GIM Consult Service Rotation Clerkship Objectives

The reasons for referral of a patient to Internal Medicine Service are many. Included in this document is a list of the more common conditions for which a consultation is requested. The list is not meant to be exhaustive and may not include the occasional unusual presentations that are not clear-cut to the referring physicians.

General Principles

The student will be able to:

1. Ensure hemodynamic stability of the patient
2. List the causes of presenting complaint
3. Elicit a comprehensive history with emphasis on the nature of the complaint(s)
4. Identify the risk factors that support the most likely cause of the problem
5. Perform a complete physical examination
6. Have a rational approach to investigations
7. Interpret the results of the tests
8. Suggest management of the problem
9. Recognize the indications for involvement of subspecialties when management falls beyond the expertise of the consulting service
10. Realize own limitations and solicit help from the senior and/or attending physician
11. Educate patient of disease and management

A. Chest Pain

1. Cardiac Causes

a) Myocardial ischemia/ACS

The student will be able to:

- Differentiate the characteristic chest discomfort of angina from the chest discomfort of pericarditis, and aortic dissection
- Distinguish stable angina from an acute coronary syndrome (ACS), the latter warranting urgent investigations and time-critical management
- Perform a careful physical examination with particular attention to the cardiovascular system, looking for elevated JVP, new onset murmurs, and extra heart sounds
- Name the appropriate investigations to support clinical diagnosis
- Initiate medical management according to the ACC/AHA guidelines
- Consult Cardiology for transfer to a high acuity unit in the case of a clinically unstable patient or for further management i.e. reperfusion
- Counsel patient on lifestyle modifications

b) Pericarditis

The student will be able to:

- Name at least 3 causes of acute pericarditis
- Describe the characteristic chest pain associated with pericarditis
- Describe the pertinent clinical findings
- Contrast the ECG findings of acute pericarditis from myocardial ischemia
- Order investigations to back the clinical impression
- Recommend the appropriate management for the type of pericarditis

- Recognize and educate patient on the possible complications of pericarditis
- Arrange for appropriate follow-up

c) Aortic Dissection

The student will be able to:

- Describe the typical chest pain in aortic dissection
- Name risk factors for developing this condition
- List findings associated with aortic dissection
- Recognize that this is a medical emergency
- Order and justify appropriate studies
- Explain the goals of treatment while waiting for definitive treatment
- Notify the Intensive Care Team immediately of the patient

2. Non-Cardiac Chest Pain

a) Respiratory Causes

i. Pulmonary Embolism

The student will be able to:

- Understand the underlying pathophysiology
- List risk factors for PE
- Identify clinical findings that may suggest a PE
- Name the diagnostic tests of choice and alternative tests for patients who have contraindications to contrast dye
- Discuss the therapy for acute PE per the ACCP guidelines
- Justify the choice of anticoagulants in a particular patient
- Discuss the optimal duration of therapy

ii. Pneumonia (see section under Dyspnea)

iii. Malignancy – primary vs secondary (see section under Dyspnea)

iv. Pleuritis

b) Other Causes

i. GI causes – esophagitis, esophageal spasm, peptic ulcer disease, cholecystitis, pancreatitis, GERD

ii. Musculoskeletal causes or chest wall lesions- Herpes zoster, costochondritis

B. Dyspnea

1. Cardiac Causes

a) Congestive heart failure

The student will be able to:

- Clarify the nature of shortness of breath from a focused history
- Discuss the causes of left ventricular (LV) heart failure and right ventricular (RV) failure
- Give at least 5 precipitating causes of heart failure
- Apply the NYHA functional classification
- Describe the clinical findings of LV failure and RV failure
- List the conditions associated with low output states and high output failure respectively
- Distinguish between heart failure with reduced LV function (HFref) and heart failure with preserved LV function (HFpef)

- Explain the utility of Brain Natriuretic Peptide (BNP) in the diagnosis of heart failure
- Outline the management of a patient with pulmonary edema
- Recognize the mortality benefit of certain drugs used in heart failure
- Expound on the drug therapy of black patients with heart failure
- Discuss long term management of these patients
- List the drugs that has been shown to have mortality benefit in patients with HFref
- Educate patient on lifestyle modifications

b) Cardiac tamponade

The student will be able to:

- List 3 clinical findings of cardiac tamponade
- Order appropriate investigations to support clinical suspicion
- Recommend diagnostic and therapeutic procedure

c) Valvular Heart Disease

The student will be able to:

