

CCU – O’Brien

Cardiac Care Unit (CCU) Fellow Goals and Objectives

Purpose:

To delineate the Roles, Goals and Objectives for Cardiology Fellows on the CCU Service

Introduction to CCU

The CCU Service is a closed unit that provides care to patients that span the entire spectrum of cardiology, which may include those with valvular heart disease, complex congenital cases, hypertensive emergencies, acute coronary syndrome, those with advanced heart failure, and new-onset or refractory arrhythmias. Cardiology patients requiring ICU-level care will be on the CCU service, including outside transfers, admissions from the ER, and transfers from other UWMC inpatient services. Management of these patients requires a multidisciplinary team and collaborative effort between faculty, Fellows, advanced practice providers (APPs), social work, and nursing to optimize outcomes.

Educational Topics

1. Structural abnormalities
 - Understand evaluation of and management for various types of valvular heart disease including aortic stenosis, acute aortic regurgitation, mitral regurgitation
 - Work-up and manage patients pre- and post-TAVR for aortic stenosis
 - Work-up and manage patients pre- and post-MitraClip for mitral regurgitation
 - Diagnose and treat patients with pericardial tamponade including management of pericardial drains
2. Hypertensive emergency
 - Management of vasoactive drips for hypertensive emergency
 - Weaning of vasoactive drips and establishment of appropriate oral therapies
 - Recognize potential end-organ complications associated with hypertensive emergency
3. Acute coronary syndromes
 - Manage STEMI, typically after revascularization in the cath lab
 - Manage NSTEMI cases, including understanding the indications for and timing of coronary intervention in these cases
 - Recognize complications that may occur after ACS and manage them appropriately such as VSD, ventricular rupture, flail mitral leaflet, arrhythmias, etc.
 - Be able to risk stratify patients after ACS
 - Optimize guideline directed medical therapies after ACS
4. Heart failure and cardiomyopathies
 - Become an expert in assessing volume status by both clinical exam, with invasive monitoring, and with imaging modalities (such as IVC and IJ assessment by ultrasound)

- Develop an intricate understanding of hemodynamics from right heart catheterization measurements including target values for each parameter
 - Be able to estimate Fick cardiac outputs from mixed venous blood draws, and understand the impact of hemoglobin on mixed venous O₂
 - Become an expert in determining optimal medical therapy and appropriate timing of these therapies for heart failure including diuretics, RAAS inhibition, beta-blockade, digoxin, and inotropes
 - Take the lead on appropriate hemodynamic optimization of patients in decompensated heart failure
 - Become an expert in management of inotropes and pressors, and understand the nuances and differences between the different types
 - Be able to perform CRT optimization and resynchronization under echo guidance
 - Understand treatment of right sided heart failure and pulmonary hypertension
 - Understand and be involved with the patient evaluation and selection process for cardiac transplant and MCS for patients with end-stage heart failure
5. Cardiac transplantation
- Identify cellular and humoral rejection based on clinical findings, echo features, and pathology from endomyocardial biopsy, and donor specific antibody profiles
 - Manage acute cellular with augmented immunosuppression with IV steroids and ATG
 - Be able to treat humoral rejection with plasmapheresis, IVIG, and rituxan/velcade
 - Recognize the acuity of heart transplant patients that are actively rejecting
6. Temporary mechanical circulatory support
- Understand indications and device selection for short-term MCS including IABP, Impella CP, Impella-RP --- Other device types typically will be on the CT surgery service
 - Understand indications for durable MCS as bridge to transplant (BTT) and destination therapy (DT) for patients that cannot be weaned off temporary support
 - Know the relative and absolute contraindications to MCS
7. Arrhythmias
- Manage post-cardiac arrest patients including the institution of cooling protocols when appropriate
 - Know basics on interrogation and re-programming for ICD/pacemakers
 - Management of VT storm including with antiarrhythmics, post-ablation, post-gangliectomy
 - Management of refractory afib/flutter including medical therapy and cardioversion
 - Place and manage temporary pacing wires for high grade heart block
8. Endocarditis and complications
- Recognize and treat acute complications of endocarditis that may lead to hemodynamic instability
 - Understand appropriate timing for surgery in patients with endocarditis
9. Adult congenital heart disease

