

Cardiac Surgery in Jehovah's Witnesses. Experience in Santander, Spain

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As patients who are Jehovah's Witnesses are against blood transfusion, they are difficult to manage when a cardiac intervention is required. Between 1998 and 2004, all Jehovah's Witness patients with an indication for cardiac surgery (n=10) were operated on by the same multidisciplinary team. The mean fall in hematocrit was 30% during cardiopulmonary bypass, 35% during the postoperative period, and 22% at discharge. One patient required cardiac re-exploration because of sternal bleeding. All patients survived operation and were discharged. At follow-up, 1 patient died due to respiratory failure. Technological developments that reduce bleeding and enable lost blood to be recovered have made it possible to perform operations involving a risk of hemorrhage in Jehovah's Witnesses.

Key words: Cardiac surgery. Bloodless surgery. Jehovah's Witnesses.

Cirugía cardíaca en testigos de Jehová. Experiencia en Santander

Los testigos de Jehová constituyen una población de difícil tratamiento para las intervenciones de cirugía cardíaca. Entre 1998 y 2004, todos los pacientes testigos de Jehová con indicación de cirugía cardíaca (n = 10) fueron intervenidos por un mismo equipo. El descenso medio del hematocrito fue, durante la circulación extracorpórea, del 30%, durante el postoperatorio, del 35% y en el alta, del 22%. Un paciente precisó una reintervención precoz por sangrado importante de origen esternal. Todos los pacientes fueron dados de alta y durante el seguimiento un enfermo falleció de causa respiratoria.

Las medidas para disminuir y recuperar la pérdida de sangre permiten realizar intervenciones de riesgo hemorrágico en pacientes testigos de Jehová.

Palabras clave: Cirugía cardíaca. Cirugía sin transfusión. testigos de Jehová.

INTRODUCTION

Jehovah's Witnesses represent a special challenge for medicine, in particular for surgery. Their strong religious convictions and interpretation of certain Biblical passages (Genesis 9:2-4, Acts 15:28,29) lead them to reject, by divine prohibition, any type of transfusion. The population of Jehovah's Witnesses in Spain is 125 000, of which about 1000 live in Cantabria. A particular challenge arises from a clash between 2 consciences: the ethics of the physician

who strives to preserve an endangered life and the patient's religious convictions.

Programs involving major surgery, designated "bloodless surgery," have recently been incorporated into clinical practice. In addition to providing enormous benefits for the patients and society, these programs allow Jehovah's Witnesses to undergo surgery that respects their convictions at a lower risk.

METHODS

Between 1998 and 2004, 10 Jehovah's Witness patients underwent cardiac surgery at our hospital. During that time, no patients were rejected because of refusal to receive blood transfusions. The patients signed a written informed consent drawn up by the ethics committee of the hospital that included an explanation of their religious condition, their refusal to

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accept transfusions of blood or blood products, and their acceptance of any potential repercussions, including the risk of death. Additionally, the professionals who participated in these procedures (anesthesia, surgery, and postoperative care) agreed to respect the patient's wishes. Both the anesthesia and the surgery and postoperative intensive care were handled by the same professional team.

The group was composed of 5 men and 5 women with a mean age of 59.8 ± 6.5 years. The surgical indication was valve disease in 6 patients, coronary disease in 3, and both conditions in 1. Nine patients were in NYHA Functional Class III and one in Class IV. The hemogram and the coagulation studies were within the normal range 24 h before surgery. All patients received aprotinin (Trasylol®) at doses of 500 000 units for anesthesia induction and 1 500 000 units during priming of the extracorporeal circulation pump. Nine patients underwent on-pump surgery, and 1, off-pump. The surgeries included 2 coronary myocardial revascularization procedures on-pump and 1 off-pump, 1 aortic valve replacement plus double coronary bypass, 2 aortic valve replacements, 2 mitral valve replacements, 1 mitral valve replacement plus tricuspid annuloplasty, and 1 double mitral and aortic valve replacement.

RESULTS

Mean operative time was 94.6 ± 28.1 min for cardiopulmonary bypass and 66.1 ± 20.8 min for myocardial ischemia. Blood salvage was performed by decreasing blood losses and recovering as much lost blood as possible. Careful hemostasis was performed, with exceptional care taken with the usual measures. Surgicel® hemostatic gauzes were used and all cardiomyotomies were ensured with biological adhesives using Tissucol® administered by aerosol. The Haemonetics® Cell Saver system with continuous reinfusion was used. Among the 10 patients who underwent surgery, salvaged blood was reinfused in only 3 cases (salvaged blood: 137, 400, and 510 mL). Bleeding volume, as recorded through the thoracic drains was 532 ± 239 mL (range, 200-950 mL). The immediate postoperative complications included early reoperation for postoperative bleeding at the sternum and late reoperation for sternal dehiscence. Oral iron supplements were indicated in 6 of the 10 operated patients, and folic acid supplements in 1. Mean duration of hospitalization was 13.2 ± 5.4 days. Hemogram evolution throughout the hospital stay is shown in Table.

