

# Management of grade V splenic injury with splenic artery embolization in pregnancy: A case report

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## ARTICLE INFO

### Keywords:

Splenic injury  
Pregnancy  
Trauma  
Angioembolisation

## ABSTRACT

**Introduction:** Trauma is known to be a causative factor of mortality in pregnancy. However, splenic injuries are atypical in pregnancy. In this case report, we discuss a novel approach using splenic artery embolization to manage a severe form of splenic injury in pregnancy.

**Case Presentation:** A 35-year-old multigravida presented at 28 weeks of gestation. She had sustained grade V splenic injury and was treated with splenic artery embolization. She continued her pregnancy up to term following the treatment.

**Discussion:** Splenic artery embolization should be considered as an alternative to laparotomy in managing severe forms of splenic injury in pregnancy.

## 1. Introduction

Trauma is the top contributor to mortality in pregnancy [[1]]. We managed a severe form of splenic injury in pregnancy with splenic artery embolization and avoided laparotomy. We used splenic artery embolization to manage a grade V splenic injury at 28 weeks of gestation and prolonged the pregnancy until term.

## 2. Case Presentation

A 35-year-old woman who was 28 weeks pregnant was transferred from a regional hospital for splenic injury following blunt trauma from assault with massive haemoperitoneum. She had previously had five uncomplicated vaginal births. At presentation she did not have any medical comorbidities and had a body mass index (BMI) of 24 kg/m<sup>2</sup>.

On arrival at the regional hospital, she was hypotensive with a blood pressure of 90/50 mmHg and a heart rate of 120 beats per minute (bpm). Computerized tomography (CT) showed grade V spleen laceration as per the splenic injury scale of the American Association for the Surgery of Trauma (AAST), with 2 litres of haemoperitoneum (Fig. 1). She was then transfused with 2 units of packed red blood cells prior to transfer to the tertiary unit. Transfer to a tertiary unit was initiated as the regional hospital did not have an intensive care unit (ICU) or a neonatal unit, which was deemed crucial for this patient's care. Because the regional

hospital is approximately 700 km by road from the tertiary hospital, the patient was airlifted.

Upon arrival at the tertiary unit, she had a blood pressure of 110/70 mmHg and a heart rate of 96 bpm. Her haemoglobin after transfusion was 84 g/L (reference range 110-160 g/L). Cardiotocography (CTG) on arrival was acceptable for 28 weeks. Obstetric ultrasound showed a normally grown foetus with normal amniotic fluid and umbilical artery Doppler. There was no evidence of placental abruption on ultrasound. Speculum examination showed a closed cervix, indicating a low chance of preterm delivery upon arrival. However, steroids (intramuscular betamethasone 11.4 mg, 2 doses 24 h apart) were given for fetal lung maturation in anticipation of preterm delivery.

12 h after admission to the ICU, her haemoglobin dropped to 60 g/L. She was transfused with another 2 units of packed red blood cells and subsequently proceeded to splenic artery angioembolization.

The left radial artery was punctured retrograde just proximal to the left cubital fossa with a 22-gauge needle following the Seldinger technique. A 5.5 French 40 cm sheath was inserted with the tip in the proximal descending aorta, followed by several 5 French catheters and wires for selective catheterization of the coeliac trunk. Digital subtraction angiography (DSA) of the splenic artery was performed with 60 cc of contrast following insertion of a 5 French Vert catheter into the proximal splenic artery (Fig. 2).

The DSA findings were consistent with grade V splenic laceration

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<https://doi.org/10.1016/j.crwh.2022.e00391>

Received 8 January 2022; Received in revised form 26 January 2022; Accepted 27 January 2022

Available online 30 January 2022

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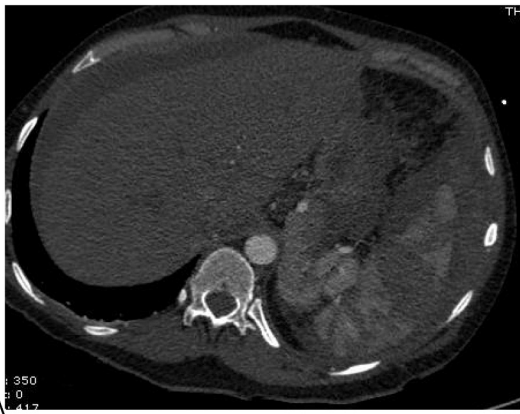


Fig. 1. Grade V splenic injury.