- Management of complex congenital heart disease patients in conjunction with the congenital heart disease team
- Understand the anatomy involved with each ACHD case and key highlights on imaging

Service Structure:

1. Weekdays: Cardiology Attending, 2 APPs , and 2 Fellows (typically one F2/3 and one F3/4.)
2. Weekends: Same as Weekday, except that only 1 Fellow is assigned to the Service on weekends.
3. The APPs and one of the Fellows (the “Front-line” Fellow) will split primary responsibilities for CCU patient care.
4. One Fellow (the “Flex” Fellow) will assist the Attending and APPs to facilitate efficient and effective patient care and team function.
5. Typically, the Fellows will alternate the “Front-line” and “Flex” roles on a weekly basis.
6. In the case of a very low CCU weekday census, one Fellow may be assigned temporarily to assist the Cardiology B floor team—this is anticipated to be an extremely rare occurrence.
7. There is a dedicated CCU pharmacist who rounds with the Team M-F.
8. Social work is provided by the Cardiology A, Cardiology B, MCS and Structural Heart social workers, as appropriate for specific patients. The Social work contact for individual patients should be listed in CORES.
9. The Cardiology team assistant (Kathleen Lunon) is available to provide support in obtaining outside records and imaging studies as necessary .
10. The CCU Nocturnist provides service coverage from 8:00 PM – 8:00 AM daily.
11. The CCU service is an elective rotation for UW Internal Medicine residents. As an elective rotation, the medicine resident works on the service M-F, typically has 1 day/week in clinic (i.e., not on CCU service), and may schedule 1 week vacation during their CCU elective.

CCU Daily Schedule

subject to adjustment based on patient care needs, conference times

- 0745: Sign-out from Nocturnist to APP/Fellow in CCU Team room
- 0800-0900a: Pre-round
- 0900: Study rounds in CCU team room
- 0910: Begin Structured bedside rounds - patient order determined by CCU Attending (generally begin with sickest patients, then anticipated transfers, then remaining patients)
- 1200-2000: Daily care of patients, notes, transfers, admits, discharges
- 1300-1315: “1pm Brief” with CCU and Cards A-C representatives to review patients nearing transfer
- 1945-2000: Sign-out from APP/Fellow to Nocturnist
- 2000-0800: Patient care by Nocturnist

Conferences:

1. The cardiology Fellows are expected to attend all **Wednesday Morning Conferences** and **Friday Cardiology Grand Rounds**. *Attendance is required.*
2. **Fellow Tutorials** are on Friday morning after Grand Rounds 8:30 - 9:30. *Attendance is required.*
3. **Cardiology Fellow Research Conference** is once a month at noon. *Attendance is required.*
4. **Interventional Conference** is weekly on Tuesday AM 7:30 - 8:30 AM. *Attendance is optional.*
5. **Transplant Conference** is weekly on Thursday morning from 8:00 - 9:45 in the CT Surgery conference room (AA115K) or Turner Conference Room (E202). Be prepared to present the in-patients who are being considered for advanced heart failure therapies. Clarify with the AHFTC Fellow who will be presenting patients who are being discussed. There is an EPIC template that needs to be completed for each patient being presented. Following the presentation, the templated note should be updated with the results of the discussion (list, turn down for X reason or continuing work-up, needs XYZ completed) and cc'd to the patient's Attending. *Attendance is required for the CCU Fellow presenting patients—typically this will be an AHFTC Fellow, or the “Flex” Fellow for months when an AHFTC Fellow is not rotating on the service.*
6. **MCS Conference** is weekly on Thursday from 16:00 – 17:00. Patients being considered for MCS and patients who have received MCS are reviewed. This is an important conference to make sure that any patient who is being worked up for MCS is on the “VADar” of the MCS service. *Attendance is optional.*
7. **Transplant/HF Educational Conference** is held monthly on the last Wednesday of the month from 4:00 - 5:00 in the CT Surgical conference room. *Attendance is optional.*

