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Case report: nursing care of postpartum hemorrhage complicated by postpartum heart failure

Ting Pu, Ling Zhang, Ying Sun, Zhulan Ding, Lei Zhang*

Gejiu City People's Hospital, Gejiu, China

*Corresponding Author. Email: 1945743898@qq.com

Abstract. This study retrospectively analyzes the clinical nursing of a patient with postpartum hemorrhage complicated by postpartum heart failure, exploring nursing strategies for such cases. In addition, it introduces care methods based on the Enhanced Recovery After Surgery (ERAS) concept, focusing on psychological support and the recovery of postpartum physical function. The patient underwent forceps-assisted vaginal delivery due to acute fetal intrauterine distress and delivered a female infant. Postpartum hemorrhage of 1,000 mL occurred. At 1 hour and 38 minutes postpartum, the patient suddenly experienced chest tightness, choking, dyspnea, and coughing without pink frothy sputum. A multidisciplinary emergency response was immediately initiated. Within 2 hours postpartum, the patient developed heart failure, likely related to the administration of uterotonic and vasoconstrictive hemostatic agents and rapid intravenous fluid infusion, which increased cardiac load and triggered heart failure. Following meticulous treatment and nursing care, the patient recovered and was discharged. With adherence to a series of guided interventions, her postpartum physical functions achieved satisfactory rehabilitation.

Keywords: postpartum hemorrhage, acute heart failure, enhanced recovery after surgery, postpartum rehabilitation, case nursing

1. Introduction

Postpartum hemorrhage (PPH) is defined as blood loss ≥ 500 mL within 24 hours after vaginal delivery, ≥ 1,000 mL after cesarean section, or the presence of symptoms or signs of hypovolemia. PPH remains the leading cause of maternal mortality in China and is a severe perinatal complication [1]. Rapid, massive blood loss leads to a sudden decrease in circulating blood volume. The use of uterotonic and vasoconstrictive hemostatic drugs, combined with accelerated fluid replacement, may excessively activate the body's compensatory mechanisms, increasing cardiac load, resulting in cardiac decompensation and triggering acute heart failure [2]. Patients with PPH complicated by acute heart failure are critically ill, and nursing care is highly challenging. Care requires both rapid hemostasis and blood volume replacement while closely monitoring clinical signs of heart failure, promptly identifying deterioration, and immediately initiating emergency interventions including anti-shock and heart failure therapies. This case report summarizes the successful nursing management and postpartum rehabilitation experience of such a patient.

2. Case presentation

The patient was a 30-year-old female who presented with "9+ months of amenorrhea with vaginal bleeding and lower abdominal colicky pain for more than one day". She was admitted to our department at 03:17 on August 2, 2025, with the following obstetric history and admission diagnosis: "nuchal cord around the neck; G2P0, 39 weeks + 5 days, cephalic presentation, threatened labor". On admission, physical examination revealed a fundal height of 37 cm, abdominal circumference of 103 cm, fetal heart rate 148 bpm, presenting part at the head, floating, with mild uterine contractions. The fetal membranes were intact. Cervical examination showed 50% effacement, posterior position, soft consistency, cervical os closed, Bishop score 3. The sacrum was not palpable, sacral curvature was moderate, sacrococcygeal joint mobility was adequate, bilateral ischial spines were not prominent, the ischial notch could accommodate three fingers, and the pubic arch angle was > 90°. Pelvimetry measurements were as follows: iliac crest distance 24 cm; interspinous distance 26 cm; sacral-pubic external diameter 18 cm; intertuberous diameter 9 cm. Prenatal echocardiography showed no abnormalities, and cardiac function was normal. Admission laboratory tests—including complete blood count, emergency biochemistry, coagulation profile, viral tests, and electrocardiogram—were all within normal limits. The labor process initially progressed smoothly. At 02:30 on August 3, 2025, the fetal membranes ruptured spontaneously, amniotic fluid was clear, cervical dilation was unchanged, and non-stress test was reactive. Regular uterine contractions began at 07:40, and by 08:50 the cervix was 3 cm dilated. Epidural analgesia for labor was administered, with close monitoring of labor progress. By 14:10, the cervix was fully dilated. The patient was assisted to the delivery bed and coached for pushing. During contractions, frequent fetal heart decelerations were observed, and maternal expulsive efforts were insufficient. The physician was immediately notified, fetal intrauterine distress was suspected, and the patient was informed. Forceps-assisted vaginal delivery was recommended. At 15:32, under mediolateral episiotomy, a live female infant weighing 3,760 g was delivered via forceps. Post-delivery, an intravenous infusion of oxytocin (20 U at 20 drops/min) was administered to promote uterine contraction and assist with placental delivery. At 15:42, the placenta was delivered, but sudden profuse vaginal bleeding occurred, dark red with clots. Uterine exploration revealed an empty, soft uterus with poor contraction. Immediate bimanual uterine massage was performed, fluid infusion rate was increased, and the patient was provided with warmth and supplemental oxygen. Vital signs remained stable. The postpartum hemorrhage was attributed to poor uterine contraction of the lower uterine segment and episiotomy. Rapid episiotomy repair was performed to control bleeding. The patient had no history of glaucoma, asthma, hypertension, or cardiac disease. At 15:45, 1 mL of methylergometrine maleate was administered intramuscularly, intermittent uterine massage continued, and uterine contractions improved with slight reduction in blood loss. At 16:00, 2 mg of carboprost tromethamine suppository was administered rectally to promote uterine contraction; contractions improved and bleeding decreased. Total blood loss during labor was 1,000 mL. A urinary catheter was placed for monitoring. Labor durations were as follows: first stage 6 h 30 min, second stage 1 h 22 min, third stage 10 min; total labor duration 7 h 02 min. At 17:10, the patient suddenly experienced chest tightness, choking, dyspnea, and coughing, without pink frothy sputum, accompanied by profuse sweating. Vital signs were: temperature 36.8°C, heart rate 103 bpm, respiratory rate 20/min, blood pressure 120/70 mmHg, oxygen saturation 97%, and capillary blood glucose 5.0 mmol/L. Physical examination revealed no obvious abnormalities in the heart, lungs, or abdomen; uterine contraction was adequate, vaginal bleeding was minimal, and perineal edema was noted. Oxygen was administered via face mask at 5 L/min, continuous ECG monitoring was initiated, two intravenous lines were established, and 20 mg of furosemide was given intravenously. Additional medications included doxofylline, terbutaline, and budesonide. Level 1 nursing care was provided, and a multidisciplinary emergency consultation was initiated. Bedside echocardiography revealed: left ventricular ejection fraction 66%,