- Distinguish between stenosis and regurgitation based on examination
- Recognize the valve involved and name causes of the valvular abnormality
- Differentiate acute from chronic valvular lesions based on history and physical examination
- Name the different stages in the progression of valvular disease based on the 2014 AHA/ACC Guideline
- Understand the natural history of aortic stenosis
- List the 3 symptoms associated with aortic stenosis and the pathophysiology behind them
- Discuss the prognosis of aortic stenosis based on each symptom listed above
- Justify investigations of the valvular disease
- List the medical management of the different valvular diseases
- Know the indications of surgical intervention
- Offer alternative intervention in patients who are not surgical candidate for AV replacement (AVR) and how it compares with AVR

2. Pulmonary Causes

a) Pulmonary embolus (PE) See section on Chest pain

b) COPD

The student will be able to:

- Assess for increased work of breathing
- Recognize the signs of impending respiratory failure
- Clarify whether this is a new diagnosis of COPD or an acute exacerbation
- List the risk factors for COPD based on patient's history
- Examine for physical findings consistent with COPD
- Identify precipitating events for patients with acute exacerbation
- Classify severity of COPD according to the GOLD criteria
- Name the 3 parameters to categorize exacerbation risk and symptoms burden in the patient with COPD (2017 Revised GOLD criteria)
- Order and support choice of investigations
- Treat acute exacerbations of COPD and discuss rationale of intervention
- List the criteria for initiating antibiotics in COPD

- Name the criteria for BiPAP
- Identify patients who may be candidate for home oxygen (O2) therapy
- Counsel patient on smoking cessation
- Recommend pneumococcal and annual influenza immunization
- Make appropriate referral for pulmonary rehabilitation
- Arrange outpatient pulmonary function tests for newly diagnosed COPD
- Name 3 life-prolonging measures for COPD

c) Pulmonary Hypertension (pHTN)
The student will be able to:
- Examine for physical signs of pHTN
- List the classification of pHTN
- Order and justify the investigations for pHTN
- Make appropriate referral to the pHTN clinic

d) Pneumonia- Hospital Acquired Pneumonia (HAP) and Ventilator Associated Pneumonia (VAP)
The student will be able to:
- Give definition of HAP, Health Care Associated Pneumonia (HCAP), and VAP
- Give the signs and symptoms of HAP
- List the most common micro-organisms causing HAP, HCAP, and VAP
- Provide the risk factors for VAP
- Order and justify investigations
- Recognize that early initiation of antibiotics is critical
- Depending on the culture and sensitivity results and provided the patient is improving, consider narrowing spectrum of antibiotics
- Determine the optimal therapy for antibiotics
- Recognize the complications of pneumonia if patient is not improving
- Know the most common organism in an HIV-infected patient
- Recognize the potential opportunistic infections in an HIV-infected patient and immunocompromised patients
- Order appropriate investigations and recommend specific treatment

e) Pneumothorax
The student will be able to:
- Describe the radiographic findings on chest X-ray and determine the extent of the pneumothorax
- Recognize the consequences of tension pneumothorax
- Name the indication(s) for chest tube insertion

f) Malignancy
The student will be able to:
- Elicit a focused history assessing risk factors and determine whether this is a primary lung cancer or metastatic lesion(s)
- Assess for airway compromise
- Evaluate for clinical signs of metastases from a primary lung cancer
- List the investigations for staging (TNM) of a biopsy-confirmed lung cancer
- Name the 2 categories of lung cancer (small cell and non-small cell lung cancer) and importance of distinguishing the two
- List the histologic types of non-small cell lung cancer
- Recognize paraneoplastic syndrome associated with lung cancer

- Name the different types of treatment for lung cancer
- Discuss the role of radiation in primary lung cancer

g) Pleural Effusion
The student will be able to:
- Explain Light's criteria and its utility
- Send for the appropriate tests on pleural fluid to aid in the probable diagnosis and management
- Recognize the potential complications from a diagnostic and/or therapeutic thoracentesis
- Name the indication(s) for chest tube insertion

3. Other Causes
   a) Anemia
   b) Drugs
   c) Metabolic acidosis
   d) Deconditioning

C. Abnormalities in BP

1. Hypertension
   The student will be able to:
   - Distinguish between hypertensive emergency or hypertensive urgency
   - Assess for end-organ damages by physical examination and investigations
   - Rationalize the use of anti-hypertensive agents in HTN emergencies
   - Define the target mean arterial pressure
   - Understand the risks of acutely lowering BP
   - List factors that may contribute to refractory HTN
   - Define resistant HTN
   - Discuss the indications for work-up of secondary HTN
   - Justify the choice of anti-hypertensives in special patient population based on history and physical findings
   - Know the target BP for certain patient population i.e. DM, CKD, stroke/TIA
   - Advise patient on non-pharmacologic therapy for HTN

