REPUBLIC OF RWANDA
RWANDA MILITARY HOSPITAL
Website: www.rwandamilitaryhospital.rw
P.O. Box: 3377 Kigali, Tel: (+250)252586420, Hotline: 4060
E-mail: info@rwandamilitaryhospital.rw

Non traumatic Chest pain in ED; Approach and Management

- Prepared by Dr MUDEREVU Alexis Senior Consultant in Accident and Emergency Department/RMH

21 February 2019

Definition

- Chest pain complaints are of common occurrence in medical practice. Chest pain frightens the patient and puts the physician on the alert, as it is often a symptom of a serious disease.

Common causes of chest pain

Cardiovascular:

- ischemia (AMI or Angina)
- pericarditis (irritation of pericardium)
- thoracic aortic dissection

Respiratory:

- PE (pulmonary embolism)
- pneumothorax
- pneumonia
- pleural irritation
- hyperventilation

Cont…

Gastrointestinal:

- cholecystitis(gall bladder/gallstones)
- pancreatitis
- hiatal hernia (part of stomach pushes through diaphragm)
- esophageal disease/GERD
- peptic ulcers
- dyspepsia (indigestion)

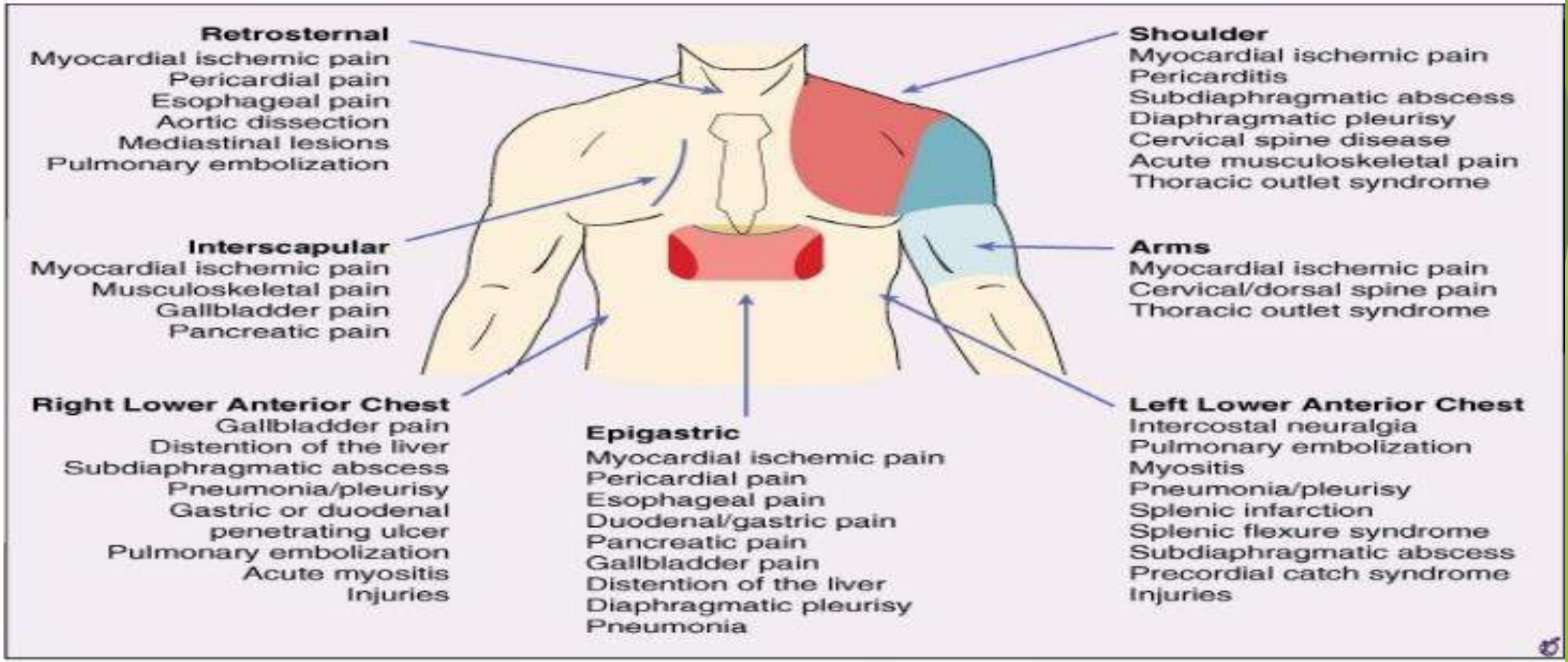
Musculoskeletal:

