

Location: Emergency Room

Vitals: BP: 80/50 mm Hg; HR: 40/min; RR: 24/min; Temp: 98.4F

C.C: Lightheadedness

HPI:

A 55 years old male victim of a motor vehicle accident is brought to the ER by ambulance. He was a unrestrained driver of a car that hit a tree due to poor visibility on that foggy night. The patient complains of mild generalized body ache, severe chest pain and lightheadedness. He remembered his chest having struck against the steering wheel. However, there was no history of head injury, headache or loss of consciousness. He did not complain of respiratory distress. The patient was feeling uncomfortable with the Miami-J collar put by the EMS team around his neck at the site of the accident. He has no allergies and denied being on any medication. Rest of the review of systems is unremarkable.

How would you approach this patient?

This is a victim of motor vehicle accident, who is hemodynamically unstable as is obvious from the hypotension and bradycardia. The initial approach should be to take the general resuscitative measures, a delay in which might be life threatening. Simultaneously, think of reasons for hypotension and bradycardia in an accident victim and order the relevant tests. Remember you always need a thorough physical examination to rule out serious injuries and decide which body parts to image.

Order No. 1:

IV access, stat- 2 large (18 G) IV bore needles
Start IV fluids: Normal Saline, bolus
Continuous BP, HR monitoring
Pulse oximetry, stat

Results for order No 1:

BP- 80/50 mm Hg; HR- 34/min
Oxygen Saturation is 95% on room air

Order examination:

General
Heart
Lungs

Results of the exam:

General appearance: Well-built, white male, in severe pain, holding on to his chest with his right hand. Lungs are clear to auscultation and percussion bilaterally; Cardiovascular - Bradycardia, variable intensity of S1 and S2; no murmurs, rub or gallop.

Order No 2:

EKG, 12 lead, stat
Chest-X ray, PA portable
X-ray cervical spine, stat
IV Fentanyl or Ketorolac, bolus

Results of Order No 2:

EKG shows complete heart block, ventricular escape rhythm with a rate of 40/min, QRS duration of 140 msec. No evidence of ischemia or injury except nonspecific ST/T changes. Chest X-ray: Fracture of the left 3rd and 4th ribs. No pneumothorax or effusion. Heart and mediastinum are normal in size and configuration.
X-ray cervical spine: Normal

Order No 3:

Atropine 0.5 mg IV stat
Put patient on transcutaneous pacemaker
Consult Cardiology, stat (for transvenous pacemaker placement)
Consult Orthopedics, stat (to rule out cervical spine injury and get rid of Miami-J collar)
Make NPO
CBC with differential, stat
BMP, stat
PT/aPTT, stat

Results of Order No 3:

CBC: Hgb - 13.0 g/dl, Hct - 39% WBC - 9,200/uL, Platelet - 250,000/mm³, normal differential count
BMP: BUN - 19, Creatinine-1.1, Sodium -138 meq/L, Potassium - 3.8 meq/L, Chloride -103 meq/L, and bicarbonate - 26 meq/L.
PT=13 sec, INR=1.23; APTT=33 sec; control=35 sec

Order No 4:

Check the BP and HR

Result of Order No 4:

Transcutaneous pacemaker paces at rate of 80/min, BP-90/60
Patient's lightheadedness and chest pain is better

Order examination of:

HEENT/Neck
Abdomen
Extremities
Skin
CNS

Results of Physical Examination:

HEENT: Normocephalic, atraumatic, PERLA, EOMI, pink conjunctiva, anicteric sclera, moist mucous membranes, no ear or nose bleed; Neck- Miami J collar on; Abdomen is soft, no tenderness, rigidity, rebound or guarding; bowel sounds are normal, no organomegaly or free fluid. Extremities - no edema, clubbing or cyanosis, no calf tenderness, peripheral pulses feeble. Neurological exam-awake, alert oriented, moves all four limbs with no focal neurological deficits.

Order No. 5:

Continuous HR and BP monitoring
Continue NPO
Continue NS
CK and MB, stat
Troponin T, stat
Echocardiogram, stat

Results for Order No. 5:

CK- 500; MB-11
Troponin T- 0.500
Echocardiogram: EF=55 - 60, no wall motion abnormalities, all valves are normal, no pericardial effusion
Cardiologist takes the patient to the cardiac cath lab for a temporary transvenous pacemaker insertion.
If case continues further, may need permanent pacemaker insertion.

Discussion:

The most important cause of hypotension in a trauma victim is hemorrhage. The first step in management would be to start IV fluids and send a CBC to look for the amount of blood loss. If there is no overt bleeding one must look for an occult collection in the chest and abdomen, for which you need to do imaging studies. Normally, patients develop tachycardia

in response to hypotension secondary to hypovolemia. The bradycardia accompanying the hypotension and the normal hemoglobin in this patient should make you suspicious of an etiology other than bleeding.

The EKG confirms the diagnosis of complete heart block (CHB). CHB is a third degree AV block the diagnosis of which is made by AV dissociation with a slow ventricular escape rhythm of around 40 beats/min. The atria may be in sinus rhythm or in fibrillation but the 'P' waves do not bear any relationship with the QRS complexes. However, it is also important to establish the etiology of CHB since it aids in the further management. The most important causes are fibrosis or degeneration of the conduction system and ischemic heart disease. The others include drugs (beta blockers, calcium channel blockers, digitalis, amiodarone), metabolic abnormalities (hyperkalemia), valvular heart disease, and cardiomyopathy (amyloid, sarcoid, hypertrophic cardiomyopathy).

Remember, trauma is an uncommon cause of CHB. Absence of ST-T changes suggestive of ischemia in EKG and no wall motion abnormalities excluded the possibility of acute coronary syndrome. The elevated CK, MB and Troponin T were probably secondary to myocardial contusion. The patient was not on any heart rate lowering drugs, his electrolytes were normal and Echo further ruled out any valvular abnormalities, cardiomyopathy or pericardial effusion.

The only modality of treatment for complete heart block is pacing. Atropine is only of little benefit and may sometimes transiently improve the heart rate and the blood pressure. These days the life packs are equipped with pads for transcutaneous pacing. But these should be used only as a bridge for the transvenous pacing. The transvenous pacing may be a temporary pacing to begin with. In this patient, if the CHB persists for the next couple of days, a permanent pacemaker can be placed.

Patients with second-degree atrioventricular blocks who are asymptomatic and hemodynamically stable may be managed without a pacemaker. However, a complete heart block even in the absence of symptoms warrants a pacemaker, since you are not sure when the patient may become unstable.

Another important thing is to avoid medications that would cause bradycardia and hypotension. This patient has rib fracture and a lot of chest pain. Use of morphine may worsen his hemodynamic parameters. So, ketorolac or fentanyl would be better options for pain control in these patients.

Final Diagnosis:

Motor vehicle accident with complete heart block (secondary to myocardial contusion)

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