
A Complication of Percutaneous Cholangiography Resulting in Hypoxia and Death of an Anesthetized Patient

LYNDA S. KOEHLER, M.D.,* PEGGY S. CHRISTIDES, C.R.N.A.,† THOMAS A. ADAMEC, M.D.‡

It is common for a patient who has obstructive jaundice to receive a diagnostic percutaneous cholangiogram. This procedure may be performed preliminary to surgical intervention, or may lead to surgical correction of bile leakage. The following case history illustrates a complication of percutaneous cholangiography during general anesthesia that has not, to our knowledge, been reported before.

REPORT OF A CASE

A 53-year-old Caucasian woman had been in good health until three months prior to admission after failure to recover in 2½ months from what had originally been diagnosed as hepatitis. Radiographic and ultrasonic investigation showed dilatation of the biliary tree, common bile duct and gallbladder, and a mass lesion in the region of the head of the pancreas. During percutaneous cholangiography extravasation of contrast material was noticed and the procedure was abandoned.

Three hours later the patient arrived in the operating room for exploratory celiotomy. She was deeply jaundiced and in distress from abdominal pain. The blood pressure was stable at 120/80 torr; heart rate 130–140 beats/min; hematocrit 41 per cent; serum electrolytes within normal limits; urinary output normal.

* Assistant Professor, Department of Anesthesiology.
† Nurse Anesthetist, Department of Anesthesiology.
‡ Resident, Department of Pathology.

Received from the University of North Carolina, Division of Health Affairs, Chapel Hill, North Carolina 27514. Accepted for publication January 21, 1978.

Address reprint requests to Dr. Koehler.

0003-3002/78/0900/0210 $00.60 © The American Society of Anesthesiologists, Inc.
Fig. 1. Light micrograph of a section of the lung, showing large bile plugs (black flocculent material) and fibrin in two large pulmonary vessels and a pulmonary capillary (upper left-hand corner). Hematoxylin and eosin. 200x.

Fig. 2. Bile emboli in two large pulmonary vessels, showing total occlusion with bile (black) and fibrin (gray). Hematoxylin and eosin. 100x.

efforts. Our clinical impression was that the patient had also had pulmonary embolization.

**Necropsy Findings**

**Gross.** Necropsy showed marked jaundice. Weight was 52.5 kg and length, 167 cm. Numerous spider angiommas were present in the skin of the upper thorax.

The major findings on gross examination of the internal organs consisted of a large, firm, buff-colored tumor mass replacing the head of the pancreas and grossly infiltrating the body of the organ. The pancreatic duct, common bile duct, and portal and splenic veins were compressed to obstruction by the tumor mass with associated distention of the gallbladder and enormous dilatation of the intra- and extrahepatic biliary tree. Numerous metastatic tumor implants were present in the liver, anterior intraventricular septum
of the heart, left kidney, both adrenal glands, and both ovaries. No tumor was found in careful examination of the entire length of the bowel. The remainder of the organs were grossly unremarkable. There was no gross evidence of pulmonary thromboembolism.

**Microscopic.** The microscopic appearance of the tumor at all sites was that of a small-celled malignancy, organized into nests and anastomosing cords of cells that were both argyrophilic and argentaffin-positive. Microscopically, the tumor mass in the head of the pancreas was poorly demarcated from the normal tissue. This fact, coupled with the finding of the main bulk in the area of the pancreas, led to the conclusion that the tumor represented a primary pancreatic carcinoid.

The most dramatic and unsuspected microscopic finding was the presence of widespread bile emboli either partially or completely occluding pulmonary arteries, arterioles, and capillaries (figs. 1 and 2). This was attributed to an iatrogenic biliary–venous fistula created at the time of the attempted percutaneous cholangiography shortly before celiotomy.

Additional microscopic findings in the lungs included a microscopic focus of tumor and occasional pulmonary arterial narrow emboli that were relatable to vigorous resuscitative attempts during cardiopulmonary arrest.

The microscopic anatomy of other organs was unremarkable.

**Discussion**

This case is presented not only to report the unusual cause of hypoxia and death during general anesthesia, but also to alert others to a possible etiology of unexplained hypoxia in a well-ventilated patient who has recently undergone percutaneous liver biopsy or cholangiography. Death from bile embolization to the lungs following percutaneous liver biopsy has been reported, but to our knowledge such a death has not been reported to have occurred in any patient during general anesthesia. In rare instances bile embolization has been observed spontaneously in the absence of an invasive procedure in patients with high pressure in the biliary system secondary to biliary obstruction. The possibility of biliary–venous communication consequent to the wedge biopsy at operation has been entertained, but the patient had clinical evidence of hypoxia prior to this procedure. It is more probable, then, that the attempted percutaneous cholangiogram was responsible for a biliary–venous fistulous tract and subsequent bile embolization. Surgical manipulation of the liver may have caused increased embolization of bile.

In the case reported here, it is probable that the course of events would have been the same even had the presence of the carcinoid tumor been suspected and the anesthetic technique altered accordingly. The amount of bile present in the pulmonary circulation was certainly adequate to explain the patient's death.

One may speculate that bile embolization to the pulmonary circulation following percutaneous liver biopsy or cholangiography may not be as rare as supposed. Depending on the path of the trochar and the biliary vs. hepatic venous pressure, bile embolization might occur in amounts too small to be clinically recognized, or the resultant hypoxia might be attributed to other causes.

**References**