



Case Report on Patent Ductus Arteriosus: Large PDA 4mm with Left Right Shunt

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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Case Study

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ABSTRACT

Background: In full term newborns, the Ductus arteriosus closes functionally within of birth, and it normally closes structurally between 2 to 8 weeks. Complete conclusion of the ductus in untimely babies may not happen until a half year old enough, and in exceptional cases may not happen until adulthood. Is medical term that afterwards birth, the ductus arteriosus fails to close, allowing oxygenated blood to travel back to the lungs from the left heart Changed Word Structural Changes Thesaurus via the pulmonary artery, which has a higher pressure. Increased laboured breathing and failure to gain weight at a normal rate are frequent later in the first year of life. A patent ductus arteriosus (PDA) can lead to pulmonary hypertension and right-sided heart failure if left untreated.

Case Report Information: A 2 years 6 months old child brought by the parents in Acharya Vinoba Bhave Rural Hospital on 22/12/2020. An patients parent's verbalization, the child was apparently alright at 8 months of age. When he started having fever, cold and cough and decreased feed intake. Then they took the child to local doctor where 2D ECHO was done. Suggestive of patent ductus arteriosus. Patient is referred to Acharya Vinoba Bhave hospital for further management.

Conclusion: The patient was admitted in AVBRH with complaints of fever, cold and cough, decreased feed intake. Then the report mainly focused on surgical management and quality nursing care due to which patient was discharged without any further complication and satisfaction.

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1. INTRODUCTION

Acyanotic CHD with left to right shunt has 3 types with most common defect being ventricular septal defect (VSD) atrial septal defect (ASD) and patent ductus arteriosus (PDA) [1].

A persistent opening among the two foremost blood arteries originating as of the heart is known as a patent ductus arteriosus (PDA). The opening is normal portion of circulatory system of a kid in the womb that closes shortly after birth. It's known as a patent ductus arteriosus if it stays open. The ductus arteriosus is a blood artery in the foetus that closes shortly after birth. The vessel does not collapse in a patent ductus arteriosus; instead, it stays patent (open), resulting in aberrant blood flow as of aorta to the pulmonary artery [2].

Premature babies are more likely to have patent ductus arteriosus because they have chronic respiratory difficulties including hypoxia [3]. Premature babies are more likely to be hypoxic and develop patent ductus arteriosus as a result of their heart and lungs' underdevelopment. Because the patent ductus arteriosus is the only means for oxygenated blood to mix with deoxygenated blood, it is not surgically closed if transposition of the major vessels is present. Prostaglandins are utilised to keep the patent ductus arteriosus open in these situations, and no NSAIDs are given until the two faults have been surgically corrected [4].

The majority of people with a patent ductus arteriosus are healthy, with normal breathing and heart rates [5]. Increased left ventricular stroke volume and diastolic run-off of blood into the (formerly lower-resistance) pulmonary vascular bed, as well as expanded pulse pressure and bounding peripheral pulses, are usually seen if the patent ductus arteriosus is mild or severe. A hammering (forceful) pulse, quick breathing, not feeding effectively, shortness of breath, sweating while feeding, easily exhaustion, and poor growth are all symptoms of a large Patent ductus arteriosus in a baby [6]. Medicine, catheter-based techniques, and surgery are the three options for treating patent ductus arteriosus. Endocarditis is a heart infection affecting the tissue that lines the heart and blood vessels. Patent ductus arteriosus can help to lower the chance of developing endocarditis. Endocarditis

is a dangerous condition that necessitates the use of antibiotics administered intravenously (IV) [7]. If the size of the opening is great enough, a doctor will shut it to prevent the lungs from becoming overloaded with blood, which can result in an enlarged heart. If left untreated, irreversible pulmonary hypertension and Eisenmenger physiology with right-to-left shunting and cyanosis result from the presence of a large, nonrestrictive patent ductus arteriosus, which causes pulmonary overcirculation, left atrial dilatation, left ventricular volume excess, and congestive heart failure [8].

The ductus arteriosus (PDA) is a crucial circulatory connection among the pulmonary arterial trunk and the proximal descending thoracic aorta [9]. It enables for right-to-left shunting of maternally generated oxygenated placental blood into the systemic circulation during foetal life, bypassing the high-resistance pulmonary bed [10].

