Case report

Aorto-right ventricular fistula : a rare and severe complication in a young patient with double localization of infective endocarditis

ABSTRACT

Abstract: Aorto-right ventricular fistulas are defects of the aortic wall in the area above the right coronary cusp, where it separates aorta and right ventricular outflow tract. This entity is rare and exceptional. Often, these defects are due to trauma or infective endocarditis.

We report an occasional finding of such a fistula with dramatic issue, in young patient without past medical history which admitted for rupture of cerebral mycotic aneurysm secondary to infective endocarditis with double localization (aortic and pulmonary valve).

Keys word: Infective endocarditis, fistula, aortic, pulmonary.

Introduction: Infective endocarditis (IE) is a serious and complex disease with high morbidity and mortality. If the aortic valve is a relatively common site for IE, the pulmonary valve is a rare site often view in patient with intracardiac device and intravenous toxicomania habitus. Heart failure, perivalvular extension and embolic events are well-known complications of IE. By contrast, the aorticocavitary fistula is extremely rare in IE of aortic localization and less on double localization. We report the case of a young patient in whom echocardiography led to the diagnosis of infective endocarditis in native aortic and pulmonary valves complicated by a right aortoventricular fistula.

Case presentration :

This was a 25-year-old patient with no medical history and no notion of drug abuse, admitted to the emergency room with global left hemiplegia revealing a ruptured right sylvian aneurysm (**Fig 1**). The patient was managed by the neurosurgery team with an aneurysm cure. He was then admitted to the post-surgical intensive care unit where he was placed on invasive ventilation and positive inotropic support. On the first postoperative day, he developed a fever with blood cultures showing Staphylococcus aureus. The patient was put on antibiotics guided by the blood cultures.

On examination, he has a fever. Blood pressure was 100/50 mmhg, pulse 64 bpm. Auscultation noted an intense holodiastolic aortic murmur, an associated diastolic pulmonary murmur and a B2 burst with signs of left heart failure.

Electrocardiogram noted sinus rhythm with first degree atrioventricular block at 360 ms, T waves were wide and positive on precordial leads. (Fig 2)

Biological examination: Leukocytes 7.5 giga/l; haemoglobin 13.3 g/dl; platelets 320 giga/l; inflammatory syndrome with elevated C-reactive protein and procalcitonin; good renal and liver function.

The transthoracic echocardiogram (Fig 3) performed in the patient's bed showed a compatible appearance of infective endocarditis in the native aortic and pulmonary valves complicated by a right aorto-ventricular fistula at the pulmonary infundibulum.

The aortic valve was tricuspid, remodeled and slightly thickened, with evidence of severe aortic regurgitation and the presence of a hyperechoic parietal thickening measuring 5 x 6 cm on the non-coronary cusp, an abscess on the right side of the sinus of Valsalva and the mitro-aortic trigone. The parasternal long-axis view showed a defect at 5 mm between the aortic root (right side of the sinus of Valsalva) and the right ventricle. The parasternal short axis view showed the same defect.

Analysis of the pulmonary valve on the small parasternal view showed a remodelled, mutilated and perforated valve with evidence of severe pulmonary regurgitation and the presence of multiple vegetations, the largest of which measured 9 x 6 mm and 6 x 7 mm on the pulmonary ejection tract.

The mitral valve was mildly remodeled, without imaging vegetations with moderate mitral regurgitation.

The left ventricle was dilated (TDD/TSD: 66/48 mm), with good systolic function, dilation of both atria, filling pressure was normal. The right ventricle was not dilated with good function.

The evolution was rapidly unfavourable towards a cardiorespiratory arrest without recovery. Transesophageal echocardiography could not be performed.

Discussion:

Infective endocarditis is observed with an annual incidence of about 30 cases per million individuals per year in population-based studies in Western countries [1,2]. In Africa, and more specifically in Morocco, there is no national registry for IE, which does not allow us to have incidence data [1,2]. The aortic valve is involved in more than half of the cases of valvular endocarditis. IE of the native pulmonary valve is extremely rare [1].

