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Case Study

Case Study: Isolated Dextrocardia Discovered on Autopsy in A 20-Year-Old Female from Goa, India

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Abstract

In the state of Goa, India, a very interesting case of a 20-year-old female who was bought to Goa Medical college, Goa, to seek for medical attention for fever and breathlessness, who eventually succumbed to septicaemia (brain abscess), who was a known case of dextrocardia which indeed was confirmed on autopsy findings. Now, the question of whether dextrocardia is associated with the cause of death was to be answered. This interesting case exemplifies the complexities of diagnosing a case of rare congenital anomalies and underscores the importance of comprehensive evaluation in young patients.

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Case Study: Isolated Dextrocardia in a 20-year-old female
A notable case involves a 20-year-old female who came for emergency medical attention in Goa Medical college. During the assessment, a pansystolic murmur was detected over the left upper sternal border, prompting further cardiac evaluation. Echocardiography revealed moderate aortic stenosis, and a subsequent chest X-ray confirmed dextrocardia. This case underscores the importance of comprehensive evaluations, as congenital anomalies like dextrocardia can remain undiagnosed for decades without causing significant symptoms.

Clinical Implications
Isolated dextrocardia is often considered benign, especially when not accompanied by other congenital anomalies. However, its presence can pose challenges in clinical practice, such as interpreting diagnostic imaging and performing surgical procedures. Awareness of this condition is crucial for healthcare providers to avoid misdiagnosis and to tailor medical interventions appropriately.
These case studies illustrate that isolated dextrocardia can remain undetected into advanced age or present early in life with non-specific symptoms. Comprehensive clinical evaluations and imaging studies are essential for accurate diagnosis and effective management of this rare congenital anomaly. Dextrocardia is a rare condition and is usually found incidentally and in association with other congenital abnormalities. It has an incidence of <1%.[3]

Case Study: Isolated Dextrocardia Discovered on Autopsy in a 20-Year-Old Female from Goa, India
Isolated dextrocardia, a rare congenital anomaly where the heart is positioned on the right side of the chest without associated visceral malposition, is often asymptomatic and may go undiagnosed (1). This case study describes the unexpected discovery of isolated dextrocardia during an autopsy of a 20-year-old female from Goa, India, who succumbed to septicaemia's reason of doing the autopsy was to find the cause of death in such a young girl.

Case Presentation
A 20-year-old female, resident of Goa, Indian/O of Sindhudurg, Maharashtra, presented to a Goa Medical College (GMC) on 7th June 2024with complaints of:

- Fever for 4 days
- Nausea and vomiting
- Progressive breathlessness

The patient had a significant medical history and previous medical records show the patient having a cyanotic congenital heart disease with a previous Xray suggestive of dextrocardia.
Clinical Course

Upon admission, her vitals were as follows:

- **Temperature:** 99.5°F
- **SpO_2:** 83% on oxygen(10L)
- **Blood Pressure:** 100/60 mmHg (hypotensive)
- **Heart Rate:** 152 bpm (tachycardia)
- **Respiratory Rate:** 28 breaths/min (tachypnoea)
- **GCS:** E1V2M1

Physical examination revealed pallor, cold extremities, and hypotension. Cardiovascular auscultation suggested a normal rhythm, with a pansystolic murmur.

Blood investigations showed
Elevated white blood cell count (WBC): 18,000/mm^3
Elevated serum procalcitonin: Suggestive of systemic infection
Lactic acidosis: Indicating poor perfusion
Hemoglobin:18gm/dl
Despite aggressive resuscitation with IV fluids, broad-spectrum antibiotics, and vasopressor support, her condition rapidly deteriorated. She developed multi-organ failure and succumbed to septic shock within an hour.

Autopsy Findings
A forensic autopsy was performed due to the sudden death of a young, previously healthy female.

Key findings:

1. **Cardiovascular System:**

- The heart was found in the right hemithorax with its apex pointing to the right (dextrocardia).
- A large ventricular septal defect was noted.
- Severe infundibular stenosis.
- Dilated right atria, right ventricle. Walls are hypertrophied.

2. **Lungs**

- Congestion and bilateral pulmonary edema.
- Pus flakes noted in lung parenchyma.
- Features of early acute respiratory distress syndrome (ARDS) secondary to sepsis.

