outlet syndrome (Bouveret's syndrome) caused by a large gallstone impacted in the duodenal bulb was successfully treated by extracorporeal shock-wave lithotripsy. Thus, open abdominal surgery could be avoided. For disintegration of the stone, three consecutive lithotripsy procedures were necessary. Thereafter, stone fragments could be extracted endoscopically. Extracorporeal shock-wave lithotripsy could become a nonsurgical alternative in patients with obstruction of the duodenum caused by a gallstone.

Cholelithiasis is complicated by gallstone ileus in a very small percentage of patients (1,2). Gastric outlet syndrome (Bouveret's syndrome) caused by a gallstone obstructing the duodenal bulb is a rare but nevertheless life-threatening event that occurs in about 3% of the patients with gallstone ileus (3). Until recently, enterolithotomy has been the only treatment choice (4).

Successful disintegration of gallstones using extracorporeally generated, focused shock waves has recently been introduced as a nonsurgical alternative therapy for gallbladder calculi as well as for stones in the bile duct (5,6). A severely ill patient presented with obstruction of the duodenum caused by a large gallstone. The stone was clearly identified by ultrasonography. Therefore, we attempted to treat this patient by means of an ultrasound-guided gallstone lithotripter to avoid open abdominal surgery.

Materials and Methods

Patient's History

A 67-yr-old male patient was admitted to the hospital as an emergency case (respiratory failure because of aspiration, weight loss, hypoglycemic coma). Suction via a nasogastric tube yielded 3 L of gastric juice. Endoscopy revealed a large stone obstructing the duodenal bulb. Repeated attempts to remove the stone endoscopically failed. A plain film of the abdomen revealed gas in the bile ducts. Ultrasonography disclosed aerobilia, a stone-free gallbladder, and a large stone (4.5 cm in diameter) in the duodenum, with no intestinal gas between the abdominal wall and the stone. The stone was radiolucent on x-ray (Figure 1). The patient received parenteral nutrition. After the general condition of the patient had improved, extracorporeal shock-wave lithotripsy by means of a biliary lithotripter guided by ultrasound was considered, and the patient's written informed consent was obtained.

Shock-Wave Treatment of the Gallstone Obstructing the Duodenum

The patient was treated three times by extracorporeal shock-wave lithotripsy using an advanced gallstone lithotripter (MPL 9000; Dornier Medizintechnik, Germering, F.R.G.). This lithotripter employs ultrasound for stone location and targeting. The patient was treated in a prone position. The shock-wave treatments were performed without any analgesic agent or sedative. The first lithotripsy was performed with 1700 discharges at 22 kV within 48 min and did not result in changes of stone size. The second treatment was performed 1 day later with 1400 discharges at 21 kV within 40 min and resulted in diminution of stone diameter by ~1 cm. At repeat endoscopy, the stone could not be removed. Therefore, a third treatment was performed 10 days later with 1500 discharges at 23 kV within 40 min.

Thereafter, multiple small stone fragments could be extracted endoscopically, the duodenal obstruction was relieved, and the patient's condition improved. Regular food and beverages were tolerated well, and a weight gain of >5 kg within 1 mo was observed. Radiologically, free passage of contrast medium was demonstrated (Figure 1). A biliary enteric fistula was no longer detectable, radiologically or endoscopically.

