

# BRADYARRHYTHMIA

*(Last updated 07/22/2019 Reviewed by: Jalal Soleimani MD)*

**PRESENTING COMPLIANT:** chest pain, shortness of breath, fatigue

## FINDINGS

- **A** Check airway (for foreign body especially in pediatric patients)
- **B** ↑ RR, increased work of breathing
- **C** ↓/↑ BP, ↓ HR; heart block
- **D** Variable altered
- **E** N/A
- **L<sub>PC</sub>** CBC, electrolytes, cardiac markers, TSH, toxicology, pulse oximetry (↓ Spo<sub>2</sub>)
- **U<sub>PC</sub>** Rule out tamponade, pneumothorax

\***V** (verbal), **P** (pain), **U** (unconsciousness), **D** (delirious)

**U<sub>PC</sub>** (point of care ultrasound) **L<sub>PC</sub>** (point of care labs)

## OTHER HISTORY

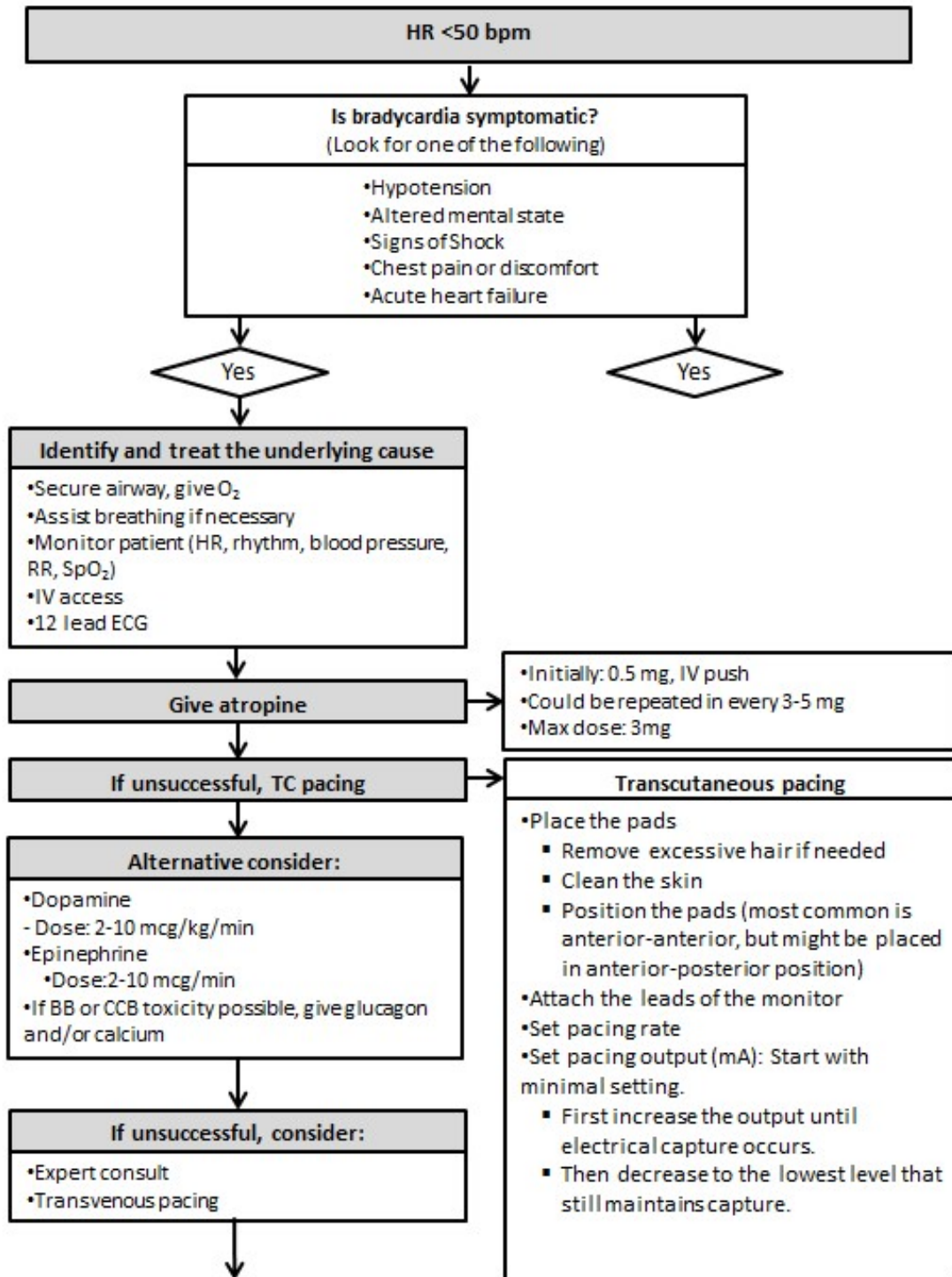
- Dizziness, fainting, syncope, impaired effort tolerance, heart failure
- **Predisposing conditions**
  - Medications: Beta-blockers, calcium channel blockers, antipsychotics
  - Acute myocardial infarction, sick sinus syndrome, ↑ vagal tone (e.g. athletes) of vagal stimulation (suctioning), ↑ intracranial pressure, hypothyroidism, hypothermia, hypoxemia, parasympathomimetic/sympatholytic drugs/toxins (including organophosphates)

