



CASE STUDY

COMPLETE ATRIOVENTRICULAR BLOCK REVEALING AN INFECTIVE ENDOCARDITIS COMPLICATED TO AORTIC ABSCESS FISTULIZED BOTH IN THE AORTIC LUMEN AND IN THE RIGHT VENTRICLE

*¹Boussir, H., ¹Berrajaa, M., ²El meghraoui, H., ¹Ismaili, N., ¹Bazid Z. and ¹El ouafi, N.

¹Department of Cardiology, University Hospital of Mohammed VI, Oujdauniversity, 60049, PB 4806 oujda, Morocco

²Department of Nephrology, University Hospital of Mohammed VI, Oujdauniversity, 60049, PB 4806 oujda, Morocco

ARTICLE INFO

Article History:

Received 25th April, 2017
Received in revised form
17th May, 2017
Accepted 13th June, 2017
Published online 31st July, 2017

Key words:

Infective endocarditis, Aorticabscess,
Conduction Abnormalities,
Aorto-cavitaryfistula.

ABSTRACT

Cardiac abscesses and aorto-cavitary fistulas are rare and serious complications of infective endocarditis (IE). They can be complicated by high degree cardiac conduction abnormalities and by haemodynamic consequences which can be life-threatening. We report here the rare case of a young patient of 27 years who presented in a table of septic shock associated with a complete atrioventricular block (AVB), making it possible to make the diagnosis of infective endocarditis to *Enterococcus Cloacae*, which is a germ exceptionally responsible of infective endocarditis and known multiresistant; Complicated with abscess of the Valsalva sinus, which is extended to the interventricular septum and fistulized both in the aortic lumen and in the right ventricle. The patient has unusually well evolved under amoxicillin and gentamycin associated with surgical treatment. Conduction abnormalities and aorto-right ventricular fistulas testify to the severity and extent of the lesions of abscessed infective endocarditis. Mortality is high in this context.

Copyright©2017, Boussir et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Boussir, H., Berrajaa, M., El meghraoui, H., Ismaili, N., Bazid Z. and El ouafi, N. 2017. "Complete atrioventricular block revealing an infective endocarditis complicated to aortic abscess fistulized both in the aortic lumen and in the right ventricle", *International Journal of Current Research*, 9, (07), 55149-55153.

INTRODUCTION

Aortic abscesses and aorto-cavitary fistulas are serious complications of infective endocarditis. Their occurrence indicates a delayed diagnosis and a very high degree of virulence, grieving on the chances of a cure by antibiotic therapy. These complications may place the patient at increased risk of adverse outcomes including heart failure and death. New conduction defects occur in native valve infective endocarditis and have been considered as an important predictive factor suggestive of abscess. Patients with conduction abnormality do appear to have increased need for early surgical intervention. (Acar and Michel, 1993; Wiest and Garcia-Tsao, 2005; Blumberg et al., 1995). Trans esophageal echocardiography (TEE) reliably determines the presence of aorto-cavitary fistula which, in 78% of cases, is associated with periannular abscess which also, in 50% of cases, its diameter measures more than 10 mm. Aorto-cavitary fistulas have been described after surgical trauma during aortic valve replacement,

chest trauma, aortic dissection, sinus of Valsalva aneurysm rupture, and only rarely, during infective endocarditis (Ignasi Anguera et al., 2005). Appropriate antibiotic therapy is the primary choice of treatment for infective endocarditis. Nonetheless, the early surgical treatment is an effective treatment for native aortic valve infective endocarditis with associated periannular abscess (Choussat et al., 1999; Knosalla et al., 2000; Acar and Michel, 1993) or aorto-cavitary fistula. The infective endocarditis in our case report, is particular in its high number and rarity of its complications which are: aortic abscess, septic shock, complete atrio ventricular block, both aorto-right ventricular and aortic annular fistulas. And also particular in the exceptionality of the germ, which is the *E.Cloacae*.

