IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 23, Issue 2 Ser. 5 (February. 2024), PP 53-56
www.iosrjournals.org

A Comprehensive Case Study Of Dextrocardia With Situs Inversus In A 4-Month-Old Infant Presenting With Persistent Cough And Cold

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Abstract:
Dextrocardia with situs inversus [1], a rare congenital anomaly, presents unique diagnostic and management challenges. Here, we present an in-depth case study of a 4-month-old infant with dextrocardia diagnosed after presenting with persistent cough and cold symptoms in the outpatient department of Fayth Clinic Medical Institute. The case underscores the importance of recognizing rare congenital anomalies in pediatric patients and highlights the need for tailored management approaches.

Keywords: *Dextrocardia, Situs Inversus, Congenital Anomaly, Infant, Cough, Cold, Echocardiography.*

Date of Submission: 11-02-2024 Date of Acceptance: 21-02-2024

I. Introduction:

Dextrocardia with situs inversus, also known as *"situs inversus totalis"* is a rare congenital anomaly characterized by the mirror-image arrangement of thoracic and abdominal organs [1]. It occurs in approximately 1 in 12,000 births. While clinical presentation can vary widely, timely diagnosis is crucial for appropriate management. Here, we present a comprehensive case study of dextrocardia with situs inversus in a 4-month-old infant [2] who initially presented with persistent cough and cold symptoms.

II. Case Presentation:

A 4-month-old male infant, birthweight 3.2 kg born via normal full-term delivery, of nonconsanguinous marriage was brought to our pediatric outpatient department of Fayth Clinic Medical Institute, with complaints of persistent cough and cold for two weeks. The parents reported no significant medical history during pregnancy or delivery, other than the infant being irritable, and having difficulty in taking breast feeds intermittently. No family history of dextrocardia or congenital cardiac anomalies.

Physical Examination and Diagnostic workup:

On physical examination, the infant appeared otherwise healthy, with no apparent abnormalities, and no cyanosis including peripheral cyanosis. Weight and length normal for age, developmental history normal. Heart rate was 98/min and respiratory rate 30/min. There was no obvious respiratory distress. The infant appeared comfortable in the mother's arms on auscultation, the lungs had mild basal crepitation, and heart sounds were detected more on the right side of the chest than the left side. Abdominal examination showed liver enlargement on the left side.

Chest X-ray (Figure 1) showed cardiac apex and gastric bubbles on the right side and liver on the left side, confirming the diagnosis of dextrocardia. No lung infiltrates were seen. Blood tests revealed high WBC counts and high C - reactive protein levels indicative of infection. Further evaluation with 2D echocardiography confirmed the diagnosis, revealing a right-sided heart and mirror-image arrangement of thoracic organs. Abdominal sonography detected mirror images of abdominal organs [3].

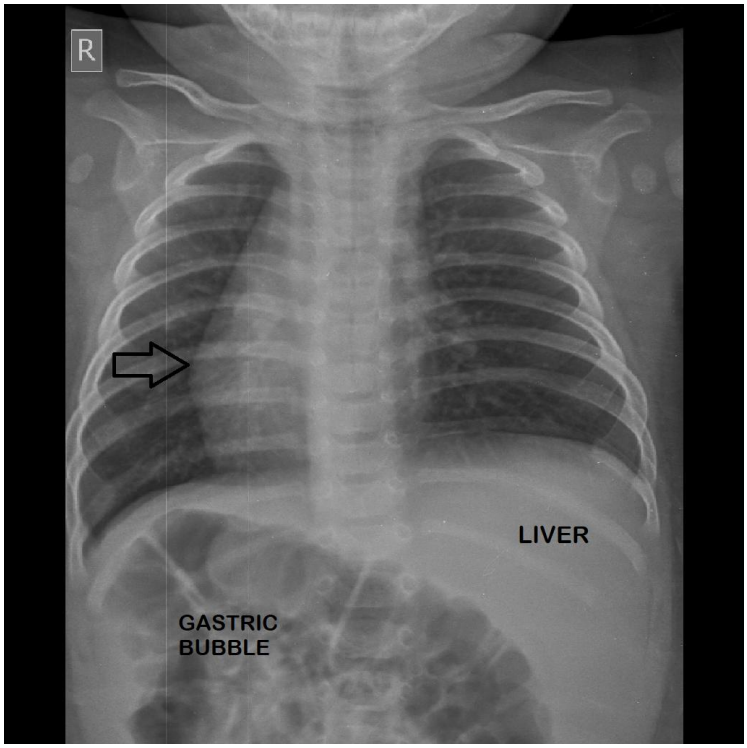

Figure 1: Chest X-Ray depicting cardiac apex in right hemithorax, with liver under left hemi-diaphragm *(situs inversus totalis)*.

Name : [redacted] Lab No. : 1,801
Ref. By. : DR. PAULA GOEL Date : 14-Feb-2024
Collected At : FAYTH CLINIC DADAR Sex : MALE Age : 4 Month

COMPLETE BLOOD COUNT

TEST	RESULT	UNITS	NORMAL VALUES
HAEMOGLOBIN	12.2	gm%	12.0 - 14.2 gm%
RED BLOOD CELLS			
R.B.C. MILLIONS / CMM	4.7	mill/c.mm.	4.6 - 6.2 mill/c.mm.
P.C.V %	40.1	%	40 - 45 %
M.C.V FL	85.32	cu-microns	78 - 100 fl
M.C.H PG	**25.96**	pi gm	27 - 31 pi gm
M. C. H. C. %	**30.42**	%	32 - 36 %
TOTAL W.B.C. COUNT / CMM	**14600**	/c.mm.	4500 - 10000 /c.mm.
DIFFERENTIAL COUNT			
NEUTROPHILS %	**79**	%	40 - 75 %
EOSINOPHILS %	03	%	00 - 06 %
BASOPHILS %	00	%	00 - 01 %
LYMPHOCYTES %	**15**	%	20 - 45 %
MONOCYTES %	03	%	02 - 10 %
PERIPHERAL SMEAR STUDY			
RBC MORPHOLOGY	NORMAL		
WBC MORPHOLOGY	NORMAL		
PLATELETS COUNT / CUMM			
PLATELETS COUNT	255000	lakhs/c.mm.	1.4 - 4.5 lakhs/c.mm.