Aortic valve is a relatively common site for infective endocarditis (IE) in the contrast with IE of pulmonary valve whose have often like complication the pulmonary embolism or the right heart failure. Aortic valve endocarditis can get complicated by spread of infection to the adjacent structures or peri-annular tissue causing aortic root abscess, ventricular septal defect, pseudoaneurysm, atrioventricular block, heart failure and aorto-cavitary fistula. The periannular extension is a dreaded complication with high morbidity and mortality [1-4].

The extension of sepsis to nearby structures is seen as a complication in 10-40% cases of aortic valve endocarditis [3,4]. The aorta communicating to adjacent chambers seen in 1.5-2.2% cases of aortic IE [4]. Early rapid and accurate diagnosis of native aortic and pulmonary valve endocarditis is essential to appropriately treat and manage the complications. Imaging is one of important modality to diagnose the complication of IE in addition to contribution in basic diagnosis [1,2,5,6]. Serial clinical evaluation and tailored imaging is important in monitoring the case of IE and early detection of the complication [1,2,5-7]. In this case, the Transthoracic echocardiogram (TTE) was sufficient for diagnosis. TEE is the first line imaging for diagnosis of IE. Infective endocarditis with complication and periannular extension can be better evaluated by transesophageal echocardiogram [1-7]. TEE has a sensitivity and specificity of 80% and 95% against a sensitivity of 57% of transthoracic echocardiography (TTE) [1,2,5-7]. In the clinically suspected cases where TTE has not yielded a clue, TEE is the next line of evaluation. TEE could not be performed in our case. IE associated with a right aortoventricular fistula is frequently associated with aortic regurgitation (AR) [7-9]. The right aortoventricular fistula has a continuous flow unlike the left ventricular aortic fistula [4]. The location of the endocarditis in the pulmonary valve could be explained by the extension from the aortic valve after rupture of the aneurysm.

In our case, the neurological presentation was at first causing the diagnosis of IE at the complication stage with probably an inotrope-dependent cardiogenic shock. An abscess on the mitro-aortic trigone explained the atrioventricular block. Detailed imaging integrating the patient's clinical status is essential for early detection of the disease and its complications [5-9]. Fever and persistent symptoms, occurrence of murmur and heart failure, and occurrence of

heart block should prompt repeat imaging to identify the complication [1,2,5,6]. Serial evaluation with specialized imaging and comparison with previous information can be of great help in this future. The lack of response to medical treatment and the clinical deterioration prompted a search for possible complications in our case. Cardiac CT angiography (CTA) has been recognized for the diagnosis of complicated IE [5-7]. Abscesses, pseudoaneurysms and fistulas of the aortic cavity are best delineated by angiography. Cardiac angiography was recommended in the IE guidelines [5, 6]. CT angiography complements transesophageal echocardiography in the diagnosis and management of infections [5-7]. The treatment is surgical and consists of surgical repair of the valves, flattening of the abscess [1,5,6]. Nowadays, percutaneous closure with a patch of the fistula is possible in case of fortuitous discovery and out of IE context [10-13].

Conclusion: We reported a case of young patient who developed a double localization (aortic and pulmonary native valve) due to infective endocarditis, in whom a fistula developed from the right coronary sinus of Valsalva to the right ventricle. The prognosis is poor if the diagnosis is late. The diagnosis must be suspected quickly on clinical status and the imaging (TTE or TEE) could lead the diagnosis and guided surgical decision.

Consent

As per international standard or university standard, patient(s) written consent has been collected and preserved by the author(s).

