

Nursing Care after Cardiac Surgery for Termination of Pregnancy in Five Pregnant Women with Co-morbid Cardiac Disease

Yaping Lu

Guangdong Provincial People's Hospital, Guangzhou 510080, Guangdong, China

Copyright: © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract: Objective: To summarize the clinical data and nursing experience of 5 cases of pregnant women with combined heart disease in pregnancy after cesarean section, followed by termination of pregnancy and then cardiac surgery in the postoperative period, to provide clinical experience for the care of such patients in the future. *Methods*; Retrospective analysis of the treatment and nursing process of 5 cases of pregnant women with pregnancy-related heart disease admitted to the hospital's department from May 16, 2023, to September 19, 2024, after cesarean section for termination of pregnancy, followed by cardiac surgery. For postoperative patients after cesarean section, using the "waist bag" type sandbag hemostasis method to prevent intra-abdominal pressure poly drop caused by heart rate, blood pressure abnormal treatment, and hemostatic effect, reduces the frequency of hemostatic drugs [1]. Strict monitoring of vital signs and hemodynamic monitoring, to maintain access and stability of the internal environment, digestive system care. Result: Five pregnant women with heart disease who underwent surgery all recovered and were discharged after appropriate nursing measures were taken. The average length of hospital stay for the five patients was (20 ± 14.3) days. Conclusion: For pregnant women with complicated heart disease who undergo cesarean section to terminate pregnancy followed by cardiac surgery, it is essential to strengthen specialized monitoring and clearly define key observation points. Focused treatment and nursing care can help reduce postoperative complications, support patient recovery and self-care, and shorten hospital stays. This approach provides valuable clinical guidance for managing similar cases in the future. It is of clinical significance for future cardiac surgery after cesarean section in pregnant women with complicated heart disease.

Keywords: Combined heart disease of pregnancy; Pregnant women; Cardiac surgery; Nursing care; "Waist pack" type sandbag hemostasis

Online publication: June 4, 2025

1. Introduction

Heart disease in pregnancy has a certain incidence rate in the maternal population, and the prevalence rate is reported to be 1-4 % in various countries, which is one of the most important factors leading to maternal

mortality^[2]. The main causes of maternal death in cardiac disease are postpartum hemorrhage, heart failure, and severe infections. Therefore, dynamic observation of cardiac function changes, timely management of various cardiac problems, and timely and appropriate termination of labor and delivery are crucial to reduce maternal and perinatal mortality in patients with confirmed cardiac disease. However, there is a relative lack of experience in the current nursing care of pregnant women with complicated heart disease undergoing cesarean section, followed by termination of pregnancy, and then cardiac surgery. In-depth investigation of the nursing measures for these patients is of great clinical significance in ensuring the recovery and prognosis of the patients.

2. Clinical data and surgical methods

2.1. General information

Five cases of pregnant women with combined heart disease in pregnancy admitted during May 2022–September 2024 are selected for this study. All patients are female, in the middle and late stages of pregnancy, with gestational weeks of 28-37 weeks, with a mean gestational week of (32.6 ± 3.1) weeks; their ages ranged from 18–63 years, with a mean age of (34.6 ± 3.4) years. Among them, there were 2 cases of combined hypertension, 1 case of combined diabetes mellitus, 3 cases of class III–VI cardiac function, 3 cases of type A aortic coarctation, and 2 cases of valvular lesions.

2.2. Surgical method

Fetal heart auscultation is performed after anesthesia is completed and before the start of surgery. Cardiac surgery is performed first to open the chest, free the vessels, and prepare for extracardiac surgery, but extracorporeal circulation is withheld for the time being. Subsequently, a cesarean section is carried out, and a longitudinal incision is chosen for the abdominal wall incision, which is 12 cm long, to remove the fetus. Then, cardiac surgery is performed under general anesthesia. The specific surgical procedures are as follows: aortic valvuloplasty + aortic sinus repair + partial resection of the ascending aorta with prosthetic vascular replacement + total aortic arch prosthetic vascular replacement + stenting elephant trunk surgery in 2 cases; aortic valve mechanical valve replacement with ascending aortic replacement in 1 case; aortic valve replacement + mitral valve replacement + tricuspid valvuloplasty in 1 case; and aortic replacement and coronary artery grafting in 1 case.

3. Surgical results

All patients completed the operation and the operation time was (155 ± 24.9) minutes under general anesthesia with extracorporeal circulation. They safely returned to the cardiac intensive care unit after the operation. The volume of pleural fluid was (258 ± 97.7) ml at 48 hours after surgery. Two patients had sudden supraventricular tachycardia, which was improved after potassium and magnesium supplementation; Three patients with celiac disease were transferred to the ward and discharged successfully after chest tube removal.

