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New onset heart failure in pregnant woman 10 years after successful Hodgkin's lymphoma treatment: case report

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Abstract:
Background: Cardiovascular disease is diagnosed for 1 - 4% of pregnant women [1] and it is the most common cause of maternal death in developed countries [2].
Aim: To present the case of heart failure in pregnancy and to discuss major pre-partum, intra-partum and post-partum points of care.
Case report: A 30 years old woman, gravida II (39 weeks of gestation) was admitted to the university teaching hospital with acute heart failure (HF) (NYHA cl.III) and bilateral hydrothorax. The irregular uterus contractions were present. At the age of 20 she was diagnosed with Hodgkin's lymphoma, treatment involved chemotherapy and radiotherapy and leaded to remission afterwards. At the age of 27 she had uncomplicated pregnancy and vaginal delivery. Any preexisting cardiovascular disease was not known.
ECG: sinus tachycardia, heart rate (HR) 124 beats/min, QTc 461ms. Echocardiography: Left ventricle systolic dysfunction EF (ejection fraction) 50%, III MR (mitral regurgitation), II TR (tricuspid regurgitation). Upper abdominal ultrasound: up to 10 cm fluid in pleural cavity bilaterally. NT-proBNP was 1719 ng/l. Multidisciplinary team (obstetrician - gynecologist, anesthesiologist – reanimatologist, cardiologist, cardio surgeon) decided to reduce fluid volume in the pleural cavity by punction and drainage and induce natural delivery.
Delivery pain management with intramuscular opioids was adequate. Healthy boy was born, Apgar score after 1 and 5 min was 9 - 10. HF persisted after delivery, so patient was moved to cardiology department. Nevertheless, conservative treatment was not effective and mitral and tricuspidal valve plastics was performed 6 months after delivery.
Conclusion: Pregnant women with HF have a high risk of mortality. Physiological changes of cardiovascular system during pregnancy deteriorate preexisting condition dramatically. In this clinical case the probable cardiac damage and congestive heart failure could have been determined by radio-chemotherapy for Hodgkin's lymphoma.
Keywords: heart failure in pregnancy, Hodgkin's lymphoma, management of heart failure.

Introduction:

Cardiovascular disease is diagnosed for 1 - 4% of pregnant women [1] and it is the most common cause of maternal death in developed countries [2]. Haemodynamic changes of cardiovascular system during pregnancy may reveal the preexisting cardiovascular disease that was not diagnosed before. Physiological changes of cardiovascular system during pregnancy and labor are mainly characterized by significant changes in circulating fluid volume (cardiac output and blood volume increase), haematopoiesis (hypercoagulation, anaemia), pulmonary function (increased tidal volume, decreased residual capacity), hormone state (increased cortisol, oestrogen and renin angiotensin aldosterone system activity) and autonomic nervous system (increased heart rate) [4]. These described changes may provoke cardiac complications, especially in the presence of preexisting heart muscle or valvular disease. Labour and delivery are considered a particularly high-risk period because of cardiac stress and changes in cardiac output caused by pain, anxiety and exertion, uterine contractions, bleeding, anaesthesia, autotransfusion from involuting uterus and resorption of oedema [5,6]. Adverse events are more likely to happen in the later stages of pregnancy, because of progressively increased haemodynamic load. The research shows that the highest risk to develop heart failure is the second trimester (34%) or peripartum period (31%) [7]. Neonatal outcomes are strictly related to maternal outcome [8], therefore the adequate management of patient with heart failure is highly important.

Case report:

A 30 years old woman, gravida II (39 weeks of gestation) presented to the hospital with acute heart failure (NYHA cl.III) and bilateral hydrothorax. The irregular uterus contractions were present. She complained of severe dyspnea and ankle oedema, the symptoms persisted for several weeks. The anamnesis revealed that at the age of 20 she was diagnosed with Hodgkin's lymphoma. The treatment involved chemotherapy and radiotherapy. The remission was achieved. At the age of 27 she had vaginal delivery without any complications. Any preexisting cardiovascular disease was not known.

Objectively: dyspnea and forced sitting position, tachypnea, ankle oedema.

