

Modified Reposition of the JOTEC Prosthesis in the Frozen Elephant Trunk Procedure

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ABSTRACT

We describe a procedure in which we inserted a modified JOTEC graft following a known complication in the case of a 78-year-old male patient who underwent surgery with the frozen elephant trunk technique for an acute Stanford type A aortic dissection.

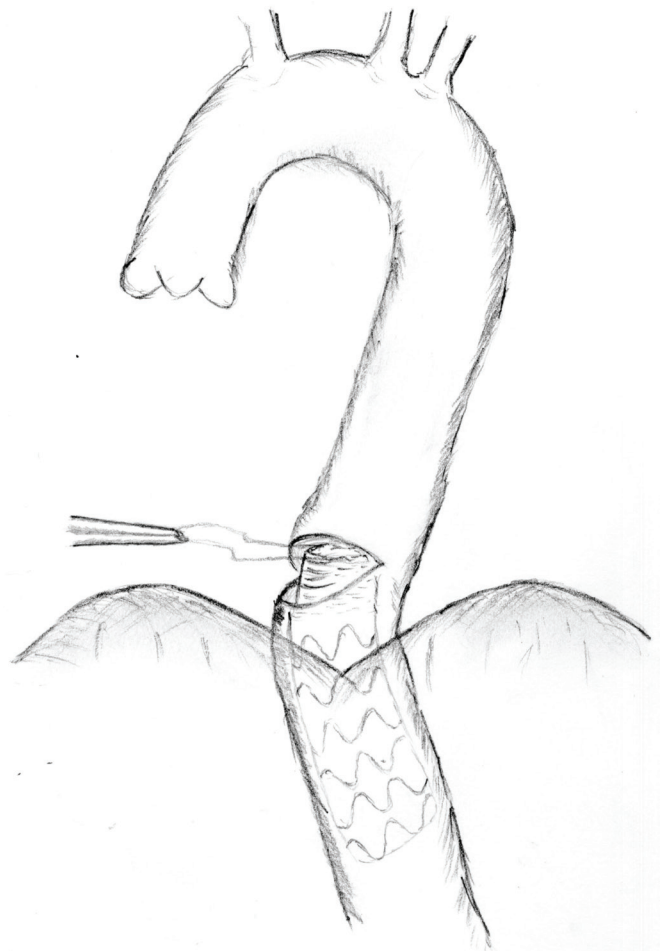
INTRODUCTION

The elephant trunk procedure was established by Burst and colleagues in 1995 and has become the method of choice for treating acute aortic dissections that extend from the aortic arch to the abdominal aorta [Heinemann 1995]. Survival rates can be expected to be 90% or higher [Heinemann 1995]. An anastomosis is created with a Dacron graft, which is inserted cranially into the distal true lumen to produce a thrombotic closure of the dissecting lumen. The conventional technique consists of 2 steps. In the first stage, the aortic arch is replaced, and the Dacron graft is placed in the descending aorta. During the second stage, the graft is then extended into the abdominal aorta via an endovascular approach.

The frozen elephant trunk technique allows for a single-stage repair of combined aortic arch and descending aortic aneurysms using a hybrid prosthesis with a stented and a non-stented end. First, the false lumen in the descending aorta is stented following loose insertion of the graft into the aorta. After distal attachment of the graft to the aortic wall, the graft is then extended cranially to be connected with the proximal prosthesis replacing the ascending aorta.

Performing the modified elephant trunk procedure with a JOTEC graft (JOTEC, Hechingen, Germany) offers the advantage that the distal end of the graft can be stented before the graft is extended endovascularly, allowing the surgeon to better define its location. By combining the conventional 2-step operation into a single-step operation, the mortality can be reduced [Svensson 1992]. Another important advantage is that in contrast to the free-floating grafts used in the

conventional procedures, there is no perigraft space that could be perfused and promote further aneurysmic dilatation in the frozen elephant trunk technique [Baraki 2007].



The stent graft became dislodged distally in the descending aorta during its insertion and could not be reached to pull it back. To locate the prosthesis and overcome the problem, we opened the distal thoracic aorta 7 cm above the diaphragm. The release mechanism was retrieved, and the prosthesis was pulled out of the stent and captured with a clamp. The extended prosthesis was pulled back proximally in the aorta to allow successful completion of the aortic reconstruction.

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One such graft that can be used for the frozen elephant trunk procedure is the JOTEC graft. The JOTEC graft has an extension that can be used to extend the graft. The extension can be seized with forceps through the opened aortic arch.

We have observed several cases in which the JOTEC graft, although stented correctly, became dislodged and relocated distally in the aorta.

CASE REPORT

Our case is of a 78-year-old male patient with an acute type A aortic dissection in which we used our modified technique to extend the JOTEC graft upwards via an additional incision in the abdominal aorta.

The chest was entered through a median sternotomy. The ascending aorta was replaced with the patient under total circulatory arrest and in deep hypothermia. Arterial cannulation was done by cannulating the ascending aorta. Venous cannulation was performed through the right atrium with a 2-stage venous cannula. Cardioplegia was administered, and antegrade cerebral perfusion was established following cannulation of the common coronary artery and the brachiocephalic trunk. The prosthesis for the ascending aorta was attached to the remaining stump of the ascending aorta by using an end-to-end anastomosis.

The JOTEC graft was inserted in the descending aorta and stented. At this point, the prosthesis became dislodged and relocated distally in the aorta. The extension of the graft could no longer be accessed via the incision in the aorta. The descending aorta was dissected, and the abdominal cavity was accessed via a transdiaphragmatic incision. An incision was made in the abdominal aorta below the suspected location of the graft. The extension could be reached through

this new incision (Figure). We extended the graft cranially with a pair of forceps until the extension became accessible via the original aortic incision. A second pair of forceps was used to complete the graft extension. The JOTEC prosthesis was sutured circumferentially to the proximal prosthesis, replacing the ascending aorta. The supra-aortic branches were reimplanted en bloc into the nonstented part of the JOTEC graft. A proximal graft-to-aorta anastomosis concluded the procedure.

DISCUSSION

We believe that we have developed a surgical technique that can be used in the event of a JOTEC graft displacement. This procedure reduces both the time for the necessary intervention and the risk to the patient. To our knowledge, this report is the first of this potential aspect of the procedure.

The advantages of this new technique are self-evident. The transdiaphragmatic approach allows the dissection of the descending and abdominal aorta without the need to increase the size of the thoracic incision. Thus, the risks of bleeding and infection are reduced.

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