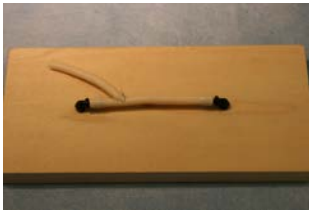


CARDIOTHORACIC SURGERY TECHNICAL SKILLS—SENIOR TOUR JANUARY 2011

I. VESSEL ANASTOMOSIS

This section focuses on technical components in the management of patients who present with severe coronary artery disease. Simulation models for vascular anastomosis are reasonably well established. The goal of this section is to understand and demonstrate proficiency in basic skills, such as the ability to perform distal and proximal coronary anastomosis.

Simulators and models: Synthetic models and simulators in coronary artery and vascular anastomosis are commercially available (e.g., HeartCase), and simpler models can be constructed (e.g., anastomosis “block”). Some synthetic heart models have embedded coronary targets, and the beating heart models can be stopped to simulate arrested heart surgery. Porcine hearts in the wet-lab can be effectively used to simulate both proximal and distal coronary anastomosis. Basic anastomosis “block” constructed of wood plank may be used. The HeartCase model has a vessel anastomosis attachment which permits sewing an end-to-side anastomosis deep and at different angles in the pericardial space.



Objective: By the end of this module, the resident will meet proficiency standards for vessel anastomosis in the following.

- Assure adequate conduit and target
- Make arteriotomy
- Achieve adequate exposure
- Perform anastomosis
- Understand instrumentation and sutures

Steps:

Assure adequate conduit and target:

1. Ensure that saphenous vein or synthetic graft is of adequate caliber.
2. Ensure that all branches are secured and the vein or graft is without leaks.

Make arteriotomy

1. Using synthetic target, make a small arteriotomy and extend with scissors.

Achieve adequate exposure

1. With tissue-based, the epicardium is incised exposing the target vessel.
2. Be facile at placing small epicardial retractor.

Perform anastomosis

1. Technique varies among institutions and surgeons (video recording).
2. Recognize important components of anastomosis (see assessment).

Understand instrumentation and sutures

1. Varies among institutions and surgeons (e.g., locking vs. non-locking Castroviejo needle holders).
2. Continuous sutures (vs. interrupted sutures).

Assessment (for distal and proximal anastomosis and beating heart anastomosis):

Components of performance rating scale

1. Graft orientation (proper orientation for toe-heel, appropriate start and end points)	1	2	3	4	5
2. Bite appropriate (entry and exit points, number of punctures, even and consistent distance from edge)	1	2	3	4	5
3. Spacing appropriate (even spacing, consistent distance from previous bite, too close vs. too far)	1	2	3	4	5
4. Use of Castroviejo needle holder (finger placement, instrument rotation, facility, needle placement, pronation and supination, proper finger and hand motion, lack of wrist motion)	1	2	3	4	5
5. Use of forceps (facility, hand motion, assist needle placement, appropriate traction on tissue)	1	2	3	4	5
6. Needle angles (proper angle relative to tissue and needle holder, consider depth of field, anticipating subsequent angles)	1	2	3	4	5
7. Needle transfer (needle placement and preparation from stitch to stitch, use of instrument and hand to mount needle)	1	2	3	4	5
8. Suture management/tension (too loose vs. tight, use tension to assist exposure, avoid entanglement)	1	2	3	4	5
9. Knot tying (adequate tension, facility, finger and hand follow for deep knots)	1	2	3	4	5

Definitions:

5. Excellent, able to accomplish goal without hesitation, showing excellent progress and flow
4. Good, able to accomplish goal deliberately, with minimal hesitation, showing good progress and flow
3. Average, able to accomplish goal with hesitation, discontinuous progress and flow
2. Below average, able to partially accomplish goal with hesitation
1. Poor, unable to accomplish goal; marked hesitation

(Modified from Fann JI, Caffarelli AD, Georgette G, Howard SK, Gaba DM, Youngblood P, Mitchell RS, Burdon TA. Improvement in coronary anastomosis with cardiac surgery simulation. J Thorac Cardiovasc Surg 2008; 136: 1486-1491)