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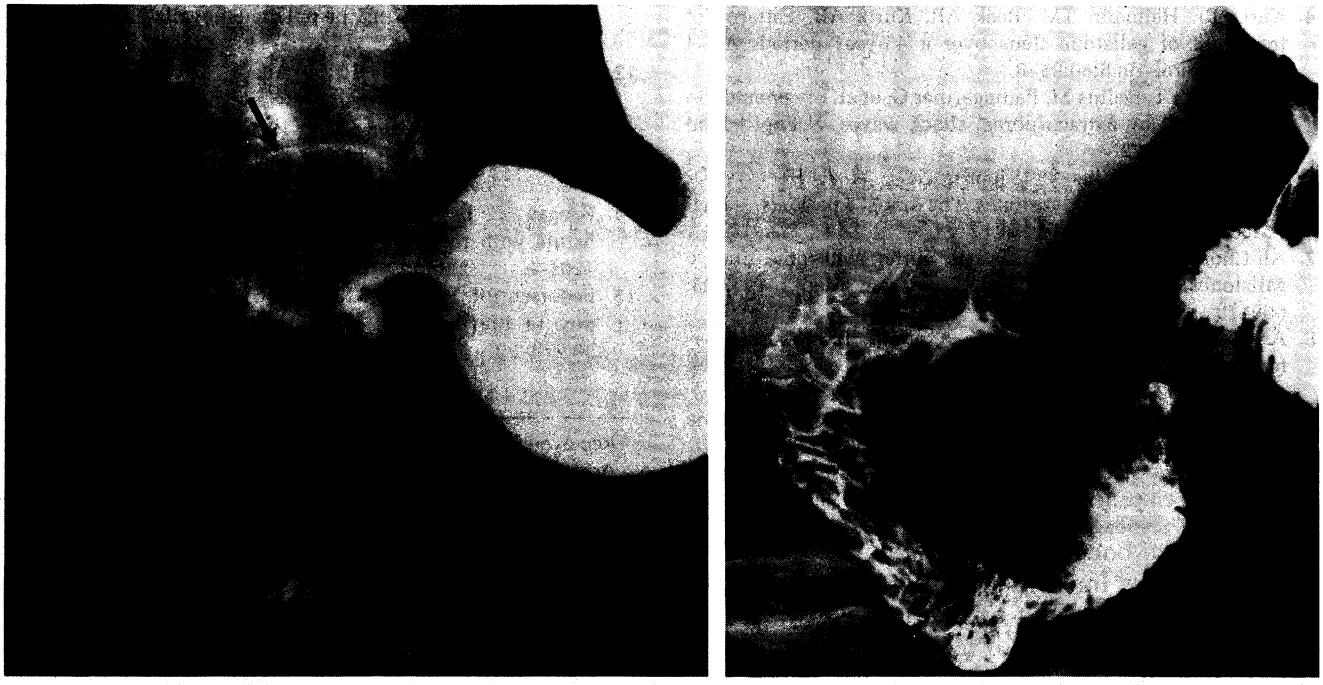

Figure 1. Upper gastrointestinal tract series demonstrating obstruction of the duodenal bulb caused by a large gallstone (*arrows, left*). After fragmentation of the stone by extracorporeal shock-wave lithotripsy and endoscopic extraction of the fragments, free passage of contrast material is observed (*right*).

Discussion

Obstruction of the duodenum by a gallstone causing gastric outlet syndrome (Bouveret's syndrome) is a rare but severe complication of gallstone disease (7–9). The treatment of choice of gallstone ileus is surgical removal of the obstructing stone (4,10). As most patients with gallstone ileus are elderly and often present in critical condition, the mortality is as high as 25% (11,12). To our knowledge, nonsurgical alternatives have not been described previously.

Gallstones that cause intestinal obstruction usually enter the intestinal tract via a cholecystenteric fistula (13,14). In most patients, no history of previous acute cholecystitis is obtained, and the diagnosis often is delayed (2). The stones enter either the stomach, the small intestine, or the large bowel. In the small bowel, the stones rarely remain in the duodenum but usually travel for varying length aborally before causing symptoms of obstruction (12). In our patient, the stone probably had entered the duodenum via a biliary enteric fistula. However, at the time of extraction of stone fragments a fistula could no longer be detected. Different opinions exist regarding removal of a stone-free gallbladder after treatment of gallstone ileus (4,10,13).

Most stones causing obstruction at various sites in the intestinal tract will be hidden by intestinal gas, and ultrasonography will often fail to localize such stones. However, in our patient ultrasound clearly detected the stone in the duodenum. Successful sonographic identification of stones in the duodenal bulb recently has also been reported by other investigators (15). As shock waves are attenuated by gas-filled structures, only stones not hidden by gas can be treated safely and successfully by extracorporeal shock-wave lithotripsy. Such a favorable situation can be found in Bouveret's syndrome but probably not in most other cases of gallstone ileus. In our patient, shock-wave lithotripsy was used successfully for the treatment of obstruction of the duodenum by a gallstone clearly detected by ultrasound. No adverse effects of this nonsurgical therapy were observed.

According to our experience, extracorporeal shock-wave lithotripsy combined with endoscopic extraction of fragments could become an alternative, nonsurgical therapy for gastric outlet syndrome caused by a gallstone.

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