CASE REPORT

Non-ST Elevation Myocardial Infarction and Coronary Artery Stenting in Pregnancy in a Woman with Resistant Familial Hyperlipidaemia

Anna Liza Roslani¹ · Abdul Hadi Jaafar² · Anwar Irawan Ruhani²

Received: 9 September 2015 / Accepted: 19 March 2016 / Published online: 13 April 2016
© Federation of Obstetric & Gynecological Societies of India 2016

About the Author

Dr. Anna Liza Roslani obtained her medical degree (MBChB) from the University of Bristol, England, in 1997 and her MRCOG (London) in 2003. She has had 16-year experience working in general Obstetrics and Gynaecology in Northwick Park Hospital, Central Middlesex Hospital and Yeovil District Hospital in the UK and Hospital Tengku Ampuan Afzan and Hospital Tengku Ampuan Rahimah in Malaysia. She completed her fellowship in Maternal Fetal Medicine in Hospital Kuala Lumpur, Malaysia, and Royal Women's Hospital, Melbourne. She has been working as a consultant in Maternal Fetal Medicine since May 2012.

Case Study

A 31-year-old woman with familial hyperlipidaemia and severe coronary artery disease presented at 6 weeks of pregnancy. She had been diagnosed with familial hyperlipidaemia at the age of 7 years, after her father suffered a myocardial infarction in his early forties. She was then lost

to follow-up. At the age of 24 years, she had a non-ST elevation myocardial infarction (NSTEMI). A coronary angiogram at that time showed 6 areas of plaque affecting three branches of the coronary arteries. Her medications were simvastatin 20 mg daily, perindopril 4 mg daily, aspirin 150 mg daily and metoprolol 100 mg daily.

After extensive counselling, she insisted on continuing with this pregnancy. Her total cholesterol level was 16.3 mmol/L. Simvastatin and perindopril were stopped due to early pregnancy foetal concerns. She was well until at 20-week gestation, she presented to the Accidents and Emergency Department with acute chest pain and shortness of breath. Her pulse rate was 120 bpm, and her BP was 109/65. Her ECG showed ST depression in leads II, III, aVF, V4-6 (Fig. 1). Cardiac enzymes were raised (CKMB 26.6, troponin T 2.1). A diagnosis of NSTEMI was made. Acute management of myocardial infarction was instituted, except for streptokinase which is contraindicated in pregnancy. She went into ventricular fibrillation and asystole (Fig. 2), but responded to defibrillation and resuscitation.

Anna Liza Roslani is a Obstetrician and Gynaecologist at Hospital Tengku Ampuan Afzan; Abdul Hadi Jaafar is a HOD and Cardiologist at Hospital Tengku Ampuan Afzan; Anwar Irawan Ruhani is a Cardiologist at Hospital Tengku Ampuan Afzan.

✉ Anna Liza Roslani
dralr@hotmail.com

¹ Department of Obstetrics and Gynaecology, Hospital Tengku Ampuan Afzan, Jalan Tanah Putih, 25100 Kuantan, Pahang, Malaysia

² Department of Cardiology, Hospital Tengku Ampuan Afzan, Kuantan, Malaysia

Fig. 1 ECG during first presentation. Sinus tachycardia (HR 120 bpm), ST depression in II, AVF, V4, V5 and V6

Fig. 2 ECG 4 h after first presentation. Ventricular fibrillation

Fig. 3 Left coronary artery system angiogram showing proximal left anterior descending artery segment severe stenosis and possible unstable eccentric plaque

Fig. 4 Right coronary artery is huge and dominant, ectatic with multiple aneurysmal deformation from proximal to distal segment

An urgent coronary artery angiogram and stenting of the left anterior descending branch of the left coronary artery were performed (Figs. 3, 4, 5, 6). Plaque was occluding 90 % of the vessel lumen. Her condition subsequently stabilized (Fig. 7). She was started on clopidogrel and rosuvastatin. A cardiac echo showed an ejection fraction of 70 % and mild mitral and pulmonary regurgitation. Obstetric ultrasound examination was normal. The rest of the antenatal period was uneventful.

At 34 weeks, she delivered via elective lower segment caesarean section under general anaesthesia. Clopidogrel was withheld 5 days prior to surgery. Aspirin was continued throughout the antepartum, intrapartum and post-partum periods. She was transfused with 2 units of platelets at anaesthetic induction to reduce the risk of bleeding. Estimated blood loss was 600 mL. A healthy baby boy weighing 2100 g was delivered with good Apgar scores. Clopidogrel was restarted at 12 h post-caesarean section. She was discharged well after a week. At the time of

Fig. 5 0.014-in coronary guidewire crossing the lesion and wire tip rest in distal LAD

Fig. 6 Post-stenting of proximal LAD lesion showed well-apposed and expanded segment about 3.0 mm diameter

Fig. 7 ECG 2 h after stenting. Sinus tachycardia (HR 120 bpm), ST depression in II, AVF and V4

writing, the baby was 2 years old and both mother and baby were well.

Discussion

Heterozygous familial hyperlipidaemia is common with an incidence of 1:500 [1]. The homozygous form is rare, affecting 1:1,000,000 [1]. Our patient had resistant familial hyperlipidaemia, severe coronary artery disease and myocardial infarction during pregnancy. There are very little data or guidelines on how to manage these conditions. Most existing guidelines are on older women with less severe hyperlipidaemia and less severe coronary artery disease.