2. Hypotension

   a) Shock
   The student will be able to:
   - Assess ABCs
   - Evaluate for the different causes of shock and discuss the pathophysiology of each type of shock
   - State the general principles in resuscitating patient with each type of shock

      i. Hypovolemic shock

         a) Hemorrhagic shock
         The student will be able to:
         - Identify possible sources of bleeding based on history and physical examination
         - Justify transfusion of blood
         - Explain the risks and benefits of blood transfusion
         - Anticipate transfusion reaction(s) and management thereof
         - Substantiate the choice of investigations

b) Volume Depletion

The student will be able to:

- Assess clinically and biochemically for signs of volume depletion
- Determine and treat the cause(s) of volume depletion
- Recommend the rate of replacement and appropriate follow-up of volume status

b) Distributive shock

i. Septic shock

The student will be able to:

- Recognize the importance of initiating antimicrobial therapy early after appropriate investigations
- Define criteria for SIRS (systemic inflammatory response syndrome)
- Understand the value of source control if a site of infection has been identified
- Rationalize the choice of antibiotics based on history, patient demographics and clinical examination
- Justify the initiation of vasoactive drugs (norepinephrine, dopamine, etc.)

ii. Anaphylactic shock

The student will be able to:

- Recognize signs and symptoms of anaphylaxis
- Realize epinephrine as potential life-saving
- Ensure patent airway
- Initiate volume expansion
- Identify and immediate removal offending agent
- Administer glucocorticoids to reduce delayed reaction
- Recommend antihistaminics for symptomatic relief of skin reactions

c) Cardiogenic shock

The student will be able to:

- Recognize the setting in which this occurs and the high mortality of cardiogenic shock
- Initiate inotropic support and alert your senior and/or attending
- Mobilize the other team members to alert Cardiology for help

D. Metabolic Abnormalities

1. Sodium Disorders

a) Hyponatremia

The student will be able to:

- List the signs and symptoms of hyponatremia
- Determine the onset of hyponatremia
- Distinguish between hypo-osmolar vs hyperosmolar hyponatremia
- Rationalize the approach to hyponatremia based on history and volume status
- Justify the rate at which hyponatremia is to be corrected and the choice of solution for correction
- Monitor improvement in clinical status of the patient and comment on frequency of monitoring
- Explain the dangers of overcorrection of the sodium in chronic hyponatremia and management of overcorrection
- Identify patients who are at risk for osmotic demyelination (ODS)
- Recognize the signs of ODS

- Explain the pathophysiology behind SIADH
- Name the criteria for diagnosing SIADH
- List the conditions commonly associated with SIADH
- Name causes for impaired water clearance besides SIADH
- Discuss the differences of Urine sodium and Urine osmolality in different hyponatremic states

b) Hypernatremia

The student will be able to:

- Describes the setting in which hypernatremia occurs
- Recognize the clinical manifestations of hypernatremia
- Justify the choice and route of administration of solution for correction
- Calculate total water deficit
- Address the underlying cause(s) of hypernatremia

2. Calcium abnormalities

a) Hypercalcemia

The student will be able to:

- Understand the regulation of calcium homeostasis
- Name the causes of hypercalcemia
- Discuss the possible mechanisms behind acute kidney injury in severe hypercalcemia
- Recognize the clinical manifestations of hypercalcemia
- Realize the critical importance of fluid resuscitation in patients with hypercalcemia
- Have a systematic approach to distinguishing parathyroid or non-parathyroid causes of hypercalcemia
- Utilize the different interventions to acute hypercalcemia and comment on onset of action and duration of the agents
- Eliminate sources of calcium
- Name 3 options for management of primary hyperparathyroidism

b) Hyocalcemia

The student will be able to:

- Name acquired parathyroid and non-parathyroid causes of hypoparathyroidism
- Discuss the biochemical findings specifically serum PTH and serum phosphate in hypoparathyroidism, renal failure, severe liver disease and hypomagnesemia
- Recognize the clinical presentation of hypocalcemia
- Discuss the cardiovascular effects of hypocalcemia
- Recommend treatment of hypocalcemia

E. Diabetes Mellitus

The student will be able to:

- Explain the pathophysiology of Type 1 vs Type 2 Diabetes mellitus
- Distinguish between diabetic ketoacidosis (DKA) and hyperglycemic hyperosmolar state (HHS)
- Describe the Acid base and biochemical abnormalities associated with DKA
- Discuss the treatment of DKA and HHS
- Recognize the complications of DKA
- Investigate for precipitating causes for decompensation
- Manage transition of intravenous insulin to subcutaneous insulin
- Discuss the principles behind basal and bolus insulin

