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Letter to the Editor · Open Access ·

Peritonitis and pneumoperitoneum after successful emergency pericardiocentesis in the case of a Chilaiditi syndrome

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Pericardiocentesis is a common therapeutic procedure for pericardial tamponade due to pericardial effusion as well as a diagnostic procedure to obtain fluid for cytopathologic examination. Standard methods include ultrasound or fluoroscopic guidance, which generally result in high success rates (over 95%).[1,2] The complication rate of pericardiocentesis is low with reported incidences of 1%–2%.[3] In the past, the most common indications for pericardiocentesis include uremia, tuberculous pericarditis or malignant pericardial effusions. However, with the increasing number of catheter-based interventional cardiac procedures, iatrogenic pericardial effusions are becoming more frequent.[4–6]

Chilaiditi syndrome is a rare anatomic variant with interposition of the colon transverse between the liver and the right diaphragm. The incidence is increasing along with the patients' age and is about 0.025 in young but up to 1% in elderly people. Most patients do not have any symptoms and are diagnosed incidentally by radiographic findings. When symptoms occur, abdominal pain, bloating, nausea, functional constipation and some cases of bowel obstruction and perforation are reported.[7,8]

We report an 81-year-old male who admitted to our clinic because of heart failure. Clinical findings included a 3/6 diastolic murmur, arrhythmic pulse, pulmonary rales, and peripheral oedema. Also noted on physical examination were a barrel-shaped thorax and overall cachexia, consistent with the clinical history of chronic obstructive pulmonary disease. Electrocardiogram showed tachyarrhythmia and a cardiac ultrasound revealed severe aortic insufficiency with moderate stenosis and a severe calcification of the aortic valve and pulmonary hypertension.

After pharmacologic cardiac compensation (diuresis and rate control), we performed coronary catheterisation and considered transcatheter aortic valve implantation for the aortic vavular disease (STS score > 6). Coronary angiogram demonstrated severe calcified stenosis of the left anterior descending coronary artery, so we performed a prima-vista percutaneous coronary intervention. This complex procedure was initiated with conventional pre-PTCA (BMW, Boston Scientific, USA and a 2.0 mm balloon, Maverick, Boston Scientific, USA) and followed by a stent-implantation with a focally under-expanded 3.0 mm stent (Xience 3.0/18 mm; Abbott, USA). Using a double-wire technique (BMW and Choice PT, Boston Scientific, USA) and despite multiple attempts with high-pressure balloons of various sizes (2.5/15 mm, 3.0/15 mm, and 3.0/8 mm; Quantum-NC, Boston Scientific, USA) the intervention was unsuccessful and the stent was still focally under-expanded. We therefore terminated the procedure and referred the patient to a conventional surgical management.

However, three hours after the procedure, the patient began complaining of dyspnoea and showed jugular venous distention including a cardiogenic shock. The pulse was up to 145 beats/min and the blood pressure low at 90/45 mmHg. He was brought back to the catheterisation laboratory immediately and a cardiac tamponade by pericardial effusion was confirmed by echocardiography in the apical four chamber view. Pericardiocentesis was performed using standard technique with a 14G needle (Angiocath, Lifeguard Emergency Products, USA), a femoral 7F sheath (Ultimum, SJM Abbott, USA), and a normal J-wire (Angiodyn, B. Braun, Germany). The procedure was performed under fluoroscopic guidance in a left anterior oblique 90° view, locating the pericardial effusion by injection of a mixture of saline and contrast agent. After placing the sheath, we placed a 7F pigtail catheter (Launcher, Medtronic, USA) in the pericardial space and as-

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pirated 300 mL haemorrhagic fluid. Immediately afterward, the patient's pulse decreased and his blood pressure stabilised.

The patient was then admitted to the Intensive Care Unit and remained stable. After 48 h and removal of the pigtail catheter, the patient complained of abdominal pain involving all four quadrants and showed peritoneal guarding and increasing signs of infection. A computed tomography scan disclosed pneumoperitoneum and free fluid within the abdominal cavity (Figure 1).

Review of the procedural fluoroscopy images, together with the additional anatomical information provided by the computed tomography scan (Figure 2), we assumed that we had punctured through the transverse colon during the emergency pericardiocentesis. The abnormality of a Chilaiditi syndrome was diagnosed post-interventional without any clinical symptoms in the patients history and this variant of the interposition of the colon between liver and diaphragm was the reason for accidental perforation of the colon by pericardiocentesis.

After intensive discussions with attending general surgeons, we decided to forego exploratory laparotomy and to treat the patient conservatively with intravenous fluid resuscitation, antibiotics (piperacillin/tazobactam), and analgesic agents.

After 48 h of conservative therapy, the patient's symptoms were diminishing and signs of peritoneal infection abated. On the fourth day after pericardiocentesis the patient referred for conventional surgical aortic valve replacement with left internal mammary artery bypass graft to the left anterior descending coronary artery. The operation and his subsequent postoperative course were uneventful. Signs of bacterial infection were not observed intra-operatively.

The most common aetiology of pericardial effusion has changed over the last three decades due to the increasing number of iatrogenic pericardial effusions arising as complications of interventional cardiac procedures. Most patients undergoing these procedures receive anticoagulant or antiplatelet therapy (or both), which increases the risk of haemorrhagic pericardial effusion.[3] However, the incidence of pericardial effusion after cardiac intervention is still low (approximately 1%).[3,9–11] Pericardial effusions developing after percutaneous coronary intervention often result in pericardial tamponade, possibly because of anticoagulation/antiplatelet therapy.

