

Dextrocardia and *Situs Inversus Totalis* in a Nigerian Cadaver: A Case Report of Rare Anomaly

Dextrocardia y *Situs Inversus Totalis* en un Cadáver Nigeriano:
Reporte de Caso de una Rara Anomalía

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SUMMARY: This report describes an adult male cadaver with dextrocardia and *situs inversus totalis* in a Nigerian cadaver. The photographic illustrations revealed transposition of some of the visceral organs such that the stomach and spleen were located on the right and the liver and gall bladder on the left. Also, the left lung was tri-lobed while the right was uni-lobed. The heart was flattened and flipped to the right thus, transposing the great vessels. The report showed that dextrocardia and *situs inversus* exists amongst Nigerians and possibly Africans and therefore wish to recommend early medical examination since patients with this condition are unaware of their unusual anatomy until they seek medical attention for an unrelated condition. Early detection may lead to a successful surgical management and consequently offer a safer chance of survival.

KEY WORDS: Dextrocardia; *Situs inversus*; Rare anomaly; Cadaver.

INTRODUCTION

Dextrocardia is an abnormal congenital positioning of the heart. Instead of the heart forming in the fetus on the left side, it flips over and forms on the right side (Tabry *et al.*, 2001). There are several types of dextrocardia, also called looping defects. *Situs inversus* (also called *situs transversus*) is a congenital condition in which the major visceral organs are reversed or mirrored from their normal positions. Many people with *situs inversus totalis* are unaware of their unusual anatomy until they seek medical attention for an unrelated condition (Tabry *et al.*). Dextrocardia is frequently diagnosed in a routine prenatal sonogram, although not every radiologist will catch it, particularly if there are no cardiac structural abnormalities.

Nawaz *et al.* (2005) in their case report found that the stomach and spleen were located on the right side, while the liver was on the left side. The gallbladder was located in the epigastric area toward the left side. In a related report, chronic gallbladder wall inflammation as well as *situs inversus* with the liver and gallbladder on the left side and the spleen on the right was discovered in a 76 year old man

(Kamitani *et al.*, 2005). Abdur-Rahman *et al.* (2007) reported a case of dextrogastric, multiple jejunal atresia and inverse rotation of the intestine with lavocardia in a neonate.

We describe a hitherto unreported case of abnormal lung formation in an adult male Nigerian cadaver with dextrocardia and *situs inversus totalis*.

CASE REPORT

During a routine supervision of dissection of formalin-fixed adult cadavers by 200 level medical students at Igbinedion University, Okada, Nigeria, dextrocardia and *situs inversus* was observed in one of the male cadavers. A total of fifteen (14 male and 1 female) cadavers were dissected (during the thorax and abdomen class) as part of the medical training in Human Anatomy. Our observation became interesting as it provided an avenue for the students to better understand the embryonic history that brought about

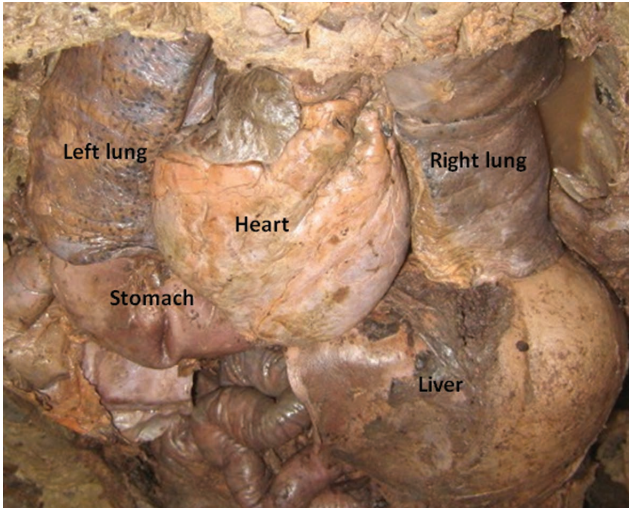


Fig. 1. Superior view of the thoracoabdominal cavity in situ. Note the transposition of the visceral organs.

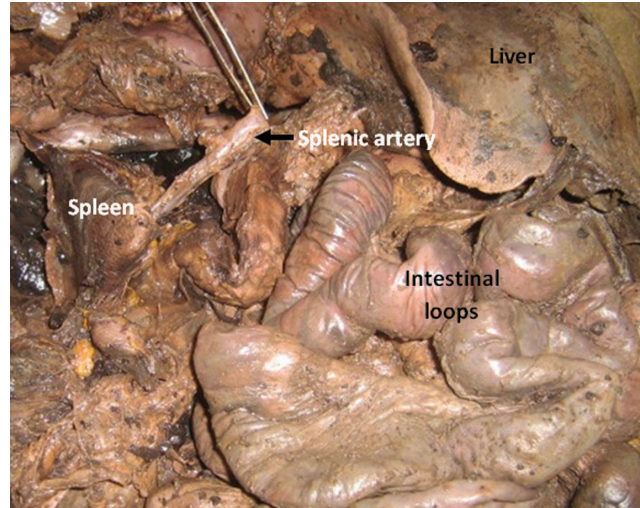


Fig. 4. Superior view of the thoracoabdominal cavity in situ. Note the splenic artery supplying the spleen on the right side of the body.

