

Case Report

Gastrectomy in a Patient with Situs Inversus Totalis

Luciano Casali Santos;¹ Eduardo Bertarini Marques;¹ Felipe José Vieira;² Alexandre Ferreira Oliveira, Phd;³ Leonardo José Vieira.⁴

1 Medicine Undergraduate Student, Universidade Federal de Juiz de Fora

2 General Surgeon, Head Of General Surgery and Trauma Service do Hospital Pronto Socorro de Juiz de Fora

3 Oncology surgeon. President of oncology surgeon brazilian Society

4 Oncology surgeon Head of oncology surgery Service, , Hospital Aacomcer- Juiz de Fora

Introduction

Situs inversus is a rare anatomic anomaly characterized by an inversion of thoracic and abdominal viscera that creates a mirror-image, and is associated with congenital heart disease. The term situs inversus totalis is used when the heart is also inverted (dextrocardy). Surgical procedures for these patients are technically more difficult¹ because of inversion of organs and vessels, and morphological variations, such as polysplenia and interruptions of inferior vena cava.² The involvement of gastric cancer in patients with situs inversus is a rare event, and a literature review found less than 40 reports. We present a case report of gastrectomy in a patient with situs inversus totalis and gastric cancer, highlighting the difficulties in dealing with the case.

Case Report

Male patient, 55 years, a former smoker, with weight loss (10kg), epigastric pain and anemia. Medicated with angiotensin-converting enzyme inhibitor (ACE) and diuretic to control hypertension, and using a permanent pacemaker (second degree atrioventricular block). Upper endoscopy showed an ulcerated polypoid lesion on gastric antrum, and a biopsy diagnosed adenocarcinoma. Chest radiography detected dextrocardia and cardiomegaly. Computed tomography showed situs inversus totalis and confirmed antrum

lesion, with no sign of secondary implant. In admission, anemia was confirmed (Hemoglobin 8.8g/dL) and blood transfusion was necessary. During surgery there were technical difficulties due to anatomical variation. Besides situs inversus, the patient had polysplenia. Subtotal gastrectomy with D2 dissection of lymph nodes and pre-colic Roux-en-Y gastric bypass were performed. Histological examination disclosed poorly differentiated adenocarcinoma measuring 7.5cm x 7.0cm and occupying whole anterior antrum wall, free-tumor margins and angiolymphatic invasion (14 positive lymph-nodes from 44 examined). The patient was discharged on 15th postoperative day and is under outpatient control with no sign of recurrence of the disease.

Discussion

The abnormal arrangement of body organs is rare and has an incidence of 1/8000–1/25000 live births.³ This abnormality of embryonic development may be due to chemical agents or genetic changes.⁴ Situs solitus represents the normal position of organs, with heart, stomach, spleen and aorta on the left side, and liver and inferior vena cava on the right.² Situs ambiguous or heterotaxia is the abnormal array

Correspondence

Luciano Casali Santos

Rua Evaristo de Sá Alves nº 80 floor 202 Morro da Glória

36035 180 Juiz de Fora Brazil

Phone: +55 32 3212-6005 +55 32 8816-6662

E-mail: lucianocasali@gmail.com

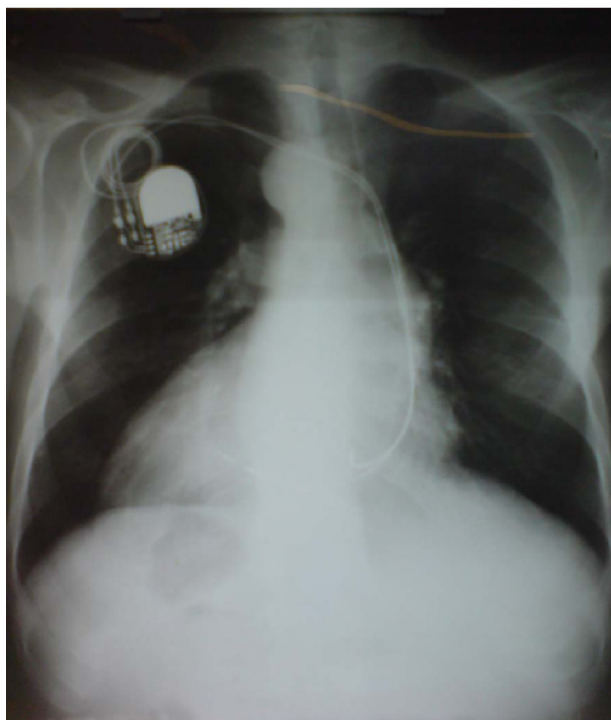


Figura 1 - Chest radiography showing dextrocardia, cardiomegaly, right sub-phrenic gastric bubble, and permanent pacemaker.

of organs and vessels with several changes, without mirror-image, and has two subtypes: situs ambiguous with polysplenia or asplenia.⁵ Situs inversus occurs in 0.01% of the population⁶ and is characterized by inversion of viscera forming a mirror-image. There are two subtypes: with levocardia or dextrocardia. The first is very rare and almost all patients have congenital heart disease; the second one, known as situs inversus totalis, has an incidence of congenital heart disease of 3% - 5%.^{2,6} The incidence in the population is 0.6% - 0.8%. [6] Given these abnormalities, a pre-operative anatomical study is very important to guide the surgery and should always be done.⁷

