Dextrocardia with situs inversus: A case report

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Summary

We present a 24-year-old lady who reported at the radiology department, UBTH Benin City for a chest radiograph, as part of her pre-employment medical examination. She was asymptomatic, her past medical history was not significant and physical examination revealed an apex beat located on the 5th right intercoastal space. The chest radiograph confirmed dextrocardia and also revealed the gastric air bubble on the right, which was suggestive of situs inversus totalis. Barium meal examination confirmed the right-sided position of the stomach, in keeping with situs inversus. Ultrasonography revealed a left sided liver and gall bladder, with a right sided location of the spleen.

Keywords: ***Dextrocardia, Situs inversus, Situs inversus totalis.***

Résumé

Nous présentons le cas d'une dame âgée de 24 ans qui s'était présentée au département de la radiologie, UBTH à la cité du Benin pour la radiographie de la poitrine comme une partie de son examen médical pré-emploi. Elle était asymptomatique, son dossier médical du passé n'avait pas de l'importance et l'examen physique avait indique un battement trés éleve logé au cinquième espace intercostals du coté droite ce qui était évocateur d'un situs inversus totalis. L'examen à travers le sulfate de barium a confirmé l'endroit du coté de l'estomac, en accord avec, ou conformement au situs inversus. L'ultrasonographie avait indique le culin foie et la vesicule biliaire à gauche avec la rate logée à droite.

Introduction

Dextrocardia was first recognised by Marco Severino in 1643 and Situs Inversus by Matthew Bailie over half a century later[1]. In dextrocardia, the normal levocardiac orientation at birth, in which the base to apex axis points to the left, is reversed. In situs inversus, the morphologic left atrium is on the right and the morphologic right atrium is on the left[2]. There is reversal of the normal pulmonary anatomy such that the right lung has two lobes and the left lung three lobes. In addition the liver and gallbladder are located on the left, the stomach and spleen more rightward while the remaining internal organs are mirror images of the normal[3]. Dextrocardia with a normal abdominal situs has a higher association with congenital Heart Disease.

This paper aims to report an uncommon condition – Dextrocardia with Situs inversus. The importance of recognizing Situs inversus lies in prevention of surgical disasters that may follow failure to identify the reversed anatomy or an atypical history; for example in these patients, cholecystitis causes left upper quadrant pain and appendicitis causes left lower quadrant pain; both with special implications for surgery[4].

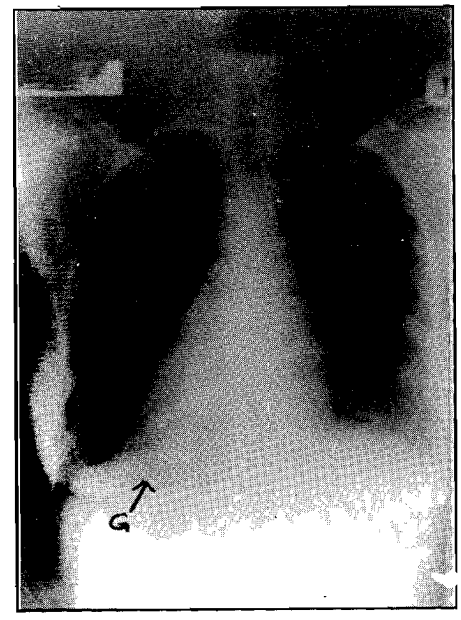

Fig. 1 ***Posteroanterior (PA) chest radiograph showing the cardiac apex (A), and the gastric fundal air buble (G) on the right. Note marker L on the top left corner of the radiograph.***

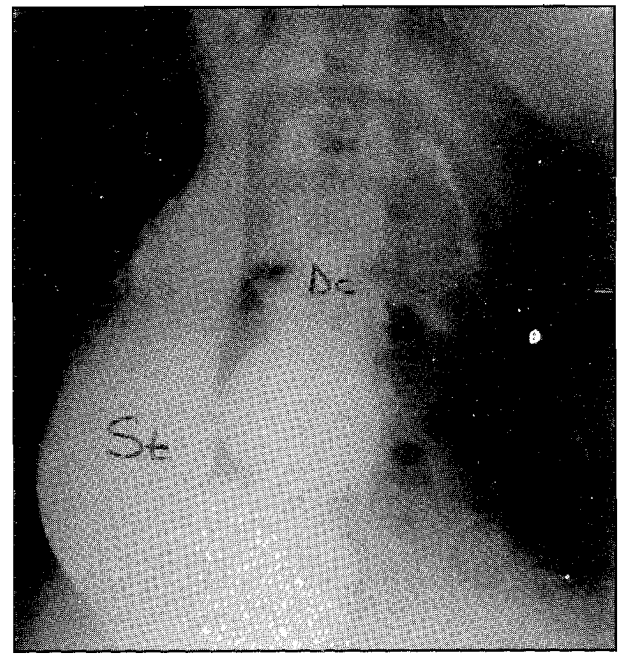

Fig. 2 ***Barium meal and follow through exam showing the stomach (St) on the right, the duodenal cap (Dc) more rightward, and the C-loop (DCL) on the left. The marker (L) is on the top left corner of the radiograph.***