Complication rates from pericardiocentesis of acute pericardial tamponade are higher than in cases of large, chronic pericardial effusions because of the limited pericardial space available for needle insertion.[12] Other complications described previously include cardiac puncture with intrapericardial thrombus formation, cardiac arrhythmias, traumatic injury of adjacent organs such as laceration of the liver or spleen, and haemorrhagic peritonitis due to perforation of the diaphragm.[3,13,14] Complications such as bowel perforation due to interposition of the colon between liver and diaphragm in case of Chilaiditi syndrome are not reported yet. The incidence of a Chilaiditi syndrome is age depended and is up to 1% in geriatric patients like in our case.[8]

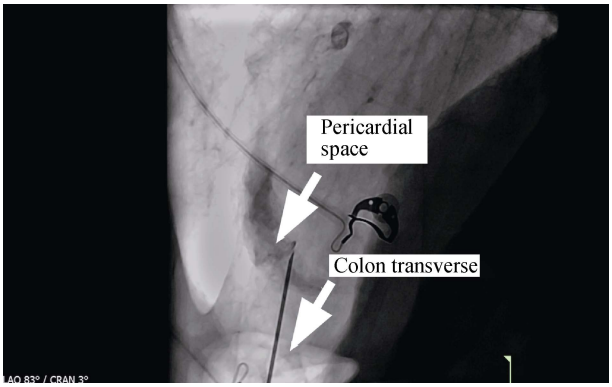

Figure 1. Puncture of the pericardium with contrast dye injection. LAO 90° View.

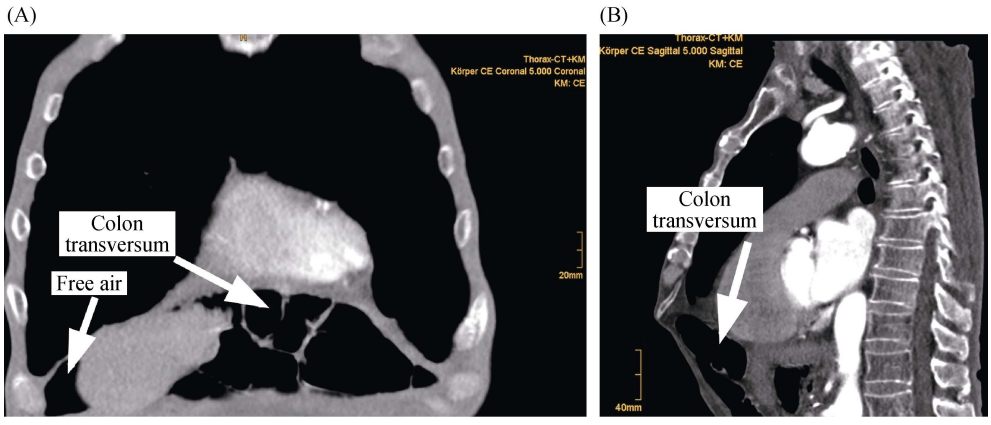

Figure 2 . Coronal (A) and sagittal (B) CT scan showing free air and fluid, Chialiditi-Syndrome (arrow marks pneumoperitoneum).

Duvernoy, *et al*.[1] described two patients presenting with acute abdominal pain after pericardiocentesis, presumptively caused by bowel perforation. As in the case presented herein, these two patients experienced spontaneous resolution of their symptoms without surgical intervention.[1] Management of bowel perforation secondary to pericardiocentesis is rare and lacks of clinical guidelines.

Colonic perforation during colonoscopy or therapeutic polypectomy is a similar scenario to perforation by a 7F pigtail catheter often used in pericardiocentesis. Even though this is a more common clinical scenario, there are no evidence-based, consensus recommendations for surgical or non-surgical management. Most authors recommend operative therapy in cases with large perforations and signs of peritonitis, whereas smaller perforations may often be treated non-surgically.[15,16] A prototypical example is colonic perforation during polypectomy. In most of these cases, the perforation is small and closes spontaneously because of the omental response; limited contamination of the peritoneal space occurs in these circumstances.[15]

In our case, the perforation caused by a 7F pigtail catheter is around 2 mm in diameter. Since the bowel wall was dilated in the region of the perforation, the probability of spontaneous closure was high in this case. In previous studies, patients with high American Society of Anaesthesiologists Physical Status Classification scores (> 3), advanced age, or on antiplatelet therapy (like our patient) have poor outcomes in case of colon perforation.[16] Nevertheless, we opted for conservative, non-surgical management: nil per os, nasogastric tube decompression, intravenous fluid therapy, broad-spectrum antibiotics, and adequate pain management. After 24 h, peritoneal signs were absent and signs of infection were deceasing, suggestive of successful non-operative treatment. The patient was finally referred for aortic valve replacement and coronary artery bypass grafting on the fourth day after the pericardiocentesis. There was no sign of pericardial infection secondary to colonic puncture during pericardiocentesis.

Bowel perforation due to pericardiocentesis in the setting of an anatomic variant of Chilaiditi syndrome is a very rare complication. Because of the higher rise of Chilaiditi syndrome in elderly, subxiphoidal ultrasound could exclude Chilaiditi syndrom before fluoroscopic guided pericardiocentesis. Management of bowel perforation due to pericardiocentesis can be deduced by previous clinical experience with perforation secondary to polypectomy or colonoscopy. Because the perforation caused by the pigtail catheter was presumed to be relatively small, conservative treatment (nil per os, decompression by nasogastric tube, intravenous fluid therapy, broad-spectrum antibiotics, and pain management) was considered as the best management strategy in this case.

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