pulmonary artery systolic pressure 30 mmHg, small pericardial effusion, right ventricular lateral wall effusion depth 6 mm, mild mitral and tricuspid regurgitation, and normal left ventricular systolic function. Emergency CT Pulmonary Angiography (CTPA) showed a slight increase in pericardial effusion compared with previous imaging, new small bilateral pleural effusions, and no pulmonary embolism in the main pulmonary arteries or branches. Laboratory evaluation for myocardial injury showed: creatine kinase 596.0 U/L, CK-MB 30.70 ng/mL, myoglobin 474.00 ng/mL, troponin I 0.01 ng/mL, BNP 137.00 pg/mL. The working diagnoses were: 1) postpartum heart failure causing choking and dyspnea; 2) postpartum hemorrhage; 3) acute fetal distress; 4) uterine inertia; 5) cephalic vaginal delivery; 6) singleton live birth; 7) premature rupture of membranes; 8) nuchal cord; 9) chorioamnionitis; 10) pregnancy complicated by hypoproteinemia. Dynamic reassessment showed decreasing myocardial enzyme levels. Following active treatment and meticulous nursing care, the patient was discharged on postpartum day 4 and followed up in outpatient clinic. One month postpartum, the patient reported vaginal laxity. Examination revealed vaginal wall prolapse accommodating three fingers. Pelvic floor muscle assessment showed a muscle strength score of 53.9, indicating severe pelvic floor dysfunction. A personalized postpartum pelvic floor rehabilitation plan was implemented, resulting in a post-treatment score of 88.1, significantly improving quality of life.

3. Nursing care

3.1. Antenatal prevention and care

Comprehensive Assessment: The primary causes of postpartum hemorrhage (PPH) include uterine atony, placental factors, soft birth canal injury, and coagulation disorders [3]. Among these, uterine atony accounts for a high proportion of PPH and may be related to prolonged labor, macrosomia, bladder distension, and maternal psychological factors. For pregnant women identified as high-risk during antenatal assessment, it is essential to fully inform them of potential complications, patiently explain coping strategies, and maintain open communication to address questions or concerns, thereby alleviating anxiety and promoting a positive approach to labor. Attention should also be paid to maternal rest and nutritional supplementation to prevent fatigue. When necessary, intravenous fluid therapy may be provided to restore physical strength, shorten labor duration, reduce the use of assisted delivery techniques, and facilitate smooth labor progression. Maternal bladder function should be monitored, with voiding every 2–4 hours. If spontaneous urination is not possible, bladder stimulation or catheterization may be employed to prevent bladder distension, which can impair uterine contraction and prolong labor, thereby reducing the risk of severe obstetric complications.