During the follow-up (between 1 and 6 years; mean, 3.3 years) 1 patient died from end-stage respiratory failure and 1 patient had to be reoperated at 8 months due to constrictive pericarditis. The 9 surviving patients had a favorable course.

TABLE. Hematocrit Evolution*

	Pre-SI	On-Pump	Post-SI	Discharge
Hematocrit, mean $\pm$ SD, %	40.2 $\pm$ 4.6	28.1 $\pm$ 3.9	26.2 $\pm$ 5.2	31.3 $\pm$ 3.4
Decrease		30.1%	34.6%	22.1%
Range	35%-46%	18%-35%	21%-42%	26%-39%

*Post-SI indicates post-surgical intervention; SI, surgical intervention.

DISCUSSION

The community of Jehovah's Witnesses has probably contributed the most to increasing health professionals' awareness of the need for blood salvage during major surgical procedures, such as on-pump cardiac surgery. In 1977, Cooley et al¹ published their experience in cardiac surgery among Jehovah's Witnesses and showed that, although some patients died due to a lack of transfusion, the overall risk was not dangerously high. In Spain, the first surgical experience with patients from this community pertains to Iglesias et al in 1981.² Another study performed in Spain and assessing hemogram evolution following on-pump cardiac surgery with no blood transfusion, found a maximum hematocrit decrease of 33% in uncomplicated surgery; the figure was obtained on-pump and on the fourth postoperative day.³ In our experience, the lowest hematocrit value (18.2%) was obtained on-pump in a patient undergoing valve surgery with a value of 26.4% at the time of discharge, i.e., a decrease of 33%. Another factor that should be taken into account is the point in time (according to the hemogram value) after which transfusion is indicated. Unquestionably this has a subjective component that depends on the scientific criterion of the attending physician.

Additionally, overall blood loss can be reduced through 2 approaches. First of all, it is necessary to prevent or decrease bleeding. In on-pump cardiac surgery, the introduction of aprotinin has led to a considerable decrease in perioperative and postoperative red blood cell losses, a finding also true of tranexamic acid. The preoperative workup includes administration of folic acid, iron, and recombinant erythropoietin. Intractable postoperative bleeding can be treated with the recently developed recombinant factor VIIa, which has yielded favorable results.⁴ The surgical technique also influences bleeding, since incisions in the heart are susceptible to hematic losses. In this regard, topical hemostatic agents and tissue adhesives are excellent resources to control and minimize bleeding from surgical wounds. Other technological aids for this objective are new surgical hemostasis systems that use bursts of steam, ultrasound (harmonic scalpel), or an argon beam. The

second approach consists of recovering and reutilizing the lost blood. In this regard, Jehovah's Witnesses only allow blood that has not been stored and therefore, cell salvage systems that aspirate lost blood, then clean, centrifuge, and reperfuse it are unquestionably excellent options. Another line of research currently in the experimental phase consists of synthetic blood substitutes such as perfluorocarbons, recombinant hemoglobin, or oxygen carriers.

According to data from this religious community, the population of Jehovah's Witnesses in Spain was 125 000 in 2005. The number of on-pump cardiac surgical procedures and off-pump myocardial revascularizations in Spain is 427 surgeries per million inhabitants and year. Based on these figures, it is estimated that the need for cardiac surgery among Jehovah's Witnesses is about 50 patients/year, not an irrelevant figure. In particular, in our reference area, with an estimated population of 500 000 inhabitants for Cantabria and 1000 Jehovah's Witnesses, we can confirm that no patient belonging to this community and with an indication for cardiac surgery has been rejected for refusing to receive blood transfusions and therefore, although this series of 10 patients is small, it is representative of the surgical needs of this community. At present, myocardial revascularization on the beating heart and endoscopic surgery allow surgical treatment of coronary disease with notable blood salvage, thereby providing enormous benefits to

this complex population,⁵ with predictable general and specific risks according to risk scales.^{6,7} Jehovah's Witnesses and cardiac surgery maintain an intense relationship from which both have surely benefited.⁸

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