- Chest wall syndrome (inflamed chest wall)
- costochondritis(inflamed rib cartilage)
- chest wall tumors

Cont…

- **Other**
- Herpes Zoster
- Disorders of the Breast
- Splenic Infarct
- Panic Attacks/Anxiety Disorder
- Fibromyalgia

Chest pain is difficult to interpret



Laboratory and other diagnostic studies

- blood enzyme activity testing
- ECG at rest, chest X-ray
- Esogo-gastro-duodenoscopy and Biopsy
- Radiography of cervical and thoracic spine
- Heart Ultrasound
- Chest CT Scan Angiography
- CT coronary angiography
- MRI

Cont…

- Full blood count
- clinical chemistry panel At the primary health care level
- C-reactive protein.
- Valuable diagnostic markers include:
- Troponin T
- CPK, SGOT, LDH are indicated

Characteristics of Chest Pain in Various Conditions

- **A. Ischemic Heart Disease**
- **In angina pectoris and myocardial infarction**
- the pain is usually pressing, located retrosternal
- radiating to the lower jaw, neck, back (between blade-bones), epigastrium, and along the medial surfaces of the arms.
- Radiation to the left arm is observed much more frequently, than to the right one.
- The pain may be initially located in the arm or epigastrium, rather than retrosternal.

B. Aortic dissection

- Aortic dissection is characterized by sudden occurrence of very severe retrosternal pain.
- Pain radiates to the back, abdomen, and legs.

C. Pulmonary thromboembolism

- Pulmonary thromboembolism is accompanied by retrosternal pain, dyspnea, and syncope.
- In severe cases; **hypotension, acute right ventricular failure, and cardiac arrest may develop**
- Diagnosis of pulmonary thromboembolism presents great difficulties when the only sign is **suddenly occurring dyspnea**.

D. Pericarditis

- Pericarditis is manifested by:
- pain worsened by cough and deep breathing, and sometimes related to swallowing;
- continuous squeezing retrosternal pain resembling to angina;
- throbbing pain in the cardiac area and left shoulder.

E. Pulmonary conditions

- Pleurodynia (pleurisy),
- History suggesting pleurodynia includes acute onset of sharp pain associated with breathing or movement, sometimes accompanied by systemic symptoms of infection.
- Physical examination may reveal a pleural friction rub.

F. Gastrointestinal conditions

- **Reflux esophagitis**
- Is characterized by burning retrosternal or epigastric pain radiating to the lower jaw.
- Pain occurs or worsens in recumbent position and especially after a meal; sleep is often disturbed.
- Pain radiates to the back and passes after taking nitrates.
- Pain from gallstones can be referred to the lower chest as well as the shoulder.
- Post-prandial chest discomfort, especially if associated with radiation to the back or abdomen and accompanied by nausea, is suggestive of gallbladder disease.

H. Psychogenic pain

- Psychogenic pain is typically located in the cardiac area and usually does not radiate. The pain is prolonged and pressing.
- Pain occurs during exhaustion and agitation.
- Symptoms include dyspnea, weakness, and palpitations.

Initial approach for Chest Pain

- **Airway, Breathing and Circulation (ABC) .**
- Vital signs should be assessed and repeated at regular intervals
- Electrocardiogram (ECG)
- Start with history.
  - Are you having discomfort?
  - How would you describe the discomfort?
  - Where is the discomfort?
  - Does it radiate anywhere?
  - Any aggravating/alleviating factors?
  - Any associated discomfort

Cont…

- History of Cardiopulmonary disease?
- Risk factors for cardiopulmonary disease
- Family history of cardiopulmonary disease?
- **Start with physical examination**
  - General appearance of patient looks sick or not sick or patient in pain or not in pain.
  - Assessment of the ABC
  - Look for swelling in legs (lower limb edema), calf tenderness (deep vein thrombosis).
  - Assess abdomen for tenderness and Pulsating mass

