

CASE REPORT

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1.5% Lugols undiluted contains 15,000 ppm iodine. For the killing of bacteria and other microbes, the strongest solution needed is approximately 500 ppm. 1.5% solution is 30 times stronger than this. When 1 mL of 2% Lugols is diluted into 2 oz (60 mL) water, the final concentration of I2 iodine is 333 ppm (and 500 ppm I-)

Acute esophageal and gastric injury: Complication of Lugol's solution

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Abstract

Several new technologies have been developed to improve the diagnostic capability of conventional endoscopic techniques. One of these most frequently used methods is chromoendoscopy with Lugol's solution in the esophagus to detect malignant lesions. This method has been used for several decades and is generally considered as a safe method, only a few cases of side effects having been reported. We describe a case of acute esophageal and gastric mucosal damage after application of Lugol's solution during endoscopy in an 84-year-old woman. Endoscopists should be aware of the potential for adverse reactions to iodine staining.

Key Words: Endoscopy, Lugol's solution, mucosa

Introduction

Several new technologies have been developed to improve the diagnostic capability of conventional endoscopic techniques. One of these most frequently used methods is chromoendoscopy with the application of Lugol's solution in the esophagus to detect malignant lesions. Lugol's solution has been used for early detection of cancers and dysplastic lesions of the esophagus since the 1960s [1]. Mucosal lesions such as dysplasias and frank carcinomas either have a low glycogen content or contain no glycogen and therefore exhibit little or no iodine staining [2,3], while normal esophageal mucosa, which contains large quantities of glycogen, is deeply stained by iodine [4]. However, iodine can irritate the mucosa, resulting in retrosternal pain and discomfort [5]. We report a case of acute esophageal and gastric injury caused by application of Lugol's solution during chromoendoscopy.

Case report

An 84-year-old woman was admitted to Kangnam, St Mary's Hospital, Seoul, Korea, because she had

suffered from dyspepsia for the previous three months. She had been treated with angiotensin-converting enzyme inhibitors because of congestive heart failure. Physical examination revealed no abnormalities apart from mild epigastric tenderness. Application of 10 ml Lugol's solution containing 1.5% iodine to the esophageal mucosa using an endoscopic spraying catheter (PL; Olympus Optical Co. Ltd., Tokyo, Japan) revealed a suspected dysplastic mucosal lesion in the mid-esophagus (Figure 1). A mucosal biopsy was taken after the chromoendoscopy. The patient complained of epigastric discomfort and retrosternal pain after the endoscopy. Because the symptoms were not severe, the patient was placed under observation without further evaluation or medication. The next day, the patient complained of severe retrosternal and epigastric pain. Subsequent endoscopy revealed that the esophageal mucosa was acutely necrotized, edematous, bluish in color, and hemorrhagic in appearance. The gastric mucosa contained acute lesions from the cardia to the antrum (Figure 2). The results of laboratory tests were inconclusive. Because the patient had suffered from congestive heart failure, angiography was carried out using a 64-channel CT

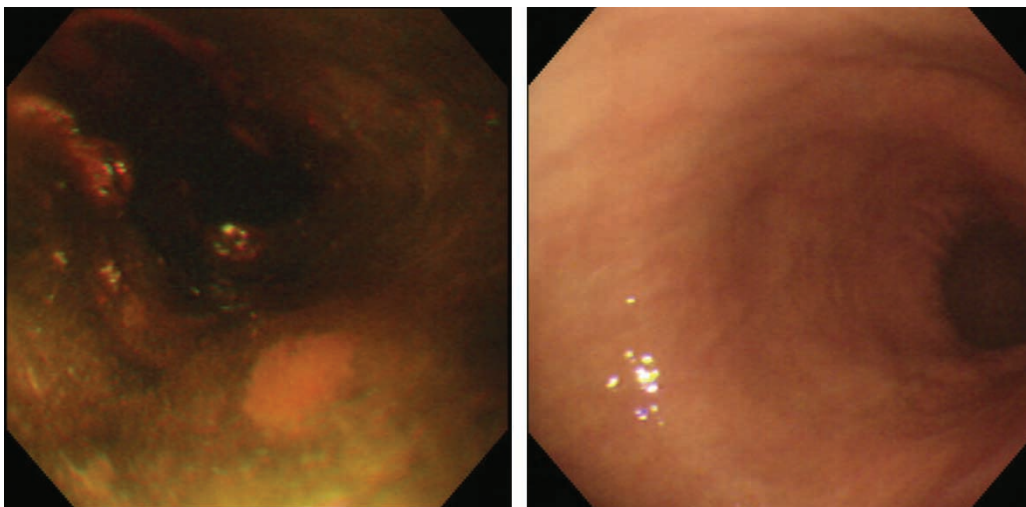


Figure 1. Initial endoscopy showing that an area of the mid-esophagus is not stained by Lugol's solution (*left panel*) and that the appearance of the stomach is normal (*right panel*).

scan to rule out thrombosis and embolism. The results of the CT scan were normal. The patient was treated with supportive care. The injured mucosae of the esophagus and stomach healed after 10 days, leaving scars (Figure 3).

