CASE REPORT

Air Embolism After Endoscopic Retrograde Cholangio Pancreatography (ERCP)

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ABSTRACT

ERCP is a routine non operating room procedure done for biliary tract abnormalities. Our main stay of the article is to give an insight in to the potential life threatening complication that can happen in endoscopic suites. We present a case of young female of 35 years who is a known case of Extrahepatic portal vein obstruction [EHPVO] with obstructive jaundice due to portal cavernoma cholangiopathy posted for endoscopic retrograde cholangio pancreatography. Immediately after the procedure patient developed sudden cardiac arrest, peri procedural echocardiography revealed massive air embolism

Keywords: Air embolism, endoscopic retrograde cholangio pancreatography, cardiac arrest

Introduction:

ERCP is primarily used to diagnose and treat conditions of the bile ducts and pancreatic duct using a combination of luminal endoscopy and fluroscopic imaging. It is usually done under prone position or lateral position. Deep sedation is desirable for the proper endoscopic position in the duodenum. Usually done as day care procedure in endoscopic suites, but complications can occur as in any other procedures. Single anaesthesia provider, area remote from operating room, inadequate monitoring standards are the challenges faced by anaesthesiologist while providing anaesthesia.

Case Report::

A 35 year old female, who is a known case of Extra hepatic portal vein obstruction with JAK 2 mutation on hydroxy urea and Ecospirin presented with itching, and yellowish discolouration of skin with history of spontaneous bruises and ecchymosis. Clinical examination revealed icterus, petechiae and splenomegaly. Lab reports showed deranged liver function test with total bilirubin 22.5g/dl and direct bilirubin of 19g/dl, OT/PT -88/117 and ALP of 194. Contrast enhanced computer tomography of abdomen showed cavernous transformation of portal vein with thrombosis. Paracholedochal and epicholedochal collaterals obstructed the proximal CBD causing intra and extra hepatic biliary radicle dilatation.

The plan was to have an emergency ERCP followed by definitive biliary surgery later. ERCP was planned under general anaesthesia. After attaching standard monitors and preoxygenation, induced with propofol 100mg, fentanyl 100mcg and atracurium 30mg. Intubated and maintained with N2O, O2 and isoflurane. Patient was turned into prone position. Procedure started – selective biliary cannulation was done. In view of raising EtCO2, CO2 insufflation was replaced with air. 10Fr * 5 cm stent placed into Left hepatic duct which drained bile. Fluoroscopyduring the procedure showed extensive air within the liver.

Immediately after the procedure, when patient was turned supine noticed tachycardia, fall in saturation and end tidal carbon dioxide followed by asystole. Cardio pulmonary resuscitation (CPR) initiated as per Advanced Cardia Life Support (ACLS) protocol. ROSC attained after 3 cycles. Emergency bed side 2D echocardiograph showed air bubbles in right atrium and right ventricle with a hypokinetic left ventricle- overall picture suggestive of massive air embolism. Immediate right internal jugular vein cannulation done but on aspiration no air was obtained. Nor adrenaline and adrenaline infusions were started. The patient again went for asystole, CPR started , Return of spontaneous circulation (ROSC) attained after 5 cycles and was shifted to ICU. She again went for asystole. In spite of our best efforts patient expired within 40 minutes.

Discussion:

ERCP is a fluoroscopic examination of the biliary or pancreatic ducts attained by injection of contrast through the duodenal papilla under endoscopic guidance. Many of these patients are compromised due to the presence of cholangitis, pancreatitis, hepatocellular tumours or bile duct obstruction. Bowel distension is required which is attained mainly with CO2 than air. Common complications are pancreatitis (1.6- 15.7%), haemorrhage (1.3%), infection (<1%), perforation (0.1-0.6%) and the fatal air embolism.

Air embolism is rare but fatal complication. It can cause hypotension and cardiovascularcollapse. It occurs as a result of communication between the source of air and the blood vessels which is further accentuated by a pressure gradient favouring the passage of air into the circulation. Fatality depends on both the volume and rate of air introduced. Though air embolism is commonly associated with ERCP, it can occur following any endoscopic procedures.

The risk factors presumed are previous manipulation of bile duct, transhepatic portosystemic shunt, digestive tract inflammation, liver injury. Procedural associated risk include amount of air infused, use of high pressure for inflating air, N2O usage. Lowndon et al, [1] in 1988 was the first to report a case of air embolism following endoscopy- 5 week old infant post kasai procedure died during endoscopy. Autopsy done revealed air embolism. Donepudi et al, [2] in 2013 conducted a systematic review of clinical presentation and risk factors for endoscopy associated air embolism. Out of the 26 cases reviewed, almost 12 patients could not be saved.

In our case biliary cannulation and multiple collaterals are thought to be the risk factors. This along with high insufflation pressure, usage of air by surgeon and N2O by us might have contributed. In our case transthoracic ECHO showed massive air embolism in both right atrium and ventricle. As central venous catheter was not placed prior to the procedure, air could not be aspirated. By the time right internal jugular vein was canulated air had already entered the coronary circulation as evidenced by the ST elevation in ECG (Fig 1). Stabile et al, [3] in 2006 proposed that in massive air embolism it exceeds the filtering capacity of pulmonary circulation and it can build up in the arterial side.

Fig 1: ST elevation in ECG

Conclusion:

In our case though we could make a diagnosis via transthoracic ECHO, patient could not be saved. Turning the patient from prone to supine further aggravated the condition. If the patient already had a central venous catheter placed in Right internal jugular vein we could have tried for aspiration. This highlights the question of having high awareness for air embolism in such cases and perhaps placing a

central venous access prior to the procedure. But as the evidence of air embolism is very low even in high risk cases the decision remain questionable. Another option is placing precordial Doppler for detection of air embolism. There are no clear evidence or recommendations available for both these.

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Conflicts of interest:

NIL

Management of air embolism is mainly supportive-position patient in Trendelenburg and left lateral decubitus position, hyperbaric oxygen therapy, and if central venous access is present – aspiration of air. Prompt diagnosis of condition is the key.

Conclusion:

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