Clinical Scenario Assignment

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# Question No:01

The buddy nurse asks for ECG even though the patient (Betsy) has no chest pain to make sure that there are no palpitations. Moreover, ECG would help the nurse to assess the impacts of medication on the patient (Betsy).

The ECG would also help the physician to monitor the arrhythmia, inflammation of the heart i.e. myocarditis or pericarditis, any disturbance in the heart conducting system, any disparity in the blood chemicals, heart’s abnormal position, the quality of blood supply to the heart, congenital defects that incorporate electrical system and coronary occlusion (Enemark, 1993). All the mentioned reasons for ECG would help the physician to know the exact condition of the heart. However, ECG of the patient will also help the physician to take a decision if any advance examination or test is required for the patient's heart.

# Question No: 02

## A)

The main cause of the acute coronary syndrome is the instability of atherosclerotic coronary plaque. This instability further leads towards the thrombotic occlusion of the coronary artery. The causes, progressions, and outcomes of angina are as follows

### Causes.

The main causes of angina are the reduced blood flow i.e., when heart muscles do not get enough oxygen carried by blood then a patient would experience ischemia. As far as the cause of reduced blood flow is concerned then primarily it is because of coronary of artery disease. Fatty acids called plaques narrow the coronary arteries (Collins & Fox, 1990). The reduction in the blood flow is actually the supply problem that means the patient's heart doesn't receive enough oxygen-rich blood.

#### Stable Angina.

Stable angina is caused due to the physical exertion i.e. when you exercise, walk, run or climb up the stairs the heart will require more blood. This will lead to stable angina because it becomes difficult for heart muscles to get enough blood when arteries are narrowed. In addition, emotional stress, smoking, heavy meals that contain more fats, and cold temperature can also trigger stable angina, for they also narrow the arteries.

#### Unstable Angina.

If blood clot form in a vessel or plaques are ruptured then blood flow will either be blocked or reduced through the artery. A sudden reduction in the blood flow will trigger unstable angina caused by blocked arteries or blood clots.

Unstable angina is a part of the spectrum of clinical presentation that includes STEMI and Non-STEMI. Unstable angina more often than not is considered to be an acute coronary syndrome (Langer, Freeman, & Armstrong, 1989).

### Progressions.

Normally angina is experienced by patients demand for blood flow is increased as in physical exertion. In such condition, angina will progress and will change into unstable angina. This progression owes the frequency of chest pain i.e. when patient experience chest pain more frequently in rest condition or during physical exertion (Collins & Fox, 1990). Definitive diagnosis cannot be carried for enzymatic patterns cannot be observed. If it is left untreated, it will progress to heart attack followed by aggressive treatment.

### Outcomes

The main outcome in case of stable angina is a composite of CHD death, chest pain that will lead to hospital admission, nonfatal MI. As far as the secondary outcomes are concerned then it is a nonfatal MI and CHD death.

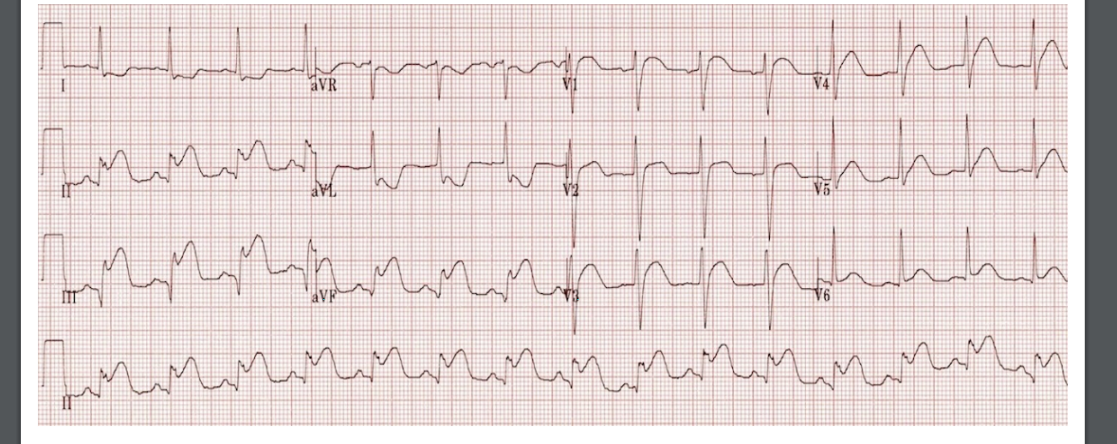
If we talk about unstable angina then the patient may experience unfavorable outcomes. Albeit, the outcome for unstable angina reveals that the relative incidence and mortality of unstable angina is less than mortality and relative incidence of STEMI or Non-STEMI angina (EPSTEIN et al., 1971). Whereas, the probability of non-fatal MI in the future remains the same as that of stable angina.

