

# Pregnancy-associated myocardial infarction following elective caesarean section for two previous caesarean sections and myomectomy

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### ABSTRACT

A 39-year-old woman, gravida 4, para 2 + 1 (2 alive) for elective second repeat caesarean delivery on account of two previous caesarean sections and one open myomectomy. Following the caesarean section, she developed sudden cardiac failure and was transferred to the intensive care unit for mechanical ventilation support. Congestive cardiac failure secondary to non ST segment elevation myocardial infarction (NSTEMI) was subsequently diagnosed following an electrocardiogram (ECG), echocardiography, and cardiac enzyme assay. The presented case demonstrates the importance of skilled delivery and efficient referral services in developing countries to minimize poor maternal and fetal outcomes in pregnancy-related heart disease.

**Keywords:** Congestive cardiac failure, myocardial infarction, NSTEMI, pregnancy

### Introduction

Maternal cardiovascular disease is rare, affecting only 1–4% of pregnancies but causing up to 10–15% of maternal deaths.<sup>[1,2]</sup>

Acute myocardial infarction (AMI) is a clinical or pathological event due to myocardial injury or necrosis.<sup>[3]</sup> Maternal deaths due to AMI have been increasingly reported, however, data from sub-Saharan Africa hardly exists.<sup>[1,2]</sup> Although rare in obstetric patients (incidence 3 to 10 per 100,000 deliveries), pregnant women have a three- to four-fold higher relative risk compared

to the non pregnant women of reproductive age with mortality rates between 5.1% and 38%.<sup>[4,5]</sup>

In pregnancy, risk is heightened by increased myocardial oxygen demand, anxiety, pain, or enhanced venous return following uterine contractions or evacuation of the pregnant uterus.<sup>[5]</sup>

The commonest cause is coronary atherosclerosis and higher parity (>3), followed by maternal age of above 35 years, pre existing hypertension, diabetes or ischemic heart disease; smoking, obesity, strong family history, dyslipidemia, pre eclampsia, eclampsia, thrombophilia, migraines, postpartum infections, and blood transfusions are risk factors.<sup>[4,6]</sup> Awareness of this is therefore vital to primary care practice.

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We present a patient who developed cardiorespiratory failure following an elective caesarean section. She was diagnosed with congestive cardiac failure secondary to non ST segment elevation myocardial infarction following ECG, echocardiography, and cardiac enzyme assays. After acute cardiac life support, spontaneous circulation returned, and oxygen saturation stabilized. Institutional ethical clearance was obtained from the Federal Capital Research Ethics Department to report this case.

## Case History

A 39-year-old woman, gravida 4, para 2+1 at 37 weeks and two days of gestation, presented at our facility as scheduled for an elective second repeat caesarean delivery on account of two previous caesarean sections and one previous open myomectomy.

The patient had an uneventful medical history prior to and in the index pregnancy. She had no history of hypertension, diabetes, or family history of cardiac disease or sudden cardiac death. Two hours after caesarean delivery under spinal anesthesia with bupivacaine, she developed sudden onset desaturation with chest tightness, tachycardia, and tachypnea.

Bilateral mild lower leg edema was observed. Blood pressure was 114/80 mmHg; pulse rate 132 beats/minute; respiratory rate 28 cycles/minute; temperature 36.2°C, and oxygen saturation 83–86% on 6 L/minute intranasal oxygen delivered via face mask. Fine crepitations were heard in the entire left lung fields. Despite 6–8 L/minute of intranasal oxygen, the patient continued to desaturate (oxygen saturation 78–80%), prompting her immediate transfer from the recovery ward to the intensive care unit (ICU). She was swiftly intubated with mechanical ventilation support.

Laboratory investigations were promptly ordered and complete blood count, serum electrolytes, clotting profile, fasting lipid profile, and fasting blood glucose were within normal limits and urine and blood cultures yielded no bacterial growth. Troponin I, Troponin T and plasma D-Dimer were all elevated (see Table 1 below). Chest radiography showed the features of interstitial edema. Electrocardiography demonstrated sinus tachycardia and ST segment depression in leads V4-V6. Echocardiography revealed mild left ventricular systolic dysfunction, an ejection fraction of 45%, mild pulmonary regurgitation, mild aortic regurgitation, and mild pulmonary hypertension.