Weekends:

Team structure differs on weekends, as there will only be one Fellow on service, though APP staffing will be similar. Therefore, the weekend cardiology Fellow should expect to assume some primary patient care responsibilities. The cardiology Fellow should be available for sign-out from the Nocturnist by 7:45 AM (or sooner). Weekend Attending rounds generally begin at 9:00 AM.

Cardiology Fellow Responsibilities:

1. The “Flex” Fellow should know about all of the patients on the service and facilitate patient care. This is particularly true for issues that are *cardiology specific* (examples: patients with an IABP after STEMI, patients with frequent VT, concern for impending tamponade, those that require escalating inotropes and pressor support).
2. Fellows will continue to have clinic while rotating on the CCU service. Please handoff to the APP or Fellow who will be assuming your patient care during your clinic time (see *Handoff Process* document).
3. Admissions:

- a. The “Flex” Fellow should be aware of and review with the Primary APP all admissions and transfers that come in during the day.
 - b. The “Front-line” Fellow is responsible for admissions (notes and orders) of patients for whom they have primary responsibility.
 - c. However, the Fellows should make every effort to assist with the care of all patients that are unstable and active.
4. A major part of this rotation is learning about the various aspects of cardiology including the advanced modalities available for treatment. We assume that F2s will have had minimal prior exposure to many of these modalities. There is a steep learning curve, so when in doubt ask questions of your co-Fellows, the APPs or the Attendings.
 5. Fellows are welcome to assist with any procedures that need to be performed on the CCU patients. This is a great rotation to develop your procedural skills both formally (in the cath lab when no procedure Fellow is available, and by doing bedside procedures with quick echo scans, central lines, right heart cath, etc.)
 6. The “Flex” Fellow will participate on rounds by assisting the Attending to facilitate efficient and effective patient care. *CCU rounds follow a Structured Format, and ideally are performed **with the patient’s RN at the patient bedside**.* The Flex Fellow will be responsible for ensuring that the Plan-of-the-Day/CCU Quality-Safety Checklist (“green”) sheet is completed for **every patient, every day**.

Direct Patient Care

1. Thorough evaluation of patients including their acuity, etiology of presentation, and develop problem-based care plans
2. Incorporate diagnostic imaging and procedures as appropriate to each case
3. Attend rounds with multidisciplinary personnel including faculty, Fellows, APPs, and/or assist with bedside cardiac procedures
4. Initiate transitions of care upon transfer as part of “discharge” planning
5. Educate other staff, advanced practice providers, patients, and families

Communication

1. Real time communication of critical changes to the CCU Attending and the rest of CCU team
2. Facilitate collaboration between CCU, MCS, Cardiology A and B services
3. Promote and enhance communication with patients, family, CCU staff, and the interprofessional team
4. Provide verbal hand-offs to providers when transferring patients out of the unit (see *Handoff Process* document)
5. Routine communication with consulting services to align goals of care in a patient centric model
6. Provide accurate and timely order entry via ORCA

7. Document CCU notes for admissions, daily notes, transfer summaries, procedure notes, and event notes (see *Documentation Standards for CCU* document)
8. Update CORES daily for all CCU patients