C REACTIVE PROTEINS IN SERUM CRP

TEST	RESULT	NORMAL VALUES
C-REACTIVE PROTEINS	**23**	0 - 5
METHOD : IMMUNOTURBIDIMETRIC		

END OF REPORT

Figure 2: Blood work showing raised White Blood Cell (W.B.C.) and C-reactive protein.

Outcome and Follow up:

Since the infant did not exhibit any cardiac anomalies apart from dextrocardia, treatment primarily involved antimicrobial therapy for respiratory infection and symptomatic relief for the cough and cold. Nasal saline drops were recommended for nasal congestion. Given the absence of significant cardiac abnormalities, surgical intervention was not indicated at this time. Regular follow-up appointments were scheduled to monitor

the infant's growth and development and assess for any potential complications associated with dextrocardia with situs inversus. Parental Counseling was done.

III. Discussion:

Dextrocardia with situs inversus poses unique challenges in diagnosis [4, 6] and management [4, 6] due to its rare occurrence and atypical clinical presentation. The abnormal positioning of organs can lead to varied clinical manifestations, often requiring a high index of suspicion for diagnosis. Complications of dextrocardia with situs inversus can vary depending on the presence of associated congenital anomalies and the severity of cardiac malformations. Here are some potential complications:

Cardiac Abnormalities: Dextrocardia with situs inversus is often associated with various cardiac abnormalities [5] including ventricular septal defects (VSD), atrial septal defects (ASD), transposition of the great arteries (TGA), and Tetralogy of Fallot. These structural defects can lead to cardiac dysfunction, arrhythmias, and heart failure if left untreated.

Respiratory Complications: In some cases, dextrocardia with situs inversus may be associated with respiratory abnormalities, such as bronchial and tracheal malformations or Kartagener syndrome. Kartagener syndrome [7], characterized by chronic sinusitis, bronchiectasis, and situs inversus, can lead to recurrent respiratory infections and impaired muco-ciliary clearance due to ciliary dyskinesia.

Arrhythmias and Conduction Disorders [8]: Patients with dextrocardia may be at increased risk of arrhythmias and conduction disorders due to abnormal cardiac anatomy and potential associated defects in the conduction system. Regular cardiac monitoring and electrophysiological evaluations may be necessary to detect and manage rhythm disturbances effectively

Gastrointestinal Abnormalities: Situs inversus can also affect the positioning and function of the gastrointestinal tract [9], potentially leading to malrotation, volvulus, or other structural anomalies. These gastrointestinal abnormalities may require surgical intervention and can contribute to feeding difficulties and nutritional challenges in affected individuals.

Pulmonary Hypertension [10]: Certain cardiac defects associated with dextrocardia, such as severe forms of Tetralogy of Fallot or pulmonary atresia, can lead to pulmonary hypertension. Pulmonary hypertension can exacerbate cardiac symptoms and increase the risk of complications, necessitating close monitoring and appropriate medical management.

Psychosocial Impact: Living with a rare congenital anomaly like dextrocardia with situs inversus can have psychosocial implications for patients and their families. Coping with chronic health conditions, frequent medical interventions, and potential physical limitations may impact quality of life and necessitate psychological support and counseling.

In our case, the infant's initial presentation with cough and cold symptoms, while common in pediatric practice, prompted further investigation due to the incidental finding of dextrocardia. This highlights the importance of thorough evaluation in pediatric patients to rule out underlying congenital anomalies [11].

Diagnosis of dextrocardia with situs inversus typically involves imaging modalities such as echocardiography, abdominal ultrasound, computed tomography (CT), or magnetic resonance imaging (MRI) to confirm the anatomical abnormalities [12]. In our case, 2D echocardiography was instrumental in confirming the diagnosis and assessing cardiac function. Additionally, further imaging studies may be warranted to evaluate for associated congenital anomalies, particularly cardiac defects, which are commonly observed in conjunction with dextrocardia [13]. The mirror-image arrangement of organs in situs inversus can pose diagnostic challenges, leading to delays in diagnosis and potentially affecting treatment outcomes. Imaging studies and diagnostic procedures may be more complex due to the atypical anatomy, requiring specialized expertise and techniques for accurate assessment.

Surgical Considerations [14]: Surgical interventions for cardiac anomalies in patients with dextrocardia and situs inversus may be technically challenging due to the abnormal positioning of the heart and great vessels. Surgeons may need to adapt surgical approaches to accommodate the unique anatomy, increasing the risk of intraoperative complications.

IV. Conclusion:

This case underscores the importance of considering rare congenital anomalies in the differential diagnosis of pediatric patients presenting with common symptoms. Early recognition and appropriate management are essential for optimizing outcomes and preventing complications associated with dextrocardia with situs inversus. Further research is warranted to elucidate the long-term implications of this condition and establish optimal management strategies tailored to the individual patient's needs.

Consent and Privacy:

Informed Consent was obtained from parents of patient for purposes of publication. All individual patient identifiers have been removed from this report.

Contributors:

Paula Goel reviewed this patient and conceptualized this idea. Ashish Goel and Paula Goel drafted this manuscript.

Conflict of Interest:

The authors have no conflicts of interest to declare.

Funding:

No funding was received for this case study.

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