4. Postoperative nursing measures

4.1. Vital signs and hemodynamic monitoring

Patients underwent cesarean section followed by cardiac surgery, which involved chest and abdominal incision, complex operation, and high risk of bleeding, with intraoperative bleeding of (260 ± 90.3) ml. Post-operative blood pressure changes were the focus of nursing care, and all the patients returning to the intensive care unit

after surgery had large fluctuations in blood pressure ^[3]. Through early and continuous hemodynamic monitoring, circulating blood volume was effectively supplemented, and central venous pressure was maintained at 6–12 mmHg. Cardiac output was measured once a day via a floating catheter in the pulmonary artery to dynamically reflect changes in cardiac blood flow and pulmonary artery wedge pressure. The use of the "double-pump method" as a substitute for vasoactive drugs can help reduce blood pressure fluctuations caused by changes in vascular tone. This method allows for timely administration of fluids and blood products, correction of hypovolemia, and stabilization of vascular tone, thereby maintaining stable invasive arterial blood pressure. The maximum dose of dobutamine used was 8 $\mu g/(kg \cdot min)$. This approach was associated with reduced postoperative chest drainage and a decrease in the number of patients requiring further intervention. This reduced the amount of bleeding from postoperative chest drainage fluid ^[4].

For two patients with symptoms of cold extremities and polyuria, they were given volume expansion therapy. Two patients with high blood pressure were given intravenous nitroglycerin vasodilator drugs, and the effect of blood pressure lowering was satisfactory. Another two patients with supraventricular tachycardia were improved by potassium and magnesium supplementation, and were maintained on oral amiodarone to prevent episodes, and the patient's QTc intervals were closely monitored during the administration of the drug, to avoid the low-potassium and magnesium situation, and synchronized electrical cardioversion abortions could be considered in the event of an episode. In 2 patients with poor cardiac function, cardiac function was improved after pumping Levosimendan $0.1\mu g/(kg-min)$, and urine output and blood pressure were improved.

4.2. Stabilization of the volume and internal environment

Due to extensive surgical trauma, multiple vascular anastomoses, and the preoperative use of anticoagulant therapy (including anticoagulant needles and medications), controlling bleeding remained difficult despite the intraoperative administration of a large number of hemostatic agents during chest closure. Additionally, the use of heparin and other anticoagulants for extracorporeal circulation was insufficient in some cases. As a result, a significant amount of pleural effusion was observed in several patients during the early postoperative period. Intraoperatively, two patients had pleural fluid volumes exceeding 300 mL, with a corresponding hemodynamic mean pressure product of blood and gas around 23 mm Hg^[5].

Early transfusion of autologous blood is very important for the maintenance of stable circulation. Importantly, 200 ml of fresh frozen plasma and 2U of erythrocyte suspension were infused simultaneously, and the infusion rate was adjusted as needed. The volume of pleural fluid was closely observed, and blood gases were retested. A total of 600 IU of zymogen complex, 2000mg of fibrinogen, and 400 IU of coagulation factor VIII were given in time to stop bleeding, and finally the volume of pleural fluid was gradually reduced, and the active bleeding was controlled. Two patients experienced disturbances in their internal environment during the postoperative period. Blood gas analysis revealed hypokalemia (potassium < 3.6 mmol/L) and hypocalcemia (calcium < 1 mmol/L). Both patients had elevated heart rates exceeding 120 beats per minute and presented with supraventricular tachycardia improved after potassium, magnesium, and calcium supplementation.

4.3. Medication care

Four patients had high blood counts after surgery, with a high risk of infection. They were treated with cefotaxime sodium sulbactam sodium injection 3g intravenous drip every 8 hours, combined with metronidazole 500mg intravenous drip twice a day to prevent infection. One pregnant woman had high fever and multiple invasive tubes

