Clinical Practice Guideline for the Use of Beta Blockers
Post-Acute Myocardial Infarction

The use of beta blockers Post-Acute Myocardial Infarction (MI) has been proven to reduce the risk of re-infarction and mortality long-term. A beta blocker should be prescribed &/or continued unless clear contraindications are documented.

**BENEFITS OF BETA BLOCKERS:**
- Decreased oxygen demand due to reductions in HR, BP, & contractility resulting in relief of ischemic chest pain.
- Decreased risk of Ventricular Fibrillation (VF) r/t an increase in the threshold reducing sudden cardiac death.
- Decreased automaticity, increased electrophysiologic threshold for activation, and slowing conduction.
- Bradycardia prolongs diastole resulting in improved coronary diastolic perfusion, reducing after-depolarizations & triggered activity.
- Reduction in remodeling and improvement in left ventricular hemodynamic function, depending upon infarct size and timing of treatment.
- Improved left ventricular diastolic function with a less restrictive filling pattern.
- Slowing of the yearly rate of progression of coronary atherosclerosis in patients with & without MI.
- Inhibition of platelet aggregation & thromboxane synthesis.

**RECOMMENDATIONS:**
- **Beta Blockers should be given to:**
  - All MI patients with HF & a left Ventricular EF ≤ 40%.
  - Patients with active HF, & initiation should be delayed until the HF is controlled.
  - Patients who have sustained an Acute MI without HF & preserved left ventricular systolic function.
  - Patients who have been treated with standard-of-care risk factor interventions, as well as dual antiplatelet therapy.

**CONTRAINDICATIONS:**
- **Absolute Contraindications:** Potential absolute contraindications to the immediate use of beta blocker therapy includes the following groups:
  - Hemodynamically compromised patients, including those with hypotension with or without shock.
  - Patients with active bronchospasm.
  - Patients with heart block greater than 1st degree (unless the patient has a permanent pacemaker).
- **Patients with 1st degree heart block & a PR interval >0.30 seconds, or severe bradycardia:**
  - The rate at which a patient is labeled as having severe bradycardia is somewhat age dependent, as HR tends to decrease normally with age.
  - Therapy is not started on patients with a HR <40bpm.
  - Above 40bpm, the threshold for starting beta blockers is lower in younger patients.
  - Some providers use a higher threshold than 40bpm.
- **Patients with overt HF including pulmonary edema:**
  - There is a strong indication for carefully initiated oral beta blocker therapy (beginning at a very low doses) in such patients whose HF has been brought under control prior to discharge.
- The role of beta blocker therapy in patients with MI precipitated by Cocaine use is controversial.
- **Patients with Comorbidities:** A survival benefit from beta blockade is seen in patients with relative or potential contraindications, however, should be monitored for the development of adverse side effects. Physician discretion should be used in treating patients with:
  - **COPD with Bronchospasm/Asthma:**
    - Beta blockers are safe and effective in MI patients with mild to moderate pulmonary disease as shown in studies.
    - Choose cardio-selective beta-blocker: atenolol or metoprolol
    - Use cautiously with COPD without bronchospasm.
  - **IDDM/DM:**
    - Concern about the possibility of masking hypoglycemic s/s or worsening glycemic control has made some providers reluctant to prescribe beta blockers during an acute MI.
    - Trials document an overall benefit from the use of beta blockers that is equivalent to & may be greater than that seen in patients with DM.
  - **Peripheral Artery Disease:**
    - There has been concern involving the use of beta blockers in patients with intermittent claudication, however, there appears to be no adverse effect of beta-1 selective blockers on claudication s/s.
  - **Patients treated with Antiarrhythmic Drugs:**
    - Beta blockers are effective.
    - The relative risks for all-cause mortality, cardiac death, arrhythmic deaths, and resuscitated cardiac arrest were lower for patients receiving beta blockers along with amiodarone than for those without a beta blocker, with or without amiodarone.
    - Antiarrhythmic drugs other than amiodarone have not been similarly studied.
    - In patients with beta blocker therapy in whom amiodarone is initiated, there’s an increased risk of bradycardia.
    - Close monitoring of the HR is advised.
    - In patients with a HR < 70bpm, recommendations include lowering the beta blocker dose at the time of initiation of amiodarone.
Other Diseases or Conditions to use Cautiously includes:
- Heart Block > 1st Degree
- Sinus Bradycardia
- Decompensated CHF
- Left Ventricular Dysfunction with any sign of decompensation

*Practitioners are encouraged to thoroughly document on the patient’s hospital discharge summary the reasons a beta blocker is not prescribed post hospitalization for Acute Myocardial Infarction.