## B)

Two risk factors specifically for the patient (Betsy) that may increase her risk of ACS (Acute Coronary Syndrome) are as follows:

1. Hypertension
2. The number of diseased vessels.

# Question No: 03

An ECG that was taken when nausea and short breadth was being experienced by Betsy. Below is the graph of ECG taken.

We will analyze the ECG on the basis of rhythm, rate, presence and regularity of P waves, and ST segment.

* The heart rate of Betsy according to the ECG comes out to be 85.71 beats per minute. It is because the number of squares between R-R is three and a half and when we divide 300 by 3.5, we get the heart rate. 300/3.5= 85.71 beats per minute.
* As far as the rhythm of Betsy’s heart is concerned then it is quite regular because the R-R interval does not differ and almost remains the same on the rhythm strip.
* P-waves are present in the ECG of Betsy which suggests that there is atrial fibrillation and the rhythm is regular.
* The most critical part in the ECG chart is the ST segment. The picture above for Betsy's ECG clearly shows that the ST segment is dipping down. The dipping down of ST segment indicates angina.

The ECG of Betsy indicates angina pain. In addition, it also indicates that there is no irregularity in the rhythm of Betsy’s heart and the heart rate is also constant i.e. 85.71 beats per minute.

# Question No: 04

The term ACS (Acute Coronary Syndrome) incorporates a number of thrombotic coronary artery diseases. Such thrombotic coronary diseases include unstable angina, STEMI elevation, and Non-STEMI elevation. The diagnosis of ACS requires ECG coupled with a vigilant evaluation of signs and symptoms of cardiac ischemia. The three central findings that potentially lead to the diagnosis of ACS are as follows:

## Assessment 01

History

## Findings

Pain in the chest or left arm, dizziness, or discomfort as chief symptoms of ACS. In addition, the reproduction of previously documented angina also indicates the high likelihood of ACS (Smith, Negrelli, Manek, Hawes, & Viera, 2015). Moreover, the history that is available concerning coronary artery disease that also includes myocardial infraction pose a threat to patient and indicates a high likelihood of ACS.

## Assessment 02

Physical Examination

## Findings

Pulmonary edema, hypotension, diaphoresis, and new transient mitral regurgitation are the findings that reveal there is a likelihood of ACS in the patient. In addition, the extracardiac vascular disease also indicates the likelihood of ACS.

## Assessment 03

Serum cardiac makers

## Findings

Elevated cardiac troponin T or I or elevated CK-MB indicate the likelihood of ACS in a patient.

In addition, clinical evaluation such as chest pain, nausea, dyspnea, diaphoresis, vomiting, light-headedness indicates the likelihood of ACS (Smith et al., 2015). ECG also provides enough information that indicates the likelihood of ACS and the determination of treatment strategy.

# Question No: 05

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| Generic Name | GTN | Diltiazem | Pravastatin |
| Drug Group | Vasodilating agent or Nitrates | Calcium Channel Blockers or Investigational | Statins or HMG CoA reductase inhibitors |
| Mechanism of Action | Pulmonary vascular resistance is reduced and relaxation of vascular smooth muscle. | Block the calcium channel owing to its antagonism of actions of calcium ion. It is a calcium channel antagonist. | It impedes the working of CoA (HMG-CoA) i.e. hydroxymethylglutaryl. It reduces triglycerides and increases HDL (High-Density Lipoproteins). |
| Side Effects | Dizziness  Fainting  Vomiting  Nausea  Irregular and Rapid heartbeat | Sore throat  Nausea  Weakness  Dizziness  Redness or Tingle feeling | Nausea  Skin or Eye Yellowing  Fever  tenderness |
| Nursing Considerations | Evaluation of therapeutic response  Checking blood-pressure after regular periods or intervals | Minimize orthostatic hypotension.  Caution patient to avoid activities such as driving. | Renal impairment i.e. dosage should be modified on the basis of clinical response.  Hepatic impairment i.e. contraindicated in patients with liver disease, persistence hepatic transaminase elevations. |

# Question No: 06

## Ticagrelor: Mechanism of Action and Use

Ticagrelor is not a prodrug, unlike clopidogrel and prasugrel. It does not necessitate metabolic stimulation for antiplatelet activity. It composes the major circulating components in the plasma. It displays linear pharmacokinetics in patients with ACS and CAD. Following the absorption of ticagrelor, it is bound to plasma proteins and mostly it is limited to plasma space. It prevents platelets from sticking together that leads to the formation of clots (Berger, 2013). Basically, it will help the blood keep flowing without any restriction and blockage.

Normally ticagrelor is used to prevent help heart and stroke in people who have heart problems such as unstable angina. Sometimes, ticagrelor is used for the prevention of heart attack and stroke following heart surgery. Medication must be taken regularly in the right amount prescribed by the physician and it is advised to keep continue the medicine if the patient as well. Overdose of ticagrelor must be avoided (Bonaca et al., 2015). Ticagrelor must be taken twice a day coupled with a low dose of aspirin.

## Aspirin: Mechanism of Action and Use

The mechanism of aspirin was discovered by Vane in 1971 and revealed that it employs its analgesic, anti-inflammatory, and antipyretic actions. It hinders the activity of enzymes that leads to the formation of prostaglandins PGs that causes fever, pain, swelling, inflammation. It also averts the creation of physiologically important PGs. It helps in blood thinning that prevent the blockage in the arteries due to blood clots.

It is not recommended to take aspirin during a stroke, for not all the strokes are caused by blood clots. Rupture in a vessel is also a cause of stroke and taking aspirin in such a condition would make the bleeding strokes more severe.

The combination of ticagrelor and aspirin for the patient (Betsy) will significantly increase graft patency in Betsy. Aspirin alone in maintaining vein graft patency is not enough. Ticagrelor will help the blood flow smoothly whereas aspirin will help in the prevention of blood clotting. Ticagrelor will prevent the platelets from sticking together and aspirin in low dose will cure fever, pain, inflammation, and swelling.

# Question No: 07

Nowadays, morphine is being used in ACS (Acute Coronary Syndrome) owing to its analgesic effects. Main cardiology guideline in EU and USA. recommends morphine. However. There are controversies associated with the use of morphine in ACS because of safety concerns. In the case of MI (Myocardial infractions) that is a squeezing pain in the chest, most of the patients receive morphine (Meine et al., 2005).

## Benefits and Controversies

Morphine is considered an ideal analgesic and possesses essential hemodynamic effects that are helpful during MI. Among the other benefits of morphine, it stimulates histamine-mediated processes, decreases the heart rate, venous return, and blood pressure. Precisely and theoretically it helps to reduce the myocardial oxygen requirement. Morphine is respiratory depression, vomiting, and hypotension (Ghadban et al., 2019).

Among the cons of morphine, the most significant is that it inhibits drug absorption. This may lead to the worst outcomes for patients because rapid platelet absorption is very important for the treatment of ACS. Most of the researcher has concluded that morphine is a valuable agent when an agent like beta-blocker, expedited reperfusion, and nitrates fail to give relief to the patient in pain. Controversies exist regarding the use of morphine in the treatment of ACS. Use of morphine has become controversial just because of platelet reactivity (Meine et al., 2005). The effects of morphine on cardiovascular have never been studied.

# Question No: 08

Researches have revealed that almost 1/3rd of the individuals suffering from chronic illness fight with depression. By definition, chronic disease is the one that lasts for long-time and cannot be completely cured. Heart diseases are amongst the chronic illnesses (Livneh & Antonak, 1997).

## Symptoms of Depression

Some of the common symptoms of depression in people suffering from chronic illness are as follows:

* Loss of pleasure in daily life.
* Mood swings or depressed mood.
* Irregular sleep intervals or disturbed sleep i.e. patient is either not able to sleep or sleep too much.
* Thinking of death or fear of death.
* Experiencing fatigue.
* Apathy
* Patient not able to concentrate on work.

## Why depression is common

Among the most common complications of chronic diseases, depression is the most important. The chronic disease may change the whole lifestyle of a person and person then finds it difficult to cope with the changes in his lifestyle. It affects a person's mobility, independence, and sentiments. The rate of heart diseases leasing to depression is the highest i.e. 40% to 60%.

## Treatment for Depression

If depression is diagnosed in early stages then distress can be reduced. Giving proper medication to a patient for depression and his chronic illness will have a positive impact on his overall medical condition. Some medication used in the treatment of a chronic disease can cause depression. In such a case it is recommended to reduce the dose of that particular medicine. However, if depression must be treated separately if it becomes a separate problem.

Psychotherapy is critical in the treatment of depression. It helps the patients in the following ways:

* Regaining pleasure in life.
* Regaining a sense of control in life.
* Focus on emotions, and ideas that are helpful in coping with depression.

## Treatment for Chronic Illness

When a person is suffering from a chronic illness like heart disease and at the same time experiences depression and disability then a vicious circle is formed. The following instructions can help the patient to cope with chronic illness:

* Consulting a doctor as soon as the symptoms of depression appear.
* Maintain emotional balance.
* Deal with the treatment of chronic illness.
* No communication between the doctor and the patient.
* Deal with the physical impact of the illness.
* Maintaining self-confidence and positive image of self is also important.

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