3.2. Intrapartum nursing

3.2.1. Anticipation of labor complications

In cases of macrosomia, prolonged or abnormal labor, abnormal fetal heart rate, or inadequate maternal expulsive effort, preparation for assisted delivery is critical. Postpartum hemorrhage emergency kits and medications should be readied, and relevant personnel should be called in advance to ensure immediate response [4].

3.2.2. Close monitoring of vital signs

During the second stage of labor, continuous electrocardiographic monitoring should be performed. Maternal consciousness, heart rate, blood pressure, respiratory rate, and oxygen saturation should be closely observed. After delivery, the shock index may be calculated to facilitate rapid assessment of blood loss.

3.2.3. Rapid identification of PPH etiology

If uterine contraction is poor and bleeding is profuse, immediate assistance should be requested. Bimanual uterine massage should be performed, and the soft birth canal carefully examined. Excessive bleeding from the perineal wound should be controlled promptly using hemostatic clamps and rapid suturing.

3.2.4. Accurate measurement of vaginal blood loss

During labor, V-shaped blood collection pads should be used to precisely measure blood loss and observe its color and characteristics, with detailed records maintained. Postpartum bleeding should be monitored using collection pads at 10, 20, 30, 45, 60, 90, and 120 minutes after delivery, with weighing to ensure accurate quantification [5].

3.2.5. Thermal and oxygen support

Maintain maternal body temperature and provide low-flow oxygen therapy. Two effective intravenous lines should be established promptly. As per medical orders, fluid resuscitation and hemostatic treatment should be administered, and blood transfusion prepared if necessary.

3.2.6. Indwelling urinary catheter

An indwelling catheter should be placed to monitor urine color, character, and volume, allowing strict fluid balance calculation and reducing the risk of falls in a weakened postpartum patient.

3.2.7. Infection prevention

Massive blood loss may reduce maternal immunity, increasing susceptibility to infection, particularly in physically weak patients. Vital signs should be closely monitored. Assistance should be provided for perineal, wound, breast, and skin care. Antibiotics may be administered as prescribed, and laboratory tests, such as complete blood count, may be performed to monitor for infection.

3.3. Nursing care for postpartum acute heart failure

3.3.1. Dynamic monitoring of condition

Pay careful attention to patient complaints and closely observe consciousness, skin color, and temperature. Continuous ECG monitoring is essential, with focus on heart rate, rhythm, respiratory rate, blood pressure, and oxygen saturation. If tachycardia (> 100 bpm), tachypnea (> 20 breaths/min), oxygen saturation < 95%, or cold, clammy skin occurs, the attending physician should be immediately notified. In this case, the patient's complaint of chest tightness triggered rapid multidisciplinary intervention and prompt diagnosis and treatment.

3.3.2. Positioning and fluid management

1) Following the onset of heart failure, the patient should assume an upright sitting position to reduce venous return [6].

2) Fluid therapy should correct hypovolemia while limiting overload to reduce cardiac burden. "Precision fluid management" is critical, balancing supplementation and restriction. Hourly monitoring and recording of urine output, fluid intake, infusion volume, vomiting, and sweating are required. Infusions should be administered via pump at 20–30 drops/min. If urine output decreases (< 30 mL/hour) or pulmonary auscultation detects crackles, the physician must be promptly notified, and fluid input adjusted. Patients should be guided to avoid excessive fluid intake at once, with total daily intake determined according to fluid balance. Maintain airway patency and administer high-flow oxygen via mask. Medications should be administered strictly according to medical orders. For example, furosemide IV push should be slow (≥ 5 minutes) with monitoring of urine output and patient-reported symptoms. When using doxofylline, terbutaline, or budesonide, observe for adverse effects such as palpitations, tremors, or nausea. In this case, these interventions quickly corrected the patient's acute heart failure [7].

3.4. Nursing interventions based on Enhanced Recovery After Surgery (ERAS) principles

3.4.1. Psychological care

Postpartum hemorrhage complicated by heart failure may trigger feelings of near-death, fear, anxiety, and tension, which can adversely affect recovery. Active communication with the patient is essential, listening patiently to her concerns, explaining the disease, treatment plan, prognosis, and successful cases to alleviate negative emotions. Family involvement is encouraged to provide psychological support through companionship and care, fostering a sense of warmth and security. In this case, the patient did not experience psychological issues due to attentive family support.

3.4.2. Early mobilization guidance

Once the patient's condition stabilized, an individualized early activity plan was developed according to her physical status, following a gradual, progressive approach: Postpartum Day 1: Assisted bedside exercises, including turning in bed and limb mobilization (knee and ankle flexion/extension), 10–15 minutes per session, 3–4 times daily. Postpartum Day 2: If vital signs were stable, assisted sitting and bedside activities, 15–20 minutes per session, 2–3 times daily. Postpartum Days 3–4: Activity intensity was gradually increased based on recovery, including walking within the ward. During all activity sessions, heart rate, respiration, and facial color were closely monitored. Any discomfort prompted immediate cessation and rest. Early mobilization promotes circulation, prevents lower-extremity deep vein thrombosis, enhances gastrointestinal function, and reduces complications. In this case, no postpartum thrombotic complications occurred [8].