after heart surgery, and was considered to have aggravated infection. After replacing the deep venous catheter, the bacterial culture of the deep venous catheter showed carbapenem-resistant Acinetobacter baumannii. Therefore, meropenem injection 1000mg was administered intravenously every 6 hours (the first dose was 2000mg intravenous drip once) for anti-infection treatment. Vancomycin 1000mg was given as a loading dose intravenously, followed by 500mg intravenous drip. Fluconazole sodium injection (Diflucan) 800mg was given as a loading dose intravenously, followed by 400mg intravenous drip once a day. Polymyxin E mesylate injection 75mg was given by nebulization every 12 hours. Eventually, the patient's infection was controlled and she was discharged. When all patients had fibrinogen levels below the normal range, albumin was infused to correct hypoproteinemia, and respiratory exercises and ventilator-assisted treatment were continued. Blood gas, lactate, and blood glucose results were closely monitored. All patients were prescribed medications upon discharge after valve replacement surgery, including anticoagulant warfarin sodium tablets (taken once a day in the evening according to coagulation indicators), cardiac stimulant digoxin tablets (0.25mg once a day, with heart rate monitoring; stop taking if heart rate is below 60 beats per minute or if obvious nausea, vomiting or other discomfort occurs), diuretic spironolactone (20mg once a day), furosemide tablets (20mg once a day), lactation suppressant bromocriptine tablets (Bromocriptine) (2.5mg once a day), and blood tonic and menstrual regulator Leonurus japonicus granules (1 bag twice a day).

4.4. Chest drainage and malodor care

Postpartum mothers with a history of cardiac surgery should be closely monitored for vital signs, uterine contractions, abnormal discharge, abdominal incision status, IV access, and any complaints of discomfort. Any concerns should be promptly reported to the obstetrician, who will coordinate further care with the cardiac team ^[6]. In all patients, if vaginal bleeding and uterine drainage remain minimal for three days following the postoperative reduction of saline (125 ml or 250 ml) from the intrauterine balloon, the device is removed after an additional 24 hours of observation ^[7].

All patients used a "waist bag" type sandbag to control bleeding after cesarean section. This method helps reduce wound pain, promotes hemostasis by applying pressure to the abdominal incision, minimizes blood and fluid seepage, stimulates uterine contractions, reduces uterine bleeding, and helps prevent shock caused by a sudden drop in abdominal pressure after delivery ^[8]. After cesarean section, abdominal compression with sandbags is typically maintained for 6 hours. Following this period, as the effects of anesthetic drugs gradually diminish through absorption and metabolism, patients are encouraged to turn from side to side to promote intestinal peristalsis. Close monitoring of anal gas passage and bowel movements is essential to assess gastrointestinal recovery. In three cases where patients had pleural effusion exceeding 300 ml, a blood salvage device was used to filter impurities from the pleural fluid. The concentrated red blood cells were then reinfused into the patients. Antiemetic medications were administered in a timely manner to manage potential side effects. Following the drainage of pleural fluid, patients also received transfusions of red blood cells, cryoprecipitate, and plasma as needed. The amount of pleural fluid gradually decreased, while the oral warfarin was stopped on the same day as prescribed by the doctor.

Three patients with positive celiac test were given a fat-free semi-fluid diet, and when the subsequent pleural fluid was still high, they were fasted, and the patients were closely monitored for their nutrition, electrolytes, and wounds, and continued to be observed. Eventually, the incision healed well without redness, swelling, and oozing. In obstetric postoperative care, when uterine balloon drainage was minimal, all saline was withdrawn from the uterine balloon. After confirming the absence of significant bleeding, the uterine balloon and the tailed gauze extending from the vagina were removed. A subsequent vaginal examination revealed no abnormalities.

Remaining patients continued with treatment protocols including lactation suppression, promotion of uterine contractions, and regular dressing changes at the incision site.

4.5. Digestive system care

All women undergoing cesarean section with abdominal incision and removal of the fetus will affect the mesentery to varying degrees ^[9]. Therefore, all patients were required to fast after surgery and could not eat until the abdomen was deflated. Two patients with healed cesarean section wounds, who reported lower abdominal pain and distension without pressure pain in the uterine area, underwent gastrointestinal decompression as per medical advice. The color and volume of gastric aspirate were monitored closely, and bowel sounds were auscultated during each shift. Abdominal circumference was measured as needed, with attention to signs of abdominal distension and peritoneal irritation. Blood and urinary amylase levels were closely monitored, and a fecal occult blood test was considered to assess for gastrointestinal flatulence. When the patient continued to experience abdominal distension, symptomatic treatment with a Pfizer enema was administered. A consultation with the Chinese Medicine Department was requested, and the patient was given treatment based on their medical advice. As a result, the patient's abdominal pain was relieved, and the abdomen became softer.

