CASE REPORT

Prosthetic Valve Endocarditis due to Non-Typhoid Salmonella

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ABSTRACT

There are several predisposing factors for the development of infectious endocarditis, among them, history of infectious endocarditis and prosthetic valve replacement. Prosthetic valve infectious endocarditis caused by Salmonella is an unusual entity. We report the case of a female patient with a history of double mitral and aortic valve replacement, who was admitted due to severe sepsis. The etiological diagnosis of infectious endocarditis by Salmonella enteritidis was reached through blood cultures. She had a fulminant clinical course and died within the first 24 hours.

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Key words > Endocarditis – Heart Valve Prosthesis - Infection

BACKGROUND

Prosthetic valve endocarditis is defined as that occurring on any mechanical or biological prosthesis. Its onset may be early –within a year after valve replacement– or late –after twelve months following valve replacement. (1) Prosthetic-valve infectious endocarditis is an entity that complicates the clinical course of patients undergoing valve replacement. (2)

The incidence of prosthetic valve endocarditis in different series is about 8% to 15% of overall endocarditis. In 5-year follow-up series, it is 3% to 6 %. (3, 4) The risk is greater between the second and third month following valve replacement, and it decreases between the sixth month and the first year, keeping a constant rate of 0.4% per year. No significant differences have been recorded between prosthetic aortic and mitral valves. Regarding the difference between mechanical or biological valves, the risk is 5% and 6.3%, respectively, at 5 years following valve replacement. However, recipients of mechanical valves had greater risk in the first three months after surgery, while the risk was higher for bioprostheses recipients 12 months or more after valve replacement. (5)

Salmonella is a flagellated, anaerobic facultative gram-negative bacterium. Clinically, it is classified in two groups: typhoid and non-typhoid Salmonella, causing a wide variety of infections, self–limiting gastroenteritis being the most common one. About 5% of patients with gastroenteritis develop bacteremia (6), most frequently in children and elderly subjects, and among immunocompromised patients. Extraintestinal infections may involve various organs, including heart valves and the myocardium. Endocarditis caused by these microorganisms has a very low incidence. (7)

We present a new case of prosthetic valve endocarditis due to Salmonella enteritidis, which, to the best of our knowledge, would be the tenth reported case published for this subspecies. The patient had fulminant clinical outcome and died within the first 24 hours of hospital admission.

CASE REPORT

We present the case of a 73-year old female with cardiovascular history of hypertension, mechanical mitral and aortic valve replacement in 1993 due to infectious endocarditis, and chronic atrial fibrillation under anticoagulation therapy. She was also allergic to penicillin. The patient did not smoke or drink alcohol, and had no history of drug abuse. Her usual medication was enalapril 20 mg/day and acenocoumarol according to INR. The patient presented with a 10 day-history of febrile episodes and New York Heart Association functional Class II dyspnea, which progressed to functional Class III and then to IV within 48 hours prior to admission. On admission physical examination her blood pressure was 190/90 mm Hg, heart rate 150 bpm, respiratory rate 27/min, and axillary temperature 38.5 °C. Arterial pulse was irregular and uneven. The apex beat was sustained at the left fifth intercostal space anterior axillary line, she presented Dressler's syndrome, S1 with opening click, S2 splitting, presence of S3, absence of S4, 2/6 protomesosystolic murmur in mitral area, 3/3 jugular ingurgitation with partial collapse, 3/4 edema in lower limbs, and crepitant rales up to the mid lung fields. The ECG (Figure 1) revealed rhythm of atrial fibrillation with right bundle branch

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block; chest X-ray showed pulmonary flow redistribution, hilar congestion, and increased cardiothoracic ratio. Admission laboratory tests showed: hematocrit 31.7%, hemoglobin 10.6 g/dL, white blood cells 12,000 / mm3 with 97% neutrophils, prothrombin time < 10 sec, activated partial thromboplastin time 49 sec, urea 112 mg/dL, creatinine 1.85 mg/dL, creatinine clearance 30 mL/min, total bilirubin 3.4 mg/dL, indirect bilirubin 1.36 mg/dL, aspartate aminotransferase 30 IU/L, alanine aminotransferase 30 IU/L, lactic dehydrogenase 738 IU/L, total proteins 4.7 g/L, albumin 2.3 g/L, sodium 129 mEq/L, and potassium 4.3 mEq/L. The rest of the tests were normal. APACHE II score was 20. Presumptive diagnosis on admission was severe sepsis with endovascular focus (late prosthetic valve endocarditis) associated with heart failure, atrial fibrillation with high ventricular response, and multi-organ failure. Treatment on admission was nitroglycerin, furosemide, and digoxin. The patient was pan-cultured and antibiotic therapy was started, including vancomycin, gentamicin, and rifampicin. On admission, a two-dimensional Doppler echocardiography and a transesophageal echocardiography were performed. In the first 12 hours, the patient progressed with signs of low cardiac output, shock and poor ventilation, requiring mechanical respiratory support and inotropes.