- Know the different insulins, the onset of action, duration of action and side-effects
- Name the different classes of oral drugs for diabetes mellitus and their mechanism of action
- List at least 1-2 drugs in each class of oral antidiabetic medications
- Mention at least 2 drugs that have been shown in clinical trials to have cardiovascular benefits
- Discuss the benefits and side effects associated with each class of agents
- Explain the utility of hemoglobin A1c and the target Hemoglobin A1c based on patient's functionality, risk of hypoglycemia, frailty, and life expectancy as recommended by Canadian Diabetic Association (CDA)
- Recommend treatment according to the CDA guidelines
- Promote and reinforce lifestyle modifications in all patients with diabetes mellitus

F. Fever

1. Infection (also see section on septic shock)

The student will be able to:

- Appreciate the importance of early initiation of antibiotics in outcome of non-neutropenic and neutropenic patients
- Describe the events including sign and symptoms preceding the fever
- Search for source(s) of infection with a thorough history and physical examination
- Justify the work-up of fever and describe laboratory and imaging results that are consistent with infection
- Distinguish the most likely microbiologic agent(s) in the immune-competent vs immunocompromised host
- Rationalize the choice of antibiotics and determine the duration of antibiotics
- Step-down spectrum of antibiotics based on culture results
- Appreciate the importance of source control
- Seek consultation with Infectious Disease Service if not responding to appropriate antibiotics
- Recognize the returning traveler-related infections and appropriate investigations

2. Non-infectious causes

a) Drugs

The student will be able to:

- Distinguish neuroleptic malignant syndrome, serotonin syndrome, malignant hyperthermia, and CNS-related hyperthermia based on history and physical examination
- Do a careful review of drugs including biologicals that may potentially be causing the fever after ruling out an infectious cause
- Remove offending agent

b) Autoimmune causes

The student will be able to:

- Look for associated signs and symptoms (rash, arthritis, cough, hemoptysis, headache, synovitis, mucosal lesions, etc.) for an autoimmune or inflammatory cause after an infectious etiology has been ruled out
- Justify ordering tests to confirm suspicion of an autoimmune disease
- Observe for potentially life-threatening complications that require emergency treatment and early involvement of the appropriate subspecialties
- Understand indication and role of glucocorticoids in certain conditions

- Discuss the long-term consequences of glucocorticoids and measures to prevent these complications
- Have a general understanding of the available immunomodulating drugs

c) Other causes

i. Venous Thromboembolism (VTE) – See also section on chest pain
The student will be able to:
- Name risk factors for VTE
- List the signs and symptoms of VTE
- Determine whether the thrombotic episode if provoked or unprovoked
- Order and justify tests for diagnosing VTE
- Know the different anticoagulants available for treatment, considering the patient's medical, social, and financial factors
- Discuss the pros and cons of different class of anticoagulants
- Estimate bleeding risk of the patient
- Determine total duration of anticoagulation
- State circumstances where extended treatment of anticoagulants is indicated

ii. Endocrine causes – hyperthyroidism

iii. Malignancy - lymphoma, post-obstructive pneumonia in lung cancer, obstructive uropathy, etc.

G. Atrial Fibrillation (AF)

The student will be able to:
- Ensure hemodynamic stability of patient
- Name 2 medications used to control heart rate in AF
- Discuss any benefit of rate vs rhythm control
- Initiate work-up for new-onset AF
- Know which patient may benefit from elective electro-cardioversion
- Assess risk of stroke using the $CHADS_2$ and CHA2DS2- VASc risk score and recommend anticoagulation based on the CCS guidelines
- Name the different classes of anticoagulants available
- Estimate the bleeding risk of patient if started on anticoagulation

H. Acute Kidney Injury (AKI)

The student will be able to:
- List the different causes (pre-renal, renal, and post-renal) of AKI
- Define AKI
- Have a systematic approach to evaluating AKI using a composite of history, assessment of volume status and investigations
- Elaborate on the urine studies and its use in differentiating between pre-renal and renal cause of AKI
- Describe the microscopic findings in the urine in AKI
- List the different pre-renal and post-renal causes of AKI
- Give the different etiologies of intrinsic kidney injury
- Name at least 3 nephrotoxic drugs

- Recognize which patients are at risk for contrast-induced nephropathy
- List at least 3 drugs that can cause acute interstitial nephritis
- Name at least 3 different types of acute glomerulonephritis (GN)
- Discuss the clinical manifestations of acute GN
- Define nephrotic range proteinuria
- Investigate for causes of acute GN
- Discuss the general principles in the management of pre-renal AKI and post-renal AKI
- Identify and discontinue the offending agent for renal cause of AKI
- Give the indications for renal replacement therapy

