Pacemaker lead endocarditis due to Brucellosis

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ABSTRACT

يعتبر التهاب الجهاز الاصطناعي أو المغروس الخمجي من المضاعفات النادرة الحدوث لميكروب البروسيلا. لقد تم نشر 6 حالات مصابه بالتهاب منظم القلب، و مزيل الارتجاف الخمجي بالبروسيلا. ونحن هنا بصدد نشر تقرير عن حالة التهاب لشغاف القلب، ومقود منظم الضربات الخمجي بالبروسيلا بدون إصابة الجهاز المنظم نفسه و اللتي تم علاجها بإزالة الجهاز و إعطاء المضادات الحيوية اللازمة.

Infection of prosthetic devices or implants is a rare complication of Brucellosis. Pacemakers and implantable cardioverter-defibrillator infections were previously reported in 6 patients. We report the first case of relapsing Brucellosis due to intracardiac lead endocarditis, which resolved only after removing the intracardiac leads and institution of appropriate antimicrobial therapy.

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Brucellosis is a zoonotic infection whose occurrence is closely related to its prevalence in domesticated animals. It presents with nonspecific symptoms such as fever, rigor, and malaise, and sometimes is complicated by hepatitis, sacroiliitis, spondylitis, meningitis, and epididymoorchitis.[1] It is usually associated with occupational or domestic exposure to infected animals or their products. Infection is acquired by ingestion of unpasteurized dairy products or inhalation of infectious aerosols inhaled or inoculated into the conjunctiva.[2] It is one of the most common zoonotic diseases in the world and remains a serious threat to animals and humans in countries surrounding the Mediterranean Sea, the Arabian Peninsula, central Asia, Greece, Spain, and Mexico. *Brucella melitensis* is the most pathogenic species for humans.[1] Infection of a prosthetic device or implant is a rare complication of brucellosis, however, in recent years, there has been more reports of Brucella organisms being implicated in a number of prosthetic device infections including prosthetic heart valves,[3] prosthetic joints,[4] and breast implants.[5] Cardiac device infection with Brucella has been documented to involve implantable cardioverter-defibrillators in one patient,[6] and pacemakers in 5 patients.[7,8] We report the first case of intracardiac leads infection without the involvement of pacemaker generator due to *Brucella melitensis* in a young male Saudi patient.

Case Report. A 38-year-old Saudi patient, presented to King Khalid University Hospital, Riyadh, Kingdom of Saudi Arabia in February 2007 complaining of fever, chills, and rigor for 2 months. His medical history was significant for placement of dual permanent pacemaker at the age of 18 years, which was removed one month later with entrapment of intracardiac leads. At the age of 27, he developed renal failure of unknown etiology, which was followed one year later by renal transplant. He was maintained on cyclosporine and prednisolone therapy. He was a native of Saudi Arabia and gave a strong history of contact with animals, especially goats, but denied consumption of raw milk. Aside from high-grade fever, his physical examination was unremarkable. Laboratory testing revealed positive Brucella serology with standard tube agglutination (STA) titer of 1:1280. Blood culture subsequently grew *Brucella melitensis*. He was treated by doxycycline 100 mg bid and rifampicin 600 mg once daily for total of 6 weeks with full recovery. He was seen again 4 months later because of relapsing Brucellosis infection with bacteremia confirmed by blood culture and positive serology of STA 1:640. He denied reexposure to animals. A similar course of antibiotics was given again for 6 weeks, and his symptoms improved. In November 2007, fever relapsed and his physical examination was notable for high grade fever. Laboratory tests showed renal failure with a serum creatinine of 676 µmol/L, and erythrocyte sedimentation rate of 54 mm/h (normal ranges; 0-25 mm\h). His chest x-ray showed 2 pacemaker leads inside the atrial

chamber. Automated blood culture systems using Bactec manufacturer 9000 (Artisan Scientific Corporation, Champaign, IL, USA) instruments grew *Brucella melitensis* within 7 days of incubation. Transthoracic echocardiography showed no cardiac vegetation but the trans-esophageal echocardiogram showed the presence of an echogenic bright thickening of the pacemaker wire with bright cast of tissue extending for around 4 cm of lead length. In addition, a mobile bright mass of 7 x 4 mm suggestive of vegetation attached to the leads was also seen (**Figure 1**). The cardiac valves were normal. Presence of vegetations on the intracardiac portion of the lead made the diagnosis of device-related endocarditis. He was started on doxycycline 200 mg per day and rifampicin 600 mg once daily. As of the partial response to antibiotics, the previous 2 relapses, and echogenic evidence of endocarditis, a decision to remove the infected intracardiac leads was made. The intracardiac wires were removed surgically, which was followed by rapid defervescence of fever. A sample taken from the leads at the time of removal yielded *Brucella melitensis* on culture. He completed a 6-week course of antibiotics therapy without sequelae. He was followed-up for 2 years with no further relapses.

