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Case Report

Right-Sided Heart Failure due to Lumbar Disc Surgery: A Case Report

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ABSTRACT

Right-sided heart failure may occur during or after cardiac and noncardiac surgeries. One reason for right-sided heart failure in noncardiac surgeries is pulmonary hypertension (PH). In this report, we describe a 51-year-old man suffering from complications of right-sided heart failure, with an unknown cause. The patient had dyspnea (WHO functional class III), abdominal pain, anorexia, weight loss, bilateral lower limb swelling, icteric sclera, and elevated jugular venous pressure. Echocardiography showed mild enlargement and systolic dysfunction of the left ventricle, moderate enlargement and dysfunction of the right ventricle, and a systolic pulmonary arterial pressure of 60 mm Hg. After several workups, it was diagnosed that his previous lumbar disc surgery had resulted in an arteriovenous fistula and the consequent PH, leading to right-sided heart failure. After the occlusion of the arteriovenous fistula, all signs and symptoms were resolved. Accordingly, iatrogenic arteriovenous fistulae should be considered a reversible cause of right-sided heart failure. ***(Iranian Heart Journal 2022; 23(3): 135-138)***

KEYWORDS: Right-sided heart failure, Pulmonary hypertension, Lumbar disc surgery; Arteriovenous fistula

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Right-sided heart failure (RSHF) may occur during cardiac surgeries due to hypoxia, air embolism, myocardial ischemia, volume overload, and arrhythmias. Intraoperative myocardial ischemia and pulmonary hypertension (PH) may also result in RSHF during or after noncardiac surgeries.[1,2] We herein describe a 51-year-old man with RSHF after lumbar disc surgery due to an uncommon reason.

Case Report

The patient was a 51-year-old man referred to our hospital for the evaluation of symptoms and signs of RSHF. He suffered from dyspnea (WHO functional class III), abdominal pain, anorexia, weight loss, and bilateral lower limb swelling of 7 months' duration. On physical examination, he had icteric sclera, elevated jugular venous pressure, clear lungs, a loud P2, grade 3/6 systolic murmurs at the right lower sternal border, and bilateral lower limb edema. In his medical history, he had an L4–L5 lumbar disc surgery 8 months before his admission. Electrocardiography showed a normal axis, mitral P wave, and rS pattern in V_1. Laboratory tests revealed a blood urea nitrogen level of 17 mg/dL, a creatinine level

of 0.8 mg/dL, an aspartate transaminase level of 45 IU/L, an alanine aminotransferase level of 49 IU/L, an alkaline phosphatase level of 294 IU/L, a total bilirubin level of 7.3 mg/dL, a direct bilirubin level of 0.7 mg/dL, a hemoglobin level of 13 g/dL, an erythrocyte sedimentation rate of 20 mm/h, and a thyroid-stimulating hormone level of 6.1 μIU/mL. Given the patient's icteric sclera and high bilirubin, abdominal sonography was performed, and it showed liver congestion without bile duct obstruction. In addition, echocardiography demonstrated mild enlargement and systolic dysfunction of the left ventricle (ejection fraction =50%), moderate enlargement and dysfunction of the right ventricle, mild-to-moderate mitral regurgitation, and severe tricuspid regurgitation. Systolic pulmonary arterial pressure (SPAP) was 60 mm Hg. Due to PH and history of surgery, a lung perfusion scan was done, and pulmonary embolism was ruled out. The patient was also evaluated on rheumatologic diseases because of PH and liver involvement. The results of the rheumatologic tests were negative, and the probability of these diseases was considered low.

The results of right heart catheterization showed a cardiac output of 15.5 L/min with the thermodilution method, a cardiac index of 8 L/min, a right atrial pressure of 15 mm Hg, a pulmonary arterial pressure of 50/20 mm Hg, a mean pulmonary arterial pressure of 30 mm Hg, a wedge pressure of 15 mm Hg, a pulmonary vascular resistance value of 1 Wood units, a systemic vascular resistance value of 14.5 Wood units, a superior vena cava O_2 saturation level of 70%, an inferior vena cava O_2 saturation level of 80%, a right atrial O_2 saturation level of 77%, a right ventricular O_2 saturation level of 77%, a pulmonary arterial O_2 saturation level of 70%, and an aorta O_2 saturation level of 95%. Due to PH with a high cardiac output, transesophageal echocardiography was carried out, and intracardiac shunting was ruled out. Then, abdominal computed tomography (CT) angiography was performed to discover extracardiac shunting. Evidence of an arteriovenous fistula (AVF) between the left common iliac vein and the left common iliac artery was seen in the abdominal CT angiography. The AVF was occluded by a covered stent. Figures 1 and 2 show the iliac angiography before and after stenting. The patient was discharged with warfarin, clopidogrel, aspirin, pantoprazole, furosemide, and spironolactone.