**Correspondence*

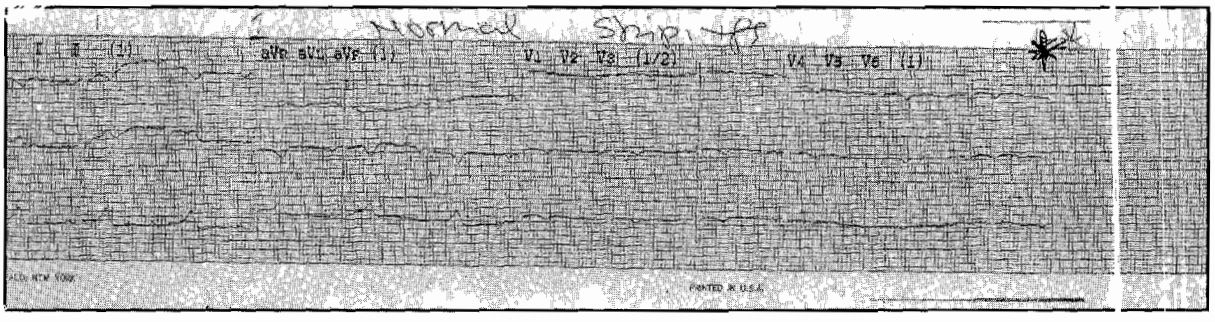

Fig. 3 *Shows the changes consistent with dextrocardia which were corrected on reverse (Mirror-Image) placement of the precordial leads*

Case report

R. E. is a 24-year-old lady who was referred for pre-employment medical check up. She was asymptomatic. Past medical history revealed only occasional lower abdominal discomfort. Her chest radiograph showed the cardiac apex, aortic arch and gastric fundal air bubble on the right, while the intermediate bronchus was on the left. There was no radiographic evidence of bronchiectasis or sinusitis. Considering the possibility of a mislabeled chest radiograph, a repeat was ordered and the findings above were confirmed. Subsequently, physical examination, electrocardiography, abdominal ultrasonography were carried out.

Physical examination confirmed the location of the apex beat at the 5th right intercostal space at the mid-clavicular line. All other organ systems were normal and these were no clinical evidence of bronchiectasis or sinusitis. Abdominal ultrasound showed the liver and gall bladder in the left hypochondrium, with the spleen right sided. Barium meal and follow through confirmed the stomach on the right side with the duodenal C-loop on the left. Electrocardiographic findings were also in keeping with dextrocardia, however, a reverse (mirror-image) placement of the precordial leads on the right corrected these abnormalities but also revealed moderate left axis deviation and T-wave inversion in the anterior leads.

Discussion

The incidence of situs inversus with dextrocardia or situs inversus totalis (SIT) has been variously estimated at 1 in 6,000 – 35,000 live births[5] or 1 in 8,0000 from mass adult radiographic screening[6]. Genetic predisposition is considered to be autosomal recessive, with the defect located on the long arm or chromosome 14[7]. There is no sex predilection; most affected patients are asymptomatic and able to lead normal lives. Occasionally there may be chest findings suggestive of bronchiectasis, which is aetiologically thought to be due to association with primary cilliary dyskinesia (PCD)[8]. Indeed reports have quoted a 1 in 5 incidence of Kataganer's syndrome in patients with situs inversus[9].

Apart from chest radiography, methods of investigating these patients include Electrocardiography (ECG), Barium studies, Computerised Tomography (CT) Ultrasonography and Magnetic Resonance Imaging (MRI). CT and MRI are particularly useful in confirming situs inversus with Dextrocardia. The two most partinent features on the ECG in dextrocardia are the

