

CARDIAC TEMPONADE FOLLOWING LEFT INTERNAL JUGULAR VENOUS CATHETERIZATION

- A Case Report -

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Central venous catheterization is a routine procedure performed by anesthetists. Various complications, have however, been reported during this procedure. Cardiac temponade, for one, is a rare but serious life threatening complication. Although percutaneous catheterization of central viens is a routine procedure requiring advanced operating skills, yet the monitoring, early detection and management of cardiac temponade is vitally important.

We report a case of cardiac temponade following central venous catheterization in a patient who underwent a living related liver transplant, where the diagnosis of cardiac temponade, initially missed, was later diagnosed and successfully managed.

Case Report

A 46 year old man, underwent a living related liver transplant (LRLT). The patient was a known case of chronic B hepatitis with liver cirrhosis and end stage hepatic failure. He was jaundiced, slightly tachypneic with large abdominal distension due to ascitis. The liver function tests were impaired, platelet count $81 \times 10/L$, prothrombin time (PT) 37.7 sec., partial thromboplastin time (PTT) 69.7 sec., international normalized ration (INR) 3.95 and impaired renal function with urea 117 mg/dl and creatinine 1.6 mg/dl. Otherwise normal electrolytes. Echocardiography showed no evidence of pericardial effusion and an

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ejection fraction (EF) of 70%.

After intravenous and left radial arterial cannulation, the patient was induced and the standard monitoring for the procedure was applied. A triple-lumen central venous catheter (Arrow-Howes, multi-lumen central venous, catheterization set with blue flextip Catheter) was introduced through the left internal jugular vein using Seldinger's technique. The procedure was performed by a senior anesthetist, a traumatically, from first attempt. A slight hematoma occurred at the site of the puncture with continuous blood ooze that necessitated firm pressure for nearly an hour*.

Surgery progressed uneventfully for 2 hours: Patients vital signs were stable with systolic blood pressure ranging from 95-110 mmHg, diastolic blood pressure 55-70 mmHg, H.R. 90-110 beats/min with initially high central venous pressure (CVP) 11 mmHg which dropped to 3 mmHg after opening the peritoneum and draining the ascitis (7 liters).

Vigorous infusion of the patient with crystalloids, albumin 5% and fresh frozen plasma to keep the CVP 4-6 mmHg. But the patients blood pressure and pulse pressure started to decrease, and the CVP to increase. Epinephrine infusion was started with slight improvement. Later on it was not possible to keep the systolic blood pressure above 60 mmHg, and the CVP increased to reach 25 mmHg. Epinephrine boluses were given just to keep the blood pressure 40/30 mmHg and a further increase in CVO to 28 mmHg, and a heart rate of 140 beat/min.

At this stage the surgeon noticed bulging of the pericardium into the diaphragm, and in view of patient's condition, it was decided to open a pericardial window. A 700 ml of fresh blood was evacuated from the pericardial cavity. Immediately patient's vital signs improved, with arterial blood pressure measuring 120/80 mmHg, CVP decreased to 6 mmHg and the pulse rate to 100 beat/min. Patient remained stable and no further blood loss through the pericardial cavity was noticed, and the operation went uneventfully.

Discussion

Complications from central venous catheters are numerous. Cardiac

tamponade is a rare but well documented complication that is often fatal¹. The incidence is not clear as reports are extremely variable ranging from 0.0001% to 1.4% of all catheter insertions with no distinction in the causes, and under reporting of the condition is likely². Mortality rate, ranges from 100% to 47%³. Cardiac tamponade can manifest itself within minutes of insertion of a central venous catheter to several months later⁴.

The variation in report incidence and time to presentation is partly related to the many risk factors associated with this complication. Direct trauma at insertion predispose to vascular or endocardial damage and perforation. The site of insertion and position of the catheter tip are important factors.

Cardiac tamponade is more frequent when catheters are inserted via peripheral rather than central veins⁵.

The angle that the catheter tip forms with the wall of a vein or cardiac chamber is thought to be an important factor responsible in vessel trauma. When the tip lies at a more perpendicular angle to the wall there is an increased chance of direct trauma and erosion⁶. This is relevant when considering catheters inserted via the subclavian veins or left internal jugular vein, as their more tortuous anatomical course.

In the case presented it was initially difficult to suspect cardiac tamponade, as the procedure was straight forward with no difficulties encountered even during the manipulation of excessive traction in the abdomen and the chest wall to facilitate hepatectomy and the presence of ascitic fluid loss. However, in retrospect we had signs and symptoms of cardiac tamponade. Our patient started to develop hypotension, raised central venous pressure, narrow pulse pressure and tachycardia, and unfortunately the diagnosis was missed considering that the patient had an end stage liver disease with abnormal bleeding profile and excessive manipulation and traction in the area.

Early recognition and treatment of cardiac tamponade is therefore essential if mortality to be avoided, as misdiagnosis of cardiac tamponade can lead to catastrophic outcome.

Percutaneous insertions of central venous catheters are usually done

by using surface anatomical landmarks (palpable or visible structures) with known relationships to the desired vein.

Catheterization via the internal jugular vein may result in fewer malpositions than catheterization via the subclavian vein⁶. Generally, catheterization via left internal jugular vein results in more malposition and vascular perforation than a catheter placed from the right internal jugular vein. This is because the right internal jugular vein runs into the right brachiocephalic vein in a fairly straight course, whereas the left internal jugular vein forms a greater bend when it becomes the left brachiocephalic vein, and more perpendicular angle with which the tip may lie compared with the vessel wall. The left internal jugular vein was chosen in this case because there was a previous scar and a more dilated external jugular and subcutaneous veins on the right side.

In summary this case, illustrates the need to maintain a high level of awareness about the complications of central venous catheterization, even when preventive practices suggest it is sited correctly. Cardiac tamponade must be considered in any patient with an indwelling central venous catheter who shows evidence of clinical deterioration.

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