The Doppler echocardiography showed no vegetations but it revealed mild aortic regurgitation and signs of moderate mitral valve stenosis with mild regurgitation, in addition to moderate tricuspid valve regurgitation.

Transesophageal echocardiography (Figure 2) showed normally functioning mechanical aortic valve prosthesis, with a 3 × 5 mm sessile echo-refringent image above the ring, on the posterior wall.

The patient progressed with septic shock and multi-organ failure, and died within 20 hours of admission. Cultures were positive (three out of three) for Salmonella enteritidis.

DISCUSSION

Salmonella is a flagellated, anaerobic facultative gram-negative bacterium of the Enterobacteriaceae family. Currently there are two recognized species of this genus, Salmonella enterica and Salmonella bongori. There are six subspecies of Salmonella enterica. There are more than 2,500 serotypes of Salmonella, most of them belonging to the subspecies Salmonella enteritidis and Salmonella typhimurium. Gastroenteritis due to Salmonella is a food- and waterborne zoonosis contaminated by the feces of infected animals or people, and constitutes a worldwide pandemic disease. Endocarditis is a rare complication of Salmonella infection, with an incidence of 0.2-0.4%. (7)

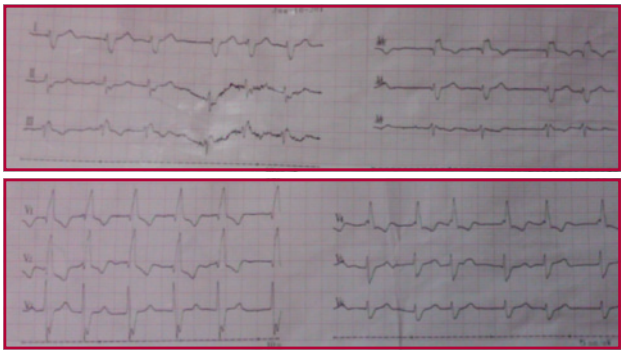

Fig. 1. 12-lead ECG showing atrial fibrillation rhythm with complete right bundle branch block.

Fig. 2. Transesophageal electrocardiographic evaluation. Two-dimensional image of the aortic valve.

A search in PubMed and Medline revealed 19 published cases of prosthetic valve endocarditis due to Salmonella. Nine cases were caused by Salmonella enteritidis (confirmed), all published in the Anglo-Saxon literature. Our case would be number 10 (Table 1).

There are certain risk factors for the development of prosthetic valve endocarditis, such as age older than 60 years, decreased gastric pH due to atrophic gastritis or excessive consumption of antacids, diabetes, neoplastic disease, decreased immunity (in patients with human immunodeficiency virus or systemic lupus erythematosus), immunosuppressive drug therapy, and bile duct disease. (8) Age was the only risk factor present in our patient.

Diagnosing Salmonella vascular infection may be difficult due to lack of uniform diagnostic criteria, and it requires a high level of suspicion. As opposed to most published reports, our patient had no gastrointestinal symptoms on the days previous to admission suggestive of Salmonella infection. (7)

Transthoracic echocardiography is the first study to identify, locate and characterize vegetations, as well as revealing any other complication due to infection. However, if it is not conclusive, emergency transesophageal echocardiography is the most sensitive complementary method to evaluate these patients. (8)

As the previous 19 published cases, our patient presented with positive blood cultures which were typified as Salmonella enteritidis. After reviewing

