

# *Salmonella* species group B causing endocarditis of the prosthetic mitral valve

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## ABSTRACT

يعتبر الالتهاب الجرثومي لصمامات القلب والناج عن عصيات السلمونيلة اللاتيفويدية أحد الأسباب الجرثومية النادرة جداً. يعرض هذا التقرير السلمونيلة اللاتيفويدية. أثبتت زراعة الدم و زراعة العينة التي أخذت أثناء عملية استبدال الصمام المصاب بأن الجرثومة المتسببة في التهاب الصمام التاجي هي من السلمونيلة اللاتيفويدية نوع (ب).

The *Salmonella* species is an extremely rare cause of infective endocarditis. This case report is for *Salmonella* spp. group B proven by positive multiple blood cultures, and positive intraoperative culture from the vegetation of the mitral valve prosthesis.

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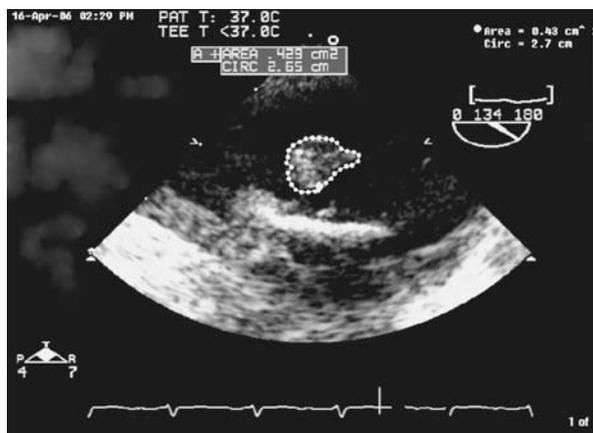
Address correspondence and reprint request to: Dr. Nisreen M. Al-Sherbeeni, Department of Medicine, Division of Infectious Diseases, Riyadh Military Hospital, PO Box 52373, Riyadh 11563, Kingdom of Saudi Arabia. Tel. +966 (1) 4777714 Ext. 25960. E-mail: nismysh@hotmail.com

Endocarditis due to non-typhoidal *Salmonella* is a rare clinical entity and is associated with high mortality. Approximately 75% of cases have underlying cardiac abnormalities such as rheumatic heart disease (RHD) and congenital heart defects.<sup>1</sup> Reports of endocarditis due to *Salmonella* species are very limited, among those reports, only 13 cases of prosthetic valve endocarditis (PVE) have been reported in the English literature.<sup>2</sup> A new case of *Salmonella* spp. endocarditis of the mitral valve prosthesis is presented in this report. The rarity of this clinical entity in addition to the definite diagnosis in our patient, which was confirmed clinically and pathologically as per "Duke criteria",<sup>3</sup> unlike the previously reported cases, was the main objective to report this case.

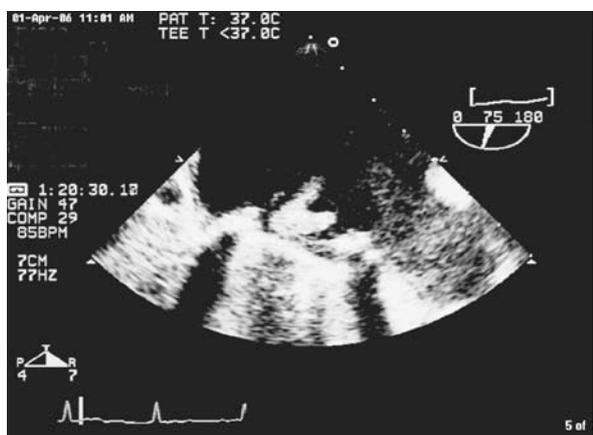
**Case Report.** A 59-year-old Saudi woman presented to Al-Kharj Military Hospital, Al-Kharj, Kingdom of Saudi Arabia in March 2006 complaining of fever, vomiting, and abdominal pain for 3 days. Her medical history was significant for RHD with mitral valve ballooning for 15 years followed by mitral valve replacement (MVR) in 2003. She had atrial fibrillation and type II diabetes mellitus. She is on warfarin, digoxin, and oral hypoglycemic agents. The patient was admitted with a possible diagnosis of pyelonephritis. Parenteral ceftriaxone was started pending blood culture results, which was positive for *Salmonella* spp. group B, pan sensitive strain (amoxicillin, ceftriaxone, gentamicin, septrin, ciprofloxacin, tazocin). However, because of the persistent fever for one week, she was shifted to tazocin and gentamicin despite there being no clinical or microbiological justification. Her fever then settled, and she underwent transthoracic echocardiography, which revealed no vegetation. Her abdominal ultrasound (US) showed no gall bladder abnormalities. Transesophageal echocardiography (TEE) was not available in the Al-Kharj Military Hospital, and she refused to stay longer until TEE was arranged, so she went home against medical advice on no antibiotics. She came back after 9 days with recurrent fever for which she was transferred to Riyadh Military Hospital for further management. Her examination revealed an acutely sick lady with temperature up to 39°C, heart rate: 100/min, blood pressure: 136/58. She had no peripheral stigmata of endocarditis, and she was not in heart failure. No localized tenderness over the spine and all joints were normal. Auscultation of the heart revealed a metallic click in the mitral area with no murmur. Abdomen: no hepatomegaly or splenomegaly. Because of the previous positive blood culture for *Salmonella* spp group B in a patient with underlying RHD who did not receive adequate therapy, endocarditis was highly suspected as a cause of her recurrent fever. Multiple blood cultures were taken, and she was started on intravenous (IV) ceftriaxone and gentamicin. Six blood culture bottles were positive for *Salmonella* spp. group B with similar