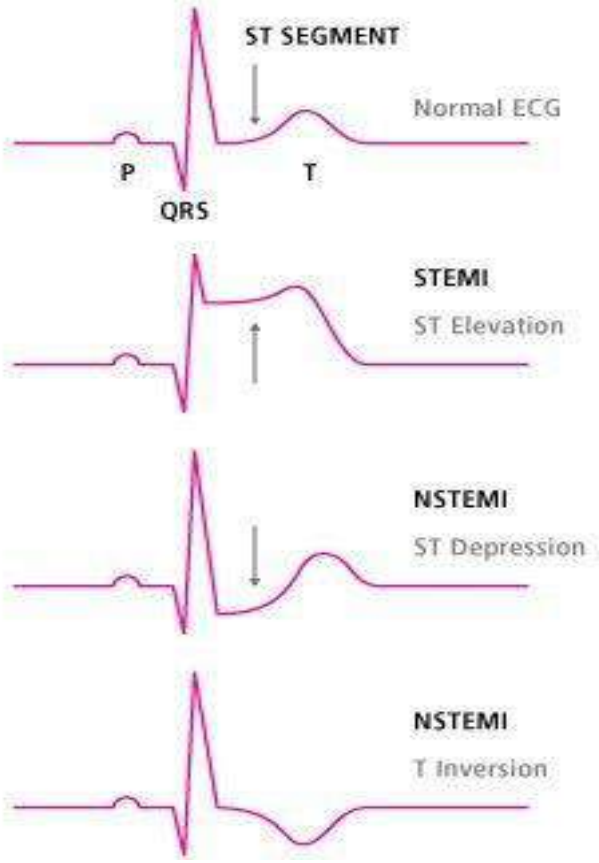
Immediate chest pain management

- Medication
- – to relieve pain and dilate (widen) the blood vessels of the heart to allow the blood to flow more effectively.
- Give morphine and Nitroglycerine

Management for life threatening conditions

Acute Coronary Syndrome

Presentation of Types of ACS on ECG



Guidelines for the Identification of Patients with Acute Coronary Syndrome

- In suspected cases of ACS, rapid assessment and triage is critical for effective therapy to be initiated.
- Recognizing the signs and symptoms, such as chest pain or shortness of breath suggestive of an ACS,
- obtaining a 12 lead ECG as soon as possible

Cont...

- It is also recommended that all nursing stations have a visible chest pain algorithm to ensure that all patients are managed according to standard protocols

Cont….

- **Patient Medical History and Vital Signs**

✓ The triage nurse should take a brief, targeted, initial history with an assessment of current or past history of:

1. Coronary artery bypass graft (CABG), PCI, Coronary Artery Disease (CAD), angina on effort, or MI;
2. Nitroglycerin use to relieve chest discomfort;
3. Risk factors, including smoking, hyperlipidemia, hypertension, diabetes mellitus, family history of CAD, and cocaine or methamphetamine use;
4. Arrhythmia history should include utilization of permanent pacemaker or implantable cardioverter-defibrillator;
5. Regular and recent medication use.

Immediate General Treatments and Interventions

- The treatment of a patient with chest pain should focus on a rapid assessment, stabilization, diagnosis and if needed reperfusion therapy.
- patient should be connected to continuous cardiac monitoring immediately.
- Initial physical assessment and a 12-lead ECG should be done within 10 minutes of patient's arrival to the nursing station.
- **Best Practice Recommendation**
- **All nursing stations are equipped with the following minimum equipment: 1. 12-Lead ECG; 2. Cardiac monitors; 3. Defibrillators.**

Cont...

- All ACS patients without contraindications reperfusion should receive adjunctive treatments

Treatment	Indication	Caution
Oxygen	• Clinically significant hypoxemia (oxygen saturation < 92%) • Heart failure • Dyspnea	Caution with chronic obstructive pulmonary disease and CO2 retention
Nitroglycerin	• Ongoing chest pain • Hypertension and HF	• Avoid in suspected right ventricular infarction • Avoid with SBP < 90 mm Hg or if SBP 30 mm Hg below baseline • Avoid if recent (24 to 48 h) use of phosphodiesterase type 5 inhibitors
Morphine	• Pain • Anxiety • Pulmonary edema	• Lethargic or moribund patient • Hypotension • Bradycardia • Known hypersensitivity • Suspected right ventricular infarction
Beta-Receptor Antagonists	• Oral: All patients without contraindication • IV: Patients with refractory hypertension or ongoing ischemia without contraindication	• Signs of heart failure; Low output state; Increased risk of cardiogenic shock; Hypotension; Bradycardia; Prolonged first-degree or high-grade AV block; Reactive airways disease

Contraindications and Cautions for Fibrinolysis Therapy in STEMI

Absolute Contraindications

- Any prior intra cranial hemorrhage
- Known structural cerebral vascular lesion (e.g., arteriovenous malformation)
- Known malignant intracranial neoplasm (primary or metastatic)
- Ischaemic stroke within 3 month EXCEPT acute ischaemic stroke within 4.5 h
- Suspected aortic dissection
- Active bleeding or bleeding diathesis (excluding menses)
- Significant closed-head or facial trauma within 3 months
- Intracranial or intra-spinal surgery within 2 months
- Severe uncontrolled hypertension (unresponsive to emergency therapy)
- For streptokinase, prior treatment with streptokinase within the previous 6 months

