

# Chest Pain Syndromes in Pregnancy

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## KEYWORDS

- Pregnancy • Acute myocardial infarction • Aortic dissection • Coronary dissection
- Pulmonary embolism • Venous thromboembolism • Amniotic fluid embolism

## KEY POINTS

- Chest pain syndromes in pregnancy include acute myocardial infarction (AMI), aortic dissection and aortic syndromes, pulmonary embolism, and amniotic fluid embolism.
- The main risk factors associated with AMI in pregnancy are older maternal age (>35 years), hypertension, and diabetes mellitus.
- Most cases of aortic dissection and aortic syndromes occur in patients with Marfan syndrome, aneurysms associated with bicuspid valve, and other aortopathies that may get unmasked during pregnancy because of the accelerated aortic dilatation that occurs during pregnancy.
- The age-adjusted incidence of venous thromboembolism ranges from 4 to 50 times higher in pregnant compared with nonpregnant women, with most cases occurring postpartum versus peripartum.
- The basis of the management of amniotic fluid embolism, a rare but lethal condition, is support of the airway, tissue oxygenation, breathing, and circulation.

## ACUTE MYOCARDIAL INFARCTION IN PREGNANCY

### *Introduction*

Acute coronary syndromes and acute myocardial infarction (AMI) are rare in pregnancy (1–2 per 35,000 deliveries).<sup>1</sup> However, pregnancy has been shown to increase the risk of myocardial infarction (MI) 3- to 4-fold.<sup>2</sup> As the trend of child-bearing at older ages and advances in reproductive technology increase, so also does the incidence of AMI from atherosclerotic heart disease. The causes of acute coronary syndromes in pregnancy range from coronary dissection, to vasospasm, to acute plaque rupture. AMI can occur during any stage of pregnancy but is most common in the third trimester and in the 6-week period after delivery, occurring mostly in multigravidas (66%), most patients being older than 30 years (72%).<sup>1,2</sup>

Location of the AMI is mostly the anterior wall, largely because of the greater susceptibility of the territory of the left anterior descending artery (LAD) for coronary dissection.

### *Incidence*

In the past decade in the United States there has been a higher incidence of detection of AMI in pregnancy, largely reflecting the changing epidemiology of increasing age of pregnancy as well as improvements in diagnostic capability. The average incidence varies from 1 in 24,000 according to Ladner and colleagues<sup>2</sup> to 1 in 16,129 deliveries as per James and colleagues.<sup>3–5</sup> The higher incidence reported by James and colleagues likely reflects improvements in diagnostic capability or a recent increase in the number of reported cases in several of these studies.<sup>1–3</sup>

Disclosures: None.

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### **Risk Factors**

The main risk factors associated with AMI in pregnancy are<sup>1-3,6</sup>:

- Maternal age greater than 35 years
- Hypertension
- Diabetes mellitus.

The magnitude of the increase in risk was evaluated in the series of 859 cases from the Nationwide Inpatient Sample.<sup>3</sup> In a multivariable regression model, the odds ratio was 21.7 for hypertension, 3.6 for diabetes, 6.7 for maternal age between 30 and 34 years, and 15 to 16 for maternal age 35 years and older.

Other independent risk factors in this report were smoking (odds ratio 8.4), thrombophilia, including a history of thrombosis and antiphospholipid syndrome (odds ratio 25.6), severe postpartum hemorrhage (odds ratio 5), migraine headaches (odds ratio 4.2) as a possible marker of vasospastic disease, and postpartum infection (odds ratio 2–3). The marked increase in risk with thrombophilia may reflect an interaction with the hypercoagulable state induced by pregnancy.<sup>2,3</sup>

It is not clear whether pregnancy itself is a risk factor for MI. In a report that had 3.6 million woman-years of observation, the incidence of a first-ever MI not related to pregnancy was 5.0 per 100,000 woman-years in women of child-bearing age, with the risk increasing dramatically after age 35.<sup>7</sup> Because pregnancy lasts three-

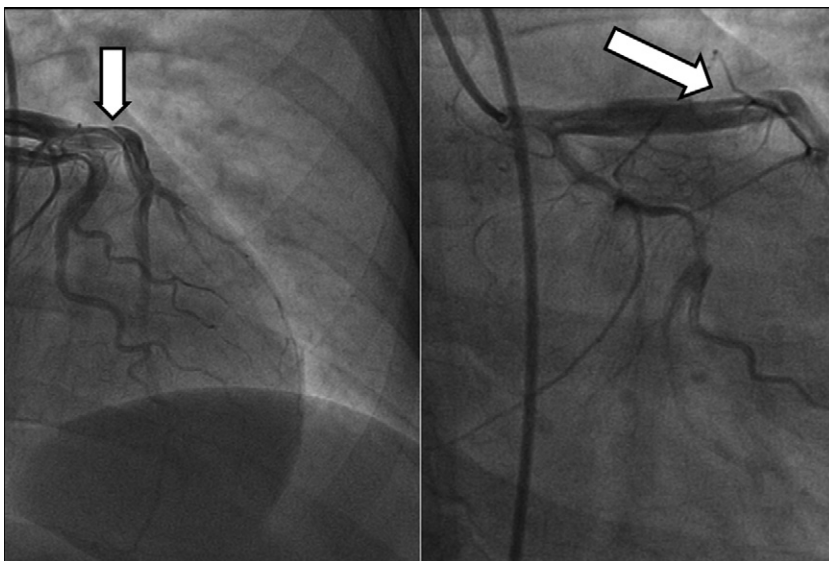
quarters of a year, this rate of MI is not different from the rates in the 2 large epidemiologic studies cited above (2.8–6.2 per 100,000 pregnancies).<sup>2,3</sup>

### **Mortality**

Maternal mortality with AMI has significantly lowered in current reviews,<sup>1-3</sup> ranging from as low as 5.1% reported by James and colleagues<sup>3</sup> to 11% as reported by Roth and colleagues,<sup>1</sup> compared with the mortality of as high as 38% reported in studies from decades before the year 2000.<sup>8</sup> This improving mortality has been largely due to use of percutaneous coronary intervention (PCI) in acute coronary syndromes in pregnancy. The mortality rate is higher in the peripartum period (18%) than in the antepartum and postpartum periods (both 9%).<sup>1</sup> The incidence of fetal mortality was 9% (6 of 68), and most fetal deaths were associated with maternal mortality.<sup>1</sup>

### **Etiology**

In a review of 103 pregnant patients presenting with acute coronary syndrome from 1995 to 2005, coronary artery morphology was evaluated in 96 by angiography or autopsy.<sup>1</sup> Coronary atherosclerosis with or without intracoronary thrombus was present in only 40% of patients. The remaining cases consisted of thrombus in a normal coronary artery (8%), coronary artery dissection (27%), spasm in (2%), emboli (2%), and normal coronary arteries (13%).



**Fig. 1.** Left coronary angiogram in a postpartum woman showing extensive coronary dissection (arrows). (From Alsleibi S, Dweik M, Afifi M, et al. Postpartum multivessel coronary artery dissection treated with coronary artery bypass grafting. *J Cardiol Cases* 2012;5(1):e23–7. doi: 10.1016/j.jccase.2011.11.003; with permission.)

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