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Cardiac Tamponade

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Cardiac Tamponade
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Introduction
What is the Topic?
The topic the author chose to research is cardiac tamponade. Cardiac tamponade occurs when fluid builds up in the pericardial cavity, which is the cavity that surrounds the heart. Cardiac tamponade can occur due to various reasons, including myocardial infarction, chest trauma, and placement of pacemaker wires. Palpitations, shortness of breath, and unusual cardiovascular symptoms can occur with cardiac tamponade.

Pathophysiological Processes
Cardiac tamponade occurs as fluid accumulates in the pericardial sac and causes increased compression on the heart. In a normal pericardial space, fluid accumulates due to the pressure of the heart chambers from filling properly. Because the right side of the heart has lower diastolic pressures, the atrium and ventricle are the first to be affected. The improper filling of the right atrium and the right ventricle lead to signs of right-sided heart failure, such as hepatomegaly and jugular vein distention. Cardiac arrest can then occur if the left atrium becomes affected due to the minimal filling and circulatory collapse.

Significance of Pathophysiology
Cardiac tamponade has many causes, including infections, trauma, surgery, and placement of pacemaker wires, a pacemaker, or central venous line. Cardiac tamponade can be caused by infections, mainly pericarditis. Trauma can cause cardiac tamponade due to perforation of the pericardial sac and resulting accumulation of fluid. Surgery and placement of pacemaker wires or central lines also cause cardiac tamponade due to perforation of the pericardial sac. Perforation by a catheter as well as direct infusion of fluid can cause cardiac tamponade. Complications of cardiac tamponade can be caused by infections, mainly carditis, and pericardial fluid reaching cardiac tamponade only after larger volumes (B).

Underlying Pathophysiology
The pathophysiology of cardiac tamponade is not fully understood, but providers can be proactive instead of reactive. The pathophysiology also seems to be unknown to patients and caregivers. The condition is important to monitor the patient’s status. One of the most important diagnostic tests is a chest x-ray after placement of a pericardial catheter and central venous line. The chest x-ray would show cardiomegaly, which would suggest cardiac tamponade. Daily chest x-rays after cardiac surgery are obtained for this reason. The heart is able to withstand fluid accumulations, as long as the fluid builds up gradually. Echocardiograms would also show the presence and size of a pericardial effusion. Monitoring for heart rate and respiratory rate increases and blood pressure decreases would also alert providers to the possibility of developing tamponade. Because the signs and symptoms of cardiac tamponade are not specific until it becomes acute, it is important to quickly rule out other conditions, including acute myocardial infarction and sepsis. The pathophysiology is significant for providers to recognize the signs and symptoms of cardiac tamponade and to intervene before the condition becomes severe and causes death.

Research Topic
“Cardiac tamponade (CT) is a life-threatening condition and a medical emergency characterized by pathophysiologic accumulation of fluid in the pericardial sac that compresses the heart and leads to cardiovascular collapse,” according to Peri G. Seth, MD, PhD (2012). Fluid builds up in the pericardial sac, which then causes increased intrapericardial pressure and compression of the heart. The cardiac tamponade results from fluid accumulation of even small amounts of fluid. “A rapid accumulation of pericardial fluid will quickly compress the heart, resulting in decreased cardiac output, shock, and (ultimately, if cardiosurgical death)” (Skau & Kloss, 2012, p. 264).

Implications for Nursing Care
Implications for nursing care include close monitoring of the patient. After placement of a pacemaker wire or central venous line, a chest x-ray needs to be obtained to ensure correct placement prior to using them. The chest x-ray would also rule out cardiomegaly. Vital signs need to be obtained at least every four hours to ensure patient status. Nurses also need to be knowledgeable of equipment used; such as chest tubes and pleuroneumothorax. The nurse needs to be aware of a chest x-ray if a chest x-ray is present and diagnosis is discovered, which could also point to developing tamponade. Nurses need to be knowledgeable regarding cardiac tamponade to ensure they intervene appropriately if a patient’s condition deteriorates.

References


Other References

Graph 1. Pressure/volume curve of the pericardium with fluid accumulating pericardial fluid leading to cardiac tamponade with a smaller volume (A) compared with the slowly gradual accumulation of even small amounts of fluid. "A rapid accumulation of pericardial fluid will quickly compress the heart, resulting in decreased cardiac output, shock, and (ultimately, if cardiosurgical death)” (Skau & Kloss, 2012, p. 264).

Graph 2. Cardiac tamponade due to hemopericardium.

Table 1. Signs and Symptoms of Cardiac Tamponade

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyspnea</td>
<td>Breathlessness or difficulty in breathing</td>
</tr>
<tr>
<td>Chest pain</td>
<td>Pain or discomfort in the chest area</td>
</tr>
<tr>
<td>Palpitations</td>
<td>Fluttering or throbbing sensations</td>
</tr>
<tr>
<td>Polyuria</td>
<td>Increased frequency of urination</td>
</tr>
<tr>
<td>Tachycardia</td>
<td>Rapid heart rate</td>
</tr>
<tr>
<td>Pericardial pain</td>
<td>Pain or discomfort in the pericardial area</td>
</tr>
<tr>
<td>Abdominal distention</td>
<td>Swelling and discomfort in the abdominal area</td>
</tr>
<tr>
<td>Palpitations on an echocardiogram</td>
<td>Visible pain or discomfort in the heart area</td>
</tr>
<tr>
<td>Cardiomegaly on chest x-ray</td>
<td>Enlargement of the heart on a chest x-ray</td>
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Graph 2. Cardiac tamponade due to hemopericardium.