Relative Contraindications

- History of chronic, severe, or poorly controlled hypertension
- Significant hypertension on presentation (Systolic Blood Pressure > 180 mm Hg or Diastolic Blood Pressure > 110 mm Hg)
- History of prior ischaemic stroke > 3 months
- Dementia
- Known intracranial pathology not covered in absolute contraindications
- Traumatic or prolonged (> 10 min) cardiopulmonary resuscitation
- Major surgery (< 3 weeks)
- Recent (within 2 to 4 weeks) internal bleeding
- Non-compressible vascular punctures
- Pregnancy
- Active peptic ulcer

STEMI Management

- There are two initial treatment options or “reperfusion” modalities:
- **Primary PCI (**Percutaneous **coronary** intervention): is a procedure in which the coronary arteries are mechanically reopened using a balloon and the placement of a stent in the blocked arteries.
- **Fibrinolysis therapy** (i.e., clot-busting drugs)should be done within 30 minutes of presentation to an emergency department (ED).
  - Fibrinolysis is typically initiated by a physician in an ED when PCI cannot be performed within 120 minutes of patient arrival.

Cont…

- After fibrinolysis, there are three options for ongoing patient management:

1. **Rescue PCI** –The decision to perform a rescue PCI is generally made if the patient has ongoing chest pain or ECG changes of STEMI at 60 to 90 minutes following fibrinolysis
2. **Pharmacoinvasive PCI** – within 24 hours after fibrinolysis
3. **Other PCI** – elective PCI during hospitalization

- PCI is recommended for STEMI when it can be performed rapidly (door to balloon < 120 minutes)

Patient Management Post Fibrinolysis Administration

- Vital signs: repeat every 15 minutes x 4, THEN every 1 hour x 4 and as required
- Neurological assessment: hourly x 2, THEN every 4 hours and as required
- Cardiac monitoring from before initiation of any therapy until transfer to an acute care hospital
- Troponin I measurement every 8 hours until air ambulance arrives for transport

NSTEMI/Unstable Angina Management

- patients with UA/NSTEMI will need to be admitted to a hospital to determine ongoing management.
- Therefore, UA/NSTEMI patients will require ongoing care until they can be safely transferred to an acute care hospital
- NSTEMI patients should be administered anticoagulants (e.g. UFH, Enoxaparin or Fondaparinux) and Antiplatelet (e.g. ASA plus Clopidogrel or ASA plus Ticagrelor) therapy.

Left bundle branch block

- **Emergency treatment**
- Heparin (Will limit propagation but does not dissolve clot)
  - Unfractionated: 80 u/kg bolus, 18 u/kg/hr.
  - Fractionated (Lovenox): 1 mg/kg SC BID.
- Fibrinolysis
  - Alteplase 50–100 mg infused over 2–6 hrs., (bolus in severe shock)

Management of pulmonary Embolism

- **Thrombolysis**
  - All patients with PE require risk stratification
  - Generally all patients with acute PE with hypotension (<90mmhg)
  - Alteplase (Actylise) 100 mg infusion over 2hrs.
  - Tenectaplase (Metalyse) Rapid infusion
- **Low-molecular weight heparin therapy**
  - LMWH-greater bioavailability, subcutaneous administration, longer duration of action. Fixed doses.
  - Can safely be administered in an outpatient setting.
  - i.e: Enoxaparin-LMW (Clexane) 1mg/Kg sc 12hrly

Cont…

- **Warfarin therapy**
- Should be started same day as anticoagulation therapy.
- Parenteral anticoagulation therapy continued 5 days until INR is 2-3.

Pulmonary embolism in pregnancy

- Risk of thromboembolism increased in pregnancy and 6-12 weeks post partum.
- Investigate as usual including venous dopplers and CT scan.
- **LMWH** treatment of choice.
- **Embolectomy**
- Either catheter embolectomy or surgical embolectomy in massive PE who have contraindications to thrombolysis.
- **Vena Cava Filters**
- If there is an absolute contraindication to anticoagulation.
- Patients who have recurrent events despite adequate anticoagulation.

