

# Situs inversus totalis (SIT) incidental finding of a patient with a confirmed case of dengue with alarm signs

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**ABSTRACT** Situs inversus totalis (SIT) is a rare congenital anomaly with the inversion of the position of the organs in the thorax and abdomen. This means that the heart and visceral organs are located on the opposite side to usual [1]. Although the direct cause of this condition remains unknown, an association with factors such as conjoined twinning, cocaine use during pregnancy, and maternal diabetes has been noted [2]. It is estimated that TIS affects about 0.01% of the population [3]. We discuss here a case of a 20-year-old male patient with TIS detected incidentally on admission with confirmed dengue case and alarm signs.

**Resumen** El situs inversus totalis (SIT) es una rara anomalía congénita caracterizada por la inversión de la posición de los órganos en el tórax y abdomen. Esto significa que el corazón y los órganos viscerales se encuentran en el lado opuesto al habitual [1]. Aunque la causa directa de esta condición sigue siendo desconocida, se ha observado una asociación con factores como la gemelaridad unida, el consumo de cocaína durante el embarazo y la diabetes materna [2]. Según estimaciones, el SIT afecta aproximadamente al 0,01% de la población [3]. Presentamos un caso de un paciente masculino de 20 años con SIT, detectado de manera incidental durante su ingreso por un caso confirmado de dengue con signos de alarma.

**KEYWORDS** patient, imaging, Situs inversus,

## 1. PRESENTATION OF THE CASE

A 20-year-old male patient was admitted to the emergency department of the Emiro Quintero Cañizares hospital in Ocaña, Norte de Santander, with symptoms of feverish peaks (39°C), general malaise, myalgia, arthralgia, tension headache, retrocular pain, emetic episodes and diarrhea with mucus. She also reported slight nasal and gingival bleeding. After the initial evaluation, a series of paraclinical tests were requested, including complete blood count, transaminases, and a positive IgM test for dengue. The results revealed leukopenia, moderate thrombocytopenia, and elevated transaminases.

The patient was hospitalized with a diagnosis of dengue with alarm signs in the critical phase (5th day of illness). During his hospital stay, the patient reported pain in the epigastrium radiating to the left hypochondrium, so a total abdominal ultrasound was requested to rule out dengue serositis or other alteration of the abdomen.

Ultrasonography revealed a complete inversion of the abdominal organs, with the liver and gallbladder in the left hypochondrium and the spleen on the right side. The patient had no prior knowledge of this condition, but mentioned that he had always felt the heartbeat on the right side.

Chest x-ray and electrocardiogram were carried out to

ascertain the diagnosis. X-ray Figure 1 showed dextrocardia, right-sided cardiac apex, left-sided ascending aorta and right-sided aortic button. Electrocardiogram Figure 2 revealed sinus rhythm with negative P, QRS and T wave in I and aVL, narrow QRS with right axis and rs in precordials, without R wave progression.

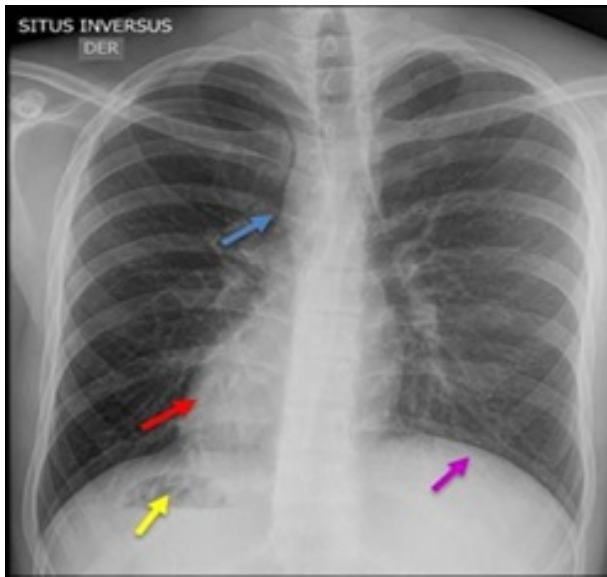
With these results, the diagnosis of situs inversus totalis (SIT) was confirmed as an incidental finding. The patient was informed in a sensitive and humanized manner about the importance of knowing the location of his organs for future medical or surgical interventions.

**Chest X-ray:** The cardiac apex on the right side (red arrow), the ascending aorta on the left side and the aortic button on the right side (blue arrow) with a gastric bubble on the right (yellow arrow) and a hepatic shadow on the left side (purple arrow).

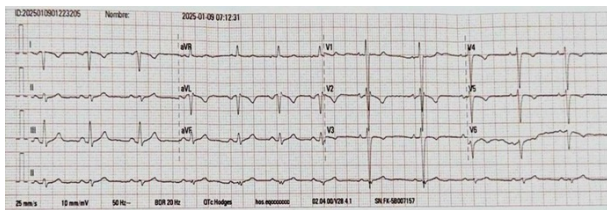
**Electrocardiogram:** deviation of the axis to the right, inversion of all complexes (global negativity) in lead I, negative P wave, QRS, and T, in AVL, rs in precordial leads, absence of R wave progression in thoracic leads.

