Case Report

DOI: 10.7860/JCDR/2024/71424.19765

Anaesthesia Section

Anaesthesia Management in Case of Placenta Accreta Undergoing Caesarean Delivery with Internal Iliac Artery Balloon Catheterisation and Embolisation

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ABSTRACT

Abnormal invasion of the placenta into the uterine tissue during pregnancy is one of the most common causes of peripartum hysterectomy, as well as morbidity and mortality. A multidisciplinary approach is the best way to manage such cases in order to maintain perioperative haemodynamic stability, which leads to lower rates of complications and shorter hospital stays for both the parturient and the newborn. The authors hereby report the case of a 27-year-old female {Gravidity and Parity (G1P2)} at 36 weeks of gestation, diagnosed with central placenta accreta with bladder invasion. In the present case, authors performed a balloon-assisted caesarean delivery under general anaesthesia while avoiding hysterectomy. The patient had a history of a previous caesarean delivery 1.5 years prior. Placenta accreta was diagnosed during her ultrasound. All routine laboratory results were within the normal range, except for haemoglobin, which was 10.1 g/dL. An elective caesarean section with a consented hysterectomy under general anaesthesia was planned. Adequate blood and blood products (4 units of packed red blood cells and 2 units of fresh frozen plasma) were arranged before surgery. Bilateral internal iliac artery embolisation was performed to reduce perioperative bleeding. Flexible cystoscopy was conducted prior to surgery to confirm the extent of bladder invasion. The caesarean section was successfully carried out with the multidisciplinary team approach under general anaesthesia, and hysterectomy was not performed, allowing for a successful fertility-sparing caesarean delivery by our team. The patient was transferred to the Intensive Care Unit (ICU) after the surgery for proper vital monitoring and adequate pain management. She was moved to the ward on day 2 and discharged on day 3. In conclusion, balloon occlusion of the internal iliac artery is effective for haemostasis in most cases of patients with placenta previa.

Keywords: Balloon occlusion, Haemodynamic stability, Obstetric haemorrhage

CASE REPORT

A 27-year-old female, G2P1, presented at 36 weeks of gestation with a Body Mass Index (BMI) of 32 kg/m^2 for safe confinement and an elective caesarean section. She was a known case of central placenta previa with placenta accreta, along with bladder invasion. She had no other significant medical or family history. Her past obstetric history included one caesarean section 1.5 years ago under spinal anaesthesia at 38 weeks of gestation, which was uneventful. This time, her caesarean section was planned at 36 weeks, as it was found that there was thinning at the uterine scar site from the previous caesarean delivery. All standard laboratory findings were within normal limits, with the exception of haemoglobin, which was 10.1 g/dL. Abdominal ultrasonography confirmed placenta accreta.

Therefore, a planned elective caesarean section under general anaesthesia was scheduled, along with a consenting hysterectomy. Adequate blood and blood products (4 units of packed red blood cells and 2 units of fresh frozen plasma) were arranged before surgery.

Before transferring the patient to the operating theatre, she was taken to the cardiac catheterisation lab for the insertion of bilateral internal iliac artery catheters via femoral arteries under all aseptic precautions. The patient was shielded with a lead apron to minimise radiation exposure. Following the procedure, the patient was transferred to the operating room, where flexible cystoscopy was performed under local anaesthesia to confirm intravesical invasion. Local anaesthesia was used to minimise the duration of anaesthetic drug exposure to the foetus. Flexible cystoscopy was preferred to avoid lithotomy positioning of the patient, which could have displaced the internal iliac artery catheters.

All routine monitors (pulse oximeter, invasive arterial blood pressure, electrocardiogram, blood pressure, and end-tidal CO_2) were attached. The patient's baseline vitals prior to induction were: blood pressure 126/74 mmHg, heart rate 112 beats per minute, and saturation 98% on room air. Two large-bore peripheral intravenous cannulas (16-gauge and 18-gauge) were secured. Invasive arterial monitoring was performed by connecting the monitor to one of the femoral arterial lines. Antibiotic coverage with 750 mg of intravenous amikacin and 1.5 grams of cefuroxime was administered, along with 40 mg of pantoprazole and 4 mg of ondansetron intravenously 15 minutes prior to induction. After five minutes of preoxygenation, rapid sequence induction of anaesthesia was performed with premedication of injection glycopyrrolate at 0.005 mg/kg and suxamethonium at 1-1.5 mg/kg body weight. Tracheal intubation with an endotracheal tube of 7 mm internal diameter was facilitated by intravenous (i.v.) thiopentone at 3 mg/kg. The tube was secured at 20 cm after checking for equal bilateral air entry. Anaesthesia was maintained with oxygen (50%) and air, sevoflurane (1.0-1.5%), and i.v. atracurium at 0.3 mg/kg. Injection tranexamic acid, 1 gram, was given intravenously slowly over one minute. A single live female foetus was delivered.

