

CARDIOTHORACIC SURGEONS SENIOR TOUR

SIMULATION TRAINING SESSION

ASSESSMENT FORMS

University of North Carolina, Chapel Hill
January 13-16, 2011

Vessel Anastomosis

CORONARY ARTERY ANASTOMOSIS ASSESSMENT

RESIDENT NAME _____ YR OF TRAINING _____ DATE _____
 EVALUATOR _____

	Poor		Ave		Excel
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/Jacobson 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

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, et al. JTCVS 2008; 136: 1486-1491.)

Aortic Cannulation

ASSESSMENT

RESIDENT NAME _____ YR OF TRAINING _____ DATE _____
 EVALUATOR _____

	Poor		Ave		Excel
1. Assess aorta for suture placement/cannulation (palpate aorta, assess for calcification, adequate BP for suture placement)	1	2	3	4	5
2. Needle angles (proper angle to permit needle point to puncture orthogonal to tissue plane; consider depth of field, limits of access, and space constraints)	1	2	3	4	5
3. Needle removal from annulus (follow curve of the needle to minimize tissue trauma)	1	2	3	4	5
4. Depth of bite (proper depth of entry and exit points; proper and consistent depth of needle and suture)	1	2	3	4	5
5. Suture advance and spacing (proper distance of suture travel in aorta, even spacing; consistent distance from previous bite)	1	2	3	4	5
6. Control of scalpel (proper orientation relative to aorta; proper size of aortotomy)	1	2	3	4	5
7. Cannula placement (proper orientation of bevel; hold close to tip, proper insertion depth)	1	2	3	4	5
8. Securing cannula and knot-tying (adequate tension, facility; follow for finger and hand to secure knots, not too loose or tight)	1	2	3	4	5

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(From Fann and colleagues, Stanford University)

Cardiopulmonary Bypass

Assessment

RESIDENT NAME _____ YR OF TRAINING _____ DATE _____
 EVALUATOR _____

<u>Steps</u>	<u>Satisfactory</u>		<u>Comments</u>
Initiation:			
Assure adequate activated clotting time	Y	N	
Communicate with perfusionist	Y	N	
Check line pressure	Y	N	
Assess venous drainage	Y	N	
Vent placement	Y	N	
Cardioplegia	Y	N	
Cross-clamp	Y	N	

Termination:

Removal of cross-clamp	Y	N	
De-airing procedures	Y	N	
Vent removal	Y	N	
Weaning CPB:			
Ventilator is on	Y	N	
Temperature satisfactory	Y	N	
TEE to assess intracardiac air	Y	N	
TEE to assess cardiac function	Y	N	
No bleeding in inaccessible areas	Y	N	
Acceptable rhythm / pacing wires	Y	N	
Need for inotropic support	Y	N	
Termination of bypass	Y	N	
Decannulation	Y	N	

Economy of time 1 and motion 2 3 4 5
 1= many unnecessary/ disorganized movements 3=organized time/motion, some unnecessary movement 5=maximum economy of movement and efficiency

Final rating (circle one) Demonstrates competence Needs further practice

Additional comments:

(From Hicks GL, Jr., Gangemi J, Angona RD, Jr., Ramphal PS, Feins RH, Fann JI. Cardiopulmonary bypass simulation and assessment at the Boot Camp. J Thorac Cardiovasc Surg 2011; 284).