Case report

A 27-year-old farmer, with an unremarkable medical history, presented with fever, vertigo, general fatigue and myalgia, lasting for three months. He also experienced three episodes of lipothymia. On admission, he was conscious, febrile (38.8°C), pulse of 40 beats per minute, respiratory rate 26 breaths per

*Corresponding author: Boussir, H.

Department of Cardiology, University Hospital of Mohammed VI, Oujdauniversity, 60049. PB 4806 oujda, Morocco.

minute, and blood pressure of 80/40mm Hg. He was admitted to the medical intensive care department because of septic shock associated to a lipothymia. Physical examination revealed a diastolic murmur, grade 2 over 6, heard at the aortic valve site related to an aortic insufficiency, and a thrill with a systolic ejection murmur at the apex radiating along the left sternal border. There were no signs of left or right heart failure. The rest of his physical examination was essentially benign. Of note, the patient did not have any rashes, subconjunctival hemorrhage, Janeway lesions, or Roth spots. Pertinent laboratory data revealed an inflammatory syndrome with 14160 white blood cells per ml, a C-reactive protein (CRP) at 282 mg/l; the erythrocyte sedimentation rate was 42 mm per hour, procalcitonin at 2.06 ng/l, the blood cultures had shown growth of *Enterobacter Cloacae*. The electrocardiogram (ECG) showed a complete atrioventricular block (Figure 1).

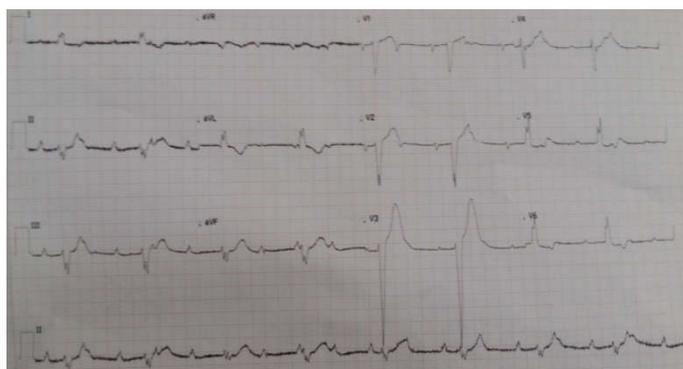


Figure 1. ECG showing a complete atrioventricular block (AVB)



Figure 2. TTE showing the large aortic abscess in the valsalva sinus



Figure 3. Transoesophageal echocardiographic image of an abscess of the valsalva sinus

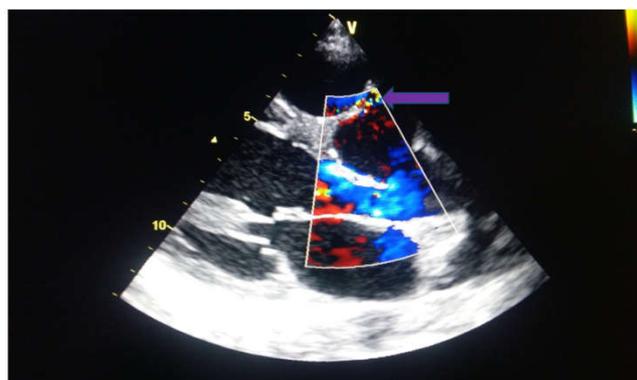


Figure 4. TTE showing the aorto right ventricular shunt (the arrow)