## OTHER INVESTIGATIONS

- **ECG:** Sinus bradycardia (sinus node dysfunction), V block 1<sup>st</sup> (asymptomatic) or 2<sup>nd</sup> (types I/II) or 3<sup>rd</sup> degrees, long QT syndrome
- **Labs:** Blood count, electrolytes, cardiac markers, TSH, toxicology
- **Monitoring:** Continuous ECG, BP, oxymetry
- **Imaging:** US/ECHO: LV function; rule out tamponade, pneumothorax

## THERAPEUTIC INTERVENTIONS

- Follow algorithm:



Transvenous pacing	
<ul style="list-style-type: none"> <li>• Prepare the equipment needed, monitor (ECG, rhythm, BP, SpO<sub>2</sub>, RR)</li> <li>• Prepare the site of entry by sterile technique</li> <li>• Check the balloon of the pacing catheter if intact.</li> <li>• Connect the (+) and (-) electrodes to the external pacemaker unit.</li> <li>• Advance the catheter through the introducer sheath to roughly 20 cm</li> <li>• Inflate the balloon with the appropriate volume of air.</li> <li>• Turn on the pacer with an initial setting of 80 bpm and the maximal current output (usually 20 mA).</li> <li>• Advance the pacing catheter slowly and watch the ECG monitor for evidence of capture</li> <li>• Deflate the balloon</li> <li>• Adjust the pacing output:               <ul style="list-style-type: none"> <li>▪ First decrease until failure to capture (threshold level).</li> <li>▪ Then set output close to twice the threshold level</li> </ul> </li> <li>• Fix and secure the catheter</li> <li>• Verify the placement of the catheter by US or Chest X-ray</li> </ul>	<ul style="list-style-type: none"> <li>• Determine electrical capture by observing the monitor, which should show a clear indication of the ECG and the pulse marker.</li> <li>• Verify the peripheral pulse to assess mechanical capture.</li> <li>• Look for clinical improvement               <ul style="list-style-type: none"> <li>▪ HR should be at least equal to pacer rate</li> <li>▪ BP may improve</li> <li>▪ Skin color may improve</li> <li>▪ SpO<sub>2</sub> monitoring is useful</li> <li>▪ Cardiac output may improve</li> </ul> </li> <li>• Evaluate patient discomfort:               <ul style="list-style-type: none"> <li>▪ Burning sensation at the electrode site and muscle contraction</li> <li>▪ Inform the patient and family.</li> <li>▪ Check electrodes if positioned properly.</li> <li>▪ Give sedatives if needed.</li> </ul> </li> </ul>

- Stop any offending medications
- If symptomatic (hypotension/signs of shock, altered mental status, chest pain):
  - Give Atropine 0.5 mg iv bolus every 3-5 minutes, max 3mg
  - If atropine ineffective: Transcutaneous pacing; Alternatively, Dopamine/Epinephrine infusion
- If ineffective: consider transvenous pacing (pacing Swan-Ganz catheter may be the quickest)
- If asymptomatic, monitor and observe
- Treat shock if needed and prepare for potential cardiac arrest
- Consider calcium, glucagon, intralipid, high dose insulin/glucose if beta-blocker or calcium channel blocker overdose
- Treat promptly: Electrolyte disturbance (hypokalemia, hypomagnesemia, hypocalcemia), hypovolemia, hypoxia, acidosis, hypoglycemia, hypothermia, myocardial ischemia/infarction, hypothyroidism (myxedema)

- Consult: Cardiology

### **ONGOING TREATMENT**

- Consider permanent pacemaker placement
- Consider electrophysiological studies
- Full investigation and treatment of possible causes if found

### **CAUTION**

- Prolonged QT interval with bradycardia predisposes to Torsades the Pointes (polymorphic VT)

### **REFERENCES & ACKNOWLEDGMENTS**

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