I. Abnormal Liver Function Tests (LFT)

The student will be able to:

- Name the different causes of abnormal LFT (viral, hereditary, toxic, metabolic, immune, and vascular)
- Recognize the clinical manifestations of acute and chronic liver dysfunction
- Contrast cholestatic and parenchymal cause of abnormal LFT
- List the stigmata of chronic liver disease
- Discuss the complications of chronic liver disease
- List the components of the Child-Turcotte-Pugh Score (CTP) and MELD (model for End Stage Liver Disease) score and discuss prognosis of each CTP score and MELD score
- Name the investigations for abnormal LFT and interpret the results of the tests
- Assess synthetic function of the liver
- Manage the complications of liver cirrhosis namely ascites, hepatic encephalopathy, UGI bleed secondary to varices
- Involve Hepatology Service in the care of the patient

J. Pre-Operative Assessment

The student will be able to:

- Stratify CV risk of patient undergoing non-cardiac surgery using the Revised Cardiac Risk Index (RCRI)
- Name some modifiable factors to decrease cardiac risk
- Identify the group of patients who will require postoperative troponin and ECG to detect myocardial injury in non-cardiac surgery
- Recognize high risk patients who may require additional investigations
- Assess the thrombotic risk using the Caprini score
- Identify patients who require bridging of anticoagulation (AF, Mechanical heart valves, history of stroke)
- Comply with the CHEST guidelines on management of perioperative anticoagulation
- Recognize the high VTE risk in certain surgical procedures that warrant extended thromboprophylaxis
- Obtain history to elicit risk of bleeding (past procedures, family history etc.) and justify further testing
- Calculate the risk of postoperative pneumonia and respiratory failure using validated tools

- Identify patient who may be at risk for developing postoperative delirium
- Mention some strategies to mitigate delirium in the elderly patient
- Utilize MELD score to calculate risk in patients with liver cirrhosis undergoing surgery
- Propose measures to optimize patients with chronic liver disease undergoing surgery
- Manage patient's home medications in the perioperative period
- Estimate the risk for undiagnosed obstructive sleep apnea
- Mention some measures to decrease the risk of complications in OSA during the postoperative period
- Establish clear communication with the referring service and anesthesiologist regarding recommendations especially in a high-risk patient
- Follow up on high risk patients in the postoperative period

K. Abnormalities in Blood Counts

1. Anemia

The student will be able to:

- Name the 3 types of anemia based on the red cell indices
- Describe the RBC morphology on peripheral blood smear (PBS) of each type of anemia
- List 3 causes of microcytic anemia
- Discuss the pathophysiology of iron deficiency anemia
- Understand the mechanism behind anemia of chronic inflammation
- Suggest appropriate investigations based on the clinical assessment and laboratory results
- Know the side-effects of iron supplements and precautions to observe when taking iron
- Name 3 different oral preparations, the recommended doses and elemental iron content of each preparation
- Determine the total duration of iron replacement therapy
- Assess response to oral iron replacement
- Know the indications of blood transfusion guided by the Choosing Wisely Canada recommendations
- Explain restrictive versus liberal blood in special patient population e.g. CHF, UGI bleed from varices, postoperative anemia
- Discuss the potential complications of blood transfusion and alternatives should the patient decline
- Describe the physical findings of a patient with Vit B12 deficiency
- Order work-up of a patient presenting with macrocytic anemia
- Discuss the metabolism of Cobalamin and give mechanisms underlying Vit B12 deficiency
- Describe the physical and laboratory findings including PBS of acute hemolysis
- Name the 2 types of hemolytic anemia

2. Thrombocytopenia

The student will be able to:

- Discuss the possible mechanisms causing thrombocytopenia
- Explain how to determine true from spurious thrombocytopenia
- Interpret thrombocytopenia in the context of other cell lines
- List the common causes of thrombocytopenia
- Identify any possible offending agent on careful review of patient's medications

- Recognize that when thrombocytopenia is associated with hemolytic anemia, a high suspicion of thrombotic thrombocytopenic purpura (TTP) must be considered and that this is a medical emergency.
- Describe the constellation of symptoms associated with TTP
- Refer urgently a patient with TTP to hematologist for plasma exchange
- Name the genetic abnormality found in TTP
- Use the 4T score for determining the likelihood of heparin-induced thrombocytopenia (HIT) and justify further investigations
- Manage a patient with HIT
- Name other alternative anticoagulants that can be safely used in HIT
- Appreciate that there is no diagnostic test for immune thrombocytopenic purpura (ITP)
- Know the indications for platelet transfusion