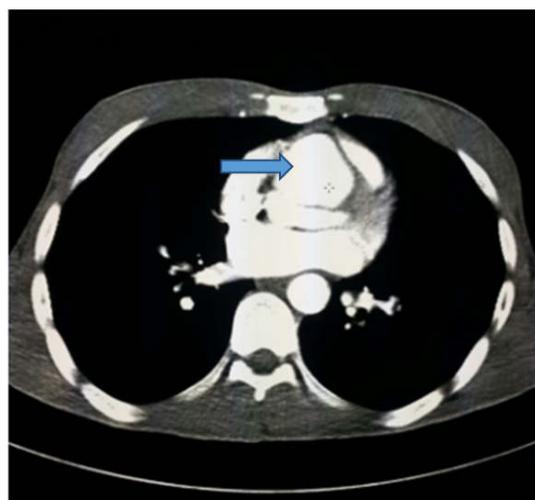


Figure 5. CT demonstrating the large aortic abscess of the valsalva sinus

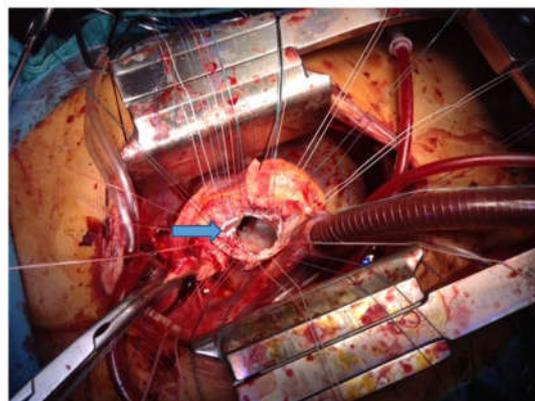


Figure 6. Peroperative view demonstrating the aortic abscess after debridement

On chest x-ray there was a cardiomegaly (TCI = 0.6) at the expense of the right cavities without any sign of pulmonary overload. An infective endocarditis was suspected, therefore, transthoracic echocardiography (TTE) and trans esophageal echocardiography were performed to confirm the diagnosis. They showed the presence of an aortic abscess of the valsalva sinus measuring 40mm / 36mm (Figure 2 and 3). We found two fistulas, the first one was between the aorta above the right coronary cusp and the right ventricle (Figure 4), and the second one was between the aorta and the aortic annular, with dilated right ventricle.

The Pulmonary pressures were high (50 mmHg). The left ventricle's size and function were normal. Computed tomography (CT) scan of the chest with contrast showed an abnormal uptake in the heart consistent with endocarditis/abscess measuring 5x5cm (Figure 5). The extension report did not find any secondary lesions, but the immunological assessment was disturbed with a high rheumatoid factor. The main gateway to the bacteria responsible for this infective endocarditis could not be identified. The patient was diagnosed with enterococcal (*Enterococcus Cloacae*) bacterial endocarditis and initially received amoxicillin plus gentamicin with vasoactive drugs and diuretics, with careful monitoring of fluid balance.

Throughout the hospital course, after two weeks of medical treatment, a marked biological improvement has been noted, with regression of inflammatory syndrome and disappearance of the fever, but the patient was relatively hemodynamically shocked despite the vasoactive drugs, and he also continued to have a complete atrio ventricular block; indicating the need to install a probe for electro-systolic stimulation before the surgery. The intraoperative findings confirmed the ultrasound data, revealing the fistulized aortic abscess (Figure 6), with a right ventricle containing the pus. After debridement of infected and necrosis tissues, the patient underwent a successful aortic valve replacement with a mechanical prosthesis combined with a classical Bentall procedure with coronary artery reimplantation, and also separate stitches were used to close the fistulas and the abscess. Postoperatively, the patient tolerated the procedure well with no major postoperative complications, with a normal hemodynamic recovery, and recovery of a sinus rhythm in the electro cardiogram. The ultrasound control has served to highlight a decrease in pulmonary pressure and a satisfying outcome of the valvular surgery.

DISCUSSION

There is usually an abscess in 20 to 30% of all infective endocarditis and at least 60 per cent of endocarditis on valvular prosthesis in the anatomical series (Arnett and Roberts, 1976; Bayer *et al.*, 1998). We note a predominantly male on recent series of abscessed endocarditis (Choussat *et al.*, 1999; Knosalla *et al.*, 2000). It is the same for the complicated endocarditis with abnormalities of the conduction, with or without abscess, without that an explanation should be proposed (Meine *et al.*, 2001; DiNubile *et al.*, 1986). In our case, the patient is a young man of 27 years, which is closer to the literature. In more than 60% of cases, the abscesses are complicated of a heart failure, more readily in the aortic endocarditis including on native valves because the evolution is often more extended before the surgical cure (Arnett and Roberts, 1976; Knosalla *et al.*, 2000; Aguado *et al.*, 1993). The abscesses on prosthesis, in the absence of desinsertion, are less providers of heart failure at the time of diagnosis, often more early. Unlike our patient, who had no signs of heart failure, despite that he had dragging 3 months before to consult which may explain the delay diagnosis confirmed by the presence of a large abscess and the fistulization in the right cavities. The embolic complications, observed in one third of patients, are all occurred from an IE on valve native. In larger series, this frequency is also found but the neurological or peripheral embolisms are generally also frequent in the abscesses on prosthesis (Choussat *et al.*, 1999; Danchin *et al.*, 1999). The extension report in our case has not revealed septic emboli,