1.1 Incidence

The ductus arteriosus is a normal foetal structure that connects the proximal left main pulmonary artery to the upper descending thoracic aorta. It originates from the left sixth aortic arch [11]. Only 1 in every 2,000 infants is documented to have patent ductus arteriosus, which accounts for 5 to 10% of all congenital heart disease. Preterm newborns have a much higher rate of Patent ductus arteriosus, with estimates ranging from 20% to 60% [12].

1.2 Patient Information

A 2 years 6 months old child brought by the parents in Acharya Vinoba Bhave Rural Hospital on 22/12/2020. An patients parent's verbalization, the child was apparently alright at 8 months of age. When he started having fever, cold and cough and decreased feed intake. There is no history of cyanosis. Then they took the child to local doctor where 2D ECHO was done. Suggestive of patent ductus arteriosus. Patient is referred to Acharya Vinoba Bhave hospital for further management.

1.3 Present Medical History

A 2 years 6 months old child brought by the parents in Acharya Vinoba Bhave Rural

Hospital on 22/12/2020 with complaints of fever since 4 days, cold and cough.

1.4 Past Medical History

As per parent’s verbalization, the child was apparently alright at 8 months of age. When he started having fever, cold and cough and decreased feed intake. Then they took the child to local doctor where 2D ECHO was done. Suggestive of patent ductus arteriosus. Patient is referred to Aacharya Vinoba Bhave hospital for further management.

1.5 Present Surgical History

A 2 years 6 months old child, had done the cardiac catheterization procedure.

1.6 Birth History

1.6.1 Prenatal history

- **Nature of marriage:** Non-consanguineous
- **Exposure to radiation:** None
- **Antenatal checkup:** Done
- **History of any drug:** no drug taken
- **Vaccine:** 2 doses of tetanus vaccine with iron, folic acid supplements

1.6.2 Perinatal history

Type of delivery: premature delivery.

Place of delivery: Government hospital, gadchiroli.

1.7 Mother Condition Following Delivery

Mother condition was good and she did not have any complication following delivery.

1.7.1 Postnatal history

- **Child condition at birth:** Normal
- **Birth weight:** 1.8kg
- **NICU stay.**

1.8 Immunization History

The patient received all immunization according to her age.

1.9 Diagnostic Assessment

physical examination, patient history and other investigations reveal different outcomes through clinical evaluation.

1.10 Physical Examination

1.10.1 Anthropometry assessment

- **Height:** 86cm
- **Weight:** 8.8kg
- **Head circumference:** 44cm
- **Chest circumference:**50 cm
- **Mid arm circumference:** 13cm

1.10.2 Head to foot assessment

- **Nourishment:** undernourished
- **Body built:** thin
- **Activity:** inactive & dull
- **Conscious –consciousness**
- **Rashes:** absent
- **Nasal discharge:** present
- **Auscultation:** Murmur sound present

Table 1. Vital signs

Sr. no	Vitals	Before treatment	After treatment start
1	Temperature	101 degree Fahrenheit	98.6 degree Fahrenheit
2.	Pulse	162 beats/min	132 beats/min
3.	Respiration	48 breath/min	32 breath/min
4.	Saturation	95% with O2	98% without O2

1.11 Blood Investigations Report

HB (haemoglobin)%- 9.6 gm% was decreased, Mean Corpuscular Volume-51.4cu/u was decreased, Mean corpuscular Hemoglobin-14.7 was decreased, Mean corpuscular haemoglobin concentration-28.7% was decreased, lymphocytes-55% was increased, serum urea-36mg/dl was increased, serum creatinine- 0.3mg/dl was decreased, sodium-133meq/q was decreased, SGOT-55u/l was increased

After:

HB (haemoglobin)%- 10 gm% was decreased, Mean Corpuscular Volume-79.4cu/u was decreased, Mean corpuscular Hemoglobin-32.6 was normal, Mean corpuscular haemoglobin concentration-32.7% was normal, lymphocytes-40% was normal, serum urea- 15mg/dl was normal, serum creatinine-

0.4mg/dl was decreased, sodium-135meq/q was normal, SGOT-40u/l was normal.

1.12 Electrocardiograph Done

chest roentgenogram showed only slightly increased pulmonary vascularity 2D ECHO: large Patent ductus arteriosus 4mm with left right shunt.