Aortic Valve Replacement—Assessment

RESIDENT NAME _____ YR OF TRAINING _____ DATE _____

EVALUATOR _____

	Poor		Ave		Excel
1. Make aortotomy and stay suture (oblique or transverse; deliberate and controlled; use of scalpel and scissors; appropriate location and depth of stay sutures)	1	2	3	4	5
2. Excise aortic leaflets (identify leaflet hinge points; avoid injury to annulus; decalcification and debridement discussed but not assessed if using model)	1	2	3	4	5
3. Sizing annulus (use sizer appropriately and understand valve size selection)	1	2	3	4	5
4. Needle angles (proper angle to permit needle point to puncture orthogonal to tissue plane; consider depth of field, and space constraints)	1	2	3	4	5
5. Needle removal from annulus (follow curve of the needle to minimize tissue trauma)	1	2	3	4	5
6. Tissue handling (gentle manipulation without excessive tension and tissue trauma)	1	2	3	4	5
7. Depth of bite (proper depth of entry and exit points; proper and consistent depth of needle and suture)	1	2	3	4	5
8. Suture advance along annulus (proper distance of suture travel in annulus, not too small or large)	1	2	3	4	5
9. Spacing between sutures (even spacing; consistent distance from previous bite, not too close or too far)	1	2	3	4	5
10. Situating aortic valve prosthesis (proper orientation relative to the annulus; proper suture placement from edge; suture spacing proportionate to annulus)	1	2	3	4	5
11. Knot-tying (adequate tension, facility; follow for finger and hand to secure knots, not too loose or tight)	1	2	3	4	5
12. Suture management/tension (avoid entanglement; use tension and traction to assist exposure)	1	2	3	4	5

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- 1. Poor, unable to accomplish goal; marked hesitation

(From Fann and colleagues, Stanford University)

Mitral Valve Repair

RESIDENT NAME _____ YR OF TRAINING _____ DATE _____
 EVALUATOR _____

	Poor		Ave		Excel
1. Identify posterior mitral annulus (demonstrate annulus, i.e., decussation or junction of leaflet and atrial wall, for suture placement)	1	2	3	4	5
2. Identify anterior mitral annulus (demonstrate annulus, i.e., junction of leaflet and fibroskeleton, for suture placement)	1	2	3	4	5
3. Needle angles (proper angle to permit needle point to puncture orthogonal to tissue plane; consider depth of field, and space constraints)	1	2	3	4	5
4. Needle removal from annulus (follow curve of the needle to minimize tissue trauma)	1	2	3	4	5
5. Tissue handling (gentle manipulation without excessive tension and tissue trauma)	1	2	3	4	5
6. Depth of bite (proper depth of entry and exit points; proper and consistent depth of needle and suture)	1	2	3	4	5
7. Suture advance along annulus (proper distance of suture travel in annulus, not too small or large)	1	2	3	4	5
8. Spacing between sutures (even spacing; consistent distance from previous bite, not too close or too far)	1	2	3	4	5
9. Situating mitral ring (proper orientation relative to the annulus; proper suture placement from edge; proper suture spacing)	1	2	3	4	5
10. Knot-tying (adequate tension, facility; follow for finger and hand to secure knots, not too loose or tight)	1	2	3	4	5
11. Suture management/tension (avoid entanglement; use tension and traction to assist exposure)	1	2	3	4	5

Definitions:

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(From Joyce DL, Dhillon TS, Caffarelli AD, Joyce DD, Tsigotis DN, Burdon TA, Fann JI. Simulation and skills training in mitral valve surgery. J Thorac Cardiovasc Surg 2011; 107)

Thoracic Surgery Technical Skills Session – Goals & Objectives

Pulmonary Hilar Dissection

This session involves the use of a porcine thoracic block placed within the chest cavity of a mannequin. A thoracotomy incision has been made to allow all maneuvers to be performed through the incision. Either the right or left lung is used.

The goals of this exercise are not only to replicate the confined thoracic space in which pulmonary resections are performed but also to provide an optimal, real-tissue model upon which hilar dissection skills can be practiced. The objectives are: a) identify anatomic landmarks noting the anatomic variants, (b) dissect and encircle the hilar vessels and bronchus, (c) ligate and divide the structures

Assessment of the exercise includes: a) dexterity with instruments, (b) handling of tissues, (c) economy of motion, (d) tying skills, (e) knowledge of anatomy

Assessment

1. Tissue Handling	1 Clumsy, forceful grasping	2	3 Careful handling of tissue with occasional mishandling	4	5 Consistent gentle handling of tissue with coordinated grasping
2. Time and Motion	1 Many unnecessary moves	2	3 Efficient time, but some unnecessary moves	4	5 Fluid and efficient economy of motion
3. Instrument Use	1 Awkward and uncoordinated	2	3 Occasional awkwardness, relatively competent	4	5 Coordinated and competent
4. Knowledge of Anatomy	1 Little to no knowledge	2	3 Moderate level of knowledge, no knowledge of variants	4	5 Well-versed in anatomy and variants
5. Dissection, separation	1 Unable to accomplish without undue structural damage	2	3 Separated structures with occasional injury and excess tissue	4	5 Successful structure isolation without injuries
6. Ligation and tying	1 Unable to perform	2	3 Slow with hesitation, but successful	4	5 Competent tying skills
Final Rating:	1 (poor)	2	3(fair)	4	5 (competent)