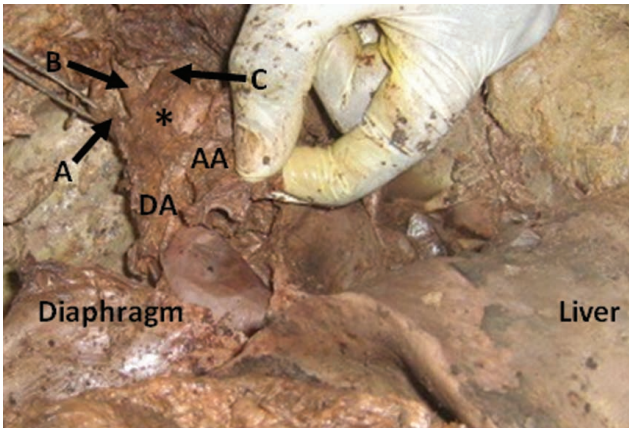


Fig. 2. Superior view of the thoracoabdominal cavity in situ. Note the transposition of the arch of aorta (*). A= Right subclavian artery, B= Right common carotid artery, C= Brachiocephalic trunk, DA= Descending aorta, AA= Ascending aorta.

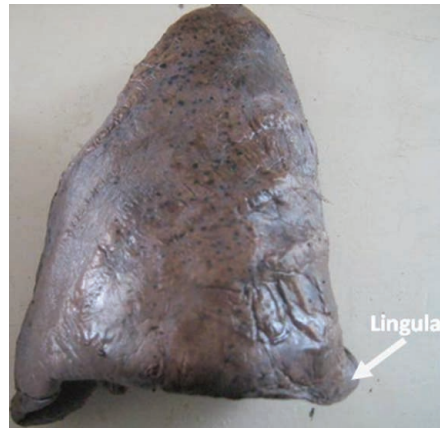


Fig. 5. The right lung. Note the lingula and the absence of fissures thus making it a uni-lobed visceral.

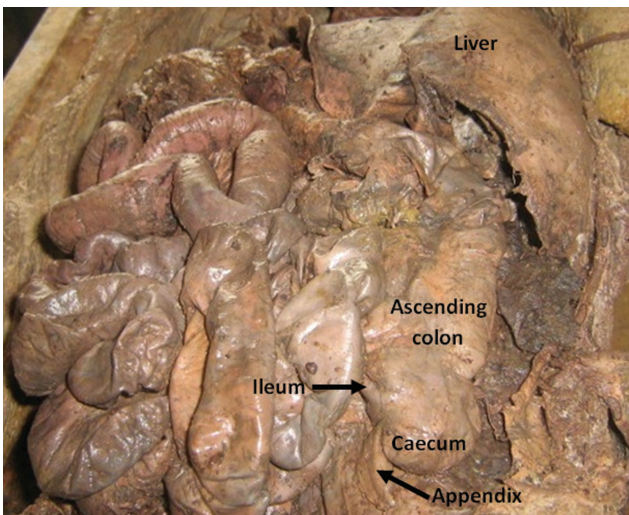


Fig. 3. Superior view of the thoracoabdominal cavity in situ. Note the ascending colon, caecum and appendix on the left side of the body.

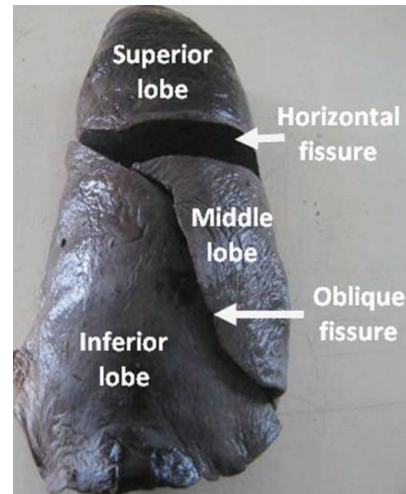


Fig. 6. The left lung. Note the oblique and horizontal fissures dividing the lung into superior, middle and inferior lobes.

the abnormality. The class had to shift from dissection to embryology discussion since the students were so lucky to have come across such anomaly during their medical training bearing in mind that the condition is a very rare one and most medical students often time do not get to see it throughout their medical training.