despite the severe loco regional extension. Staphylococci and streptococci are the most frequent germs in abscessed endocarditis (Daniel *et al.*, 1991; Arnett and Roberts, 1976; Danchin *et al.*, 1999) and Staphylococcus only in those complicated of fistulous tracts (Ignasi Anguera *et al.*, 2005). For the occurrence of the electrocardiogram changes during the infective endocarditis, Meine *et al.* did not find a significant difference between these two germs (Meine *et al.*, 2001). In our case, the blood cultures had grown and isolated an *Enterococcus Cloacae* which is a non-HACEK Gram-negative bacillus (GNB) (HACEK=Haemophilus, Actinobacillus, Cardiobacterium, Eikenella, and Kingellaspp). This group of germs, is exceptionally responsible for an infective endocarditis, which in this case is highly severe (Morpeth *et al.*, 2007). Its origin is digestive. In our patient, the main gateway to the bacteria responsible for this infective endocarditis could not be identified (Wiest and Garcia-Tsao, 2005).

Trans esophageal echocardiography's contribution in the diagnosis of abscess and fistulous tracts, has been confirmed, allowing the diagnosis in all cases. Its sensitivity exceeds 80 per cent, and its specificity can reach 100 per cent for the diagnosis of abscesses (Cormier *et al.*, 1993). However, difficulties exist for the anterior lesions of the aortic ring or those located in an area of shadow induced by of the calcifications or metal structures. The initial aortic localization is classic since it generally represents more than 80 per cent of abscesses (Arnett *et al.*, 1976; Choussat *et al.*, 1999; Aguado *et al.*, 1993). The extensive lesions at the aortic sleeve, the fibrous trigon, the interventricular septum and the presence of multiple fistula testify the fact that the diagnosis is usually made at advanced evolution. Which is similar to our case, where the diagnosis has been confirmed at the stage of the double fistulisation and the extension of lesions to interventricular septum, which also explains the occurrence of complete atrio ventricular block. The conduction abnormalities are not only related to a direct endocardial mutilation, they can also be caused by an associated bacterial myocarditis, a coronary embolism, an anevrysm invading the interventricular septum or by an anti-arrhythmic therapy (Roberts and Sommerville, 1969). This endocardial mutilation explains the incidence of conduction disorders of high degree and the need for a surgical debridement itself generating conduction anomalies. High-grade atrio ventricular blocks usually complicate infective endocarditis only in 2-4% of cases, but a conduction abnormality is described in approximately 25% of cases (Choussat *et al.*, 1999; Himbert and Lenègre, 1963; Wang *et al.*, 1972). Meine *et al.* (2001), in their recent study, observed 26% of conduction abnormalities, which account for 36 cases (including 4 BAV III, 3 BAV II and 11 BAV I) out of 137 infective endocarditis, but mainly eight times in 15 cases of abscessed endocarditis. Of these 36 cases, 11 have died while only 15 deaths were found in the 101 endocarditis free of conduction abnormalities: conduction disorders complicating endocarditis are associated with increased mortality. In another series of 233 abscesses, Choussat *et al.* reported 20 high-grade BAV (II or III) only on aortic abscess (Choussat *et al.*, 1999). Therefore, conduction anomalies appear to be much more frequent and severe in abscessed endocarditis, especially in the presence of peri-aortic abscesses. But this is not always as clear as it seems; in fact, Danchin *et al.* have compared the scalable profile of 122 endocarditis with and without abscess of aortic ring and have not noted a difference concerning the occurrence of atrioventricular conduction disorders; probably because of

the early surgery (Danchin *et al.*, 1999). The infective endocarditis in our case report, is enterococcal, and is particular in its high number and rarity of its complications that are aortic abscess, septic shock, complete atrio ventricular block, and both aorto-right ventricular and aortic annular fistulas.