sensitivity biogram as before. The TEE demonstrated 2 large pedunculated vegetations on the mitral valve prosthesis with abscess in the posterior mitral suture ring with no paravalvular leak seen (**Figure 1**). An emergency redo MVR was carried out with extensive debridement and curettage of all the infected tissue. The intra-operative specimen was sent to the microbiology laboratory, which showed *Salmonella* spp. group B with similar sensitivity to the strain in the blood. Postoperatively, she remained stable on IV ceftriaxone and gentamicin. Repeated blood cultures were negative, white blood cell count, and c-reactive protein improved significantly to normal level. However, 16 days postoperatively a follow up TEE demonstrated a recurrence of a large vegetation on the MV prosthesis (**Figure 2**). She was discussed with

the cardiac surgeons who were reluctant to operate on her again because of high risk surgery, and they preferred to carry on with antibiotics alone as long as she was clinically well. A search for a possible infective focus to explain her relapse/recurrence was initiated, so urine and stool cultures were sent. The urine culture was negative, but the stool culture was positive for *Salmonella* spp. group B. Abdominal CT was also carried out for the same reason, but it did not show any abnormalities. Since she did not have diarrhea, we thought that most likely she is a chronic *Salmonella* carrier in her gall bladder, so in an attempt to optimize her treatment and to prevent further relapse, she was offered laparoscopic cholecystectomy, which was tolerated very well. Gall bladder specimen was sent for histology and culture. Unfortunately, the histology specimen was lost, but the culture showed again *Salmonella* spp. group B. She remained well until she completed 6 weeks of IV antibiotics (ceftriaxone/gentamicin for 2 weeks followed by IV ceftriaxone/ciprofloxacin for 4 weeks). Repeated TEE yielded no more vegetation and only mild paravalvular leak (PVL). She was then discharged home on oral ciprofloxacin 750 mg BID (high dose was chosen to ensure tissue penetration), and given a follow up appointment in the clinic. Unfortunately, one week from discharge, she came back to the ER with orthopnea and dyspnea at rest due to severe pulmonary edema. An urgent TEE showed severe PVL. She was started on IV ceftriaxone/ciprofloxacin, and taken immediately to theater for her second redo MVR. Intra operatively, severe PVL with dehiscent mitral valve prosthesis, multiple adhesions, and inflammatory tissues were found and removed. Postoperatively, she was continued on the same antibiotics. During her hospital stay, she developed right knee monoarthritis due to diuretic induced pseudogout. Septic arthritis was ruled out by negative synovial fluid analysis and culture. She improved after a short course of non-steroidal analgesics. During this admission, she received a one month therapy of IV ceftriaxone and ciprofloxacin then was shifted back to oral ciprofloxacin 750 mg, twice a day. Further cultures from the blood and stool remained sterile. She completed 3 months of oral ciprofloxacin without any side effects. She was seen several times in the clinic after her discharge from the hospital and as of the date of reporting this case, namely, more than 2 years from her initial presentation, her general health has been good with no evidence of recurrence.