Following the delivery of the baby, intravenous fentanyl at 1.5 micrograms/kg and 100 micrograms of carbetocin were administered, along with 20 units of oxytocin in 100 mL of Ringer's lactate. Once the placenta was separated manually, there was an incident of heavy bleeding, for which 250 micrograms of carboprost were given intramuscularly, along with 0.2 micrograms of methyl ergometrine. One unit of packed red blood cells was started, and bilateral internal iliac artery balloons were inflated to stop further uterine bleeding. After 10 minutes, the balloons were deflated, and the uterine bleeding resumed. Subsequently, internal iliac artery

embolisation was performed by an interventional radiologist, and the uterine bleeding ceased. After confirmation of the cessation of placental bleeding, the uterus was closed.

The patient was given 1 gram of intravenous paracetamol along with 75 mg of diclofenac in 100 mL normal saline intravenously for pain relief. After complete reversal of neuromuscular blockade with 0.005 mg/kg of glycopyrrolate and 50 mcg/kg of neostigmine, the patient was assessed. She exhibited adequate respiratory efforts, was able to follow commands, and could lift her head for more than five seconds. She was successfully extubated. Total blood loss during the surgery was approximately 800 mL. The femoral arterial sheath from one side was removed, and the patient was transferred to the intensive care unit for postoperative monitoring. The patient remained stable postoperatively and was shifted out of the ICU on the second day after surgery. She was discharged on the third day postsurgery.

DISCUSSION

In a normal pregnancy, the placenta anchors to the decidualised endometrium [1]. The abnormal invasion of placental trophoblasts into the uterine myometrium is referred to as placenta accreta.

Depending on the extent of myometrial invasion, it constitutes a spectrum of conditions that includes placenta accreta, placenta increta, and placenta percreta. The incidence of Placenta Accreta Spectrum (PAS) is rising worldwide [2]. This increase is most likely due to the rising rates of caesarean delivery, which is the major risk factor for PAS in subsequent pregnancies. PAS is one of the most dangerous conditions during pregnancy. It is the most common indication for peripartum hysterectomy and a frequent cause of severe maternal morbidity and obstetric haemorrhage [3]. Placenta previa is present in approximately 80 percent of cases of placenta accreta. Placenta accreta has also been linked to other types of uterine surgery, such as myomectomy, uterine curettage, hysteroscopic surgery, prior endometrial ablation, uterine embolisation, and pelvic irradiation [1]. Elective caesarean delivery is recommended for conditions such as major placenta previa and caesarean hysterectomy, even though leaving the placenta in-situ is advised for placenta accreta. For patients with placenta accreta who still wish to maintain fertility, an alternative option is the manual removal of the placenta by resection of the infected area, along with conservative management of leaving the placenta in-situ. A multidisciplinary approach may improve patient outcomes. Kumar R et al., also recommend that a multidisciplinary team approach under general anaesthesia is essential for such complicated procedures [4].

In the cardiac catheterisation laboratory (Cath lab), the interventional radiologist performs a technique known as bilateral internal iliac artery blockage. To protect the foetus from radiation exposure, a lead shield is placed over the parturient before the bilateral femoral arteries are punctured under local anaesthesia, and balloon-tipped catheters are inserted into the bilateral internal iliac arteries under limited fluoroscopic guidance [5]. The parturient is then anaesthetised in the operating theatre. General anaesthesia is the preferred mode of anaesthesia due to concerns about haemodynamic instability and the potential need for massive transfusions [6].

The balloons are inflated manually once the obstetrician clamps the umbilical cord during a lower segment caesarean section. This intervention decreases the pulse pressure, thereby significantly reducing uterine blood supply, which leads to decreased blood loss during the caesarean section, shorter surgical time, and an overall reduced stay in the intensive care unit and hospital. In several situations, an obstetric hysterectomy can also be avoided if the placental tissue is completely removed from the uterus. Foetal blood flow is not affected, as the balloons are inflated only after the umbilical cord has been clamped [7].

Similar to the present case, according to Tan CH et al., patients with placenta accreta and its variations undergoing caesarean delivery may require fewer transfusions and experience less intraoperative blood loss when internal iliac artery occlusion balloons are used during the procedure. This is a safe and minimally invasive approach. There is no discernible increase in the length of hospitalisation or intensive care unit stay linked to this operation, only a shorter caesarean surgery time. In addition, compared to intraoperative endovascular embolisation procedures, it results in shorter fluoroscopy periods and lower radiation exposure to the foetus [8]. However, Savukyne E et al., reported that the use of intermittent balloon occlusion catheters in patients with placental pathology is a safe method but does not significantly reduce intraoperative blood loss during caesarean delivery [9]. Ahmed HA et al., also found no statistical difference in blood loss or the need for other measures to control haemorrhage between women with and without internal iliac artery balloon occlusion catheters [10].