Other Information

1. There is an introduction to many of these topics and an extensive collection of relevant articles on the Division of Cardiology Fellowship web page
2. We are developing a calendar that outlines evening schedules as well as clinics, vacations, conferences, etc.
3. If you are in a morning conference, when possible, get sign out before the conference, or page the Nocturnist.
4. If you discharge a patient while on call for the weekend, complete the discharge summary and send an email with a brief summary of the hospital course and planned follow-up to: post-dc@uw.edu (for transplant patients), pre-dc@uw.edu (for other heart failure patient). This process will ensure that appropriate follow-up is obtained for the patients.
5. Certain cardiology protocols (including the diuretic protocol) are available in OCCAM: <https://occam.hsl.washington.edu/category/uwmc/cardiology-b-uwmc/>

References

The amount of variation in patients seen in the CCU is immense and a broad review of relevant literature in all topics would be beyond the scope of this document. Much of the pertinent information can be found on the UW cardiology Fellow's website (<http://www.uwcardiologyfellows.org> password: ventricles) or the UW cardiology curriculum website (<http://crdportal.medconnection.org/Pages/Main-Curriculum.aspx>).

A recommended starting point is to review key guidelines (links below, ACCF/AHA joint guidelines unless otherwise noted) on each of the relevant topics and subsequently review additional literature on a case-by-case basis:

ACCF/AHA all topics:

http://my.americanheart.org/professional/StatementsGuidelines/ByTopic/TopicsA-C/ACCAHA-Joint-Guidelines_UCM_321694_Article.jsp

Structural disease (including valves):

[2014 AHA/ACC Guideline for the Management of Patients With Valvular Heart Disease - Full Text](#)

[ACC/AHA 2008 Guidelines for the Management of Adults With Congenital Heart Disease: Full Text](#)

[ACC/AHA 2008 Guideline Update on Valvular Heart Disease: Focused Update on Infective Endocarditis](#)

Acute coronary syndromes:

[2009 Focused Updates: ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction \(Updating the 2004 Guideline and 2007 Focused Update\) and ACC/AHA/SCAI Guidelines on Percutaneous Coronary Intervention \(Updating the 2005 Guideline and 2007 Focused Update\)](#)

[2014 AHA/ACC Guideline for the Management of Patients With Non–ST-Elevation Acute Coronary Syndromes](#)

[2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease](#)

[ACCF/SCAI/STS/AATS/AHA/ASNC 2009 Appropriateness Criteria for Coronary Revascularization](#)

Arrhythmias:

[2014 AHA/ACC/HRS Guideline for the Management of Patients With Atrial Fibrillation](#)

[ACC/AHA/ESC 2006 Guidelines for Management of Patients With Ventricular Arrhythmias and the Prevention of Sudden Cardiac Death - Full Text](#)

[2012 ACCF/AHA/HRS Focused Update of the 2008 Guidelines for Device-Based Therapy of Cardiac Rhythm Abnormalities](#)

[2014 EHRA/HRS/APHRS Expert Consensus on Ventricular Arrhythmias \(HRS\)](#)

[CPR & ECC Guidelines in Circulation \(opens new window\)](#)

Heart Failure:

[2013 ACCF/AHA Guideline for the Management of Heart Failure](#)

[2013 ISHLT Guidelines for Mechanical Circulatory Support \(ISHLT\)](#)

[The ISHLT Guidelines For The Care Of Heart Transplant Recipients](#) (ISHLT)

[2013 ISHLT Guidelines for Mechanical Circulatory Support](#) (ISHLT)

[2009 ESC / ERS Guidelines on the Diagnosis and Treatment of Pulmonary Hypertension](#) (ESC)

[Disease Management, Advance Directives, and End-of-Life Care in Heart Failure Education and Counseling](#) (HFSA)

[Surgical Approaches to the Treatment of Heart Failure](#) (HFSA)

[Evaluation and Management of Patients with Acute Decompensated Heart Failure](#) (HFSA)

[Myocarditis: Current Treatment](#) (HFSA)

[Recommendations for the Use of Mechanical Circulatory Support](#) (AHA)

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Process Owner: Kevin D. O'Brien, MD

Process Reviewers: W. Robb MacLellan, MD; Ron Boerger, MHA, Kelly Waters