**Table 1: Laboratory Investigations at admission into ICU**

Laboratory Investigations	Result	Reference
Troponin I	1.8 ng/mL	≤0.034 ng/mL
Troponin T	236.2 pg/mL	≤14.5 pg/mL
Plasma D-Dimer	>4000 ng/mL	≤229 ng/mL
Fasting Blood Glucose	4.2 mmol/L	3.5 - 7.9 mmol/L
Triglycerides	1.8 mmol/L	<2.3 mmol/L
HDL-Cholesterol	1.3 mmol/L	1.2 - 1.7 mmol/L
LDL-Cholesterol	2.4 mmol/L	≤3.0 mmol/L
Total Cholesterol	4.1 mmol/L	<5.0 mmol/L

A diagnosis of congestive cardiac failure secondary to acute non ST elevation myocardial infarction (NSTEMI) was made.

Diuretics (intravenous frusemide 80 mg 12-hourly), β-blockers (tablets bisoprolol 2.5 mg daily), angiotensin receptor blockers (tablets losartan 25 mg daily), and tablets spironolactone 25 mg daily were administered for cardiac failure; and fluid restriction with nasogastric tube insertion for medication and feeding was initiated. She was also administered subcutaneous enoxaparin 40 mg 12-hourly, tablets aspirin 75 mg daily, tablets clopidogrel 75 mg daily. By the fourth post operative day, her condition was assessed to have improved, and she was extubated. She returned to the general ward on the seventh post operative day and was subsequently discharged home on day eight. Follow up echocardiography done six months post discharge showed an improved ejection fraction of 55%.

## Discussion

Little information from low- and middle-income countries exists regarding sudden onset pregnancy-related cardiac disease.<sup>[7]</sup> Considering a vast majority of births occur at primary care level, availability of skilled obstetric care with efficient referral services would significantly lower the cases of maternal mortality and fetal compromise due to cardiac disease.

The patient presented in this case was regular with antenatal appointments and showed no features that would have raised the suspicion of a cardiac condition. In the index pregnancy and prior antenatal visits, clinical assessments and investigations were uneventful. Her sudden cardio-respiratory compromise necessitated an urgent ECG that showed features of myocardial infarction. Echocardiography though not a routine diagnostic requirement for MI is said to be helpful when a patient presents with the symptoms or signs of MI and the diagnosis is uncertain given the ambiguity of the features of heart failure in peripartum women.<sup>[8]</sup>

Ideally, the care of the patient with pregnancy-associated myocardial infarction (PAMI) requires a critical care setting with a multidisciplinary team including obstetrician, internist cardiologist, family physician, and anesthetist.<sup>[9]</sup>

Medical management includes oxygen administration, pain relief, nitrates, aspirin, unfractionated or low molecular weight heparin to prevent further thrombosis, beta-blockers to decrease myocardial oxygen demand and clopidogrel for additional antiplatelet effect.<sup>[6]</sup>

Previous MI is not an absolute contraindication to subsequent pregnancies; however, pre-conception care must involve full cardiac evaluation with electrocardiogram, stress test, echocardiography, and possibly assessment of the coronary arteries to determine risk.<sup>[7]</sup>

Pre-conception counseling is thus required to advise patients of risks associated with pregnancy, labor, and delivery. Once

pregnancy is diagnosed, patients' physical activity and cardiac symptoms should be reviewed and activities should be restricted where necessary.<sup>[7,9]</sup> Regular follow-up should ideally occur in facilities with access to specialist care, as patients remain at a risk of ischemia and associated complications as pregnancy advances.

Few cases of pregnancy-related AMI are reported, and those recorded are often associated with high maternal and infant mortality.<sup>[10]</sup> Vigilance by a multi-specialist team is therefore crucial ante-, intra-, and postpartum.<sup>[9]</sup>

The reported patient following cardiorespiratory failure due to AMI after elective cesarean section received prompt care and was recovered. Skilled delivery and efficient referral services for immediate transfer to emergency specialist care whenever necessary are a hallmark of quality primary care. This case highlights the critical role of the primary care practitioner in providing comprehensive and coordinated care across multiple specialties where needed, to avert increased morbidity and mortality especially in developing settings.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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### Conflicts of interest

There are no conflicts of interest.

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