The heart failure experience is a one month rotation on the inpatient service dedicated to the care of patients with advanced heart disease and includes care of heart failure patients, including those with cardiogenic shock requiring advanced pharmacologic and device therapies, as well as patients who have undergone cardiac transplantation. For fellows interested in receiving additional training, options include additional month long inpatient elective rotations, a year long subspecialty outpatient experience, and an unaccredited 4th year rotation providing advanced training in subspecialty heart failure and transplant cardiology.

Goals:
- Initiate the appropriate work-up for a patient who presents with new onset heart failure, focusing on defining reversible causes of ventricular dysfunction.
- Understand the pathophysiologic basis of the heart failure syndrome.
- Develop proficiency in the care of patients with heart failure, including the appropriate guideline-supported use of proven medical therapies for heart failure (ACE inhibitors, beta blockers, diuretics, and spironolactone), the role of implanted device therapy (ICDs, CRT, ICD/CRT), as well as non-pharmacological treatments such as dietary sodium and fluid restriction and exercise training.
- Develop familiarity with the treatment of arrhythmic complications in the patient with systolic dysfunction heart failure, including use of anti-arrhythmic therapy, invasive testing and treatments such as ablation, and use and monitoring of implanted devices.
- Exposure to methods used to appropriately select patients with severe heart failure requiring advanced therapy including hemodynamic monitoring for adjustment of therapy, intravenous inotropes, renal dose dopamine, intra-aortic balloon pumps or ventricular assist devices.
- Develop comfort with the perioperative management of patients with severe left ventricular dysfunction undergoing cardiac surgery, including management of vasoactive medications in the immediate post-cardiopulmonary bypass period, and management of post-operative fluid, arrhythmic and blood pressure issues.
- Exposure to the use of cardiopulmonary exercise testing as part of the evaluation and management of the heart failure patient.
- Exposure to the management of patients with heart failure severe enough to require left ventricular assist devices as a bridge to cardiac transplantation or destination therapy, the management of the perioperative cardiac transplant recipient, and the long-term care of the cardiac transplant recipient.

<table>
<thead>
<tr>
<th>Competency</th>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Care</td>
<td>Patient evaluation including:</td>
</tr>
<tr>
<td></td>
<td>- Strong emphasis on taking an accurate heart failure history and</td>
</tr>
<tr>
<td></td>
<td>performing a bedside physical exam for determination of volume status</td>
</tr>
<tr>
<td></td>
<td>and perfusion.</td>
</tr>
</tbody>
</table>
- Generation of a written or dictated history and physical and impression with treatment plan.
- Close interaction with attending Heart Failure/Transplant Cardiologist for refinement of H&P and discussion of evaluation and treatment plan
- Review of diagnostic studies with attending Heart Failure/Transplant Cardiologist
- Daily rounds including patient examination, bedside discussion with Heart Failure/Transplant Cardiologist, NP, RNs and social worker.
- Ordering pertinent tests and therapies
- Interactions with consultants and other members of the healthcare team as care evolves
- Interaction with all members of the multi-disciplinary team to address barriers to compliance and optimize all aspects of care.
- Participation in discussion with the patient and family and discharge planning

Procedural skills, including:
- Assess volume status and perfusion at the bedside using refined physical diagnosis skills.
- Invasive procedures performed on inpatients on the heart failure and transplant cardiology service, including obtaining informed consent
- Performance of right heart catheterizations, primarily via the right internal jugular approach, but occasionally via the left internal jugular or subclavian approach.
- Sterile technique and venous access
- Interpretation of invasive hemodynamics and understanding of management of the heart failure patient based on invasive hemodynamics.
- Opportunity to become experienced in endomyocardial biopsy technique
- Familiarity with implantable cardiac devices used in the management of heart failure patients, including implanted cardiac defibrillators, resynchronization pacemakers and ventricular assist devices. Emphasis will be placed on appropriate patient selection for these therapies.
- Familiarity with cardiopulmonary exercise testing, including indications, performance and interpretation of tests.

