CASE REPORT Libri Oncol., Vol. 38 (2010), No 1-3, 61 – 63

HEMODYNAMIC MONITORING OF PERICARDIAL EFFUSION WITH CARDIAC TAMPONADE IN A PATIENT WITH COLORECTAL CANCER

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Summary

Metastatic cardiac malignancies mainly come from the breast, lung, esophagus and lymphoreticular system. Metastasis from colorectal cancer to the heart or pericardium is seldom reported and only sporadic antemortem cases have been reported. We report an unusual case of malignant pericardial effusion with cardiac tamponade caused by metastatic adenocarcinoma of colon in a 58-year-old patient and hemodynamic monitoring with lithium dilution cardiac output (LiDCO) method of measuring cardiac output to prepare patient for surgery of the subileus.

KEYWORDS: *pericardial effusion, cardiac tamponade, hemodynamic monitoring, colorectal cancer*

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Sažetak

Najčešći uzroci malignog perikardijalnog izljeva su karcinom dojke, pluća, jednjaka i limforetikularnog sustava. Maligni perikardijalni izljev je vrlo rijetka komplikacija u bolesnika s karcinomom debelog crijeva. Ovo je prikaz slučaja liječenja 58-godišnjeg bolesnika s malignim perikardijalnim izljevom i srčanom tamponadom pomoću mjerenja minutnog srčanog volumena LIDCO metodom u svrhu pripreme bolesnika za hitnu operaciju subileusa.

KLJUČNE RIJEČI: *perikardijalna efuzija, srčana tamponada, hemodinamski monitoring, kolorektalni karcinom*

INTRODUCTION

Malignant pericardial effusion is a rare and serious manifestation of advanced malignancies. Pericardial effusion defines the presence of an abnormal amount of fluid in the pericardial space. Malignant pericardial effusions are caused by cancer that begins in the pericardium or the heart muscle, or by cancer that has spread there from the esophagus, thymus, or lymph system and are commonly caused by lung cancer in males and breast cancer in females (1, 2,3). Pericardial effusions can be acute or chronic, and the time course of development has a great impact on the patient's symptoms. Treatment is directed at both removal of the pericardial fluid and alleviation of the underlying cause which usually is determined by a combination of fluid analysis and correlation with comorbid illnesses. Clinical manifestations of pericardial effusion are highly dependent upon the rate of accumulation of fluid in the pericardial sac and include chest discomfort, dyspnea, tachycardia, pulsus paradoxus, increased central venous pressure, hypotension and cardiogenic shock, although some patients remain undiagnosed until death (4,5). Rapid accumulation of pericardial flu-

id may cause elevated intrapericardial pressures with as little as 80 mL of fluid. Slowly progressing effusions can grow to 2 L without symptoms (6). Pericardial effusion is the primary or contributory cause of death in 85% of cancer patients with symptomatic effusions (7, 8). Because most patients are asymptomatic, the incidence is much higher in autopsy series (9).

LiDCO is a minimally invasive indicator dilution technique for the measurement of cardiac output and providing continuous, reliable and accurate assessment of the hemodynamic status of critical care and surgery patients. A small dose of lithium chloride is injected as an intravenous bolus, and cardiac output is derived from the dilution curve generated by a lithium-sensitive electrode attached to the arterial line. Besides cardiac output with LiDCO method we can measure: cardiac index, stroke volume, systemic vascular resistance, intrathoracic blood volume index, oxygen delivery, heart rate and mean blood pressure (10).

CASE REPORT

A 58-year-old patient was hospitalized for tumor of final intestine and planned surgical procedure. The colonoscopy findings showed infiltrative process which almost completely closed the interior side of the bowel. During preoperative preparation, the patient developed images of subileus. Biopsy proved adenocarcinoma of colorectal cancer. The patient suffered from hypertension and diabetes mellitus type II. During routine preoperative preparation, CT revealed pericardial effusion. Preoperative ultrasound of the heart confirmed minimal pericardial effusion (17mm) and left ventricular ejection fraction (EFLV) 55%. The patient was hemodynamically stable. On the 6th day of hospitalization, the patient suddenly became disturbed, dyspnoic, pale, sweaty, tachycard and hypotensive and was admitted to the intensive care unit. On admission, the patient was hemodynamically unstable, central venous catheter and cannula for arterial blood pressure monitoring were set and LiDCO monitoring was connected. Hemodynamic monitoring with LiDCO method showed that heart stroke volume was 67mL, cardiac output 6,3L/min, systemic vascular resistance 769 dyn/s/cm^3, heart rate 100/min, blood pressure was 100/56 and central venous pressure 11mmHg. Three days after admission to intensive care unit, hemodynamic monitoring with LiDCO method noticed a sudden change of values, heart stroke volume fallen to 22mL, cardiac output to 2.6 L/min, blood pressure to 80/66mmHg, systemic vascular resistance risen to 2270dyn/s/cm^3, heart rate to 119/min and central venous pressure to 22 mmHg. An urgent ultrasound of the heart confirmed a large pericardial effusion of 5 cm, EFLV 33%, partial diastolic collapse of the front wall of the right ventricle and right atrial systolic collapse, which showed cardiac tamponade. An urgent pericardiocentesis was done, and through the placed catheter it was received a 560mL of hemorrhagic, cytologically proven malignant content. The patient became hemodynamically stable with inotropic support with dobutamine (6 mg/kg/min), prepared for palliative surgery and planned surgical procedure was done.

DISCUSSION

Malignant pericardial effusion is a potentially fatal complication of malignancy and very rarely associated with colorectal cancer. Chen JL et al. (11), report an unusual case of malignant pericardial effusion and subsequent tamponade that was the earliest manifestation caused by metastatic adenocarcinoma of the colon. Ben Yosef R et al. (12) present a patient who developed malignant pericardial effusion following surgery. Malignant pericardial effusion is frequently asymptomatic and usually detected incidentally. Symptomatic cases, however, often manifest with cardiac tamponade, which can rapidly lead to cardiovascular collapse and death unless promptly treated. Pericardial effusion can lead to cardiac tamponade which is a life threatening condition and accurate diagnosis and prompt intervention are necessary. Cardiac tamponade refers to cardiac compression caused by abnormal accumulation of pericardial fluid which limitates ventricular filling and reduces stroke volume and cardiac output (13). Clinical diagnosis of malignant pericardial effusion is difficult, and can be easily confused with other conditions such as pulmonary embolism and silent myocardial infarction. Cardiac tamponade is often difficult to diagnose without performing echocardiography.

In our case, a spectrum of abnormal hemodynamic changes associated with this condition has

been identified with LiDCO method and raised the suspicion of a cardiac tamponade which was confirmed by echocardiography. The use of LiDCO method significantly reduced the time period of diagnosis of acute deterioration of pericardial effusion and thus prevented the occurrence of fatal pericardial tamponade. By examining the available literature no description of using LiDCO methods in hemodynamic monitoring of pericardial effusion and cardiac tamponade was found.

CONCLUSION

Because malignant pericardial effusion is a rare complication of colorectal cancer, it is harder to raise a suspicion of cardiac tamponade in hemodynamically unstable patients. In our case hemodynamic assessment with LiDCO method provided a rapid resolution of this fatal complication. LiDCO method could be a complementary technique for precise assessment of hemodynamic impact of malignant pericardial effusion in hemodinamically unstable patient in intensive care unit.

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