Ethical Approval:

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

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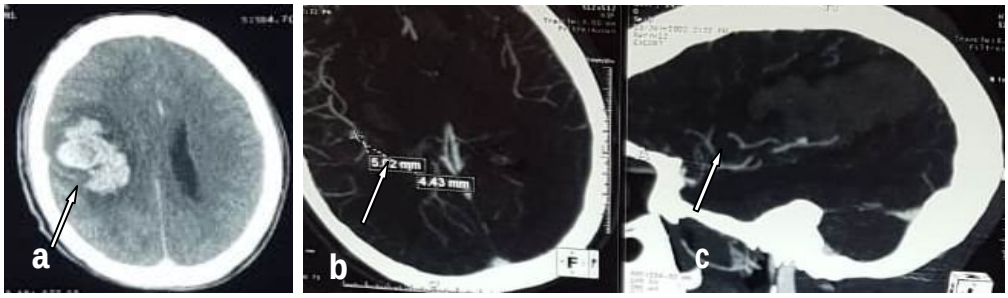

Figure 1: Brain Scanner showing a): spontaneous hyperdensitis related to cerebral hemorrhage (white arrow); **b) Sylvian aneurysm** (white arrow) **c)** Passage of contrast indicating Sylvian aneurysm rupture (white arrow)

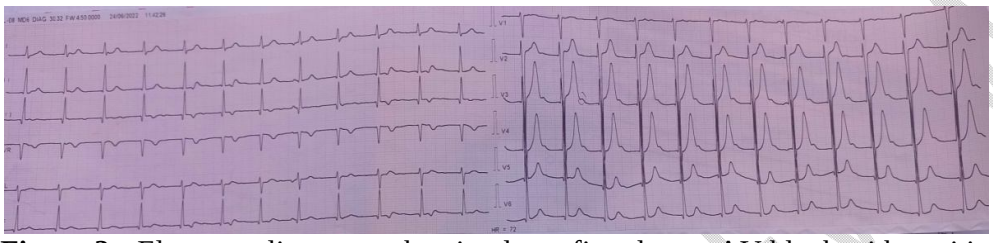

Figure 2: Electrocardiogramm showing large first degree AV block with positive and ample T waves on precordial derivations

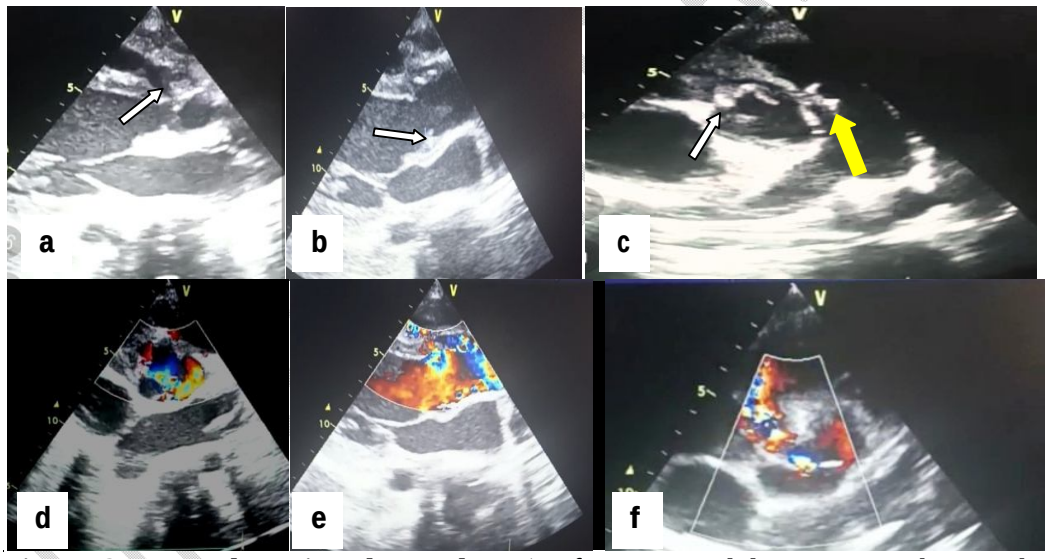

Figure 3: Transthoracic echography: a) Left parasternal long axis with Breach (white arrow) between aorta and right ventricular with irregular shoreline related a large fistula**; b)**Aortomitral curtain (White arrow); **c**): Mutilated pulmonary valve with vegetation (large white arrow); Large abcess in pulmonary outflow in contact with breach (small white arrow); **d) and e):** Severe aortic regurgitation; **f):**Flow passage between the aorta and pulmonary tract.