Cardiothoracic Fellow Expectations
Division of Cardiac Anesthesia, Beth Israel Deaconess Medical Center

The fellowship in Cardiothoracic Anesthesia at the Beth Israel Deaconess Medical Center is intended to provide the foundation for a career as either an academic cardiothoracic anesthesiologist or clinical practitioner. The emphasis will be on an in-depth understanding of cardiopulmonary pathophysiology, pharmacology, and therapy. In addition, the fellow will be given the teaching and clinical experience necessary to become certified in perioperative TEE as outlined by the national Board of Echocardiography. All aspects of the anesthetic management, including pre-, intra-, and postoperative care of patients undergoing cardiothoracic procedures, will be taught.

I. Preoperative Assessment

A. It is expected that the fellow can independently perform a complete evaluation of the cardiothoracic surgical patient

1. Complete a full history and physical exam.

2. Outline the nature and extent of the patient’s cardiovascular and/or pulmonary pathophysiology.

3. Understand the full extent and significance of co-morbidities.

4. Complete review, knowledge, documentation, and assessment of any and all laboratory data.

5. Independently consult with colleagues from other disciplines with regards to treatment plans and/or needs for further testing.

B. The fellow is expected to independently develop a rational, comprehensive anesthetic plan

C. The fellow should be able to independently counsel and educate patients and their families

II. Case Preparation

A. The fellow should be able to set up a cardiothoracic room and troubleshoot basic equipment problems

B. The fellow is expected to develop a rational plan for patient monitoring

1. Need for pulmonary arterial catheterization.
a. Limitations

b. Catheter selection – standard vs. oximetric vs. pacing

2. Need for non-standard monitoring – e.g. multiple arterial catheterizations

C. The fellow is expected to be able to independently manage the placement of intravenous and peripheral monitoring lines

1. Rational plan for placement location(s).
2. Proper sedation for line placement in cardiothoracic surgical patients.
3. Knowing when to ask for assistance with placement.
4. Understanding potential complications.

D. The fellow should be able to formulate a plan for antifibrinolytic therapy

E. The fellow is expected to be able to assess the need for special equipment or non-standard requests

1. Level one
2. Pre-incision external defibrillation pads
3. Arctic sun warming device
4. Blood bank requests

III. Intraoperative Care

A. The fellow should be able to independently develop a plan and then carry out the induction and maintenance phases of anesthesia

1. Medications and proper dosing
2. Knowledge of cost issues
3. Airway management
a. Airway adjuncts
b. Lung isolation strategies

B. The fellow is expected to be able to independently obtain central access and place monitoring lines

1. Demonstrate proper set up
2. Demonstrate appropriate sterile technique
3. Troubleshoot difficult placements and develop plans for such
4. Understand and treat complications related to placement

C. The fellow is expected to learn and understand basic and advanced TEE concepts

1. Indications and contraindications
2. Proper placement
4. Doppler concepts
5. Assessment of ventricular function
6. Ischemia monitoring
7. Valvular assessment
8. Assessment for intracardiac air
9. Comprehensive and accurate reporting

D. The fellow is expected to be able to independently manage and modify hemodynamics as required through the different phases of the surgical procedure
E. The fellow should display the ability to effectively communicate with all members of the cardiac surgical team in a coherent and professional manner.

F. The fellow is expected to have a thorough and level appropriate understanding of the following topics:

1. Hemodynamics and monitoring
   a. Limitations
   b. Complications
   c. Indications/contraindications
   d. Set up and use

2. Myocardial oxygen supply and demand

3. Systolic and diastolic myocardial function

4. Hemodynamic goals for coronary arterial, valvular, pericardial, and outflow tract pathologies

5. TEE (as outlined above)

6. Cardiovascular medications – inotropes, vasopressors, vasodilators, antidysrhythmics
   a. Mechanism of action
   b. Side effects
   c. Dosing
   d. Indications

7. ACLS protocol

8. Defibrillation and Cardioversion

9. Coagulation and anticoagulation
   a. Heparin
b. Heparin substitutes

c. Protamine

d. Anti-platelet medications

e. Heparin induced thrombocytopenia

f. Tests of coagulation
   
   (1) PT, PTT

   (2) ACT

   (3) TEG

  
g. Transfusion therapy

10. Hypothermia

11. Physiology of cardiopulmonary bypass

12. Cardioplegia
   
   a. Components

   b. Methods of delivery

13. Surgical procedures
   
   a. Anesthetic requirements

   b. Time course of procedure

   c. Potential risks and complications

14. Pacemakers and AICDs

15. Physiology of single lung ventilation

16. Intra-aortic balloon pumps
   
   a. Indications
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b. Contraindications
c. Positioning
d. Proper timing

17. Basic ventricular assist device physiology
18. Deep hypothermic circulatory arrest
19. Spinal cord protection during thoracic aortic surgery

G. The fellow is expected to be able to develop a plan for and manage separation from cardiopulmonary bypass

H. The fellow is expected to manage patients undergoing minimally invasive cardiac surgeries

   1. Understand surgical needs
   2. Place coronary sinus and pulmonary vent catheters

I. The fellow is expected to be able to coordinate and manage the transport of critically ill patients

IV. Post Operative Care

A. The fellow is expected to give a clear, concise, and comprehensive report to nursing staff and other team members who will care for the patient post-operatively

B. The fellow is expected to follow up on the patient's post-operative course

   1. The fellow should provide information about the patient’s course to the attending anesthesiologist who cared for the patient with the fellow
   2. The fellow should develop a plan to manage any anesthetic complications
   3. The fellow should present any complications to the Department of Anesthesia at Clinical Conference in a timely manner.
V. The fellow should expect to prepare a lecture on a selected topic to be presented to the Division of Cardiac Anesthesia.

VI. The fellow should expect to take an oral exam administered by members of the Division of Cardiac Anesthesia at the end of their rotation.

   A. This exam will follow a similar protocol as that administered by the American Board of Anesthesiology
   
   B. The results of this exam will become a part of the fellow's evaluation of performance during their rotation