Conclusion

- **Physician and nurse should remember that:**
- Chest pain is often a warning sign of life-threatening conditions, thus physician's alert is indispensable.
- In case of **Acute coronary syndrome** include unstable angina , Myocardial infarction without ST elevation and Myocardial infarction without ST elevation;
  - Administration of nitrates, Aspirin and Morphine to all patients with acute coronary syndrome is indicated.
  - Oxygenotherapy to reach a good saturation in patient with COPD. In addition, administration of clopidogrel and prasugrel is crucial in patients with ACS
  - Quick initial assessment based on patient history, physical Examination, and clinical examination, 12 leads ECG findings are helpful to define the diagnosis and stratification of risk at short time.
  - Consider reperfusion therapy for patients with ST elevation MI or Left bundle block
  - Quick efficient assessment associated with early treatment for patients with ACS reduce risk of cardiopulmonary arrest or sudden death.

Cont…

- **Aortic dissection** is a life threatening condition and is often complicated by occlusion of coronary and renal arteries, aortic insufficiency and cardiac tamponade. In suspicion cases; Quick Cardiologist involvement for patient emergency management is very important
- For **pulmonary Embolism**; we remind that is third cause of death after ACS and stroke. Patients can be asymptomatic and can present cardiovascular collapse
  - Patient with low risk can start anticoagulation therapy and be discharged home
  - Patient with high risk must be hospitalized in ICU then undergo thrombolysis or surgical thromboembolectomy.

References

- Asaad SShujaa (2017). How to Approach a Patient with Chest Pain in Emergency Department: Case of Hypophosphatemic Osteomalacia. JOJ Case Stud. 2017; 3(3) : 555615. DOI: 10.19080/JOJCS.2017.03.555615008
- John R And Rupal S (2013). Outpatient Diagnosis of Acute Chest Pain in Adults. (Am Fam Physician. 2013;87(3):177-182. Copyright © 2013 American Academy of Family Physicians
- Ruzanna et al,(2010). CHEST PAIN Clinical Practice Guideline for Primary Health Care Physicians. American International Health Alliance 1212 New York Avenue, NW, Suite 750 Washington, DC 20005.

Cont...

- Canadian Institute for Health Information. (2013). Hospital Care for Heart Attacks Among First Nations, Inuit and Metis. Retrieved from https://secure.cihi.ca/estore/productFamily.htm?locale=en&pf=PFC2048
- Czarnecki, A., Chong, A., Lee, D., Schull, M., Tu, J., Ko, D. (2013). Association between Physician Follow Up and Outcomes of Care After Chest Pain Assessment in High-Risk Patients. Journal of American Heart Association, 127, 1386-1394. Health Council of Canada. (2013). Progress Report 2013: Health care renewal in Canada. Retrieved from http://www.healthcouncilcanada.ca/rpt_det.php?id=481
- Lambert, L., Brown, K., Segal, E., Brophy, J., Rodes-Cabau, J., & Bogaty, P. (2010). Association between timeliness of reperfusion therapy and clinical outcomes in ST-elevation myocardial infarction. JAMA, 303(21), 2148-55.

Cont...

- O'Gara, P.T., Kushner, F.G., Ascheim, D.D., Casey Jr, D.E., Chung, M.K., de Lemos, J.A., Ettinger, S., Fang, J., Fesmire, F., Franklin, B., Granger, C., Krumholz, H., Linderbaum, J., Morrow, D., Newby, K., Ornato, J., Ou, N., Radford, M., Tamis-Holland, J., Tommaso, C., Tracy, C., Woo, J., Zhao, D.X. (2013). ACCF/AHA Guideline for the Management of ST-Elevation Myocardial Infarction. A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. Journal of the American College of Cardiology, 61(4), e78-140.
- Rollando, D., Puggioni, E., Robotti, S., De Lisi, A., Ferrari Bravo, M., Vardanega, A., Pattaro I., De Benedetti F., Brignole, M. (2012). Symptom onset-to-balloon time and mortality in the first seven years after STEMI treated with primary percutaneous coronary intervention. Heart, 98(23), 1738-42.
- Wright, R. S., Anderson, L. J., Adams, D. C., Bridges, R. C., Casey, Jr, E. D., Ettinger, M. S., Fesmire, F., Ganiats, T., Jneid, H., Lincoff, M., Peterson, E., Philippides, G., Theroux, P., Wenger, N., Zidar, J. P. (2011). 2011 ACCF/AHA Focused Update Incorporated Into the ACC/AHA 2007 Angina/NonSTElevation Myocardial Infarction: A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. Journal of the American College of Cardiology, 57(19), e215 – e367.

End

Thank you for your Kind attention