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Practical Approach to Critical Care in Obstetrics



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Foreword
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30 CHAPTER

Congenital Heart Disease in Pregnancy

Pinkee Saxena

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CASE STUDY

Mrs A, a 25-year-old primigravida at 37 weeks of gestation, came to the outpatient department with complaints of sudden increase in breathlessness since 2–3 days and orthopnea since day one. She also complained of chest pain since morning. She had trouble lying down in supine position and difficulty in speaking. She had a past history of surgery done in childhood for tetralogy of Fallot. She was attending a private hospital but missed her follow-up for the last two months.

On examination, her pulse was 146/min, blood pressure (BP) 100/70 mmHg, and respiratory rate 35/min with oxygen saturation of 82%. On auscultation, crepitations were present all over the chest. Grade two to three systolic murmur was heard. Per abdomen uterus was term size, vertex presentation with regular fetal heart rate of 146/min. She was immediately given oxygen by face mask, intravenous line was inserted and furosemide 20 mg was administered intravenously. She was admitted in cardiac high dependency unit where she was started on 5 L oxygen by face mask, nebulization with asthalin and intravenous antibiotics. All her blood investigation including arterial blood gas (ABG) was sent. X-ray chest was done with an abdominal shield and two-dimensional echocardiography was done.

Chest X-ray showed lung congestion. Echocardiography revealed pulmonary regurgitation, right ventricular dilatation, and ejection fraction of less than 40% (revealing residual cardiac disease after operation or due to hemodynamic changes in pregnancy that precipitated cardiac failure). She was not maintaining adequate oxygen saturation, so repeat furosemide was given and she was put on venturi mask. Her serial ABG done showed partial arterial pressure of oxygen (PaO_2) less than 60 mm, partial arterial pressure of carbon dioxide ($PaCO_2$) less than 45 mm, with pH 7.1–7.3 indicating increasing respiratory acidosis. In view of her current status, it was decided to electively intubate her. She was later planned for cesarean under general anesthesia. She delivered a male baby weighing 2.2 kg. She was extubated after 24 hours. Her parameters improved over 4–5 days.

DISCUSSION

Differential diagnoses which were considered in this case were:

- Heart disease as she gave a past history of congenital heart disease (CHD)
- Pulmonary embolism
- Cardiomyopathy
- Pneumonia
- Exacerbation of asthma.

Definitive Management

The incidence of cardiac complications in pregnant women with CHD ranges from 4.5 to 25.0%. Management of CHD involves:

- Identification of the heart disease

- Identification of the residual lesions
- Determination of the baseline functional level
- Recognition of hemodynamic changes of pregnancy, labor, and delivery
- Early identification and treatment of complications.

Identification of the heart disease and its residual lesion is best done by echocardiography and detailed past history. For assessing baseline cardiac function one must note:

- Any prior cardiac event (heart failure, transient ischemic attack, stroke, or arrhythmia)
- New York Heart Association functional class <II/>II or cyanosis
- Left heart obstruction (mitral valve area <2 cm^2, aortic valve area <1.5 cm^2, or peak left ventricular outflow tract gradient more than 30 mmHg by echocardiography)
- Reduced systemic ventricular systolic function (ejection fraction <40%)
- B-type natriuretic peptide values in pregnancy.

Points to note specifically for CHD:

- In asymptomatic patients with corrected transposition of the great arteries (cTGA), pregnancy changes may cause systemic right ventricular dysfunction leading to heart failure. Since the atrioventricular node is absent in cTGA, pacing is required to prevent complete heart block
- Post-fontan operation, in cyanotic CHD, a single ventricle pumps oxygenated blood from the lungs to the body while deoxygenated blood returns from the body to the lungs via blood vessel connections only (bypasses the heart). Ventricular failure and arrhythmia are often seen
- Women with complex cyanotic heart disease may have paradoxical embolism due to right to left shunt, heart failure, and increasing cyanosis caused by the vasodilation of pregnancy
- Patient with Eisenmenger syndrome with high pulmonary vascular resistance, reversal shunt flow, and cyanosis should be advised against pregnancy as the risk of death is 40–50%.

Antenatal Care

Strict monitoring of cardiac functions. Look out for:

- Severe dyspnea and orthopnea
- Palpitations
- Chest pain with exertion
- Difference in BP of the two arms → coarctation of aorta
- Diastolic murmur (in Marfan's → aortic root dilatation→ onset of aortic regurgitation)
- Loud, harsh systolic murmur.

Maternal Complications

- *Heart failure:* Precipitated by increased cardiac output during pregnancy and ventricular or valvular dysfunction:
  - Oxygen
  - Diuretics
  - Angiotensin converting enzyme inhibitor, vasodilators
  - Digoxin
  - Inotropic drug
  - Bronchodilators.

