



# Gastric Rupture: A Danger of Postoperative Oxygenation with a Nasal Catheter

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## ABSTRACT

On the fifth postoperative day after pulmonary lobectomy, a 64-year-old man accidentally connected his nasal catheter (providing six liters of oxygen per minute) to his nasogastric tube.

Tension pneumoperitoneum occurred with acute respiratory distress. Gastric rupture occurring during cardio-pulmonary resuscitation has been reported several times. Our case illustrates another unusual cause of tension pneumoperitoneum.

Emergency percutaneous decompression was effected with needle aspiration, followed by laparotomy for gastric repair covered by an omental flap.

*Key words:* Gastric rupture; nasal catheter; postoperative oxygenation.

## INTRODUCTION

Several cases of gastric rupture occurring during mouth-to-mouth resuscitation and external cardiac massage have been reported<sup>1-3</sup>.

A case of gastric rupture due to accidental connection of a nasal catheter, used as a means of postoperative oxygenation, to a nasogastric tube is reported here.

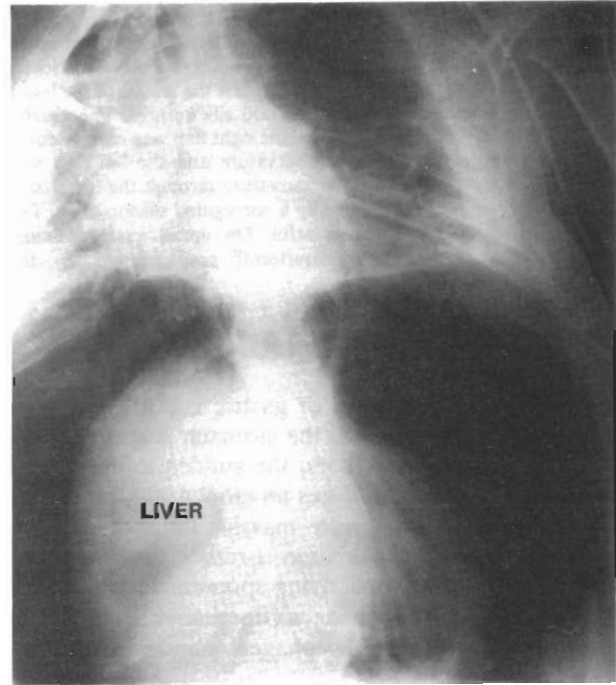
To our knowledge, this is the first such case reported in the surgical literature although there is one report of gastric rupture resulting from the use of a nasal oxygen catheter which accidentally transfixed the cricopharyngeus muscle<sup>4</sup>.

## CASE REPORT

A 64-year-old man had undergone pulmonary lobectomy for an epidermoid carcinoma. On the fifth postoperative day, during an episode of confusion, he disconnected his nasal catheter providing six liters of oxygen per minute. He tried to reconnect the catheter, but connected it to his nasogastric tube.

Distention of the abdomen was noticed two minutes later by the ICU nurse on duty. The systolic blood pressure was 60 mmHg, and the femoral pulses were barely perceptible. Marked cyanosis was

present in the lower abdomen and lower limbs. The patient was in obvious respiratory distress. A diagnosis of tension pneumoperitoneum with impending respiratory and cardiac failure was suspected. The trachea of the patient was intubated and dopamine started (6  $\gamma$ /kg/min). X-rays of the thorax and the abdomen confirmed the diagnosis of tension pneumoperitoneum and left hepatic displacement (Fig. 1). The most likely cause of this tension pneumoperito-



**Fig. 1.** X-rays of the abdomen demonstrating a large pneumoperitoneum with the liver displaced medially.

neum was a diastatic perforation of the stomach with consequent inferior vena cava compression causing cyanosis of the lower part of the body. A 14 gauge needle was inserted just above the umbilicus to decompress the peritoneal cavity and the patient was transferred to the operating theater for laparotomy.

At laparotomy, a 6 cm subserosal hematoma extending from the angular portion up to the gastroesophageal junction (Fig. 2), was found on the lesser curvature of the stomach, but no actual full-thickness tear or perforation of the lesser curvature was found. The liver, the spleen, the colon and the small bowel were normal, and



**Fig. 2.** Operative field: 6 cm subserosal hematoma of the lesser curvature (no obvious full-thickness perforation of the gastric wall).

there was no soiling of the peritoneal cavity with gastric contents. The lesser curvature was explored over a 3 cm length in the region of the subserosal hematoma after careful ligation of the small blood vessels arising from the small omentum.

The anesthetist then gently distended the gastric pouch by injecting 200 ml of air through the nasogastric tube. The surgeon clamped the pyloric portion of the stomach with his fingers and the upper portion of the peritoneal cavity was filled with a normal saline solution to localize the air leak, but none could be clearly demonstrated. It was decided to approximate the tissues of the lesser curvature by sero-serous interrupted 000 silk sutures. The greater omentum was divided into two flaps, the right flap was used to cover the anterior aspect of the lesser curvature and the left flap was mobilized up to behind the lesser curvature through the lesser sac. Subhepatic drainage was assured by a corrugated silastic drain. The postoperative course was uneventful. On upper gastrointestinal radiography performed on the fourteenth postoperative day, the stomach appeared normal.

## DISCUSSION

The actual mechanism of gastric rupture due to a massive influx of gas into the stomach is still unclear. According to some authors, the sudden influx of gas under high pressure produces an esophageal laceration, whereas a slower but more massive influx leads to a gastric tear<sup>1</sup>. This explanation is rather similar to that for the mechanisms underlying spontaneous full-thickness rupture of the esophagus (Boerhaave's syndrome) as against simple gastroesophageal lacerations (Malloxy-Weiss syndrome)<sup>5</sup>.

Complete gastric rupture or subserosal tears have been reported after forceful mouth-to-mouth resuscitation combined with external cardiac massage<sup>1-3</sup>, inges-

tion of large quantities of beer or sparkling beverages<sup>6</sup> and sudden accidental discharge of a compressed air hose or fire extinguisher near a patient's mouth<sup>5,7</sup>.

The lesion in all the cases reported, was confined to the lesser curvature, possibly because it is less elastic and has fewer mucosal folds than the rest of the stomach<sup>2</sup>. In Safar's study<sup>8</sup>, in which anesthetized volunteers were given mouth-to-mouth respiration by untrained personnel, up to 1900 ml of air was found in the stomach even after only a few incorrectly performed breaths. This is a harmless situation, but not when mouth-to-mouth respiration is combined with external cardiac massage, as the intragastric pressure is further increased by the sternal compression. In hospital, early endotracheal intubation will minimize this danger, and if the epigastrium is distended, a nasogastric tube should be used immediately to decompress the stomach.

If gastric rupture is suspected and if respiratory distress due to a tension pneumoperitoneum is present, then this should first be reduced with a needle inserted into the peritoneal cavity. Linch *et al.*<sup>3</sup> recommend that the needle be inserted in the eighth intercostal space, in the right anterior axillary line, as the liver is often displaced medially (Fig. 1).

The mortality of accidental gastric rupture has been reported as 80%<sup>1</sup>. Peritonitis is more likely to occur in stomachs containing food at the time of rupture stomach, as this causes massive peritoneal soiling. Prompt surgical exploration, suture of the ruptured stomach and the formation of an omental flap cover is the procedure of choice<sup>1-3</sup>.

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