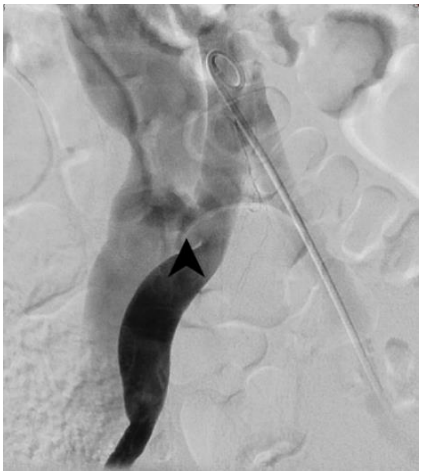

Figure 1: The patient's iliac angiography shows an arteriovenous fistula (the arrow) between the left common iliac vein and the left common iliac artery.

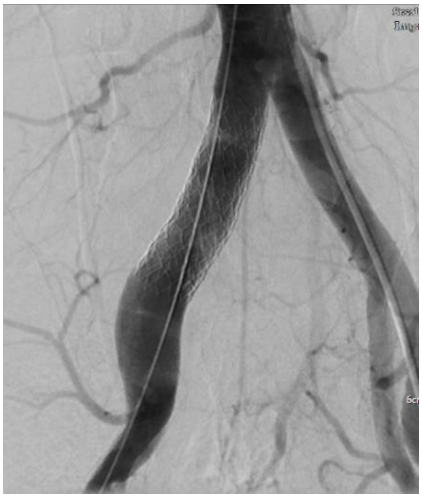

Figure 2: The patient's iliac angiography after stenting shows no communication between the iliac vein and the artery.

Six months after the treatment, the patient underwent a follow-up examination, which showed the resolution of the symptoms and signs. Additionally, the cardiac axis and the P wave were normal in electrocardiography. Further, the total bilirubin level was 1.8 mg/dL, the right ventricle had normal size and function, and SPAP was maximally 35 mm Hg.

DISCUSSION

The iatrogenic AVF after lumbar disc surgery is very rare and often occurs at the levels of L4–L5 and L5–S1, where the aorta and the inferior vena cava are bifurcated.[3] Thus, the most common involved vessels are the common iliac arteries (right artery: 43% and the left artery: 29%).[4] The AVF can cause signs and symptoms of high-output heart failure, especially when the Qa_1/CO_2 ratio is greater than 0.30.[5] The signs and symptoms include palpitations, fatigue, dyspnea, abdominal distention, and edema.[6] In addition, the AVF may result in PH and RSHF by increasing the cardiac output.[7] The mechanism of PH due to the rise in the cardiac output is still unknown. High shear stress may progress vascular remodeling and produce PH.[8] Several case reports have described renal[9-12] and non-renal[6,13-15] patients with PH and RSHF due to the AVF. According to a few studies, the AVF resulted in the remission of PH and RSHF. Faul et al[16] found that iliofemoral AVF creation upgraded exercise tolerance in patients with chronic obstructive pulmonary disease.[3] Unal et al[17] noted that the AVF could not significantly elevate SPAP. In the present paper, we presented a case of RSHF and PH. Through multiple evaluations, we diagnosed an AVF due to lumbar disc surgery as the cause of PH. We occluded the AVF by stenting, which contributed to the cure of the patient. Byoung-Wo et al[13] reported a similar case in which tricuspid annuloplasty was carried out to cure the patient, but it was not effective.

[1] Flow rate in AV fistula
[2] Cardiac Output
[3] Chronic Obstructive Pulmonary Disease

CONCLUSIONS

Although AVFs after lumbar disc surgery are rare, careful physical examinations, including the auscultation of the abdomen and the lumbar zone for continuous murmur detection, are recommended due to the fatal consequences of AVFs such as PH and RSHF.

Conflict of Interest
None declared.

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