Discussion

Lugol's solution is a mixture of potassium iodide and iodine. Screening studies of patients at high risk of squamous cell cancer consistently show that the diagnostic accuracy of endoscopy is increased when Lugol's solution is used to stain the mucosa [6,7]. However, Lugol's solution can cause substernal burning and nausea. High concentrations of iodine (3–5%) are associated with a greater risk of corrosion of the gastrointestinal tract and shock than low

concentrations [8]. The iodine concentrations of Lugol's solutions that are used in hospitals range from 0.5% to 5%. Lugol's solution can cause general allergic reactions such as laryngospasm and bronchospasm, and may even cause cardiac arrest [8]. A Japanese study reported that retrosternal discomfort can be reduced by washing the mucosa with sodium thiosulfate to neutralize the iodine solution [5]. One report described gastric erosion that developed after application of Lugol's solution [9] and another described a case in which iodine toxicity was confined to the columnar epithelium of the greater curvature of the stomach and did not affect the squamous esophageal mucosa [10]. The investigators in the latter study proposed that the gastric columnar epithelium may be more susceptible to the toxic effect of Lugol's iodine than the squamous

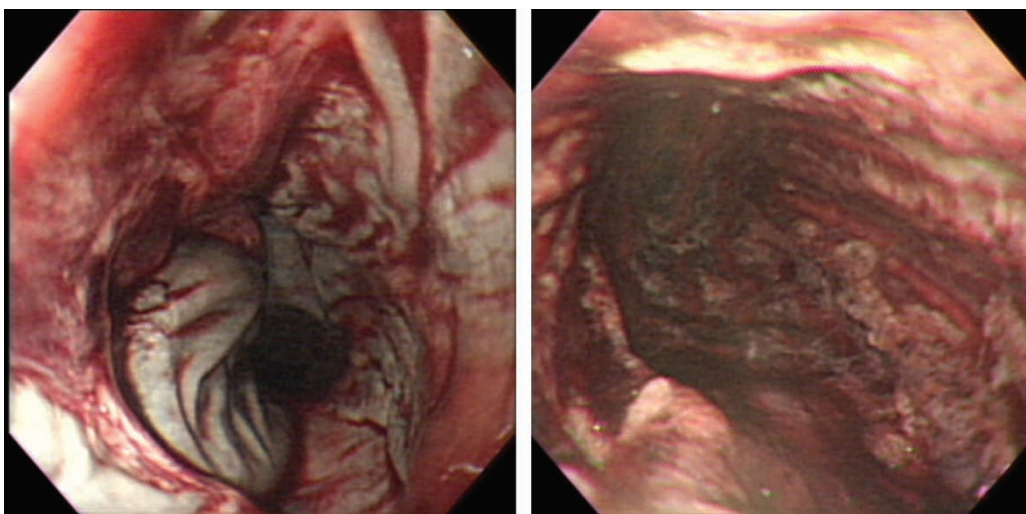


Figure 2. Endoscopy on the day after application of Lugol's solution showing that the esophageal mucosa is acutely necrotized (*left panel*) and that the gastric mucosa contains acute lesions (*right panel*).

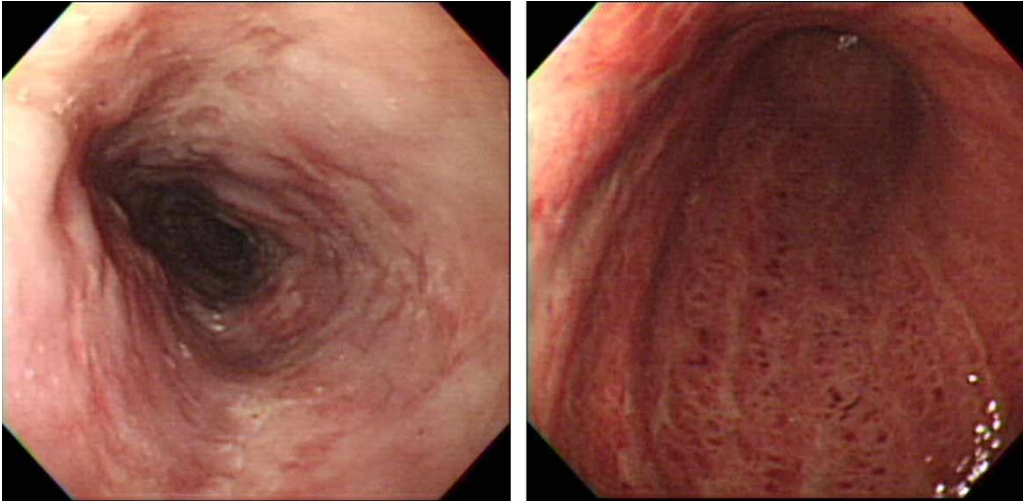


Figure 3. Follow-up endoscopy showing that the esophageal mucosa has healed, leaving scars (*left panel*) and that the condition of the gastric mucosa has improved since the previous examination but is still erythematous and edematous (*right panel*).

esophageal mucosa. In our patient, the esophageal mucosa and the gastric mucosa were damaged by a solution that had a relatively low concentration of iodine (1.5%). The same iodine solution was used that day for endoscopy of other patients, none of whom complained of retrosternal or epigastric discomfort. The mucosal damage might have been caused by a hypersensitivity reaction.

Endoscopists should take into consideration the possibility of adverse reactions associated with iodine staining before recommending the use of Lugol's solution for screening purposes.

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