ECG: sinus tachycardia HR 124/min, QTc 461ms. Echocardiography: Left ventricle systolic dysfunction with EF (ejection fraction) 50%, III° MR (mitral regurgitation), II° TR (tricuspid regurgitation) pressure in pulmonary artery 39mmHg. Upper abdominal ultrasound: up to 10 cm fluid in pleural cavity bilaterally. NT-proBNP was 1719 ng/l. Multidisciplinary team composed of obstetrician-gynecologist, anesthesiologist–reanimatologist, cardiologist and cardio surgeon decided to puncture and to drain the pleural cavity and induce natural delivery. One liter of transudate was drained and that improved the general condition of the patient. Vaginal delivery was induced.

Pain relief with intramuscular opioids (Pethidine 50mg) was adequate. Fluid balance: crystalloids 500ml i/v, blood loss 1200ml. Pain management was adequate. Vaginal delivery was successful and healthy boy was born (Apgar score after 1 and 5

minutes was 9 – 10). The HF persisted after delivery (increasing volume of fluid in pleural cavities, increasing MV and TV insufficiency) patient was transferred to the cardiology department. When state became stable she was discharged home. The conservative treatment of HF consisted of intravenous infusions of levosimendani and dopamine, sol. digoxin 0.125 mg x1 in acute period; Other medication, method and rate of their prescribing is in Table 1. Breastfeeding was stopped by bromocriptine.

Table 1. The prescribed medication

Name	Times per day	Method of prescribing
Tab. torasemid 20 mg → Caps. furosemidi retard 60 mg → Tab. torasemid 5 mg	1 2 1	Oral Oral Oral
Tab. spironolacton 25 mg	1	Oral
Tab. metoprolol 25mg → Tab. bisoprolol 1.25 mg	1 1	Oral
Tab ivabradin 7.5 mg	2	Oral
Tab. sacubitril 24 mg/valsartan 26 mg	2	Oral
Tab. apixaban 2.5 mg Sol. fraxiparin 0.3 ml	2 2	Oral Subcutaneous

"→" - changed to

As the results of conservative treatment was not satisfactory, the HF persisted therefore elective mitral and tricuspidal valve plastics were performed 6 months after delivery.

Discussion:

The etiology of cardiovascular disorders during pregnancy can be various, although the most frequent are hypertensive disorders, occurring in 5-10% of all pregnancies and it is associated with increasing maternal age at first pregnancy [9,10]. Late reproductive years are linked to increased prevalence of cardiovascular risk factors, especially diabetes, hypertension and obesity. The second biggest cause of cardiovascular disease (CVD) during pregnancy is congenital heart disease [11] and that determined by the fact that increasing number of women with congenital heart disease reach childbearing age. Less frequent is rheumatic valvular disease, which dominates in non-western countries and the rarest cause of CVD is cardiomyopathies. Cardiomyopathies in pregnancy usually are unexpected, acute and damaging. In our case the CVD was caused by Hodgkin's lyphoma treatment induced valvular and cardiac muscle damage. The cardiovascular function deteriorated when pregnancy related haemodynamic changes occured. First pregnancy of that patient remained uncomplicated or complications were not so serious and were ignored, that is possibly related to more compensated cardiovascular state. The incidence

of CVD for Hodgkin's lymphoma survivors is from 4 to 7 times higher if compared with general population and typically appear more than 15years after treatment [12].

The combined treatment (radiotherapy and chemotherapy) for Hodgkin's lymphoma is associated with increased risk of heart failure and valvular heart disease [13] and that possibly was the reason of our patients HF. Additionally to cardiovascular complications the Hodgkin's lymphoma survivors are at higher risk of secondary malignancies such as leukemia followed by connective tissue, pleura, thyroid cancer and non-Hodgkin's lymphoma and increased risk for solid tumors (cancer of lung, breast, stomach, esophagus, colon/rectum, cervix, mouth and melanoma) [12,14].

Patient with symptoms and signs of acute heart failure should be evaluated according to acute HF Guidelines. The early management and care of pregnant woman with acute/subacute HF include cardiac and obstetric care, serial echocardiograms, serum NT-proBNP and foetal ultrasound. Afterwards the HF severity should be assessed by taking in to account following measures: systolic blood pressure, heart rate, respiratory rate, central venous oxygen saturation, lactate, mental state, skin temperature and urine volume (Figure 1).

