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The use of Enclose II anastomosis assist device for the coronary branch anastomosis to vascular graft

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How to Do It

The Use of Enclose®II Anastomosis Assist Device for the Proximal Coronary Branch Anastomosis to Vascular Graft

Keita Kikuchi, MD, Ph.D, Keichi Tambara, MD, Ph.D, Taira Yamamoto, MD, Ph.D, Motoshige Yamasaki, MD, Ph.D, Hitoshi Hirose, MD, Ph.D, and Atsushi Amano, MD, Ph.D

We used the Enclose®II anastomosis assist device (Novare Surgical Systems, Inc., CA, USA), which was originally developed as an ancillary device for proximal anastomosis in off-pump coronary artery bypass grafting (OPCAB), to assist anastomosis for the vascular grafts without clamping those conduits in two cases. In these cases, it was difficult to clump vascular graft partially, because vascular graft was short. So we used Enclose®II anastomosis assist device for these cases.

The advantage of this method is that the Enclose®II anastomosis assist device facilitates the anastomosis of arterial side branches to the artificial graft (1) by eliminating the use of partial clamp on the artificial conduits and (2) by providing a plane surface for easy handling for suture.

Key words: Enclose®II anastomosis assist device, vascular graft, CABG (coronary artery bypass grafting)

INTRODUCTION

We used the Enclose®II anastomosis assist device (Fig. 1, Novare Surgical Systems, Inc., CA, USA), which was originally developed as an ancillary device for proximal anastomosis in off-pump coronary artery bypass grafting (OPCAB), to assist anastomosis for the vascular grafts without clamping the ascending aorta. This paper introduced our clinical experience and gave some comments for that.

CASE PRESENTATION AND TECHNICAL APPLICATION

We applied this method in two cases (Table 1). In them, proximal anastomosis to the vascular grafts was conducted with this method in CABG concomitantly performed with total arch replacement.

In case 1, the proximal anastomosis of radial artery, which had been inosculated to the circumflex artery, was performed after total arch replacement. Initially we tried to clamp vascular graft partially, but we encountered various difficulty in making proximal anastomosis. We decided to use Enclose®II anastomosis assist device. A purse-string suture with 4-0 Prolene® was placed in the artificial conduit and the Enclose®II was inserted by incising within the purse. Then, the upper and lower jaws of the device were opened, and a hemostasis was attained by clipping the artificial graft. Next, an anastomosis port to which the radial artery was to be inosculated was created in the artificial graft using a 4.0-mm puncher (Fig. 2). Although mild bleeding from the anastomosis port was recognized, satisfactory operative field was obtained with additional use of a CO₂-blower.

In case 2, aortic root reconstruction was performed for aortic root pseudo-aneurysm after graft replacement for ascending aorta due to acute aortic dissection. In this case, we could not partially clamp new vascular graft because the vascular graft was too short. Enclose® II anastomosis assist device was used in similar fashion as was applied in case 1.
Use of Enclose®II for Vascular Grafts


One may encounter considerable bleeding from the anastomosis port even after clipping with the Enclose®II because the vascular graft is not as thick or flexible as the aorta. However, there should be no technical problems during anastomosis with using a CO₂-blower. In addition, the anastomosis can be carried out with more ease because the anastomosis field is obtained on a plane surface without any kinking of the artificial graft in the absence of partial blockage.

HEARTSTRING II Proximal Seal System (MAQUET Cardiovascular LLC. San Jose, CA, USA) is another anastomosis assist device for CABG, and it needs only one hole. In our cases, Enclose®II not only made an anastomotic hole, but also provide a flat surgical field (Fig. 1).

![Fig. 1 Enclose®II anastomosis assist device (Novare Surgical Systems, Inc., CA, USA)](image)

Table 1  Clinical characteristics of the surgical cases using the Enclose®II anastomosis assist device

<table>
<thead>
<tr>
<th>Case</th>
<th>Age</th>
<th>Sex</th>
<th>Diagnosis</th>
<th>Operative procedure</th>
<th>Site of using Enclose®II</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>67</td>
<td>M</td>
<td>TAA, IHD</td>
<td>Total arch replacement CABG (radial artery to vascular graft)</td>
<td>proximal anastomosis in CABG</td>
</tr>
<tr>
<td>2</td>
<td>70</td>
<td>M</td>
<td>AD, post graft replacement for ascending aorta. dissection of aortic root</td>
<td>Aortic root reconstruction CABG to RCA</td>
<td>proximal anastomosis in CABG (SVG to vascular graft)</td>
</tr>
</tbody>
</table>


**DISCUSSION**

The Enclose®II anastomosis assist device was developed as an ancillary device for proximal anastomosis on the ascending aorta in CABG. We thought that the device might also be used for artificial vascular grafts. In these cases, partial clamping of the vascular graft may occasionally be difficult because a vascular graft replacing the ascending aorta and/or the aortic arch is sometimes very short to apply partial clamping. In our cases, we tried to put a partial clamp at first, but it was very difficult due to unexpected transformation of the artificial graft, which had side branches and the proximal anastomosis with the ascending aorta.

In that situation, the use of the Enclose®II anastomosis assist device eliminates the clamp of the graft. One may encounter considerable bleeding from the anastomosis port even after clipping with the Enclose®II because the vascular graft is not as thick or flexible as the aorta. However, there should be no technical problems during anastomosis with using a CO₂-blower. In addition, the anastomosis can be carried out with more ease because the anastomosis field is obtained on a plane surface without any kinking of the artificial graft in the absence of partial blockage.
Therefore, we think that Enclose®II was more advantageous than Heartstring in our particular situations. However, HEARTSTRING II Proximal Seal System may be a good alternative for Enclose®II.

This method may be a crucial technique to make anastomosis to artificial vascular grafts in some circumstances, especially when it is difficult to obtain a good operative field.

**CONCLUSION**

The Enclose®II anastomosis assist device was used for the proximal anastomosis to the graft. The advantage of this method was that the Enclose®II anastomosis assist device facilitates the anastomosis of arterial side branches to the artificial graft by eliminating the use of partial clamp on the artificial conduits and by providing a plane surface for easy handling for suture.

**REFERENCES**