Case Report

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Successful Medical Management of PPH in a High-Risk IVF Pregnancy – A Multifaceted Obstetric Challenge

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Abstract:

Postpartum hemorrhage (PPH) is an obstetric emergency. In this case report, a 37-year-old primigravida, IVFconceived and complicated by GDM, IHCP, and severe pre-eclampsia at 35+4 weeks, underwent caesarean delivery. Three hours postpartum, she developed atonic PPH, which was managed using a stepwise medical protocol, highlighting the importance of medical management, thus preventing hysterectomy and thereby preserving fertility.

Keywords: Postpartum hemorrhage, *In-vitro* fertilization, Carboprost.

Introduction

Postpartum hemorrhage (PPH) remains a significant contributor to maternal morbidity and mortality worldwide, accounting for approximately 3 to 5% of all deliveries and nearly a quarter of global maternal deaths. It is clinically defined as any amount of bleeding from the genital tract within 24 hours of delivery till 12 weeks in the postpartum period, which affects the general condition of the patient, evidenced by an increased pulse rate and falling blood pressure. Quantitative definition, for management purpose, is blood loss exceeding 500 mL after vaginal delivery and 1000 mL following caesarean section.

A range of maternal, fetal, and obstetric factors increases the likelihood of PPH. Up to 80% of PPH cases are attributable to uterine atony—insufficient contraction of the myometrium after placental separation. Other aetiologies include retained placental fragments, genital tract trauma (including vaginal or cervical lacerations), uterine rupture, and underlying maternal coagulation disorders. Increasing maternal age and the growing use of assisted reproductive technologies (ART) are associated with a 1.7 to 3.4% increased risk of PPH compared to spontaneous conceptions.[1]

Management of PPH requires a rapid, tiered approach. First-line interventions include uterine massage, bladder emptying, and administration of uterotonic agents such as oxytocin, methylergometrine, and prostaglandins. If bleeding persists, mechanical and surgical options like intrauterine balloon tamponade, uterine compression sutures, bilateral arterial ligation, and uterine artery embolization are considered. In refractory cases where fertility preservation is not possible, emergency peripartum hysterectomy becomes the definitive life-saving measure.[2]

In this context, we present the case of a woman with a high-risk IVF pregnancy complicated by pre-eclampsia,

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who developed primary postpartum hemorrhage following caesarean delivery. Remarkably, the bleeding was effectively controlled using medical measures alone, preserving uterine integrity and fertility.