BETA BLOCKERS THAT ARE ACCEPTABLE:
- The generic name is listed first with the brand name in parenthesis.
- It is noted that use of a Beta-1 Selective agent is preferred, indicated with an *.
  - Atenolol (Tenormin)*
  - Bisoprolol (Monocor or Zebeta)*
  - Metoprolol Succinate (Toprol XL)*
  - Metoprolol Tartrate (Lopressor)*
  - Nebivolol (Bystolic)*
  - Carvedilol (Coreg)
  - Labetalol HCL (Normodyne or Trandate)
  - Nadolol (Corgard)
  - Propranolol HCL (Inderal)

CHOICE OF DRUG & ROUTE OF ADMINISTRATION FOR INITIAL THERAPY:
- **Oral:**
  - Patients without contraindications are treated within the first 24 hours after diagnosis.
  - In most patients, a cardio-selective beta blocker is preferred in the setting of an Acute MI & may include the following:
    - Metoprolol Tartrate 25-50mg BID
    - Atenolol 25-50mg BID initially, titrating up PRN; max dose 100mg/day
  - Short acting beta blockers are preferred early to allow for more rapid dose adjustments based on the patient’s BP & HR response.
  - Patients who do NOT receive a beta blocker during the first 24 hours because of early contraindications should be re-evaluated for candidacy for subsequent therapy.
  - Near the time of discharge, it is preferred for the patient to switch to long-acting beta blockers.
- **IV:**
  - IV route is reserved for patients with refractory angina, &/or HTN who have ongoing ischemia prior to PCI in whom there is no hemodynamic instability, risk for shock, HF, or other contraindications.
    - **IV Metoprolol Tartrate:**
      - Given in 5mg increments over 1-2 minutes.
• Repeated every 5 minutes for a total initial dose of 15mg (3 doses).
• Patients who tolerate this regimen should then receive early ORAL therapy with either:
  • **Metoprolol Succinate XR 25-50mg po QD:**
    ▪ Dependent on HR & BP post-IV infusion.
    ▪ May carefully titrate up to max dose 200mg/day.
  • OR
  • **Metoprolol Tartrate IR 25-50mg po BID:**
    ▪ Start the first dose 15-30 minutes after the last IV dose.
• Goal is a discharge HR of approximately 70bpm.

- **IV Esmolol:**
  • Given 50mcg/kg per min.
  • May increase to a max of 200-300mcg/kg per min.
  • Is ultra-short-acting & can be given to assess tolerance to beta blockade in patients with borderline or questionable left ventricular function.
  • Bradycardia and hypotension are the most common limitations to achieve the full dose.
    ▪ If this happens, the rate of administration should be slowed or oral therapy started.
    ▪ A rigid regimen shouldn’t be used since there’s a variable sympathetic response to acute MI.

**LONG-TERM THERAPY:**
• While all patients with acute MI should receive long-term beta blocker therapy, the optimal duration, dose, and agent are NOT known.
• The use of a long-acting, once daily beta blocker is recommended to improve treatment adherence.
• Evidence supports the use of beta blockers for as long as 3 years after an acute MI.
• Evidence supporting a longer duration or indefinite therapy is limited.

The American College of Cardiology recommends that patients who have had a Myocardial Infarction be treated with a beta-blocker indefinitely (unless the patient has a documented contraindication to beta-blocker therapy or a previous reaction [i.e., intolerance] to beta-blocker therapy).

- **Patients with a prior MI have a clear indication for continued beta blocker therapy including:**
  ▪ HF with reduced EF
  ▪ Asymptomatic left Ventricular Systolic Dysfunction
  ▪ HTN
  ▪ Angina
• **Patients who have high-risk features at presentation should continue beta blockers indefinitely including:**
  o Cardiogenic shock
  o HF
  o CKD
  *It is recommended for providers to discuss the potential benefits and risks of continued therapy beyond 3 years with patients and have them participate in decision making.*
  *There are no known life-threatening side effects such as proarrhythmia or malignancy of long-term beta blocker therapy.*

• **Patients with HF with reduced EF should be treated long-term with any of the following:**
  o Carvedilol
  o Metoprolol Succinate XR
  o Bisoprolol
  It is suggested to reduce a patient’s HR to between 55-70bpm while maintaining a SBP > 90mmHG, based on published evidence.

**DISCONTINUING BETA-BLOCKER THERAPY:**
• Use a tapering protocol carried out over a few weeks.
• In patients with unacceptable side effects
• In patients for whom the use of multiple meds is problematic (polypharmacy).

**REFERENCES:**


• UpToDate “Acute Myocardial Infarction: Role of Beta Blocker Therapy”; Authors: Dr. Robert S Rosenson, Dr. Guy S Reeder, Dr. Harold L Kennedy; May 2021; [https://www.uptodate.com/contents/acute-myocardial-infarction-role-of-beta-blocker-therapy](https://www.uptodate.com/contents/acute-myocardial-infarction-role-of-beta-blocker-therapy)
Chief Medical Officer
Medical Associates Clinic & Health Plans

Date

President, Board of Directors
Medical Associates Clinic

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