Case 1295

Situs inversus totalis
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Section: Abdominal imaging
Imaging Technique: CT
Case Type: Anatomy and Functional Imaging
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Patient: 53 years, female

Clinical History:
Abdominal pain with palpation of an abdominal mass in the left flank.

Imaging Findings:
The patient was admitted with crampy abdominal pain. Laboratory tests were normal, but abdominal examination revealed a palpable mass in the left flank, justifying the performance of an abdominal CT.

Discussion:
Lateralisation abnormalities are characterised by one or more viscera located on the wrong side of the body. They are caused by a malrotation of the fetal cardiac and/or gastrointestinal tube. The normal anatomical position of all organs is called situs solitus. Complete inversion of the normal anatomy, referred to as situs inversus totalis, occurs in 1:8000 cases.

Any kind of incomplete inversion is known as situs inversus partialis: such a condition is encountered in 1:7000 cases. Three common variations of situs inversus partialis are: situs inversus thoracalis (dextrocardia and inversion of mediastinal structures), situs inversus abdominalis (inversion of abdominal structures), and isomerism of either the right or left half-body. The latter is characterised by a symmetric duplication of either the right or left lung, bronchial system and heart atrium and by a centrally positioned, symmetric liver. Polysplenia is observed in left isomerism, and asplenia in right isomerism.

Associated malformations are far more frequent and severe in sinus inversus partialis than in situs inversus totalis. 95% of the newborns with situs inversus partialis suffer from major cardiovascular abnormalities, such as septal defects, great vessel transposition, right or left ventricular double outlet, or pulmonary stenosis. Asplenia or polysplenia are found in 80% of cases of situs inversus partialis. Venous malformations are common.

In 20-25% of cases, situs inversus totalis is part of a Kartagener syndrome. This is characterised by the tetrad of sinus inversus totalis, chronic sinusitis, bronchiectasis, and male infertility, all of which result from immotile cilia syndrome. Minor cardiovascular malformations and asymptomatic gut abnormalities, such as incomplete bowel rotation and atresia, are common in patients with situs inversus totalis.

Differential Diagnosis List: Situs inversus totalis

Final Diagnosis: Situs inversus totalis
References:


Description: Spiral CT section demonstrating situs inversus totalis. At the thoracic level can be seen: a dextrocardia (heart H), a descending aorta (Ao) on the right and an inferior vena cava (IVC) on the left.

Origin:
Description: At the abdominal level, the stomach (St) is right-sided. The liver (L) is on the left side, explaining the mass effect in the left flank. Origin:
Description: The inferior vena cava (IVC) is located on the left side of the body. The renal veins entering it allow it to be distinguished from the abdominal aorta (Ao). The spleen (Sp) is right-sided. Neither asplenia nor polysplenia can be identified. Origin:
Description: Situs inversus totalis including a dextrocardia, a left-sided ascending aorta (Aao) and a right-sided descending aorta (Dao) at the thoracic level. Origin:
Description: Situs inversus totalis including a dextrocardia (H), a left-sided ascending aorta and a right-sided descending aorta (Dao) at the thoracic level. Origin:
**Description:** At the abdominal level, liver (L) and spleen (Sp) are right- and left-sided, respectively. The inferior vena cava (IVC) is left-sided in its retrohepatic portion (2c), whereas it is located on the right side of the abdominal aorta in its infrarenal portion (2d). This can be explained by the double potential embryologic origin of the various segments of the inferior vena cava. **Origin:**
Description: At the abdominal level, liver (L) and spleen are right- and left-sided, respectively. The inferior vena cava (IVC) is left-sided in its retrohepatic portion (2c), whereas it is located on the right side of the abdominal aorta in its infrarenal portion (2d). This can be explained by the double potential embryologic origin of the various segments of the inferior vena cava. Origin: