Nursing Management of Mr. Ferguson

This is a critical discussion paper focused on a 76 year old man, Mr. Ferguson, presented to the emergency department with a complain of chest heaviness. Ferguson appears diaphoretic, pale and experiencing shortness of breath. The discussion would reveal the patient's presenting issues focusing on the pathophysiology; would explain pharmacokinetics of the prescribed medications and indications. A discussion on related nursing management, patient education and long-term effects of prescribed medications would also be included.

Problems focusing on pathophysiological issues

As per case study, the presenting problems of Ferguson are chest heaviness, pale appearance, diaphoretic along with breathing shortness. Ferguson has a medical history of angina, myocardiac infarction, hypertension and hypercholesterolemia. Hence, from indications like chest heaviness, breathing shortness or diaphoretic condition, it could be apprehended that Ferguson might be experiencing cardiac complications. Angina, described as chest heaviness or a sense of discomfort happens due to diminished blood flow to the heart, causes can be many like thickening of atrial wall, plaque formation, pulmonary embolism, pericarditis, aortic stenosis and so on (Colombo & Murray, 2016). As per Ferguson's medical history, there is a probable association with his medical history of hypertension and hypercholesterolemia. Thickening of arterial wall can happen because of hypercholesterolemia. This is medically termed as atherosclerosis or hardening of arteries. High density Cholesterol buildsup plaque formation causes a form of chest pain and increase the chance of cardiac arrest. Hence, from the associated pathophysiology, it can be stated that such kind of chest pain is a warning sign that Ferguson could be at a risk of stroke or heart attack.

Hyertension can lead to angina in two ways: high blood pressure can damage coronary arteries that in turn results in blockages in the arteries and insufficient blood flow towards heart and thereby, generate a sense of chest pain. Another issue is high blood pressure strain the cardiac system. The heart has to exert more pressure to pump blood again the elevated pressure that also requires more flow of oxygen and blood, which causes a sense of chest pain (Chaudhary, 2017). In case of patients with coronary disease, blood flow fails to increase properly in such situation. Therefore, the patient senses breathing shortness and appears pale as well.

Diaphoresis or profuse sweating is an indication of underlying health condition (Convertino, Grudic, Mulligan & Moulton, 2013). If oxygenated blood fails to reach to the heart due to any blockage within the coronary artery, affected individual seeks for more oxygen to normalize the imbalance and the condition can exacerbate diaphoresis and angina. This could be another warning sign that indicates that Ferguson could be at a risk of stroke or heart attack.

Pharmacokinetics of prescribed medications and indications

Aspirin gets absorbed in the intestinal tract and distributed throughout the cells inside the human system. Aspirin breaks down to salicylic acid, has a half-life of approximately 6 hours. However, half-life increased in case of higher dosages. Salicylic acid reaches peak plasma level within approximately 1-2 hours and partially eliminated hepatically (Norgard, 2017).

For Ferguson, prescribing Aspirin is helpful because blood clot formations within an artery obstructs the flow of oxygenated blood to the cardiac muscle. During a cardiac arrest, Aspirin hinders the formation of clotting and reduces blood clot size. Also, Aspirin reduces the chance of second heart attack as supported by many literature (Bhat, Anozie, Grewal, Karkee & Hegazy, 2016).

Morphine sulphate IV is an opioid that is administered to manage pain. It is variably absorbed following administration. It is metabolized by the liver and excreted renally. IV onset is rapid and reaches peak within 20 minutes and it's duration is approximately 4-5 hours.

As per the case study, Ferguson self administered glyceryl trinitrate pump for minimal relief. But it was not resolved. So, small doses have been prescribed than large doses to decrease his pain. Morphine unites with opiate receptors in the brain and decreases the pain perception. It has a calming effect that decreases the emotional response to pain (Setnik, Sommerville, Goli, Han & Webster, 2013) .

LMW heparin reversibly binds to its target site antithrombin and serine proteases that take part in coagulation, especially Factor X. Besides, it binds to plasma proteins like plasmin, albumin, fibrinogen, lipases and so on. Heparin volume distribution is limited to plasma volume (Deser & Demirag, 2015). It has a short half-life, approximately 1.5 hours and is dose-depended. It is not eliminated by renal filtration.

As per the case study, LMW heparin correctly administered to Ferguson, because it's a class of anticoagulant medication, use to prevent blood-clots, hence effectively treat myocardial infarction and deep vein thrombosis. It's administration is advantageous over unfractionated Heparin because LMW heparin includes more expected anticoagulant effect, therefore, repeated monitoring is not required for anticoagulation, less chance of heparin-induced thrombocytopenia.

Fentanyl is a synthetic opiate and clinical efficacy almost 50-100 times more than Morphine. It has short duration of action and rapidly remove from the system. The half-life range is about 1.5-6 hours and clearance range from 0.4- 1.5L/min. It eliminates renally almost 10% of the dosage and rest of the clearance is hepatic. Morphine may lead to histamine release, which in turn can cause a decrease in blood pressure and systemic vascular resistance. But Fentanyl is a mu opioid receptor agonist, an effective anesthetic agent and not related to histamine release. It is well tolerated by patients coexisting with cardiac complications (Chen & Ashburn, 2015).

Nursing management

In case of Ferguson, the nursing professionals need to act first to ease his sense of chest discomfort. In such cases, the cardiac muscle needs blood supply, harder the heart works, more it requires for oxygen. Hence, the major aim of nursing management would be an increase in oxygen supply to the cardiac muscle and diminish oxygen demand. This would in turn reduce Ferguson's shortness of breath. The professionals should abide by the clinical guidelines on cardiac management published by the National Heart Foundation. Oxygen therapy is given to the hypoxic patient with SpO2 less than 93%, in case of non-hypoxic situation more than 94% SpO2, benefit can be uncertain. Gylceryl trinitrate, the coronary vasodilator, was self administered by the patient. Aspirin administration would diminish the chance of thrombus formation as it inhibits thromboxane formation that mediate platelet aggregation and vasoconstriction. Morphine is another good option, as it helps in reducing the pain. It also acts as vasodilator, improve vessel perfusion and reduce patient anxiety. Other nursing management may include performing and recording vital signs, pain assessment (PQRST) as in knowing the Position of pain, Quality of pain-sharp, dull or burning, Radiation- if the pain is moving or static, Severity- rate pain on a scale between 0-10 (Pate, Raoofi, Szumicki & Chendrasekhar, 2014). Nurses should carry out 12-lead ECG under the guidance of a medical officer, maintain access of defibillator, check for blood test

for example Full Blood Examination, electrolytes, troponin. Troponin is said to be a cardiac enzyme, in other word marker of infarction. Besides new biochemistry tests with improved sensitivity, the present guideline states that an increased level of troponin may not indicate ischemia. Hence, troponin result should be measured within the context of complete clinical presentation that means along with ECG interpretation.

This would inform the care professionals to decide if the patient needs reperfusion therapy to care for the causes of chest discomfort. An accurate and rapid assessment helps in the identification of the major causes of chest pain, leads to appropriate and prompt responses to eliminate pain. Along with that, maintaining a controlled and peaceful environment is necessary for the patient as well as for the nursing professionals.

Patient education

Patient education is highly necessary in this case, because, Ferguson already had a medical history of ischemia and again, he has a complain of chest discomfort, from which it could be interpreted that Ferguson might have a chance of a second attack. Providing education would help him to alter his health behavior in order to improve his health status. He has a history of hypercholesterolemia and hypertension. So, he should say a 'no' to smoking, alcohol consumption, eating junk or foods containing high fat and maintain a healthy weight. Such alteration would definitely help him to control his high blood pressure. He should also be educated to properly maintain follow-up dates and make regular checks and consultation with his cardiologist. Along with this, Ferguson should be made aware of the side effects of the prescribed medicine. For example, aspirin side effects include black stool, wheezing, ringing in ears, stomach pain, weakness. So, if he notices such he should immediately report to the doctor. Long-term effect of fentanyl include dizziness, intense fatigue, unresponsiveness to painful stimuli, trouble in swallowing, risk of anoxic injury. Long-term effect of heparin include easy bleeding, itchiness to feet, pain, redness to skin especially the injection sites and so on (Brand, McDonald & Dunning, 2018). Lastly, Ferguson should be reminded to follow medicine schedule as directed and not to skip dosages. Recovery after cardiac arrest takes time, hence he should plan for adequate rest for 4-8 weeks and resume to normal activity after approval from the doctor. Such informative education would definitely assist Ferguson to improve his present health condition.

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