The treatment of FH is challenging in women who are pregnant because cholesterol levels often increase during pregnancy and statins, in general, are contraindicated (Category X) during pregnancy [1]. Women with FH who plan to get pregnant should be on statins and aim for a 50 % reduction in baseline cholesterol levels before they embark on pregnancy [1]. Statins are generally stopped through the course of pregnancy due to their theoretical risk of interrupting lipid metabolism in the foetus, although no increased risk of foetal anomalies has been reported in accidental use of statins [2]. Furthermore, interruption of cholesterol-lowering therapy during pregnancy does not have any apparent effect on long-term treatment of hyperlipidaemia. Our patient's cholesterol levels were elevated at the start of pregnancy and rose further when cholesterol-lowering therapy was stopped. Whether cholesterol-lowering therapy should have been continued is debatable. Unlike other case reports, our patient had very elevated cholesterol levels and severe coronary artery disease. However, even after commencing rosuvastatin (after

her second NSTEMI) her cholesterol levels did not reduce significantly.

In resistant hyperlipidaemia, low-density lipoprotein (LDL) apheresis is an option to lower cholesterol levels prior to pregnancy. However, there is limited experience of performing LDL apheresis in pregnant women. This treatment option was not available to her in our centre.

Pregnancy is associated with increased plasma volume and decreased systemic vascular resistance, both resulting in an increase in cardiac output [3]. These changes are greatest in the third trimester of pregnancy. The decision to deliver her prematurely at 34 weeks via caesarean section was a balance between the risk of her having another coronary event and risk of prematurity in the baby. Furthermore, the safest period to deliver a woman following a myocardial infarction is after 3 months.

Co-prescription of aspirin and clopidogrel in the treatment of NSTEMI for between 3 and 12 months reduces the risk of death from cardiovascular causes, non-fatal myocardial infarction or stroke (9.3 vs 11.4 %) compared to aspirin only [4]. For perioperative management of caesarean section, the risk of intraoperative bleeding if antiplatelet therapy was continued had to be balanced against the risk of stent thrombosis if antiplatelet therapy was stopped. It had been 3 months post-NSTEMI and stent insertion, and therefore risk of another coronary event and stent thrombosis was not increased [5]. However, available data are based on non-pregnant patients, while pregnancy is a hypercoagulable state.

Data on the risk of bleeding during caesarean section and antiplatelet therapy are limited. A meta-analysis of major non-cardiac surgeries by Burger et al. [6] found that although aspirin increased the rate of bleeding complications by 1.5-fold, it did not increase their severity. Data on the risk of intraoperative bleeding during caesarean section while on clopidogrel are even more scarce. Due to these reasons, a decision was made to continue aspirin perioperatively but to stop clopidogrel.

The ASA Task Force 2006 [7] recommended that platelet transfusion may be indicated despite an apparently adequate platelet count if there is known platelet dysfunction and microvascular bleeding. Therefore, two units of platelets were transfused at induction as prophylaxis against bleeding. Each unit was expected to raise the platelet count by 5000–10,000/ μ L. This was deemed adequate for haemostasis as aspirin has only weak antiplatelet activity. Heparin has not been proven to reduce the risk of coronary events of thrombus formation and was not used in our patient.

The baby was born with a good weight despite being premature and was discharged well with his mother. This is in keeping with reports that women with familial

hyperlipidaemia do not appear to have a higher risk of having infants with low birth weight [8].

Conclusion

Managing women with resistant familial hyperlipidaemia and coronary artery disease is challenging. Women who have had a NSTEMI and require coronary artery stenting should be managed with aspirin and clopidogrel for a minimum of 3 months. Clopidogrel can be stopped safely a week prior to caesarean section if they have already completed the three-month course. Continued aspirin therapy throughout the perioperative period did not cause haemostatic problems during caesarean section.

Compliance with Ethical Standards

Conflict of interest Authors Anna Liza Roslani, Abdul Hadi Jaafar and Anwar Irawan Ruhani have not received any research grants, speaker honorarium, do not own any stock in any related company and are not committee members in any related organization. Anna Liza Roslani declares that she has no conflict of interest. Abdul Hadi Jaafar declares that he has no conflict of interest. Anwar Irawan Ruhani declares that he has no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in this study.

References

1. Eapen DJ, Valiani K, Reddy S, et al. Management of familial hypercholesterolemia during pregnancy: case series and discussion. *J Clin Lipidol*. 2012;6(1):88–91.
2. Briggs GG, Freeman RK, Yaffe SJ. *Drugs in pregnancy and lactation. A reference guide to fetal and neonatal risk*. 9th edn. Philadelphia: Lippincott Williams & Wilkins; 2011.
3. Pieper PG, Hoendermis ES. Pregnancy in women with pulmonary hypertension. *Neth Heart J*. 2011;19(12):504–8.
4. Yusuf S, Bijnsterveld NR, Moons AHM. Effects of clopidogrel in addition to aspirin in patients with acute coronary syndromes without ST-segment elevation: the Clopidogrel in Unstable Angina to Prevent Recurrent Events Trial Investigators. *N Engl J Med*. 2001;345:494–502.
5. Chassot PG, Delabays A, Spahn DR. Perioperative anti-platelet therapy: the case for continuing therapy in patients at risk of myocardial infarction. *Br J Anaesth*. 2007;99(3):316–28.
6. Burger W, Chemnitius JM, Kneissl GD et al. Low-dose aspirin for secondary cardiovascular prevention—cardiovascular risks after its perioperative withdrawal versus bleeding risks with its continuation—review and meta-analysis. *J Intern Med*. 2005;257:399–414.
7. Nuttall GA, Brost BC, Connis RT, et al. Practice guidelines for perioperative blood transfusion and adjuvant therapies: an updated

report by the American Society of Anesthesiologists Task Force on Perioperative Blood Transfusion and Adjuvant Therapies. *Anesthesiology*. 2006;105:198–208.

8. Toleikyte I, Retterstøl K, Leren TP et al. Pregnancy outcomes in familial hypercholesterolemia a registry-based study. *Circulation*. 2011;124:1606–14.