Gastric cancer is one of the most common tumors in the world, with an incidence of over 20 thousand cases a year in the United States.⁸ However, the development of this kind of cancer in people with situs inversus is a rare event, and a review of the literature revealed less than 40 cases reported. Surgery is the only treatment able to cure the patient, and results of various studies are being published, leading to a standardization of surgical technique in gastric cancer. For distal tumors a subtotal gastrectomy is recommended, since a 6cm surgical margin can be obtained and survival is similar to that of total gastrectomy, but with lower morbidity, less technical difficulties and higher

quality of life.⁹ The extent of lymphadenectomy still remains controversial in the literature, but recent studies have shown that D2 lymphadenectomy, preferably sparing pancreas and spleen, can be performed with low morbidity and a greater chance of improving survival.¹⁰⁻¹¹

Conclusion

In this case report, computed tomography and chest radiography confirmed situs inversus totalis, and upper endoscopy with biopsy revealed adenocarcinoma on gastric antrum. Subtotal gastrectomy and D2 dissection of lymph nodes were then performed. At some moments, the surgeon had to switch position to facilitate surgery access. This is a procedure that can be done, but it is worth emphasizing the importance of the surgeon to be used to this type of surgery and the necessity of pre-operative staging.

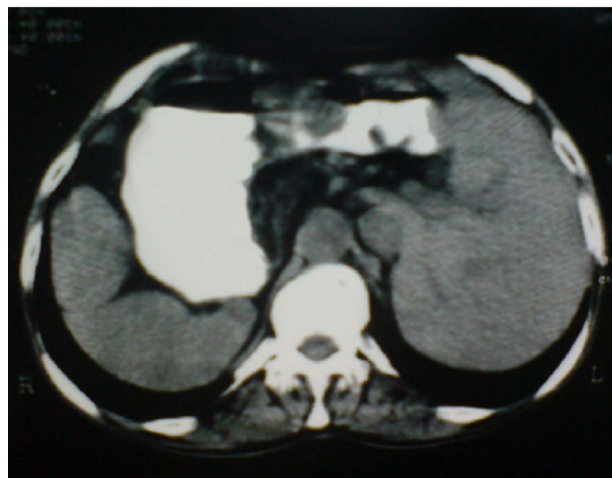


Figura 2 - Computed tomography showing inversion of abdominal viscera (situs inversus), liver on left and lobulated spleen on right, and antrum lesion.

References

1. Fujiwara Y, Fukunaga Y, Higashino M, Tanimura S, Takemura M, Tanaka Y, et al. Laparoscopic hemicolectomy in a patient with situs inversus totalis. *World J Gastroenterol* 2007;13:5035-7
2. Fulcher AS, Turner MA. Abdominal manifestations of situs anomalies in adults. *RadioGraphics* 2002;22:1439-56.
3. Afzelius B, Mossberg B. The metabolic and molecular basis of inherited disease. In: Scriver C, Beaudet A, Sly W, Valle D, editors. *Immotile-cilia syndrome (primary ciliary dyskinesia), including kartagener syndrome*. New York: McGraw-Hill; 1995. p.3943-54.
4. Levin M. The embryonic origins of left-right asymmetry. *Crit Rev Oral Biol Med* 2004;15:197-206.
5. Applegate KE, Goske MJ, Pierce G, Murphy D. Situs revisited: imaging

- of the heterotaxy syndrome. *Radiographics* 1999;19:837-52.
6. Strife JL, Bisset GS, Burrows PE. Cardiovascular system. In: Kirks DR, editor. *Practical pediatric imaging: diagnostic radiology of infants and children*. 3rd ed. Philadelphia: Lippincott-Raven; 1998. p.524-90.
 7. Iwamura T, Shibata N, Haraguchi Y, Hisashi Y, Nishikawa T, Yamada H, et al. Synchronous double cancer of the stomach and rectum with situs inversus totalis and polysplenia syndrome. *J Clin Gastroenterol* 2001;33:148-53.
 8. Jemal A, Murray T, Ward E, Samuels A, Tiwari RC, Ghafoor A, et al. Cancer statistics, 2005. *CA Cancer J Clin* 2005;55:10-30.
 9. Bozzetti F, Marubini E, Bonfanti G, Miceli R, Piano C, Gennari L. Subtotal versus total gastrectomy for gastric cancer: five-year survival rates in a multicenter randomized Italian trial. Italian Gastrointestinal Tumor Study Group. *Ann Surg* 1999;230:170-8.
 10. Edwards P, Blackshaw GR, Lewis WG, Barry JD, Allison MC, Jones DR. Prospective comparison of D1 vs modified D2 gastrectomy for carcinoma. *Br J Cancer* 2004;90:1888-92.
 11. Degiuli M, Sasako M, Ponti A, Calvo F. Survival results of a multicentre phase II study to evaluate D2 gastrectomy for gastric cancer. *Br J Cancer* 2004;90:1727-32.