## 2. DISCUSSION

Situs inversus totalis syndrome (SIT) is a rare congenital anomaly characterized by inversion of the position of the



**FIGURE 1.**



**FIGURE 2.**

heart and visceral organs of the abdomen [4]. This condition was first described by Leonardo da Vinci in 1452-1519 and later recognized by other physicians, who described the complete mirror-image inversion of the thoracic and abdominal organs [3].

TIS affects approximately 0.01% of the population and, in most cases, patients are asymptomatic and have a normal life expectancy. However, the exact etiology of this condition remains unknown [3], [5].

It is important to note that TIS may remain undiagnosed until an associated complication occurs, either abdominal pain as in the case of our patient or a congenital cardiac anomaly associated with dextrocardia such as atrial solitus, discordant AV connection discordant ventriculo-atrial (VA) connection and transposition of great arteries [1].

In these cases it is also essential to know the patient's abdominal anatomy to avoid complications during surgery.

An example of this is acute appendicitis, which may present atypically in patients with TIS. In these cases, the abdominal pain may be localized on the left side, which may confuse the treating physician.

Two case reports of acute appendicitis in patients with SIT illustrate the importance of knowing the abdominal anatomy in these patients. In the first case, the patient was unaware of his anatomic abnormality and the diagnosis was delayed [6].

In the second case, the patient was aware of his condition and it was corroborated with tomographic imaging and laparoscopic exploration [7]. The atypical presentation of appendicitis in patients with situs inversus can lead to confusion in the initial diagnosis. Because the abdominal pain associated with appendicitis is usually located on the right side, the physician may not consider it as a possible cause when the patient presents with left-sided pain. Instead, pain in the left lower quadrant may suggest other gastrointestinal conditions, such as complicated diverticulitis or gastroenteritis.

There are no specific studies that analyze the relationship between TIS and dengue, but it is important to keep in mind that the underlying condition of STI may affect the presentation of dengue symptoms, for example abdominal pain may be more difficult due to organ inversion, in terms of treatment there are no significant differences in the management of dengue in patients with TIS, management focuses on relieving symptoms, rehydrate the patient and prevent complications.

Not having accurate information about a patient's condition can have adverse consequences in emergency surgical situations, both for the surgeon and the patient. In addition, it can affect the clinical evaluation. In the case of our patient, there were no clinical symptoms requiring surgical intervention and no significant cardiopulmonary problems. However, he did present abdominal pain in the left hypochondrium associated with dengue, which led us to perform imaging studies that finally revealed the diagnosis of situs inversus totalis (SIT).

### 3. CONCLUSION

Patients diagnosed with Situs Inversus Totalis (SIT) can lead a normal life, but it is essential to educate and explain to them about their anatomical variation so that they can inform health professionals about their condition, especially before any surgical procedure or medical intervention.

This is crucial to ensure proper medical care and avoid possible complications. Patient education and awareness of their condition are fundamental to effective health management. In addition, it is important for patients with SIT to be aware of the importance of keeping detailed records of their condition and sharing this information with their healthcare providers.

In this way, SIT patients can take an active role in the management of their health and ensure that they receive the most appropriate medical care for their individual needs.

### REFERENCES

- [1] Edzie, Emmanuel Kobina Mesi, et al. "Incidental finding of dextrocardia with situs inversus in a 59-year-old man." *Case Reports in Radiology* 2019.1 (2019): 7107293.
- [2] Amankwa, Nana Ama, et al. "Situs inversus totalis in a 34-year-old diabetic woman. A case report." *Radiology Case Reports* 18.2 (2023): 704-708.
- [3] Supriya, G., S. Saritha, and Seema Madan. "Situs inversus totalis—a case report." *IOSR Journal of Applied Physics* 3.6 (2013): 12-6.
- [4] Wadhwa, Leena, et al. "Successful obstetric outcome in dextrocardia with situs inversus and moderate pulmonary hypertension-rare case." *Journal of Clinical and Diagnostic Research: JCDR* 10.10 (2016): QD08.
- [5] Tayeb, Mohammad, Faiz Mohammad Khan, and Fozia Rauf. "Situs inversus totalis with perforated duodenal ulcer: a case report." *Journal of Medical Case Reports* 5 (2011): 1-3.

- [6] Pipal, Dharmendra K., Vibha Rani Pipal, and Seema Yadav. "Acute appendicitis in situs inversus totalis: A case report." *Cureus* 14.3 (2022): e22947.
- [7] Saavedra Idrogo, Franklin, Jorge Luis Gálvez Díaz, and Leslie Saavedra Paredes. "Apendicitis aguda no complicada en situs inversus totalis. Reporte de un caso." *Revista del Cuerpo Médico Hospital Nacional Almanzor Aguinaga Asenjo* 15.4 (2023): 615-618.