Discussion. Although there have been 5 previous reports of Brucella pacemaker infection and one patient with implantable cardioverter-defibrillator (ICD) infection due to *Brucella melitensis*. All previous 6 reported cases had local symptoms of inflammation with local pain, redness, and swelling referable to the device site indicating infection of the pacemaker pocket (5 cases) or the ICD (one case) itself with involvement of the intravascular leads. Four cases had systemic Brucella infection and the other 2 had only local symptoms. Our patient had systemic Brucella infection with involvement of the intracardiac leads. *Brucella melitensis* was the species grown from all the 6 reported cases of Brucella cardiac device infection. In general, *Brucella melitensis* is the most pathogenic Brucellar species for humans.[1] In spite of receiving 2 courses of antimicrobial therapy for systemic Brucellosis, our patient experienced 2 relapses of the disease. The denial of recent exposure to goats, sheep, and unpasteurized dairy products made the likely explanation for these relapses to be the intracardiac leads which may have been seeded during the first episode of Brucellar bacteremia. In the previous 2 cases treated for systemic brucellosis, and both experienced relapse because an infected pacemaker served as a nidus for recurrence.[8] The intracellular localization of Brucella species in specialized compartments is known to affect the natural history of Brucellosis. This is characterized by protracted disease evolution, which may lead to relapses even with a prolonged combined therapy administered in accordance with optimal recommendations.[9] In addition to Brucella species being primarily intracellular pathogens, they also tend to bind strongly to extracellular matrix proteins especially fibronectin and vitronectin.[10] Prosthetic devices implanted into humans are often coated with this matrix protein and may serve as a nidus for bacterial colonization or infection. Removal of devices infected with Brucella is required for cure, as shown in our patient as we failed to eradicate the organism with antibiotics only.

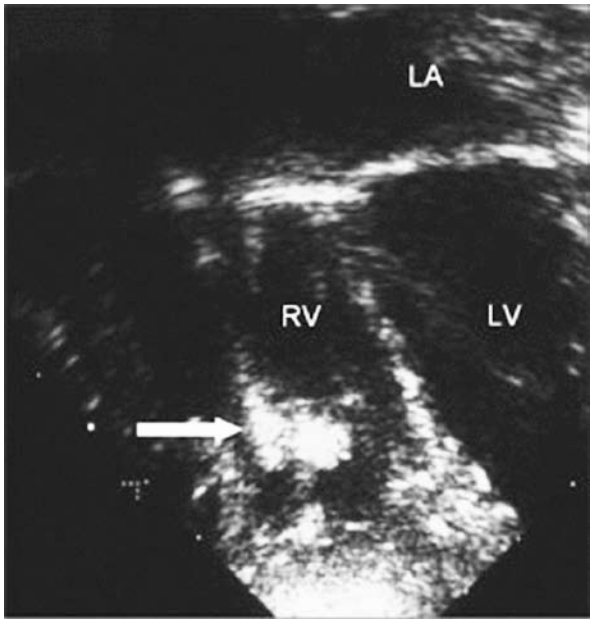

Figure 1 - Transesophageal echocardiogram showing vegetations (arrow) attached to the leads. LA - left atrium, LV - left ventricle, RV - right ventricle

The case represents a challenge to clinicians. They should be aware with relapsing *Brucellosis* and the possibility of infection of implanted devices with *Brucella melitensis* in patients residing in or travelling to areas endemic for Brucellosis. Early laboratory recognition of this virulent pathogen is helpful in managing these patients. Furthermore, this case suggests that *Brucella melitensis* is able to persist around pacemaker devices, which may result in recurrent relapses despite its having been eliminated from the rest of the body by antimicrobial therapy. Removal of an infected cardiac device with Brucella along with an appropriate antibiotics therapy is the treatment of choice.

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