3. **Liver/Kidneys/Spleen/Pancreas:**

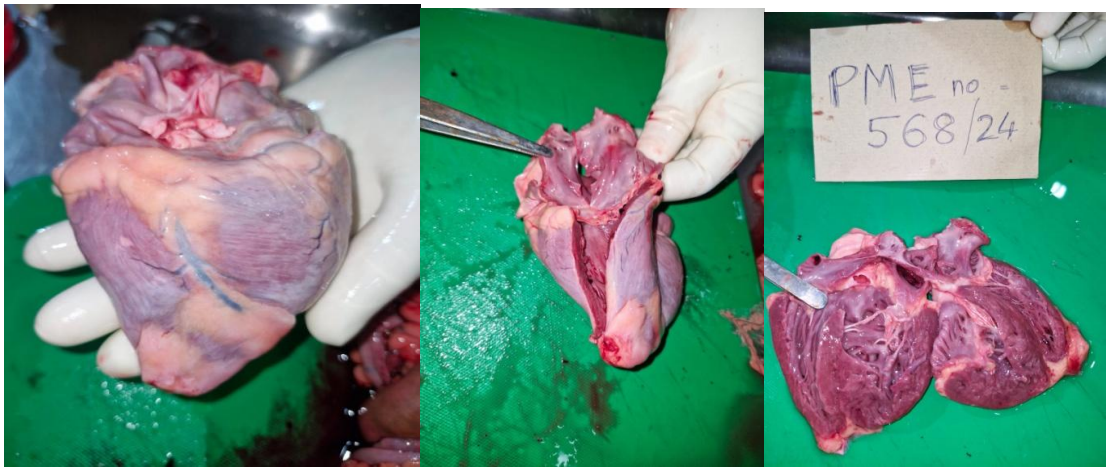
- Hepatic, Renal Splenic, and Pancreatic congestion noted.
- No free fluid

4. **Brain**

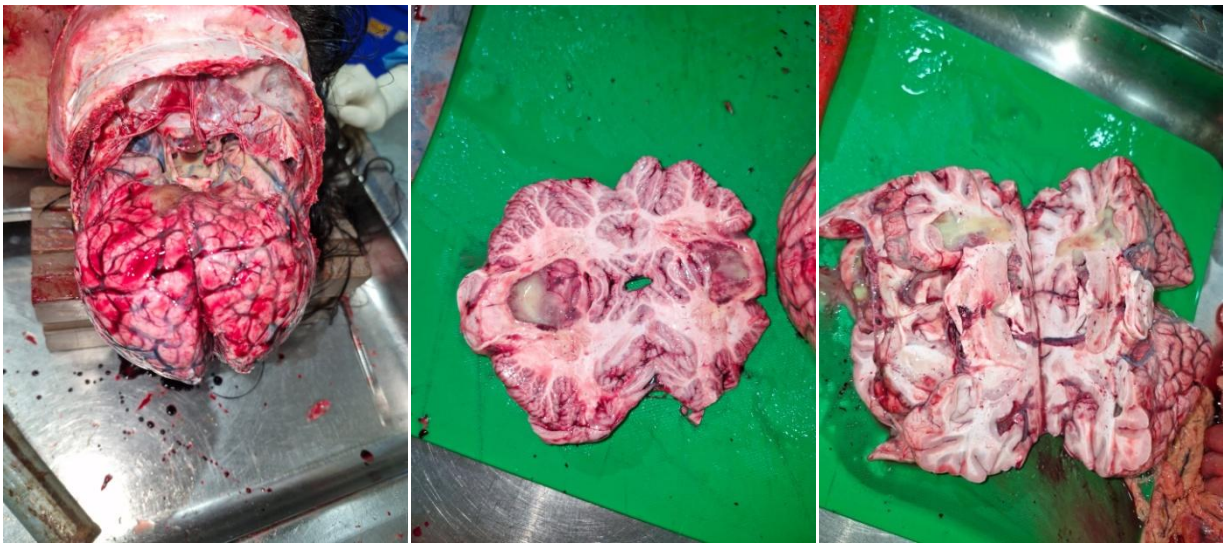
Pus flakes were noted in the midbrain.
Marked flattening of gyri and obliteration of sulci.
Marked cerebral edema.

External examination findings

Internal examination findings



Findings of the heart



Findings in the brain

DISCUSSION

Displacement of the heart to the right by extracardiac causes such as right lung hypoplasia, right pneumonectomy, or diaphragmatic hernia is termed cardiac dextroposition and should be differentiated from dextrocardia (2). This case highlights a rare instance where isolated dextrocardia remained undiagnosed during the patient's lifetime and was only discovered at autopsy. The patient's death was primarily due to fulminant septicaemia, with dextrocardia being an incidental finding.

