We report a case of autologous platelet-rich plasma (PRP) application over the driveline site of a left ventricular assist device (LVAD) to treat an infection. The patient, a 47-year-old man with end-stage dilated cardiomyopathy, underwent Jarvik 2000 implantation through a median sternotomy. A pedestal with power supply and LVAD control was implanted into the mastoid bone. Retroauricular wound dehiscence occurred, and PRP was applied over the wound. Normal healing of the driveline exit site was observed. PRP can be used at a driveline exit site to either prevent or treat wound infection.


Current implantable left ventricular assist device (LVAD) designs still require a tunneled driveline to conduct energy, controller algorithms, and telemetric data between the pump and the extracorporeal controller unit. The exit port of the driveline is a vulnerable site of infection. Thus, driveline infection remains a life-threatening complication, which could lead to device explantation and eventually to the patient’s death [1]. In the past 2 decades, platelet-rich plasma (PRP), an autologous product with antibacterial properties, has been proposed especially for the treatment of infected wounds [2]. The purpose of this report is to describe the topical application of PRP as a new tool to treat LVAD driveline infections.

A 47-year-old man with end-stage dilated cardiomyopathy (New York Heart Association class IV) was admitted in acute cardiac failure. He was obese (body mass index 35), hypertensive, and hypercholesterolemic. He also had a biventricular implantable cardioverter defibrillator placed 6 years earlier. Preoperative transthoracic echocardiography revealed poor left ventricular function (15%) and 3+/4+ mitral regurgitation. Intravenous inotropic agents (dobutamine 5 μg/Kg/min) were started before implantation of the LVAD because of cardiogenic shock. The patient’s condition improved, but he could not be weaned from inotropic drug support. In addition, he had an episode of septic shock resulting from contamination of the central venous vein (CVC) line inserted in the right internal jugular vein. Empiric antibiotic therapy with teicoplanin and ciprofloxacin was instituted, and another CVC line was placed in the right subclavian vein. The sepsis resolved, and after 30 days of hospital stay an LVAD (Jarvik 2000 Flowmaker) was implanted through a median sternotomy with the patient under cardiopulmonary bypass. The pedestal with power supply and LVAD control was implanted in the skull at the retroauricular area into the mastoid bone. The postoperative course was complicated by bleeding, which required surgical repeated exploration of the sternotomy wound and transfusion of several red blood cells and fresh-frozen plasma units. Additionally, the patient experienced postoperative acute kidney failure, requiring hemodialysis for 4 days. Thereafter, his condition improved, and he made a steady recovery. Three weeks after the operation, retroauricular wound infection occurred, and the pedestal implant became visible. Wound swabs showed the growth of *Staphylococcus epidermidis*. The wound was surgically debrided and then dressed with autologous PRP every 3 days. After 2 weeks of treatment, granulation tissue was observed, and direct wound closure was performed with the patient under local anesthesia. The patient was discharged home 1 week later (Fig 1). No recurrence of infection has been observed after 2 years of follow-up.
Comment

Device-related infection is a life-threatening complication, which can lead to device removal [3]. As the REMATCH study first showed, driveline infection is the foremost cause of death in patients with congestive heart failure [4]. An LVAD requires an externalized driveline, which can become a passage through the skin barrier for bacterial and fungi [5]. Many therapeutic approaches have been developed over the years to treat LVAD driveline infections [3, 6]. In the early days, the same antimicrobial coatings (with chlorhexidine and silver sulfadiazine) used to reduce CVC colonization were used to impregnate LVAD drivelines to prevent early-onset infections [7]. Pasque and colleagues [5] proposed intravenous antibiotic therapy against germs, driveline immobilization, and aggressive surgical excision of the involved exit site. Nevertheless, despite all these strategies, there are still cases of VAD explantation for driveline infection [1].

In the early 1990s, PRP was proposed for the treatment of postsurgical infection, with good clinical results [2]. During the inflammatory phase of tissue healing, activated platelets release specific growth factors (GFs). They include platelet-derived growth factor, transforming growth factor-β, vascular endothelial growth factor, and epithelial growth factor. Platelet GFs, together with other GFs and cytokines, regulate the early migration of cells to the injury site, cell mitosis, angiogenesis, granulation tissue formation, and bone regeneration [2]. Furthermore, Bielecki and colleagues [8] showed that PRP inhibits in vitro the growth of Staphylococcus aureus and Escherichia coli. The antimicrobial action of white blood cells and platelets, both found in PRP, may reduce the potential for the development of infection, constituting in this way a preventive tool against infections and a therapeutic strategy in wound healing. To our knowledge, the present study reports the first use of PRP to treat retroauricular dehiscence of a pedestal wound. This study supports the possibility that the topical application of PRP in frail patients, such as those undergoing LVAD implantation, could be a potential solution to prevent or treat driveline infections.

References