

Fatal venous air embolism during upper endoscopy in a patient with percutaneous transhepatic cholangiography (PTC) catheter

Venous air embolism is a rare complication of endoscopic procedures reported with colonoscopy, esophagogastroduodenoscopy, endoscopic ultrasound with fine needle aspiration and endoscopic retrograde cholangiography with sphincterotomy [1–5]. We report a case of a fatal venous air embolism during upper endoscopy in a patient with prior pancreaticoduodenectomy and recent percutaneous transhepatic cholangiography (PTC) catheter placement.

A 52-year-old man underwent pancreaticoduodenectomy for pancreatic adenocarcinoma and PTC catheter placement for ascending cholangitis. An upper endoscopy under fluoroscopy was performed after the patient developed melena. The endoscope was advanced to the hepaticojejunostomy (Fig. 1), when the patient suddenly became hypoxic, bradycardic, and developed pulseless electrical activity. Despite prolonged cardiopulmonary resuscitation, the patient expired. An autopsy was declined by the family, however, review of the intra-procedural fluoroscopic images revealed an air venogram, consistent with a fatal venous air embolism (Fig. 2).

Occurrence of venous air embolism during endoscopy requires communication between the air source and vasculature as well as a pressure gradient favoring passage of air into the venous circulation. Air usually enters through a mucosal defect or vasculoenteric fistula, aided by positive pressure from insufflation. Clinical manifestations include sudden decrease in end-tidal carbon dioxide or oxygen saturation, cyanosis, hypotension, bradycardia or tachycardia, and a mill-wheel murmur. Initial management consists of provision of high-flow oxygen, Trendelenburg position, and insertion of a central venous catheter for aspiration of gas bubbles.

Although venous air embolism may occur in patients without risk factors [6, 7], disruption of mucosal barriers (ulcerations, trauma, dilation, sphincterotomy), presence of blind intestinal limbs (hepaticojejunostomy), and bowel directly apposed to venous structures (varices) are known risk factors [8–12]. In the present patient, placement of the PTC catheter probably

created a vasculobiliary fistula. The presence of a widely patent hepaticojejunostomy, blind intestinal limb, and air insufflation created a pressure gradient allowing air flow into the venous circulation. The fluoroscopic images confirmed air within the hepatic veins and inferior vena cava (Fig. 2). General endotracheal anesthesia and close monitoring of endotracheal carbon dioxide in patients with known risk factors may improve clinical outcomes.

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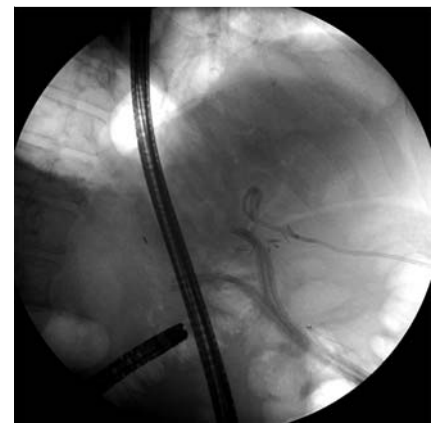


Fig. 1 Endoscope advanced through the afferent limb to the hepaticojejunostomy.

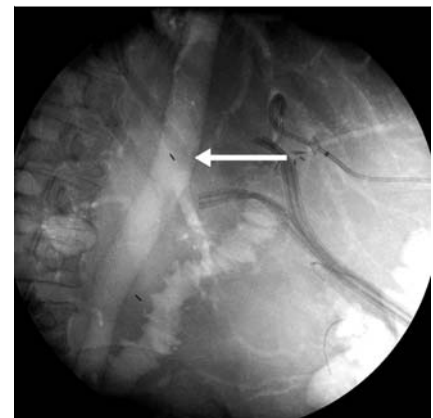


Fig. 2 Venous air embolism.

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