  Some patients may require bed rest, closer cardiovascular monitoring, and (for cyanotic patients) oxygen therapy. Appropriate thromboprophylaxis with low molecular weight heparin may be started if required.
- *Arrhythmia:* Seen in cTGA postatrial repair, Fontan operation or atrioventricular septal defect:
  - *Emergency treatment:* Electrical cardioversion, intravenous verapamil, or adenosine
  - *Maintenance therapy:* Propranolol, verapamil, or digoxin

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- Refractory cases: Amiodarone
  Pacemaker implantation
- *Thromboembolism:*
  - Patients with mechanical prosthetic valve, cyanosis, atrial fibrillation, or Fontan circulation are especially at risk for thromboembolism
  - Start anticoagulant warfarin, heparin, or low molecular weight heparin depending on gestational age
  - Aspirin is to be given till 34 weeks
- *Aortic dissection:*
  - Elevation of estrogen and elastases during pregnancy results in fragmentation of the elastic lamella in the aortic wall media. This coupled with increased cardiac output of pregnancy increase the risk of aortic dissection in pregnant patients
  - Seen in Marfan syndrome, bicuspid aortic valve, aortic coarctation, Ehlers-Danlos syndrome and Turner syndrome
  - It can lead to sudden death. Repair also has 22% risk of mortality
- *Endocarditis:*
  - Appearance of new murmurs in ventricular/atrial septal defect may point to endocarditis
  - Cardiac echocardiography and blood cultures are done to confirm the diagnosis
  - Intravenous antibiotics need to be started
- *Pregnancy induced hypertension:*
  - The incidence of hypertension increases in patients with aortic stenosis, pulmonary stenosis, aortic coarctation, and transposition of the great arteries.

Fetal Complications

Maternal cyanosis or reduced cardiac output leads to compromised uteroplacental circulation resulting in complications like:

- Preterm delivery (10–20%)
- Intrauterine growth retardation (8%)
- Spontaneous abortion (12%)
- Fetal/neonatal death (4%).

The risk of CHD in offspring of pregnant women with CHD is 6%. So screening for these defects must be done by detailed fetal echocardiography at 24 weeks.

Mode of Delivery

Vaginal delivery with good analgesia is safe in most cases of CHD. It results in smaller shifts in blood volume, less risk of hemorrhage, infection, and thromboembolism. Epidural anesthesia and forceps assistance help to reduce the increased cardiac workload of labor.

Lower segment cesarean section is indicated in:

- Marfan syndrome
- Aortic aneurysm
- Acutely unwell mother.

Postpartum hemorrhage is usually to be managed with oxytocin and misoprostol.

CONCLUSION

Complex CHD is nowadays seen more often in pregnancy than in rheumatic disease. Cardiomyopathy and pulmonary hypertension continue to account for most maternal deaths. Multidisciplinary approach can help to manage these cases.

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SUGGESTED READINGS

1. Drenthen W, Pieper PG, Roos-Hesselink JW, et al. Outcome of pregnancy in women with congenital heart disease, a literature review. J Am Coll Cardiol. 2007;49:2303-11.
2. Drenthen W, Pieper PG, Roos-Hesselink JW, et al. Outcome of pregnancy in women with congenital heart disease, a literature review. J Am Coll Cardiol. 2007;49:2303-11.
3. Immer FF, Bansi AG, Immer-Bansi AS, et al. Aortic dissection in pregnancy: Analysis of risk factors and outcome. Ann Thorac Surg. 2003;76:309-14.
4. Khairy P, Ouyang DW, Fernandes SM, et al. Pregnancy outcomes in women with congenital heart disease. Circulation. 2006:517-24.
5. Silversides CK, Marelli A, Beauchesne L, et al. Canadian Cardiovascular Society 2009 Consensus Conference on the management of adults with congenital heart disease. Can J Cardiol. 2010;26:e65-150.
6. Warnes CA, Liberthson R, Danielson GK, et al. Task force 1: The changing profile of congenital heart disease in adult life. J Am Coll Cardiol. 2001;37:1170-5.
7. Whittemore R, Wells JA, Castellsague X. A second-generation study of 427 probands with congenital heart defects and their 837 children. J Am Coll Cardiol. 1994;23:1459-67.
8. Whittemore R, Wells JA, Castellsague X. A second-generation study of 427 probands with congenital heart defects and their 837 children. J Am Coll Cardiol. 1994;23:1459-67.

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Practical Approach to
Critical Care in Obstetrics

Key Features

- This book is presented in a concise and clear format
- It is a comprehensive collection of well-written and easy-to-read chapters on every aspect of critical care in obstetrics
- This book has been divided into 2 sections with a section devoted to "near miss cases," which are taken from day-to-day practice. They illustrate to the reader the steps of clinical management that result in successful outcome of saving lives
- Includes chapters as well as safety check lists of equipments and evaluation of the quality of care
- It has been penned by a multidisciplinary group of experts in the field
- An easy-to-follow and valuable book which makes for good reading for all, from postgraduates to the practicing clinicians and nurse practitioners.

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