**Figure 1** -The transesophageal echocardiography demonstrated 2 large pedunculated vegetations on the mitral valve prosthesis with abscess in the posterior mitral suture ring with no paravalvular leak seen.



**Figure 2** - Transesophageal echocardiography demonstrated a recurrence of a large vegetation on the MV prosthesis (16 days postoperative follow up).

**Discussion.** Patients older than 50 years with pre-existing cardiac disease are more likely to develop endocarditis following *Salmonella* bacteremia.<sup>1,4</sup> In the present case, the patient had classical risk factors for

*Salmonella* endocarditis. The diagnosis of prosthetic valve endocarditis (PVE) was made by persistent *Salmonella* spp. group B bacteremia, the presence of large vegetation in TEE and isolating the same organism from the culture obtained from the vegetation intraoperatively. On the contrary, the diagnosis in most of the previously reported cases was based primarily on the positive blood cultures and/or echocardiographic findings.

Non-typhoid *Salmonella* bacteremia with distant endovascular infection such as aortic aneurysm and endocarditis is usually associated with apparent focus in the gastrointestinal tract.<sup>5,6</sup> In our patient, the stool culture was also positive for *Salmonella* spp. group B although she had no history of diarrhea. The same organism was also isolated from her gall bladder after laparoscopic cholecystectomy. This indicates that she was most likely a chronic carrier for *Salmonella* spp. in her biliary tree.<sup>7</sup> As compared to most of *Salmonella* carriers in the gall bladder, this patient has no evidence of gall stone or radiological features of chronic cholecystitis.<sup>7</sup> The approach to *Salmonella* carrier is a debatable issue, as some authors suggest long-term oral suppressive antibiotic therapy if eradication is needed such as in food handlers, whereas others suggest cholecystectomy as an effective treatment for long-term gall bladder carriers.<sup>8-11</sup> Despite combined medical and surgical therapy, the patient experienced recurrence of disease. To prevent further recurrence, considering that the likely focus of that is the gall bladder, laparoscopic cholecystectomy was carried out. *Salmonella* spp. endocarditis is a destructive disease associated with an overall fatality rate of 70%.<sup>1</sup> Successful therapy is difficult, requiring both appropriate antibiotics and surgical removal of the infected valve especially if response to antibiotics is inadequate or a prosthetic valve is involved.<sup>1,11,12</sup> The duration of antibiotics must be individualized. A parenteral course of 4-6 weeks is recommended by some authorities and may be followed by oral antibiotics suppressive therapy for some time.<sup>1,11</sup> A search for an infected extra or intra-cardiac focus should be performed if response to the above mentioned management is not adequate or relapse/recurrence occurs. Removal of infective focus is necessary to avoid further recurrence and provide the best chance for survival.

The choice between fluoroquinolones and beta-lactam antibiotics for serious endovascular infections due to *Salmonellosis* is still an issue of debate, some clinicians prefer to use cephalosporins because data from animal models in infective endocarditis demonstrates their ability to penetrate and kill the organism within vegetations. By extrapolation from studies of *Salmonella typhi* infections, fluoroquinolones result in more rapid

and durable clinical response than do cephalosporins, and *in vitro* data showed greater penetration of fluoroquinolones into phagocytes where salmonella persist, one might reasonably choose fluoroquinolones.<sup>10</sup> Many clinicians might use beta-lactams initially followed by a longer oral fluoroquinolones. There are no clinical data that combination therapy of both is more effective than either single agent.<sup>11</sup>

Our patient received around 6 weeks of IV antibiotics. However, because of recurrent vegetations and severe paravalvular leak, which was most likely due to endocarditis, a second redo MVR was performed with prolongation of IV antibiotic therapy for another month. This was followed by oral ciprofloxacin for 3 months.

*Salmonella* spp. prosthetic valve IE is associated with high mortality, however, appropriate medical therapy and the patient's adherence to it, with timely surgical intervention is of paramount importance to improve patient survival. Both were not optimum in our patient due to obligatory non-compliance as a result of her discharge from the hospital against medical advice in the early phase of the disease and delayed operation due to her general condition. Fortunately, our patient did very well despite the above obligatory non-compliance. After more than 2 and half years from stopping antibiotics, she is doing fine with no signs of recurrence.

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