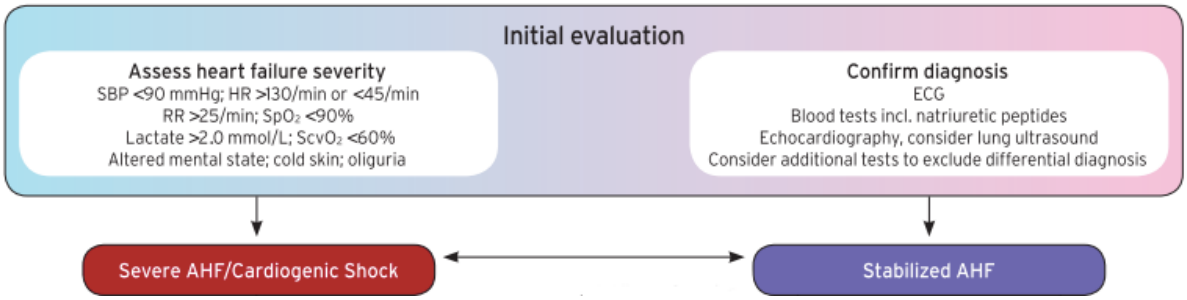

Figure 1. Initial evaluation of acute heart failure [9]

If the HF is stabilized, the medicamental treatment should be started by administering following medications: Hydralazine, Nitrates, Beta-blockers and diuretics if required (loop diuretics and thiazides). Diuretics are recommended only if pulmonary congestion is present and routinely use of diuretics should be avoided due to their negative effect on placental blood flow [15]. Hydralazine and nitrates should be used in the presence of hypertension, severe left ventricle dysfunction and evidence of decompensated HF [16]. The algorithm of early antepartum management is shown in Figure 2.

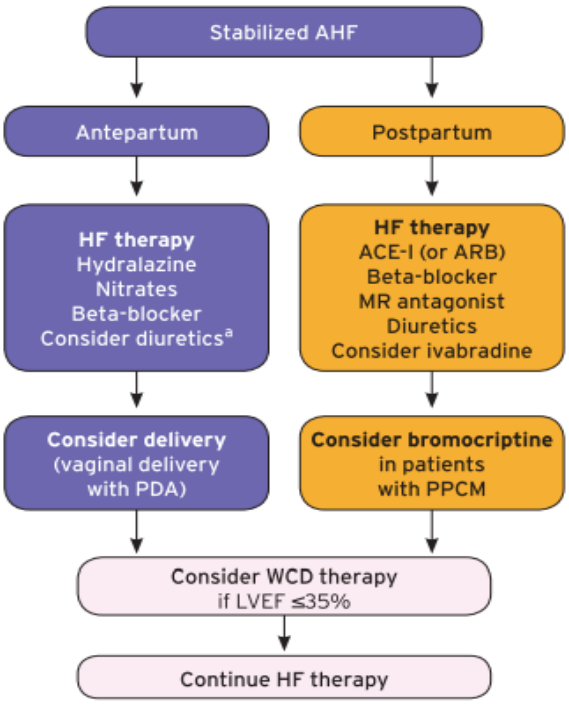

Figure 2. Early management of stabilized acute HF in antepartum and postpartum period. [9] AHF – acute heart failure; WCD – wearable cardioverter-defibrillator; PDA – peridural analgesia; LVEF – left ventricular ejection fraction.

Delivery type according to guidelines depends on HF stability – vaginal delivery is preferred if it is stable congestive HF and that was the method of choice in the presented case. The recommended analgesia is spinal or epidural (in our case neuraxial analgesia was contraindicated due to prior administration of fraxiparine). On the other hand, if woman is with advanced HF and haemodynamic instability despite adequate treatment – caesarean section with central neuraxial anaesthesia is recommended [10].

Post-partum HF treatment includes ACE-I or ARB, beta-blockers, MR antagonist, diuretics and ivabradine (should be considered) also bromocriptine should be discussed in order to interrupt breastfeeding because discontinuation of lactation reduces high metabolic demand and enables early optimal HF treatment.

Conclusion:

Pregnant women with heart failure have a high risk of mortality. Physiological changes of cardiovascular system during pregnancy deteriorate preexisting condition dramatically. In this case the probable explanation for cardiac damage and congestive heart failure could be previous radio-chemotherapy for Hodgkin's lymphoma. Therefore, adequate multidisciplinary management and approach are required.

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