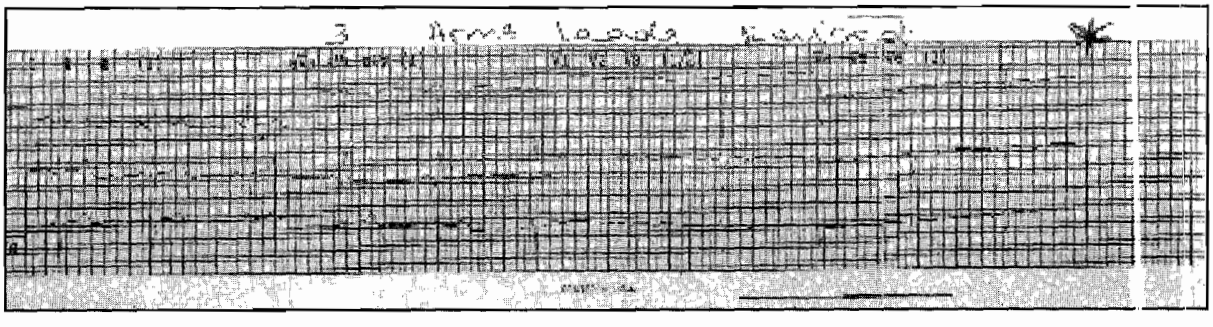

Fig. 4 *Shows the changes consistent with dextrocardia which were corrected on reverse (Mirror-Image) placement of the precordial leads.*

p-wave axis and the morphology of the QRS waves on the precordial leads. ECG findings includes a reversal of the gradual increase in the amplitude of the R wave over the mid and left precordial leads; the QRS amplitudes of the right leads are prominent and they diminish in size over the left precordial leads[10]. The condition of transposition of the viscera, unless associated with other severe anomalies may remain undetected, permitting affected patients to lead normal lives. This is supported by this case that was detected incidentally during a routine pre-employment medical examination. She had no history of hospital admissions. Other findings like renal dysjplasia, pancreatic fibrosis, intrahepatic biliary dysgenesis and other digestive tract anomalies previously described in other reports[11], were also not found in this patient. Barium meal only confirmed visceral transposition with no parenchymal abnormality.

The ECG findings in our patient were in keeping with a diagnosis of dectrocardia. Reverse placement of (mirror-image) of the ECG precordial leads on the right chest resulted in correction of these features and revealed moderate left axis deviation and T-wave inversion in the anterior leads suggesting a possible anterior ischaemia.

Computerised Tomography (CT) and Magnetic Resonance Imaging (MRI), where available, are the best methods for demonstrating the mirror anatomy of the vicera in dextrocardia and situs inversus.

Conclusion

An incidental finding of dextrocardia with situs inversus is reported and the need for clinicians to be aware of the peculiar surgical/medical presentations of this rare condition is highlighted.

References

1. Wilhelm A. Holbert MJ. Situs Inversus. E-meedicine 2002 Feb; 1 – 2

2. Partridge J. The radiological evaluation of atrial situs. Clin Radiol 1979 Jan. 30 (1): 95 – 103.

3. Winer-Muram HT. Adult presentation of heterotaxic syndromes and related complexes. J Thorac Imaging 1995 Winter; 10(1): 43 – 57.

4. Franklin Jr. M. E. Almeida JA, Perez ER, Mic haelson RLP, Majarrez A. Cholecystectomy and appendectomy by laparoscopy in a patient with situs inversus totalis – a case report and review of the literature. Association Mexicanade Cirugia Endoscopica, A. C. 2002 July – Sept, 2 (3): 150 – 3.

5. Sandro C, Raffaele DV, Roberto Z. Suspected appendicitis in Situs inversus totalis. An indication for a laparoscopic approach. Surgical laparoscopy and Endoscopy 1998; 8: 393 – 4.

6. Garson A, Bricker JT, McNamara DG. The science and practice of paediatric cardiology 1990, Chapter 75 (p.1282). Lea and Fabiger.

7. Demetriades H, Bistsios D, Dervenis D et al. Laparoscopic cholecystectomy with symptomatic cholelithiasis and situs inversus totalis. Dig. Surg. 1999; 16: 519 – 21.

8. Holzmann D, Ott PM, Felix H. diagnostic approach to primary cilliary dyskinesia; a review. Eur J Paediatr 2002 Jan – Feb; 159 (1-2): 95 – 8.

9. Kinney TB, De Luca SA. Kataganer's Syndrome. Am Fam hysician 1991 Jul; 44 (1): 133 – 4.

10. Emmanoulides GC, Allen HD, Riemenschneider TA, Gutgese LHP. In Moss and Adans (eds). Heart Disease in infants, Children and Adolescents, 5th edition 1995 (chapter 80). Williams and Wilkins.

11. Wong J, Tang CN, Chau Ch, Luk YW, Lim KW. Laparoscopic cholecystectomy and exploration of common bile duct in a patient with stus inversus. Surgical Endoscopy 2002; 15: 218.