Most Common Surgical Procedures

<table>
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<tr>
<th>Surgery</th>
<th>Description</th>
<th>Areas of Application/Rationale</th>
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<tbody>
<tr>
<td>Aortotomy for valve repair/replacement</td>
<td>Incision made into the aorta to access damaged heart valves for replacement with animal or synthetic valves.</td>
<td>Aortotomy suture-line sealing; cardiac operative site coverage to prevent adhesion formation.</td>
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<td>Aortic aneurysm/root repair</td>
<td>Repair of defects in the aorta, the major arterial vessel exiting the heart. Includes ascending, descending, and total arch repair.</td>
<td>Anastomotic suture-line sealing for hemostasis; cardiac operative site coverage to prevent adhesion formation.</td>
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<td>Coronary artery bypass grafting (CABG)</td>
<td>CABG involves using a segment of a vein or artery to bypass blocked coronary arteries. May be alone or combined with additional cardiac surgical procedures.</td>
<td>Anastomotic and cannulation suture-line sealing for hemostasis; cardiac operative site coverage to prevent adhesion formation.</td>
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<td>Left ventricular assist device (LVAD) implantation</td>
<td>Following removal of a failing heart, a left ventricular assist device is implanted into a patient until a replacement heart becomes available.</td>
<td>Anastomotic suture-line sealing for hemostasis; cardiac operative site coverage to prevent adhesion formation.</td>
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<td>Staged congenital heart procedures</td>
<td>Staged procedures to correct birth defects occurring in the heart, valves, or arteries.</td>
<td>Anastomotic suture-line sealing for hemostasis; cardiac operative site coverage to prevent adhesion formation.</td>
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**Benefits of Using COSEAL Surgical Sealant in Cardiac Surgery**

**Anastomotic Suture Line Sealing**
1. COSEAL is a strong, flexible, and completely synthetic sealant ideal for cardiac surgery. It is able to adhere to Dacron/PTFE grafts as well as tissue, so it is well-suited to many reconstructive cardiac procedures, especially in the aorta.

**Cardiac Adhesion Prevention**
Postoperative adhesion formation makes repeat cardiac surgery more challenging. Reduction in the severity of adhesions provides faster access to cardiothoracic structures. COSEAL has been clinically proven to reduce the severity of postoperative cardiac adhesions. No other surgical sealant has been clinically proven to deliver both sealing and adhesion prevention efficacy.
Challenges in Cardiac Surgery

- Intraoperative and postoperative bleeding from anastomotic sites
- Coagulopathy induced by cardiopulmonary bypass, anticoagulant/antiplatelet drugs, and/or deep hypothermic circulatory arrest
- High-pressure vascular anastomoses
- Difficult-to-reach locations for hemostasis at completion of surgery
- Global withdrawal and use of aprotinin
- Increase in reoperative procedures with aging population

Probing Questions

Questions before COSEAL introduction:

- Is it more challenging to achieve hemostasis in the typical cardiac surgery patient than it was 5-10 years ago?
- Has the withdrawal of aprotinin made the achievement of intraoperative hemostasis more challenging for you, including hemostasis at anastomotic suture lines?
- How has the increased use of Clopidogrel (Plavix) affected your patient’s ability to achieve hemostasis during surgery? While it is optimal to take patients off this therapy before surgery, how often do you have urgent cases in which this is not possible?
- What is your overall level of interest in blood management conservation? Do you think that intraoperative and postoperative bleeding from anastomotic sites is an important consideration?
- What is your current approach to achieving hemostasis at difficult anastomotic suture lines? Do you think it is something you should just address when bleeding occurs, or do you think a proactive approach to minimizing blood loss is more logical?
- How often do you experience challenging anastomotic situations because of friable and/or calcified tissue? What are the hemostatic challenges associated with this and how do you manage them?
- What are your concerns regarding postoperative pressure spikes (hypertension) and their impact on the anastomotic suture lines after the patient is awake or sits up for the first time?
- When performing a reostentomy on a cardiac patient, what challenges do cardiac adhesions create for you? What is your interest in technology to help reduce this burden?

Objections

COSEAL can’t be used with a cell saver.

The use of COSEAL with a cell saver is not contraindicated. COSEAL is completely synthetic and does not possess any active hemostatic agents such as thrombin. However, care should be taken not to aspirate COSEAL into extracorporeal autologous cell-saver circuits.

COSEAL can’t be used for patients on bypass.

COSEAL can be used for patients on bypass, and it has been studied in an aortic clinical trial. Further, use of COSEAL on bypass may be the preferred method of use since the anastomotic sites are anagamous and non-pressurized at this point in the procedure which may reduce the problematic issues of achieving hemostasis once the patient is off-pump.

I’ve heard COSEAL is expensive.

Compared to what? In a randomized controlled trial, when COSEAL was compared to a similar product, it offered equivalent anastomotic sealing, but provided this desired effect in a significantly more rapid time frame. If one considers the potential costs associated with prolonged operative time, potential reoperation, or a prolonged hospital stay, the cost of COSEAL is not significant by comparison.

Tips for Success

- Work with staff to determine the focus of the surgeon and their current challenges.
- Prepare and demo product with surgeon and staff prior to case:
  - Use the COSEAL Application Spraysheet as a tool to train the surgeon on ideal application, and explain the advantages/disadvantages between the standard applicator and the spray applicator.
- Explain proper application to surgeon and staff:
  - Apply to a mainly dry surface. On-pump application is a good time for this. If there is active bleeding present, bleeding can be stopped with FLOSEAL, and then sealed with COSEAL.
  - Plan on the pathway for anastomotic application. If using the standard applicator, remind the surgeon to apply quickly (3-6 cm away from the vessel) and do not stop for a long period of time because the applicator can clog.
- If there are many anastomoses to perform, recommend use of spray applicator.
  - Allow 60 seconds for COSEAL to polymerize before touching the anastomosis.
  - Discuss precautions before surgery regarding COSEAL. Refer to the Instructions for Use.

Marketing Materials

| Description | COSEAL Aortic Sales Sheet | COSEAL Trifold | Cardiovascular Biosurgery Brochure | Video: CABS, Antithromb, Aortic Root |

Cardiac Reference Overview

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<thead>
<tr>
<th>Article Title</th>
<th>Reference</th>
<th>Key Finding</th>
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References

Cardiovascular Procedures

Abbreviation Key
- AAA: abdominal aortic aneurysm
- CABG: coronary artery bypass graft
- Cross-fem: cross-femoral graft
- Fem-fem: femoral-femoral graft
- Fem-pop: femoral-popliteal graft

CABG

Aortotomy

Ascending aortic reconstruction

Descending aortic reconstruction

AAA

CEA

Cross-fem

Fem-fem

Fem-pop