Aorto-cavitary fistulas can occur in various pathological situations: surgical trauma during aortic valve replacement, chest trauma, aortic dissection, sinus of Valsalva aneurysm rupture. Their septic origin remains exceptional (Ignasi Anguera *et al.*, 2005). They are associated with periannular abscess in 78% of cases, and almost 50% of these abscesses have a diameter > 10 mm, which is closer to our case (Ignasi Anguera *et al.*, 2005). Fistula usually create a left-right shunt that aggravates the patient's clinical condition and deteriorates his hemodynamic stability. In the study of I. Anguera *et al.*, the complication rate was high, more than 60% of patients developed a significant heart failure and more than 40% died. Moderate and severe heart failure remain significant and independent risk factors for mortality in infective endocarditis. This study reflects the association of aorto-cavitary fistulas with significant hemodynamic complications and a high mortality rate (Ignasi Anguera *et al.*, 2005). In addition, advanced sepsis and progressive local destruction of tissues with abscess forming have also been recognized as the primary determinants of mortality in infective endocarditis and may exacerbate the hemodynamic compromise produced by the ventricular aorto fistula (Bayer *et al.*, 1998; Aguado *et al.*, 1993). The haemodynamic consequences of fistulas producing left-right or left-left shunts may vary depending on the site of rupture and the size of the shunt. The existence of an aorto-cavitary fistula is a strong indication for surgery, however, in the presence of a small fistula, especially with a very high surgical risk, and a low risk of extension, the conservative attitude is required.

E.Cloacae is a non-HACEK GNB, which is known multiresistant. The AmpC β -lactamase gene is naturally carried by this type of bacteria, which is responsible for the secretion of β -lactamase and resistance to antibiotics (Paterson, 2006). Its therapeutic management differs according to the authors, there are those who advocate early surgical treatment combined with long-term antibiotic therapy (> 6 weeks) combining β lactamines and aminoglycosides. Others have not found any difference in the mortality rate between patients treated surgically and those are not (Morpeth *et al.*, 2007). Our patient was prescribed a 6-week course of 2 g intravenous (IV) amoxicillin at 4 hourly intervals and 1 mg/kg IV gentamicin at 8 hourly intervals for 2 weeks; with good biological evolving during the first two weeks; contrary to reports in the literature of the multidrug resistance; and by setting up a probe for electro-systolic stimulation before the surgery. A successful aortic valve replacement with a mechanical prosthesis combined with a classical Bentall procedure and coronary artery reimplantation were performed, and separate stitches were used to close fistulas and abscesses. The postoperative control was satisfactory, with recovery of normal hemodynamics and sinus heart rate.

Conclusion

The conduction abnormalities and the aorto-right ventricular fistulas reflect the severity of the extended lesions of the abscessed endocarditis, and boost the requiring to an intensive monitoring of patients in anticipation of the fact that they

would require surgical intervention in the near future. The in-hospital mortality rates, in patients with complicated infective endocarditis, is high.

Conflict of Interests

The authors declare that there is no conflict of interests.