(from Nesbitt JC and colleagues, Vanderbilt University)

Esophageal Anastomosis

The thoracic block within the mannequin is used in this session. A thoracotomy incision has been made for access to the posterior mediastinum. The esophagus, positioned and secured in the posterior cavity, is isolated and transected. The two free ends are reapproximated in either one or two layers.

The goals of this exercise focus on specific operative skills used for suturing the esophagus through a thoracotomy incision. The objectives are: a) alignment and approximation of the esophageal ends, (b) proper placement of sutures (running or interrupted) within the esophageal wall, (c) securing the sutures following placement.

Assessment of the exercise includes: a) dexterity with instruments, noting needle holder handling and needle angles, (b) economy of motion, (c) proper suture placement, spacing and alignment, (d) tying skills

Assessment

1. Structure Orientation	1 Poorly aligned, uneven approximation	2	3 Moderately well-aligned, able to compensate proximity of structures	4	5 Well-aligned throughout anastomosis
2. Tissue Handling	1 Clumsy, forceful grasping	2	3 Careful handling of tissue with occasional mishandling	4	5 Consistent gentle handling of tissue with coordinated grasping
3. Time and Motion	1 Many unnecessary moves	2	3 Efficient time, but some unnecessary moves	4	5 Fluid and efficient economy of motion
4. Instrument Use	1 Awkward and not coordinated	2	3 Occasional awkwardness, moderately competent	4	5 Coordinated and competent
5. Needle Angles	1 Consistently poor position of angle relative to needle holder and tissue	2	3 Fair positioning of angle relative to needle holder and tissue	4	5 Good positioning of angle relative to needle and tissue
6. Suture Placement	1 Poor and inconsistent bite depth and spacing	2	3 Fair bite depth and spacing	4	5 Consistent and even bite depth and spacing
7. Ligation and Tying	1 Unable to perform	2	3 Slow with hesitation, but successful	4	5 Competent tying skills
Final Rating:	1 (poor)	2	3(fair)	4	5 (competent)

(from Nesbitt JC and colleagues, Vanderbilt University)

Thoracoscopic Lobectomy

This session involves the use of a left porcine thoracic block placed within the chest cavity of a mannequin. A lateral access thoracotomy and working ports have been made to allow a video assisted resection.

The goals of this exercise are not only to replicate the confined thoracic space in which pulmonary resections are performed but also to provide an optimal, real-tissue model upon which hilar dissection and resection skills can be practiced using thoracoscopic guidance. The objectives are: a) identify anatomic landmarks, (b) competently maneuver the thoracoscope and pulmonary structures to optimize the field of dissection, (c) dissect and encircle the hilar vessels and bronchus through the thoracoscope, (d) ligate and divide the structures using the EndoGIA.

Assessment of the exercise includes: a) dexterity with instruments and thoracoscope, (b) handling of tissues, (c) economy of motion

Assessment

1. Tissue Handling	1 Clumsy, forceful grasping	2	3 Careful handling of tissue with occasional mishandling	4	5 Consistent gentle handling of tissue with coordinated grasping
2. Time and Motion (Lung and Scope)	1 Many unnecessary moves	2	3 Efficient time use, but some unnecessary moves	4	5 Fluid and efficient economy of motion
3. Instrument Use	1 Awkward and not coordinated	2	3 Occasional awkwardness, moderately competent	4	5 Coordinated and competent
4. Dissection and Isolation of Structures	1 Unable to accomplish without undue structural damage	2	3 Separated structures with occasional injury and excess tissue	4	5 Successful structure isolation without injuries
5. Ligation and Tying	1 Unable to perform	2	3 Slow with hesitation, but successful	4	5 Competent tying skills
Final Rating:	1 (poor)	2	3(fair)	4	5 (competent)