Table 1. Published cases of Salmonella endocarditis

Author	Year	Age	Gender	Risk Factors	Valve	Morphology	Treatment	Early outcomes	Late outcomes
Our case	2010	73	F		Mech. ao. & mi.		ATB	Death	
Halil, et al	2009	69	F	DM	Biol. ao.		ATB + Surg.		
Hagen, et al	2009	22	F	SLE Cholecystitis DM	Biol. mi.	Annular vegetation and disruption	ATB + Surg.	Alive, complicated	Death 30 weeks after surgery.
Hagen, et al	2009	69	F	Ca. DM	Bio. ao.	Periannular vegetation and abscess	ATB + Surg.	Death	
Fernández Guerrero, et al	2004	67	M	-	Mech. mi.	Vegetation	ATB + Surg.	Alive	No recurrence at 56 weeks
Gonen, et al	2004	51	M	-	Mech. ao. & mi.	Vegetation in both valves	ATB + Surg.	Alive, complicated	No recurrence at 17 weeks
Aribas and Gormus	2002	62	F	-	Mech. mi.	Vegetation	ATB + Surg.	Alive	No recurrence at 16 weeks
Keller, et al	2001	85	F	Ca. DM	Mech. ao.	Vegetation	ATB	Alive	No recurrence at 130 weeks
Gunalingam, et al	2000	69	M	Omeprazole	Bio. ao.	Vegetation	ATB + Surg.	Alive	No recurrence at 7 weeks
Urfer, et al	2000	80	F		Mi.		ATB	Alive	
Goerre, et al	1998	79	M	Prednisolone	Bio. ao.	Vegetation	ATB	Alive	No recurrence at 52 weeks
Miyamoto, et al	1997	59	M	Prednisone	Bio. ao.	Vegetation Disruption	ATB + Surg.	Alive, complicated	No recurrence at 39 weeks
Fernández Guerrero, et al	1996	59	M	HIV	Mech. mi.	Regurgitation	ATB	Death	
Fukushima, et al	1996	58	M	Vesicular lithiasis	Mech. ao. & mi.	Vegetation	ATB + Surg.	Alive	No recurrence at 52 weeks
Lee, et al	1994	42	M	-	Mech. ao. & mi.	Vegetation Regurgitation	ATB	Death	
Reisshauer, et al	1993	54	M	-	Mech. ao.	Vegetation and periannular abscess	ATB	Death	
Choo, et al	1992	62	F	-	Biol. mi. & tric.	Vegetation	ATB + Surg.	Alive	No recurrence at 208 weeks
Shanson, et al	1977	52	M	-	Mech. ao.	Vegetation Regurgitation	ATB + Surg.	Death	
Yamamoto, et al	1974	50	F	-	Mech. mi.	Vegetation and periannular abscess	ATB + Surg.	Death	
Fraser, et al	1967	56	F	-	Bio. ao.	Vegetation Regurgitation	ATB + Surg.	Death	

F: Female. M: Male. Mi: Mitral. Ao: Aortic. Tri: Tricuspid. Biol: Biologic. Mec: Mechanic. ATB: Antibiotics. Surg: Surgery. SLE: Systemic lupus erythematosus. DM: Diabetes mellitus. HIV: Human immunodeficiency virus. Ca: Cancer.

the previous cases, ours would be the tenth published about this agent, which represents 50% of the total number of cases. (8) Therefore, this serotype is placed as the most prevalent and possibly the most aggressive agent causing Salmonella endocarditis in patients with prosthetic valves. (6-9)

In conclusion, our patient was admitted with severe sepsis, had a fulminant clinical course and died within the first 24 hours of hospital admission.

RESUMEN

Endocarditis de válvula protésica por Salmonella no tifoidea

Existen varios factores predisponentes para el desarrollo de endocarditis infecciosa; entre ellos se destacan el antecedente de haber padecido endocarditis infecciosa y el recambio valvular con válvula protésica. La endocarditis infecciosa de válvula protésica producida por Salmonella es una entidad de muy baja incidencia. En esta presentación se describe el caso de una paciente con antecedente de doble recambio valvular, mitral y aórtico, que ingresó con un cuadro de sepsis grave. Se llegó al diagnóstico etiológico de endocarditis infecciosa por Salmonella enteritidis a través de hemocultivos. La paciente tuvo una evolución fulminante y falleció antes de las 24 horas.

Palabras clave > Endocarditis - Prótesis valvular cardíaca Infección

Conflicts of interest
None declared.

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