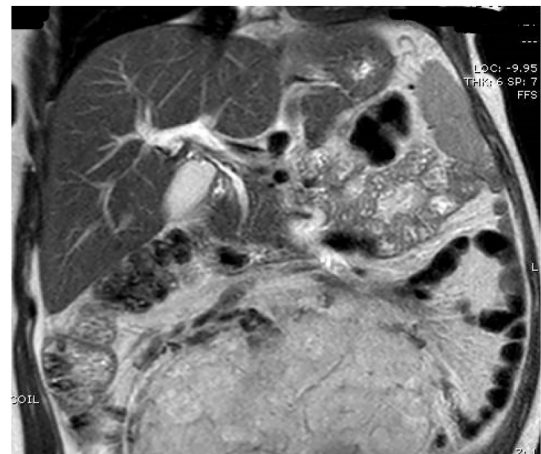


Fig. 4. MRI of spleen 2 weeks post-embolization.

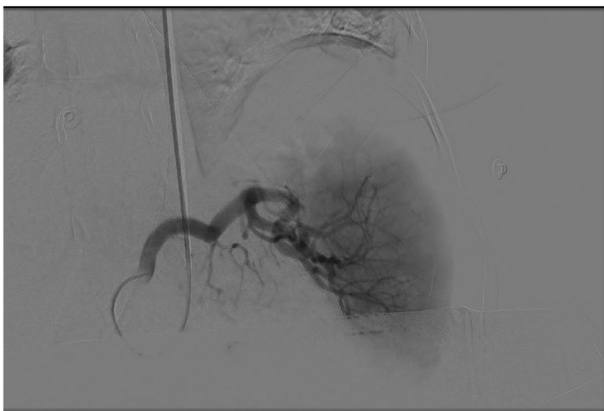


Fig. 2. Pre-angiogram.

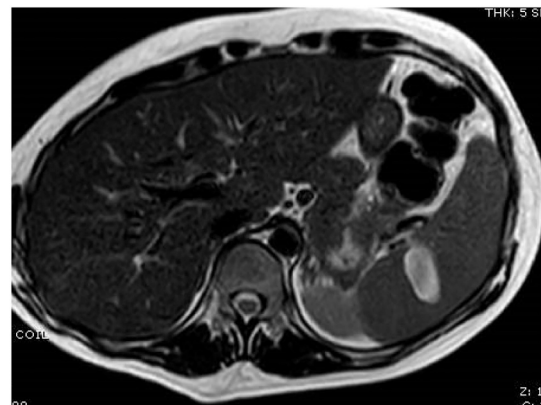


Fig. 5. MRI of spleen 2 weeks post-embolization.

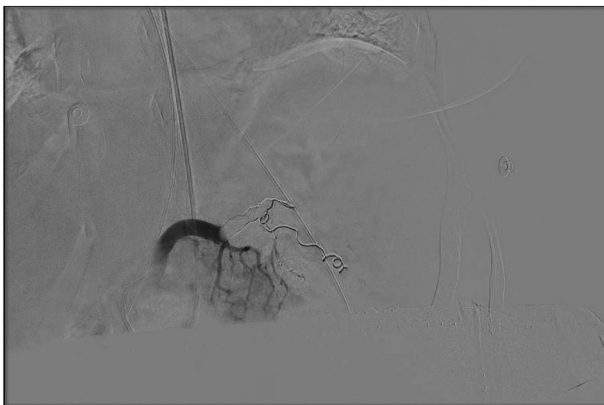


Fig. 3. Post-angiogram.

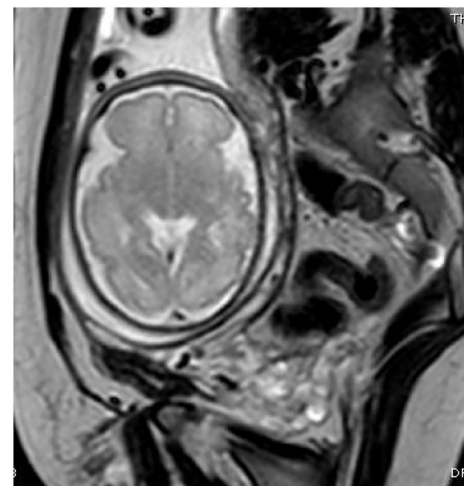


Fig. 6. MRI of Fetal brain, 2 weeks of post embolisation.

with a small area of active bleed from the distal branches of the mid-segmental artery. Two pieces of 18S 8/4 MWCE Tornado coils, five pieces of 18S 7/3 MWCE Tornado coils, and 1 piece of 18–7-8 MWCE Nester coil were deployed into the distal splenic artery distal to the level of origin of the greater pancreatic artery followed by 0.5 cc of glue mixture (Lipiodol and Histoacryl blue) flushed with 10 cc of 25% glucose into the distal splenic artery distal to the level of origin of the great pancreatic artery. A follow-up angiogram showed successful complete embolization (Fig. 3).

After angiogram, the patient was monitored for 7 days with serial haemoglobin and daily CTG. Speculum examination would have

been performed if the patient reported uterine regular contractions, to rule out preterm labor. MRI of the spleen and foetus brain two weeks after the angiogram (Figs. 4 and 5) showed no obvious hypoxic changes in the foetal brain and the maternal spleen was stable. (See Fig. 6.)

The patient had an obstetric ultrasound at 32 weeks of gestation, which showed a normal grown foetus. She was booked for induction at

**Table 1**

Summary of case reports.

Case Report	Gestation at injury	Severity of injury (AAST)	Outcome
Michael V. Muench (2004) [[3][3]]	16 weeks and 4 days	Grade 3	Delivered at 35 weeks for PPROM
Y. Athiel (2019) [4]	33 weeks	Grade 3	Delivered at 35 weeks for suspected chorioamnionitis

39 weeks with a Foley catheter followed by syntocinon. Induction commenced in the daylight hours and surgeons were notified. She did not require any restrictions during labour.

She then proceeded to have a vaginal birth, which was complicated by retained membranes, which required removal in theatre under anaesthesia. Her total blood loss from labour was 550 ml. The baby was delivered with Apgar scores of 9 at 1 min and 9 at 5 min and weighed 3.1 kg. The patient was discharged home on day 2 postpartum with Implanon for contraception.

### 3. Discussion

Trauma is associated with high mortality in pregnancy [[1]]. The commonest type of injury is blunt abdominal trauma [[1]]. Maternal and fetal mortality from blunt trauma are 2% and 10% respectively [2]. Splenic injuries in pregnancy are rare. There were two case reports published on handling blunt splenic injury with splenic angioembolization. Both case reports dealt with grade 3 splenic laceration. We summarize their findings in Table 1.

No published case report has explored a severe form splenic injury in pregnancy. We successfully dealt with a grade V splenic injury with a minimally invasive technique and prolonged the pregnancy to term. Most importantly, we avoided laparotomy, which could have increased the risk of preterm labour. We managed to prolong the patient's gestation up to 38 weeks and she had a vaginal birth complicated only by retained membranes.

Since there is no guideline available on the management of a patient with splenic trauma in pregnancy, we used the general recommendation. A recent systematic review recommends splenic angioembolization (SAE) for blunt splenic injury graded IV or V by the American Association for the Surgery of Trauma (AAST). [5]

### 4. Conclusion

In conclusion, splenic angioembolization (SAE) can be used for grade

IV and V blunt splenic injury in pregnancy with the aim of prolonging the pregnancy as long as possible without compromising either mother or foetus.

### Contributors

Kumaressan Ragunathan contributed to acquisition and analysis of data as well as drafting of the report.

Jane Thorn contributed to acquisition and analysis of data, and was involved in patient care.

### Funding

No funding from an external source supported the publication of this case report.

### Patient consent

Obtained.

### Provenance and peer review

This article was not commissioned and was peer reviewed.

### Conflict of interest statement

The authors declare that they have no conflict of interest regarding the publication of this case report.

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