Tan YL et al., presented data concerning 13 parturients whose diagnosis of placenta accreta was validated by colour Doppler, ultrasonography, and, when necessary, magnetic resonance imaging. They recommended that preventive internal iliac artery balloon occlusion be used as an adjuvant in cases of aberrant placentation in current clinical practice because it significantly reduces the amount of blood lost and transfusions needed [11]. Gulino FA et al., reported on 37 cases of placenta accreta, of which 16 were in a balloon group and 21 were in a non balloon group. The balloon group experienced lower rates of bleeding, reduced blood transfusion volume, and fewer hysterectomies than the non-balloon group [12]. Additionally, Carnevale FC et al., found that preventive internal iliac artery balloon occlusion is a safe method to lower bleeding and blood transfusion rates in patients with placenta accreta following caesarean section [13].

CONCLUSION(S)

Balloon occlusion of the internal iliac artery is effective for haemostasis in most cases of patients with placenta previa undergoing caesarean section under general anaesthesia and may even prevent hysterectomy and excessive perioperative blood loss.

REFERENCES

[1] Silver RM, Barbour KD. Placenta accreta spectrum: accreta, increta, and percreta. Obstet Gynecol Clin North Am. 2015;42(2):381-402.
[2] Jauniaux E, Chantraine F, Silver RM, Langhoff-Roos J. FIGO consensus guidelines on placenta accreta spectrum disorders: epidemiology. Int J Gynecol Obstet. 2018;140(3):265-73.
[3] Morlando M, Sarno L, Napolitano R, Capone A, Tessitore G, Maruotti GM, et al. Placenta accreta: Incidence and risk factors in an area with a particularly high rate of caesarean section. Acta Obstet Gynecol Scand. 2013;92(4):457-60.
[4] Kumar R, Sahay N, Naaz S, Kumar R. Anaesthetic management of complicated placenta percreta. Ain-Shams J Anaesthesiol. 2022;14:14.
[5] Wang YL, Duan XH, Han XW, Wang L, Zhao XL, Chen ZM, et al. Comparison of temporary abdominal aortic occlusion with internal iliac artery occlusion for patients with placenta accreta- A non-randomised prospective study. Vasa. 2017;46(1):53-57.
[6] Ring L, Landau R, Delgado C. The current role of general anaesthesia for caesarean delivery. Curr Anaesthesiol Rep. 2021;11(1):18-27.
[7] Nair AS. Balloon occlusion of internal iliac arteries in placenta accreta! Saudi J Anaesth. 2017;11(2):245-46.
[8] Tan CH, Tay KH, Sheah K, Kwek K, Wong K, Tan HK, et al. Perioperative endovascular internal iliac artery occlusion balloon placement in management of placenta accreta. AJR Am J Roentgenol. 2007;189(5):1158-63.
[9] Savukyne E, Liubiniene L, Strelcoviene Z, Nadisauskiene RJ, Vaboliene E, Machtejeviene E, et al. Experience of Managing Suspected Placenta Accreta Spectrum with or without Internal Iliac Artery Balloon Occlusion in Two Lithuanian University Hospitals. Medicina (Kaunas). 2021;57(4):345.
[10] Ahmed HA, Minisha F, Babarinsa IA, Omar AJ, Bayo AI, Omar KK, et al. The intraoperative use of internal iliac artery balloon catheters in caesarean deliveries for abnormal invasive placentation: A 3-year retrospective cohort review in Doha, Qatar. Qatar Med J. 2021;2021(1):8.

[11] Tan YL, Suharjono H, Lau NL, Voon HY. Prophylactic bilateral internal iliac artery balloon occlusion in the management of placenta accreta: A 36-month review. Med J Malaysia. 2016;71(3):111-16.
[12] Gulino FA, Guardo FD, Zambrotta E, Di Gregorio LM, Miranda A, Capriglione S, et al. Placenta accreta and balloon catheterization: the experience of a single center and an update of latest evidence of literature. Arch Gynecol Obstet. 2018;298:83-88.
[13] Carnevale FC, Kondo MM, de Oliveira Sousa W, Santos AB, da Motta Leal Filho JM, Moreira AM, et al. Perioperative temporary occlusion of the internal iliac arteries as prophylaxis in caesarean section at risk of hemorrhage in placenta accreta. Cardiovasc Intervent Radiol. 2011;34:758-64.

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PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Apr 28, 2024
- Manual Googling: Jun 19, 2024
- iThenticate Software: Jul 06, 2024 (18%)

ETYMOLOGY: Author Origin

EMENDATIONS: 6

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. NA

Date of Submission: **Apr 28, 2024**
Date of Peer Review: **Jun 17, 2024**
Date of Acceptance: **Jul 08, 2024**
Date of Publishing: **Aug 01, 2024**