**Medical Knowledge**
- Describe the pathophysiology of the heart failure syndrome
- Demonstrate specific knowledge of the ACC/AHA guidelines for the evaluation and management of chronic heart failure in the adult.
- Initiate the appropriate clinical evaluation for patients with new onset heart failure.
- Identify reversible causes of ventricular dysfunction and the appropriate interventions.
- Demonstrate specific knowledge of the major clinical trials in heart failure and cardiac transplantation.
- Discuss the current pharmacologic treatment of ventricular dysfunction, including the rationale for using angiotensin converting enzyme inhibitors, hydralazine/isosorbide, beta-blocking agents, diuretics, angiotensin receptor blocking agents and aldosterone antagonists.
- Discuss experimental and/or controversial pharmacologic treatments for ventricular dysfunction.
- List the indications, management and complications of hemodynamic monitoring with a pulmonary artery catheter.
- Interpret cardiac pathophysiology from pressure waveform analysis.
- Discuss the current indications for mechanical treatment of advanced heart failure, including implantation of an intra-aortic balloon pump or a ventricular assist device.
- Participate in the post-operative care of a patient with a ventricular assist device, including complications and device management.
- List the indications and contraindications for cardiac transplantation and discuss candidate selection.
- Initiate the appropriate evaluation for cardiac transplantation.
- Participate in the pre-operative, peri-operative and immediate post-operative care of the cardiac transplant patient.
- Discuss the histologic and hemodynamic features of cellular and humoral cardiac allograft rejection.
- Discuss the maintenance immunosuppressive regimen used after cardiac transplantation, including actions, interactions and toxicities.
- Discuss the immunosuppressive regimens used to treat acute cellular and/or humoral rejection.
- Describe the evaluation and treatment of infection in the immunocompromised patient.
- Discuss the long-term management and expected outcomes of the cardiac transplant patient.

**Professionalism**

- The fellow will display professionalism in carrying out clinical responsibilities
- Adhere to ethical principles
- Be culturally aware
- Consistently respect patients and recognize how a patient’s background affects health care choices and wishes.
- Involve the patient and family in decision making
- Consistently act with altruism, integrity, reliability, courtesy
and empathy when caring for patients.

| **Interpersonal and Communication Skills** | ▪ Effective written, verbal and non-verbal communication skills  
▪ Understand the importance of listening and careful communication skills to the therapeutic relationship, particularly when dealing with chronically and severely ill patients.  
▪ Gain an understanding of the importance of communication between physicians and consultants, nurses, advanced practitioners, dieticians, social workers, exercise physiologists and many other care team members.  
▪ Compassionate and culturally aware communication with the critically ill and/or dying patient, caregivers and loved ones in order to maintain optimism and motivation, create a positive environment and instill hope. |
|---|---|
| **Systems-Based Practice** | ▪ During the heart failure rotation, time is dedicated to improving the trainee’s understanding and appreciation of the nature and advantages of multidisciplinary practice in chronic illness.  
▪ The trainee participates in daily multidisciplinary case discussions with the cardiac surgeons, attending heart failure/transplant cardiologist, surgery and cardiology mid-level providers, nurse coordinators, social worker, physical therapists, nutritionists and other relevant team members.  
▪ A patient-centered model of care using chronic disease management by the multidisciplinary advanced heart disease team is in continual use.  
▪ The trainee will gain understanding of the importance of opinions and input from all members of the multidisciplinary team, particularly when making difficult, often life-and-death, decisions regarding patient candidacy for ventricular assist device implantation or cardiac transplantation.  
▪ Awareness of the role of palliative care practices and team approach in the management of patients with advanced heart failure who are not candidates for heart transplantation or advanced device-based care.  
▪ The trainee will gain appreciation for a collaborative relationship with cardiothoracic surgeons, and participate in frequent discussions with cardiothoracic surgeons regarding appropriate patient management in complex cases of advanced heart failure. This will be contrasted with the classical referral model for clearly indicated cardiac surgical procedures. |