(from Nesbitt JC and colleagues, Vanderbilt University)

Bronchoscopy

ASSESSMENT

Bronchoscopy (level 1) checklist

RESIDENT NAME _____ YR OF TRAINING _____ DATE _____
EVALUATOR _____

Step	Satisfactory		Comments		
Instrument check (flexible bronchoscope)	Y	N			
Check patency of aspiration port	Y	N			
Check patency of working port	Y	N			
Ensure control knobs work	Y	N			
Lubricate scope, keep optics clear	Y	N			
Intubate pharynx via oral or nasal route	Y	N			
Navigate posterior pharynx, visualize cords	Y	N			
Intubate cords with minimal trauma	Y	N			
Visualize and identify trachea and lobar bronchi	Y	N			
Visualize and identify segmental bronchi	Y	N			
Navigate with minimal airway trauma	Y	N			
Safe withdrawal of bronchoscope	Y	N			
Economy of time and motion	1	2	3	4	5
	1= many unnecessary/ disorganized movements		3=organized time/motion, some unnecessary movement		5=maximum economy of movement and efficiency
Final rating (circle one)		Demonstrates competence			Needs further practice
Additional comments:					

(From Ara Vaporciyan and MD Anderson Cancer Center)

Bronchoscopy (level 2) checklist

RESIDENT NAME _____ YR OF TRAINING _____ DATE _____

EVALUATOR _____

Step	Satisfactory		Comments
Instrument check (rigid bronchoscope)	Y	N	
Check light source	Y	N	
Check side port for ventilation	Y	N	
Lubricate scope, keep optics clear	Y	N	
Position patient, protect teeth throughout procedure	Y	N	
Intubate posterior pharynx	Y	N	
Navigate posterior pharynx, visualize cords	Y	N	
Intubate cords with minimal trauma	Y	N	
Visualize and identify trachea and lobar bronchi	Y	N	
Navigate with minimal airway trauma	Y	N	
Safe withdrawal of bronchoscope	Y	N	
Economy of time and motion	1	2	3
	1= many unnecessary/ disorganized movements	2=organized time/motion, some unnecessary movement	3=organized time/motion, some unnecessary movement
			4
			5
			5=maximum economy of movement and efficiency
Final rating (circle one)	Demonstrates competence		Needs further practice
Additional comments:			

(From Ara Vaporciyan and MD Anderson Cancer Center)

Bronchoscopy (levels 3 and 4) checklist

RESIDENT NAME _____ YR OF TRAINING _____ DATE _____
 EVALUATOR _____

Step	Satisfactory	Comments
Anatomy post resection		
Identify 2 randomly "resected" lobar bronchi	Y	N
Identify 4 randomly "resected" segmental bronchi	Y	N
Biopsy, lavage, and brushing		
Explore tracheobronchial tree and identify "targets"	Y	N
Bx left mainstem lesion	Y	N
Brush left mainstem lesion		
Bx RLL basilar segmental lesion	Y	N
Lavage RLL basilar segmental lesion	Y	N
Bx RUL apical segmental lesion	Y	N
Assess tracheobronchial tree for bleeding	Y	N
Administer topical epinephrine	Y	N
Hemoptysis		
Identify source of minimal bleeding (RUL apical)	Y	N
Identify source of major bleeding (LUL)	Y	N
Intubate with the rigid scope	Y	N
Control airway		
Selective ventilation w rigid scope	Y	N
Bronchial blocker		
Double lumen tube	Y	N
Removes scope w/o dislodging bronchial blocker	Y	N
Stenting		
Identification of stricture	Y	N
Safe advancement of wire	Y	N
Selection of appropriate stent length and diameter	Y	N
Appropriate application of stent	Y	N
Bronchoscopic assessment of stent position	Y	N
Foreign body extraction (elements)		
	Y	N

Economy of time and motion 1 2 3 4 5
 1= many unnecessary/
 disorganized movements 3=organized time/motion,
 some unnecessary movement 5=maximum economy of
 movement and efficiency

Final rating (circle one) Demonstrates competence Needs further practice

Additional comments: