INNOVATIVE COLLECTIONS

CLINICAL DECISION MAKING

Successful Lead Extractions in a Young Jehovah’s Witness Patient

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Introduction

The Jehovah’s Witnesses (JW) Society was founded in 1872 in Pittsburgh and New York and is known for refusing blood product transfusions even in life-and-death situations.1 By 2014, the JW faith had grown to more than 7.96 million followers in 239 countries. Cardiovascular surgery procedures in JW patients has become a major medical and ethical challenge to physicians involved in their management, essentially due to refusal of transfusions of any blood products during surgery.1,2

Methods

A 20-year-old male, single son of a JW faith family, with congenital AV block diagnosed at birth, implanted with a pacemaker at age 9 after developing symptoms of low cardiac output was seen. He became pacemaker dependent shortly afterwards (Figure 1a,b). After 11 years of follow-up, both V-leads verticalized requiring their removal (two ventricular (one connected, one abandoned) and one atrial connected); they had been implanted 11 and 7 years previously because of the development of new symptoms (“painful upper neck stretching sensation”) attributed to normal patient growth (145 cm to 190 cm of height; from ages 9 to 20) (Figure 2a).

A multidisciplinary cardiovascular team closely followed the recommendations of the Bloodless Medicine Program from University of Pennsylvania Hospital (www.pennmedicine.org/health_info/bloodless/000208.html) and recommendations in peer review publications from experts in the field,2 some of them with high single-center experience of up to 500 JW cardiovascular surgeries followed for 21 years.3 The core of this approach is based on the great concern regarding the risks of using allogenic blood transfusions on patient outcomes.2 Essentially, the patient blood management (PBM) considers the existence of three pillars for blood management of the patient.2 The first pillar represents “optimization of hematopoiesis”. The second pillar represents “minimize blood loss and bleeding,” and the third pillar refers to “harness and optimize physiological tolerance to anemia.”

Four weeks before surgery, hemoglobin (Hb) and ferritin levels were measured (Hb 11 g/% and ferritin of 47.6 ng/mL/%), which according to the World Health Organization are considered for anemia in men. After 2 weeks of subcutaneous administration of human recombinant erythropoietin (30,000 IU/dose per week) (rHuEPO; Recormon, Roche), vitamin B12 (1000 μg/daily × six doses IM), folic acid (5 mg orally), plus an all-in-one combination tablet of ferrous sulfate (105 mg) + folic acid (800 μg) + ascorbic acid (100 mg) (Ferro-Folic; Abbott)
the preoperative Hb and ferritin levels were raised to 16.7 g/% and 78 ng/mL, respectively. The leads to be removed, depicting significant verticalization (Figure 2a), were accessed at the original venous entry site, dissected and freed from intense fibrotic tissue in the pocket. All three leads were independently and fully liberated from their entry site in the left subclavian vein. A complete capsulectomy was done as well. In two of three leads (one atrial and one ventricular) a standard stylet (53 and 59 cm) was inserted under magnified high-definition fluoroscopic imaging at the tip of the lead and the helix retracted with a regular lead screwdriver. The standard stylets were then replaced with a Liberator Beacon Tip Locking Stylet (Cook Medical, Bloomington, IN). Progression of the stylet to the tip in the sectioned and abandoned V lead was impossible; therefore, a Bulldog lead extender (Cook Medical, Bloomington, IN) was used in combination with the Liberator previously inserted as far as possible within the damaged lead; both were used to secure this electrode. Gentle counterclockwise rotation of the lead was applied under continuous transesophageal echocardiography (TEE) monitoring and magnified fluoroscopy. Short rotational sheaths (Evolution; Shortie F, 11F) were initially used to facilitate passage under the left clavicle and to enter the ipsilateral subclavian vein; these were later changed to standard rotational sheaths with right and left cutting capabilities (Evolution RL 9F, 11F, 13F). Downward progression of the telescoped rotational sheaths to the tip of each lead was achieved with traction–countertraction movements until complete detachment of each lead tip. The three leads were successfully removed. Continuous vital signs monitoring remained stable throughout the procedure, and TEE showed normal contractility and

Figure 1: (a) Chest X-ray at age 3 prior to the fist pacemaker implant. (b) Chest X-ray at age 9, with two endocardial leads.

Figure 2: (a) Preoperative chest X-rays showing the verticalization angle in both ventricular leads to be extracted. (b) Postoperative X-rays after temporal lobe epilepsy (TLE) and contralateral atrial based magnetic resonance imaging compatible pacemaker implant.
lack of fluid in the pericardial sac. Transfusion of blood products was not required during or after the procedure and fluid reposition was solely done with crystalloids (2500 mL) and iso-oncotic succinylated gelatin solution (500 mL) (Gelofusine). A magnetic resonance imaging-compatible pacemaker was subsequently implanted in the contralateral side (Figure 2b). The patient remained in a stable hemodynamic condition, and was transferred to the ICU for close monitoring. The patient was safely discharged 3 days later.

Discussion

Refusal of transfusions of blood and blood products by JW patients requiring complex cardiovascular and other surgical procedures represents a medical and ethical challenge to physicians and health-care providers involved in their care.1-3 Different blood management approaches and risks of their use and other recommendations have been proposed and published. The goal has been to reach a point of a bloodless surgery strategy for complex cardiac surgery.2 There are encouraging reports from pioneers in this field dating back to 1977; the results of 20 years’ experience in 542 cardiovascular surgeries in JW patients have been presented. They have the way that has been followed and progressively modified worldwide, when required, by other experts in the field in publications from the USA and Europe. Effective and successful modified techniques for TLE, through the internal jugular vein (Pisa technique), also provide an alternative.4 A recent publication5 including more than 5,000 chronic lead extractions has shown a very high success rate, adding additional and important therapeutic value and encouragement on the safety of the various TLE techniques. To the best of our knowledge, our case appears to be the first one reporting a successful bloodless experience on multiple TLEs with non-laser endovascular dissection sheaths in a JW patient.

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