3.4.3. Nutritional support

A "cardiac-friendly" nutritional plan was implemented considering the patient's heart failure: Postpartum high-salt lactation diets were modified to low-salt, high-protein diets, with daily sodium intake limited to ≤ 5 g. Foods rich in branched-chain amino acids were included to support lactation while minimizing fluid and sodium retention that could strain the heart. The patient followed a "small, frequent meals + semi-recumbent position after eating" approach to avoid postprandial gastrointestinal congestion and cardiac overload. Using this approach, the patient achieved adequate milk production by postpartum day 3 without exacerbation of heart failure.

3.5. Postpartum rehabilitation nursing

3.5.1. Pelvic floor rehabilitation

Three weeks postpartum, the patient reported vaginal gas leakage, indicative of pelvic floor dysfunction. A detailed pelvic floor muscle strength assessment was performed. Based on the results, an individualized rehabilitation plan was developed, including pelvic floor electrical stimulation therapy and biofeedback therapy. Patients were instructed on proper engagement of pelvic floor muscles, including contraction and relaxation techniques, duration, and frequency. Home exercises such as Kegel training were prescribed: muscle contraction 3–5 seconds, relaxation 3–5 seconds, 10–15 minutes per session, 2–3 times daily. Following this regimen, the patient's pelvic floor muscle strength score improved, enhancing quality of life [9].

3.5.2. Breast care and breastfeeding guidance

Assistance was provided to maintain breast hygiene and dryness, preventing mastitis. After consultation with a cardiologist, the patient was permitted to breastfeed. A structured breastfeeding plan was provided, including guidance on proper positioning (cradle hold, side-lying) and latch technique. Feeding schedules were adjusted according to milk production, while monitoring for signs of heart failure or breast complications such as

engorgement, pain, or redness. By postpartum day 3, the patient had mastered breastfeeding techniques, and the newborn received adequate feeding without maternal heart failure symptoms.

3.5.3. Discharge education and follow-up

Before discharge, detailed education was provided to the patient and family, covering: Medication adherence; Dietary guidance; Activity recommendations; Personal hygiene; Pelvic floor exercises. The patient was instructed to take medications on schedule and attend regular follow-up. A follow-up record was established, with telephone or outpatient follow-up at 1, 2, 4, and 6 weeks postpartum to assess recovery, cardiac status, pelvic floor function, and breastfeeding. Questions were promptly addressed with appropriate guidance. Patients were advised to seek immediate medical attention for any abnormal signs, such as heavy vaginal bleeding, chest tightness, or dyspnea. In this case, the patient experienced no post-discharge complications.

4. Conclusion

4.1. Qualities required of nurses

(1) Nurses must possess solid professional knowledge and extensive clinical experience. In the management of postpartum hemorrhage complicated by heart failure, they must rapidly control bleeding and restore blood volume while closely monitoring signs of heart failure, balancing anti-shock and heart failure interventions. Nurses must collaborate with physicians, integrate clinical information, make timely assessments, and secure the necessary time for effective resuscitation. (2) Strong psychological resilience is essential. PPH with heart failure is life-threatening and can progress rapidly. During emergency management, nurses must remain calm to ensure orderly resuscitation and help reduce patient anxiety and fear. (3) Nurses must be proficient in all emergency medications, including dosages, concentrations, administration methods, routes, and potential adverse effects, using their expertise to assist physicians effectively in resuscitation efforts.

4.2. Prediction and prevention of postpartum heart failure

Heart failure often presents with early warning signs. Early identification of triggers and proactive intervention can significantly reduce risk. For example, maternal emotional agitation can stimulate the sympathetic nervous system and increase myocardial oxygen consumption; sudden positional changes may cause fluctuations in venous return; rapid IV administration of medications can also provoke tachycardia. Nursing interventions should include preemptive communication with the patient in simple language to alleviate anxiety, gentle assistance with repositioning to avoid abrupt sitting, and strict control of oxytocin infusion rates.

4.3. Application of the Enhanced Recovery After Surgery (ERAS) concept

The ERAS approach to nursing patients with PPH complicated by heart failure includes: psychological support through communication and family involvement to relieve negative emotions; early mobilization guided by heart rate and respiratory thresholds, progressing gradually in a stepwise manner; and nutritional management with a low-salt, high-protein diet delivered in small, frequent meals. This individualized approach aligns with the patient's condition while minimizing heart failure risk, facilitating safe and effective postpartum recovery.

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