In our case report, the stomach and spleen were found on the right side, while the liver was on the left side (Figs. 1 and 4). There was a malrotation of the intestinal loops there by lodging the ascending colon, caecum and appendix on the left side and the descending and sigmoid colon on the right (Fig. 3). The two lungs were also observed to be defective. The left lung had two fissures (horizontal and oblique) and three lobes (superior, middle and inferior) while the right lung had no fissure and as such, no lobe (Figs. 5 and 6). The heart is some what flattened and flipped towards the right (Fig. 1). The arch of aorta passed posteriorly with a slight inclination and convexity to the right thus orientating the descending aorta to the right side (Fig. 2). The branches of the arch were transposed and composed of the right subclavian artery, right common carotid artery and brachiocephalic trunk which in turns divided into the left common carotid and left subclavian arteries (Fig. 2).

DISCUSSION

Dextrocardia with *situs inversus* is a rare anomaly occurring in about one of 10.000 people (Nawaz *et al.*). This anomaly may not be diagnosed until later in life. In some cases *situs inversus* is commonly associated with serious primary ciliary dyskinesia and splenic malformations (Nawaz *et al.*). Its frequency is between 1 in 8000 to 1 in 20.000 (Treiger *et al.*, 1993). It may be total (*situs inversus totalis*) or incomplete in less than 10% of cases. Many people with *situs inversus totalis* are unaware of their unusual anatomy until they seek medical attention for an unrelated condition.

In our case report, we observed a male cadaver with dextrocardia and *situs inversus totalis* (Fig. 1). It is pertinent to note that people with this anomaly have higher chances of suffering from other problems of the heart especially if other organs are affected also. Individuals may find that they suffer no symptoms at all until they are in the later stages of life, whilst others may suffer from some serious renal, respiratory, gastrointestinal and cardiovascular diseases. For instance Danbauchi & Alhassan (2002) reported two cases of dextrocardia with *situs inversus*. The first patient was a 35-year-old man presented for the first time with respiratory symptoms but no cardiac symptoms and the second patient (14-year-old) presented with cardiac symptoms. Also, Treiger

et al. reported a clear cell of carcinoma in the kidneys of patient with *situs inversus* even though the two kidneys were normal on macroscopic examination. Nawaz *et al.* in their report described a case of two newborns with *situs inversus* in association with congenital duodenal obstruction. Although the mechanism responsible for the malrotation of the intestinal loop in our case report is yet to be completely understood, evidence from the literatures had it that the direction of rotation is under the influence of the forces exerted by the adjacent organs on the intestine and its mesentery (Naboth-Cegara, 1999; Abdur-Rahman *et al.*). The right lung that was observed to be uni-lobed and the larger of the two lungs make this case report a rare one (Fig. 5). The right principal bronchus divided directly into segmental bronchi which supplied the bronchopulmonary segments within the parenchyma without the intervening lobar bronchi. This is a very rare anatomical observation and may not be diagnosed in some cases prior to surgery consequently leading to complications. Considering the pathological implication, patient with uni-lobed lung are more prone to respiratory complications unlike a normal multi-lobed individual where disease processes in the lung may be limited to the affected lobe thus allowing the unaffected lobe(s) to carry on with the respiratory activities (Romanes, 2006). Patient with this anomaly are susceptible to lung cancer (Kodama *et al.*, 1990). The left lung on the other hand was smaller with the left principal bronchus dividing into three lobar bronchi which in turn divided into segmental bronchi which supplied the bronchopulmonary segments within each of the three lobes of the lung. Because dextrocardia and *situs inversus* is asymptomatic and does not cause any long term problems, it is very dangerous if the condition is not diagnosed prior to surgery. Often it is diagnosed during a medical examination or during a routine visit to hospital when cardiac function is examined.

We therefore, in conclusion, sensitize the surgeons and radiologists to beware of this anomaly during the presurgical and surgical management and also encourage a routine medical examination which could give a signal to the existence of this condition if present. This will help the patient when afflicted with certain clinical conditions such as appendicitis; where the referred pain will be on the left side rather than the right thus leading to wrong diagnosis and possibly death due to delay in surgical management.

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RESUMEN: Este reporte describe a un cadáver adulto nigeriano de sexo masculino con dextrocardia y *situs inversus totalis*. Las ilustraciones fotográficas revelaron transposición de algunas de las vísceras, como el estómago y el bazo que se encuentra en el derecho y el hígado y la vesícula biliar a la izquierda. Además, el pulmón izquierdo era tri-lobulado, mientras que el derecho uni-lobulado. El corazón fue aplanado y situado a la derecha, por consiguiente, transposicionando los grandes vasos. El reporte demostró que la dextrocardia y el situs inversus existen entre los nigerianos y, posiblemente, los africanos, por tanto, se recomienda un temprano examen médico, ya que pacientes con esta condición no son conscientes de su inusual anatomía hasta que acuden al médico por atención por una condición no relacionada. La detección temprana puede conducir a un éxito quirúrgico y, en consecuencia, ofrecer una segura oportunidad de sobrevivir.

PALABRAS CLAVE: Dextrocardia; *Situs inversus*; Rara anomalía; Cadaver.

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