Transcatheter aortic valve implantation in Jehovah’s Witness patients with symptomatic severe aortic valve stenosis

Semih Buz*, Miralem Pasic, Axel Unbehaun and Roland Hetzer

German Heart Institute Berlin, Berlin, Germany

*Corresponding author. Deutsches Herzzentrum Berlin, Augustenburger Platz 1, D-13353 Berlin, Germany. Tel: +49-30-45931938; fax: +49-30-45932100; e-mail: buz@dhzb.de (S. Buz).

Received 17 January 2012; received in revised form 5 April 2012; accepted 10 April 2012

Abstract
Transcatheter aortic valve implantation (TAVI) is currently reserved for high or prohibitive surgical-risk patients with aortic valve stenosis. We report on successful TAVI in two Jehovah’s witness patients. It offers a simple and effective treatment of severe aortic valve stenosis in high-risk patients who refuse the use of allogeneic blood and blood products.

Keywords: Aortic valve stenosis • Transcatheter valve implantation • Jehovah’s Witness

INTRODUCTION
Conventional aortic valve replacement with cardiopulmonary bypass is currently the treatment of choice for symptomatic aortic stenosis. Open heart surgery sometimes requires transfusion of allogeneic blood products. Transcatheter aortic valve implantation (TAVI) is a truly minimally invasive technique to treat severe aortic valve stenosis without cardiopulmonary bypass [1] and with less need for transfusion of allogeneic blood and blood products. Thus, it may be considered as a primary choice of treatment for high-risk patients who refuse transfusion of blood or blood products, such as Jehovah’s witnesses. We report on a successful TAVI in two Jehovah’s Witness patients.

CASE REPORTS

Patient 1
A 75-year old man with severe aortic valve stenosis and previous coronary artery bypass grafting was referred for aortic valve replacement. The preoperative NYHA functional class was III. Echocardiography revealed a calcified aortic valve with an indexed aortic valve area of 0.4 cm²/m² and a mean pressure gradient of 35 mmHg. Annular diameter was 22 mm. Left ventricular ejection fraction was 45%. The coronary angiogram showed a patent left internal thoracic artery graft and two patent venous grafts. Logistic EuroSCORE was 25% and the Society of Thoracic Surgeons (STS)-predicted mortality was 10%. As a Jehovah’s Witness, the patient refused transfusion of allogeneic blood and blood products. In consideration of his complex comorbid profile, and to reduce the risk of perioperative bleeding, we opted for TAVI. Because of the severe calcification of the femoral and iliac arteries, a transapical approach was planned. The preoperative hemoglobin was 14.2 mg/dl, and no erythropoiesis-stimulating agents were prescribed. The procedure was performed in the hybrid operating room. After mini-thoracotomy in the sixth intercostal space and systemic heparinization (100 IU/kg), a modified transapical TAVI [2] was performed with a 26 mm balloon-expandable valve (Edwards SAPIEN THV, Edwards Lifesciences, Irvine, CA). There was no paravalvular or valvular regurgitation (Fig. 1), the mean pressure gradient was 4 mmHg and aortic valve area was 1.82 cm². During the procedure, a 70-ml contrast agent was used. Although an intraoperative cell saver was used for blood conservation, no processed autologous blood was transfused as a result of very limited blood loss. The postoperative course was uneventful and the patient was discharged on the fourth postoperative day. Postoperative blood loss was in total 220 ml. Hemoglobin at discharge was 12.1 mg/dl.

Patient 2
An 81-year old woman suffering from dyspnea and recurrent syncope due to severe aortic valve stenosis was referred to our hospital. She had pulmonary hypertension, coronary artery disease (previously treated with percutaneous coronary intervention), chronic renal failure and peripheral vascular disease. Logistic EuroSCORE and STS score were 53 and 29%, respectively. Echocardiography showed an indexed valve area of 0.3 cm²/m² and peak-to-peak gradient of 80 mmHg. Annular diameter was 24.5 mm. Left-ventricular ejection fraction was 30%. Being a Jehovah’s Witness, she also refused any blood and blood product transfusion. We primarily decided to perform transfemoral TAVI. A 29-mm CoreValve (Medtronic Inc., Minneapolis, MN) was implanted percutaneously via the transfemoral route, as previously described [3] (Fig. 2). The intraoperative and perioperative course was uneventful. A total of 100 ml contrast agent...
was used. There was no paravalvular or valvular regurgitation, and the mean pressure gradient was 5 mmHg; aortic valve area was 1.44 cm². The patient was discharged on postoperative day 5 with a hemoglobin level of 9.0 mg/dl.

DISCUSSION

The invasive nature of cardiac surgery and the use of cardiopulmonary bypass may lead to blood loss and may require a high rate of blood transfusions during and/or after the procedure. In contrast, TAVI is a blood-sparing procedure. Jehovah’s witnesses belong to a religious group that is well recognized for its refusal of blood and blood product transfusion. Due to the refusal of blood products, open-heart surgery still remains a challenge in this subset of patients, although it has been performed successfully in numerous reference centers. Our institution is also a reference center for Jehovah’s Witness patients requiring cardiac operations. Over the years, we have successfully performed all kinds of cardiac procedures, including emergency complex aortic or cardiac procedures without transfusing blood products [4], and even in patients with extremely low preoperative hemoglobin [5]. Despite our good experience with conventional surgery in Jehovah’s witnesses, we must acknowledge that TAVI offers some important advantages in the treatment of aortic valve stenosis in high-risk patients. Both techniques of interventional aortic valve implantation (transapical and transfemoral) can be performed without cardiopulmonary bypass. In fact, the limitation of surgical trauma and the complete elimination of the effects of the heart–lung machine on the hemostatic function can reduce the risk of perioperative bleeding and minimize the requirement for transfusions. Therefore, we consider TAVI to be the primary indication for high-risk Jehovah’s Witness patients with severe aortic valve stenosis, especially in patients with previous cardiac surgery. Decisions regarding aortic valve surgery in Jehovah witnesses need to follow the same guidelines as for those patients who do accept blood products. In our opinion, the two patients described here are clearly primary candidates for TAVI independently of their religious beliefs. Their categorical refusal of blood product transfusions further strengthened the indication for TAVI. However, despite its less invasive nature, TAVI by both techniques (transapical and transfemoral) can be associated with bleeding complications. In particular, a transapical approach should be performed with extreme caution in elderly, fragile patients to avoid uncontrollable apical hemorrhage. Moreover, the percutaneous transfemoral route can be associated with vascular complications often leading to profuse bleeding requiring blood product administration.

In conclusion, TAVI should be considered as a primary treatment option in high-risk patients with aortic valve stenosis who refuse transfusion of allogeneic blood and blood products, especially in patients with previous cardiac surgery, in order to eliminate the requirement for transfusions.

ACKNOWLEDGMENTS

The other members of our TAVI team are Thorsten Drews, Giuseppe D’Ancona, Stefan Dreyssse, Christoph Klein, Alexander Mladenow, Marian Kukucka, Ekatarina Ivanitskaia-Kühn, Natalia Solowjowa and Katrin Schäfer. We thank Anne Gale for editorial assistance.

Disclosure

Semih Buz, Miralem Pasic and Axel Unbehaun have been proctors to Edwards Lifesciences since July 2009.
Conflict of interest: none declared.

REFERENCES