REFERENCES

- Acar J, Michel PL. 1993. Chirurgie de l'endocardite bactérienne: Quand? *Arch Mal Coeur*, 86:1863–7.
- Aguado JM, Gonzalez-Vilchez F, Marti'n-Duran R *et al.* 1993. Perivalvular abscesses associated with endocarditis: clinical features and diagnostic accuracy of two-dimensional echocardiography. *Chest*, 104:88–93
- Aguado JM, Gonzalez-Vilchez F, Martin-Duran R, Arjona R, Vazquez de Prada JA. 1993. Perivalvular abscesses associated with endocarditis, clinical features and diagnostic accuracy of two-dimensional echocardiography. *Chest*, 104:88–93.
- Arnett EN, Roberts WC. 1976. Valve ring abscess in active infective endocarditis : frequency, location and clues to clinical diagnosis from the study of 95 necropsy patients. *Circulation*, 54:140–5.
- Bayer AS, Bolger AF, Taubert KA *et al.* 1998. Diagnosis and management of infective endocarditis and its complications. *Circulation*, 98:2936–2948
- Bayer AS, Bolger AF, Taubert KA, Wilson W, Steckelberg J, Karchmer AW, *et al.* 1998. Diagnosis and management of infective endocarditis and its complications. *Circulation*, 98:2936–48.
- Blumberg EA, Karalis DA, Chandrasekaran K, Wahl JM, Vilaro J, Covaleky VA, *et al.* 1995. Endocarditis associated paravalvular abscesses : do clinical parameters predict the presence of abscess? *Chest*, 107:898–903.
- Choussat R, Thomas D, Isnard R, Michel PL, Lung B, Mathieu M, *et al.* 1999. Perivalvular abscesses associated with endocarditis – Clinical features and prognostic factors of overall survival in a series of 233 cases. *Eur Heart J*, 20:232–41.
- Cormier B, Diebold B, Gueret P, Roudaut R. 1993. L'échographie dans le diagnostic de l'endocardite infectieuse: fiabilité et limites. *Arch Mal Coeur*, 86:1819–23.
- Danchin N, Retournay G, Stchepinski O, Selton-Suty C, Voiriot P, Canton P, *et al.* 1999. Comparison of long term outcome in patients with or without aortic ring abscess treated surgically for aortic valve infective endocarditis. *Heart*, 81:177–81.
- Daniel WG, Mugge A, Martin RP, Lindert O, Hausmann D, Nonnast-Daniel B, *et al.* 1991. Improvement in the diagnosis of abscesses associated with endocarditis by transesophageal echocardiography. *N Engl J Med*, 324:795–800.
- DiNubile MJ, Calderwood SB, Steinhaus DM, Karchmer AW. 1986. Cardiac conduction abnormalities complicating native valve active infective endocarditis. *Am J Cardiol*, 58:1213–7.
- Himbert J, Lenègre J. 1963. Les troubles de la conduction intracardiaque dans les endocardites bactériennes. *Arch. Mal. Coeur*, 56:247–53.
- Ignasi Anguera I, Jose M. Miro, Isidre Vilacosta, Benito Almirante, Manuel Anguita *et al.* 2005. Aorto-cavitary fistulous tract formation in infective endocarditis:

- clinical and echocardiographic features of 76 cases and risk factors for mortality. *European Heart Journal*, 26, 288–297
- Knosalla C, Weng Y, Yankah AC, Siniawski H, Hofmeister J, Hammerschmidt R, *et al.* 2000. Surgical treatment of active aortic valve endocarditis with associated periannular abscess - 11 year results. *Eur Heart J.*, 21:490–7.
- Meine TJ, Neetles RF, Anderson DJ, Cabell CH, Corey R, Sexton DJ, *et al.* 2001. Cardiac conduction abnormalities in endocarditis defined by the Duke criteria. *Am Heart J.*, 142:280–5.
- Morpeth S, Murdoch D, Cabell CH, Karchmer AW, Pappas P, Levine D, *et al.* 2007. Non-HACEK gram-negative bacillus endocarditis. *Ann Intern Med.*, 147:829e35.
- Paterson DL. 2006. Resistance in gram-negative bacteria: enterobacteriaceae. *Am J Infect Control*, 34:S20e8. Discussion S64e73.
- Roberts NK, Sommerville J. 1969. Pathological significance of electrocardiographic changes in aortic valve endocarditis. *Br Heart J.*, 31: 395–6.
- Wang K, Gobel F, Gleason DF, Edwards JE. 1972. Complete heart block complicating bacterial endocarditis. *Circulation*, 46:939–47.
- Wiest R, Garcia-Tsao G. 2005. Bacterial translocation (BT) in cirrhosis. *Hepatology*, 41:422e33.