One patient experienced delayed chest closure following surgery, had been intubated for several days, and remained on fasting. No bowel sounds were detected, and a laxative was administered using an enema solution containing sodium phosphate. Another patient had postoperative blood gas analysis showing lactic acid levels between 4 and 5 mmol/L with abdominal distension, prompting concern for gastrointestinal flatulence. To rule out intestinal ischemia, a CT scan was immediately arranged. One patient's stool tested weakly positive, and treatment included growth inhibitors (250 μ g/h) and continuous infusion of esomeprazole (8 mg/h), leading to the recovery of intestinal function. The other patients were able to ventilate and eat normally

4.6. Rehabilitation and psychological care

Absolute bed rest after surgery in all patients increases the risk of physical and psychological complications, such as pressure ulcers, deep vein thrombosis, ICU-acquired debility, ICU delirium, and so on. Two of the five postoperative patients had D-dimer levels > 10,000 ug/L, and all had a venous thromboembolism assessment score of > 5. They were at high risk for deep vein thrombosis. The patients were instructed to perform ankle exercises, including clockwise and counterclockwise encircling movements, dorsiflexion, inversion, plantarflexion, eversion, slowly, forcefully, and at the maximum angle possible to hold for 5 seconds, and the above movements were performed for 5 minutes per hour each time, and 5–8 times per day. One patient had delirium symptoms after surgery, and was given psychological counseling and ineffective comforting, and then was given olanzapine orally, and medetomidine was micro-pumped to keep her quiet and sleepy.

Postoperatively, all 5 patients had different degrees of coughing and thick sputum, and oxygen saturation was reduced to about 95% in 3 of them. The patients were instructed to adopt a standing or sitting position during abdominal breathing. When inhaling, the abdomen slowly rises, inhale deeply through the nose more slowly, the mouth is tightly closed, the lungs do not move, the whole body is relaxed, the shoulders do not lift, to ensure that the air is inhaled into the abdomen, can be used to press the hand to the position of one inch below the navel. When exhaling, contract the abdomen as far as possible inward, keep the chest still, and exhale the gas from the mouth, and do not inhale. Encourage the patient to do more deep breathing and coughing maneuvers. Deep breathing and coughing exercises are 2–3 times/day, 10–20 minutes/time.

5. Conclusion

In this study, a comprehensive and systematic nursing program was summarized by retrospectively analyzing the clinical data and nursing experience of five pregnant women with combined heart disease in pregnancy who had terminated pregnancy after cesarean section and then underwent cardiac surgery. During the nursing process, the patients' nursing problems were effectively solved by proposing the first-, middle-, and second-best nursing problems, formulating and implementing targeted, multidisciplinary, and collaborative nursing measures, and following up on the regression of the nursing problems promptly and repeatedly evaluating them. After careful nursing care, all patients were discharged successfully with improved cardiac function, stable vital signs, satisfactory oxygenation, confidence in disease recovery, and decreased BNP index and inflammatory index.

Disclosure statement

The author declares no conflict of interest.

References

- Ao S, 2013, The Effect of Sandbag Pressurization of the Uterine Fundus on Women After Cesarean Section. Medical Aesthetics and Cosmetology: A Middle-aged Journal, 22(4): 1.
- [2] Lu Z, Qi H, 2020, Interpretation of "Management Guidelines for Pregnancy Complicated with Heart Disease (2019)" by the American College of Obstetricians and Gynecologists. Chinese Journal of Obstetric Emergency Care Electronic Edition, 9(3): 9.
- [3] Liu Z, Dai Q, Wang M, et al., 2014, Correlation Between Ultrasound Parameters of Cesarean Section Scar Pregnancy and Intraoperative Blood Loss. Chinese Journal of Hua Liang, 5(1): 7.
- [4] Shi H, Ge Y, Bao H, et al., 2009, A Comparative Study of Three Methods of Measuring Cardiac Volume Load and Hemodynamics. Biomedical Engineering and Clinics, 13(6): 8.
- [5] Chen X, 2011, Common Causes and Management Measures of Heparin Resistance During Cardiac Extracorporeal Circulation Surgery. Chinese Practical Journal of Medicine, 38(22): 2.
- [6] Zeng W, 2000, Modern Concept of Indication for Cesarean Section. Chinese Journal of Practical Gynecology and Obstetrics, 16(5): 3.
- [7] Ma Q, Zhou G, Cheng H, 2011, Observation on the Therapeutic Effect of Uterine Cavity Water Bag Compression in Treating Uterine Contraction Insufficiency–Induced Postpartum Hemorrhage in 56 Cases. Journal of Jilin Medicine, 32(28): 3.
- [8] Zhang XQ, 2007, The Efficacy of Sandbags Placed Under Pressure in Abdominal Incision on Wound Healing of the Abdominal Wall in Cesarean Delivery. Journal of Xiangnan College: Medical Edition, 9(3): 2.
- [9] Yang YF, 2016, Nursing Care of Patients With Mesenteric Vein Thrombosis Complicating Cesarean Delivery. China Medical Guide, 14(35): 1.

Publisher's note

Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.