Case

A 37-year-old primigravida with a conception achieved through *in-vitro* fertilization (IVF) was diagnosed with gestational diabetes mellitus (GDM), intrahepatic cholestasis of pregnancy (IHCP), and hypertensive disorders of pregnancy (HDP) during the second trimester. She was managed on an outpatient basis with appropriate medical follow-up. At 31 weeks of gestation, she was admitted for maternal and fetal surveillance and received antenatal corticosteroids for fetal lung maturity. After discharge, the patient was lost to follow-up and presented to the emergency department at 35^{+4} weeks' gestation with complaints of epigastric pain for 6 hours, associated with vomiting, headache, and blurred vision for the last 4 hours. She also reported being admitted to a private hospital one day prior with a diagnosis of severe pre-eclampsia and signs suggestive of impending eclampsia, where she had received a loading dose of magnesium sulphate (24 hours prior) and intravenous labetalol. On arrival to our facility, her vital signs were: Temperature: 97.5°F, Pulse rate: 98/min, Blood pressure: 170/100 mmHg, respiratory rate: 20/min, SpO_2: 98% on room air. Physical examination revealed bilateral pedal oedema, abdominal wall oedema, and 3+ proteinuria on dipstick testing. Obstetric examination was concerning for intrauterine growth restriction (IUGR), and the non-stress test (NST) was non-reactive. All supportive medications, including aspirin and low-molecular-weight heparin, were withheld in view of the impending need for delivery if the situation worsens, and relevant investigations were sent. Ophthalmologic evaluation revealed grade 1 hypertensive retinopathy, and Doppler ultrasound demonstrated absent end-diastolic flow in the uterine arteries. Despite meticulous blood pressure monitoring, progressively elevated readings were recorded. Given her worsening symptoms of impending eclampsia (persistent headache, visual disturbances, epigastric pain), a decision was made to proceed with preterm caesarean section in the interest of maternal safety. The grave maternal and fetal prognoses were explained, and informed consent was obtained. The intraoperative period was uneventful. However, three hours post-operatively, the patient developed active vaginal bleeding. On examination, her pulse was 100/min and blood pressure 110/60 mmHg. Abdominal examination revealed a flabby uterus, and ongoing bleeding was noted on local inspection. The PPH care bundle was promptly activated. Management included: Intravenous crystalloids with oxytocin (10 IU) infusion, sublingual misoprostol (600 mcg), bimanual uterine massage, and nipple stimulation. Despite these measures, the uterus remained atonic. The patient was transferred to the operating theatre with one packed red blood cell unit on flow, after obtaining consent for potential peripartum hysterectomy. Management in the OT included: continuation of oxytocin IV infusion and intramuscular oxytocin (10 IU), continued uterine massage, transfusion of 2 units PRBCs and 8 units FFP, intravenous tranexamic acid (1 g), intramuscular carboprost (250 mcg) administered every 15 to 20 minutes (total of 4 doses), adequate uterine tone was achieved, and active bleeding ceased. The patient was continued on two-hourly carboprost injections for an additional four doses. She remained hemodynamically stable, and uterine tone was maintained. The rest of her postoperative course was uneventful, and she was discharged on postoperative day six in a stable condition. She is currently under regular outpatient follow-up.

Discussion

Carboprost tromethamine, a synthetic prostaglandin $F_2\alpha$ analogue, exerts potent uterotonic and vasoconstrictive effects and is indicated for refractory PPH due to uterine atony after oxytocin and ergot alkaloid failure. Clinical trials demonstrate high efficacy, with control rates of 80 to 95% and approximately 73% of cases responding to a single 250 μg intramuscular dose. Guideline-compliant dosing protocols recommend 250 μg IM initially, repeatable every 15 to 90 minutes up to a maximum cumulative dose of 2 mg, i.e., eight doses.[3] anticipation, early detection, and management are crucial to reducing the risk of severe PPH (SPPH

In our high-risk IVF-conceived patient with severe pre-eclampsia and primary PPH unresponsive to first-line measures (oxytocin, misoprostol, uterine massage, tranexamic acid, and blood products), we escalated carboprost in line with these recommendations, reaching the 2 mg ceiling without resorting to hysterectomy or uterine artery embolization. This approach aligns with evidence supporting carboprost's safety, efficacy, fertility-preserving potential, and its critical role before proceeding to invasive interventions.

Conclusion

This case highlights the critical importance of timely, evidence-based medical management in addressing

severe primary PPH, especially in a high-risk obstetric patient with multiple comorbidities, including IVF conception, gestational diabetes mellitus (GDM), intrahepatic cholestasis of pregnancy (IHCP), and hypertensive disorders. The administration of carboprost tromethamine up to the maximum recommended cumulative dose of 2 mg IM effectively restored uterine tone, controlled bleeding, and prevented the need for surgical intervention, such as peripartum hysterectomy.

When used promptly and within established safety parameters, carboprost serves as a vital, fertility-preserving therapy in cases of uterine atony unresponsive to initial treatments. This case further underscores the importance of early activation of standardized PPH protocols, multidisciplinary coordination, and a readiness to escalate care based on clinical response. Ultimately, this experience supports the prioritization of maximally optimized medical therapy before advancing to invasive procedures and adds to the growing body of evidence validating full-dose uterotonic regimens as effective and safe in managing obstetric emergencies.

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