1.12.1 Chest X-ray done

Table 2. Therapeutic interventions

Sr. no	Name of Drug	Dose	Frequency	Route
1.	Syrup augmentin	2ml	BD(twice a day)	Orally
2.	Syrup Rinifol	5ml	BD(twice a day)	Orally
3.	Syrup Furoped	2ml	BD(twice a day)	Orally
4.	Syrup ondensteron	2.5ml	BD(twice a day)	Orally

1.13 Procedure

A 2 years 6 months old child has done cardiac catheterization.

The healthcare provider will put a thin, flexible tube (catheter) into a blood vessel in the groin. He or she will guide it through the large blood vessel in the groin to the area of the PDA. The catheter will be placed in the PDA. Dye may be injected at this time to help the provider put the catheter in the right place. A coil or closure device which is attached to the catheter will then be placed in the PDA. This will stop blood from flowing through the PDA. Once the coil or device is in the correct position, it will be released from the catheter. Then the catheter will be removed.

2. NURSING MANAGEMENT

As per criteria, the nursing care was given to maintain the health status and to prevent further complications.

- Provided a comfortable position to the patient.
- Maintained vital signs of the patient.
- Administered all the prescribed medications.
- Monitored the intake and output chart.
- Advice to give proper position during breastfeeding.

- All explanation given the mother about immunization and explained about the benefits of the immunization.
- Advice to maintain personal hygiene.
- Advice about the to daily exercise.

2.1 Nursing Diagnosis

2.2.1 Nursing diagnosis according to patient complaints are as follows

- Ineffective airway clearance related to productive cough.
- Hyperthermia related to infection
- Disturbed sleeping pattern related on hospitalization.
- Nutritional imbalanced less than body necessity related to less intake of food.
- Knowledge deficient related to the treatment modalities.

2.2 Prognosis

Patient with small Patent ductus arteriosus may live normal life span, spontaneous closure after infancy care. With large Patent ductus arteriosus, congestive heart failure occur commonly in infancy. Other complications are infective endocarditis, pulmonary or systolic embolism, pulmonary hypertension, calcification of ductus.

3. FOLLOW UP AND OUTCOMES

At the time of discharge the patient's condition was satisfactory. The relatives were informed about the prognosis of the disease, drug therapy and personal hygiene, and the importance of taking medication on time. It is also told that they should come after 7 days for routine follow to see the disease outcomes.

4. DISCUSSION

Transcathether occlusion of the patent ductus arteriosus has developed into an important form of treatment with excellent results. Before deciding whether or not to treat a clinically significant patent ductus arteriosus, it's critical to understand the difference between the two [13]. Because of the hemodynamically significant patent ductus arteriosus, which raises ventilator support and oxygen demand in previously weanable infants, the respiratory status of preterm newborns deteriorates [14]. Conservative management, which includes fluid restriction (no more than 130ml/kg) after the third day of life and ventilation adjustment by lowering

inspiratory time to as low as 0.35 seconds and applying higher peak end expiratory pressure (PEEP) of 6 to 7, is the first option in non-hemodynamically significant ducts. In a retrospective review of 109 preterm newborns 30 weeks gestation who required mechanical ventilation and surfactant replacement, patent ductus arteriosus was found in 31 preterm infants (28%) who required mechanical ventilation and surfactant replacement [15]. Only six newborns needed medical treatment and surgical ligation, and they were all treated conventionally, with a good closure rate up to 80%. In conservatively treated neonates, there were no severe problems. If medications are employed, it is more likely that early therapy will result in effective ductal closure and avoid negative pulmonary consequences [16].

4.1 Strength

A 2 years 6 months old male patient tolerates all medication and responded within 7 days to the therapeutic treatment.

5. CONCLUSION

The patient was admitted in Aacharya Vinoba Bhave Rural hospital with complaints of cold and cough and decreased feed intake. Immediate treatment was started by health team members. The plan of care completely based on interventions were includes various management that were pharmacological management and nursing management, as well as therapeutic management and surgical management also. Since from the first day of hospitalization, plan of action were planned with rationales; according to the planning the implementation also done with positive outcomes. An positive outcome get by the patient not only with the help of therapeutic management but also the family coping and support even. Patient shown positive feedback and slowly all the aims are achieved which were planned in postoperative period. Finally the patient got discharged from the hospitals.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by

the producing company rather it was funded by personal efforts of the authors.

CONSENT

Before taking this case, information was given to patient's parents and their relatives and informed consent was obtained from the patient as well as relatives.

ETHICAL APPROVAL

Ethical clearance taken from institutional ethics committee and preserved by author (s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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