- Isolated dextrocardia is often asymptomatic and may go undiagnosed unless detected via imaging or physical examination.
- Septicaemia remains a major cause of mortality in young adults, emphasizing the need for early recognition and aggressive management.
- Dextrocardia can pose clinical challenges in interpreting ECGs, radiographs, and during resuscitation efforts, underscoring the importance of careful physical examination.

Isolated Dextrocardia: A Silent Anomaly

Dextrocardia is a congenital condition where the heart is positioned on the right side of the chest with its apex pointing rightward. It can occur in association with situs inversus, where all visceral organs are mirrored, or as an isolated anomaly with normal visceral arrangement (situs solitus). In this case, the patient had isolated dextrocardia with no associated congenital heart defects. (Before autopsy)

Individuals with isolated dextrocardia may remain asymptomatic throughout their lives, as was seen in this patient. The lack of structural cardiac abnormalities meant that her condition had no impact on her normal physiological functioning. Many cases remain undiagnosed unless a chest X-ray, ECG, or other imaging modalities are performed for unrelated reasons. A missed diagnosis can have clinical implications, particularly in emergencies where medical professionals might misinterpret ECGs or radiographic findings. Dextrocardia has no known cause, but maternal diabetes

mellitus and maternal cocaine use have been implicated. Factors such as genetics are also suspected with increased incidence found among conjoined twins (4)

Diagnostic Challenges in Undiagnosed Dextrocardia

A critical learning point from this case is the importance of physical examination in detecting anomalies. The heart sounds were noted to be more prominent on the right side, an important clue that was overlooked due to the focus on treating sepsis. Had the dextrocardia been identified during life, certain investigations such as ECG interpretation might have been adjusted accordingly. Dextrocardia can cause standard ECG lead placements to produce a mirror-image pattern, which can be mistaken for pathology if not correctly identified.

Additionally, imaging studies such as chest X-rays and echocardiography could have confirmed the diagnosis. However, as the patient's acute illness was unrelated to her congenital anomaly, no cardiac imaging was performed before her death. This case emphasizes the need for physicians to always consider congenital anomalies when physical examination findings are unusual.

Septicaemia: A Rapidly Fatal Condition

The primary cause of death in this patient was fulminant septicaemia due to Klebsiella apneumoniae infection. Sepsis is a life-threatening condition caused by a dysregulated immune response to infection, leading to systemic inflammation, endothelial dysfunction, and multi-organ failure. Young adults are typically more resilient to infections, but in this case, the rapid progression suggests a highly virulent organism, possible delayed presentation, or an overwhelming immune response.

Despite aggressive fluid resuscitation, antibiotic therapy, and vasopressor support, the patient deteriorated rapidly. The presence of hypotension, lactic acidosis, and multi-organ

dysfunction indicated severe septic shock, which carries a high mortality rate even with optimal management. This case reinforces the importance of early sepsis recognition, timely initiation of antibiotics, and hemodynamic support to improve survival outcomes.

The Hb levels in the patient were high suggestive by of polycythaemia. In the above case the cause of polycythaemia can be mostly secondary to some underlying factor. Causes of secondary polycythaemia are chronic lung diseases like COPD, ILD, and sleep apnea. Congenital heart diseases as right-to-left shunts, high altitude sickness, obesity, Erythropoietin secreting tumours, renal diseases like Renal artery stenosis, polycystic kidney disease, drug ingestion like anabolic steroids, DMARDs.

Clinical and Forensic Implications

From a forensic perspective, the autopsy played a crucial role in uncovering an underlying congenital anomaly that had remained undiagnosed. The absence of congenital cardiac defects ruled out any contribution of dextrocardia to the fatal outcome. The postmortem findings confirmed septicaemia as the sole cause of death, with Klebsiella pneumoniae being identified as the responsible pathogen.

For medical professionals, this case serves as a reminder to perform thorough systemic evaluations, particularly in young patients presenting with critical illness. Even incidental findings like dextrocardia can have implications for patient care, especially in interpreting diagnostics and planning medical or surgical interventions.

CONCLUSION

This case highlights the silent nature of isolated dextrocardia and the diagnostic challenges it presents when undiagnosed. It also underscores the devastating impact of septicemia, which can rapidly progress to multi-organ failure despite aggressive treatment. Clinicians must maintain a high index of suspicion for congenital anomalies during physical examinations and be vigilant in the early recognition and treatment of sepsis to improve patient outcomes.

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