ISSN: 3033-3326

Case Report

Journal of Chemotherapy and Cancer Research

Total Gastrectomy for Gastric Carcinoma with Situs Inversus Totalis

Bayamurat Damai*, Bumchin Byambadorj, Erkhembayar Enkhbat, Jargalsaikhan Duntee, Khaliunaa Battulga, Baatarkhuyag Ochgerel, Chinzorig Munkhjargal, Ganbaatar Rentsenbalbar

National Cancer Center of Mongolia General surgery Department, NCCM, Mongolia

***Corresponding author**

Bayamurat Damai, National Cancer Center of Mongolia General Surgery Department, NCCM, Mongolia.

Received: December 30, 2025; **Accepted:** January 08, 2026; **Published:** January 16, 2026

ABSTRACT

Background: Situs inversus totalis (SIT) is a rare congenital condition characterized by a complete mirror-image transposition of the thoracic and abdominal organs. The coexistence of gastric cancer in patients with SIT is extremely uncommon and presents unique diagnostic and surgical challenges due to altered anatomy.

Case Presentation: We report the case of a 53-year-old male who presented with epigastric pain radiating to the right costal margin and back, poor digestion, anorexia, constipation, fatigue, and weight loss. Upper gastrointestinal endoscopy performed one year prior revealed a gastric ulcer, which was treated medically. Due to worsening symptoms, repeat endoscopy demonstrated an ulcerative lesion on the lesser curvature of the gastric antrum, and biopsy confirmed moderately differentiated adenocarcinoma. Contrast-enhanced abdominal computed tomography revealed situs inversus totalis without associated vascular or visceral anomalies. The patient underwent gastrectomy with D2 lymphadenectomy. The procedure was completed successfully without major intraoperative complications, despite the mirror-image anatomy.

Discussion: Surgical management of gastric cancer in patients with SIT is technically demanding and requires thorough preoperative evaluation and detailed anatomical understanding. Although some authors recommend altering the positions of the surgical team, the operation in this case was performed using standard positioning with careful intraoperative adaptation. No abnormal vascularization or additional malformations were encountered.

Conclusion: Gastric cancer associated with situs inversus totalis is rare. With meticulous preoperative imaging, comprehensive anatomical knowledge, and careful surgical technique, gastrectomy with D2 lymphadenectomy can be performed safely and effectively in patients with SIT. Awareness of potential associated anomalies is essential to minimize perioperative risks.

List of Abbreviations

SIT	:	Situs Inversus Totalis
GC	:	Gastric Cancer
CT	:	Computed Tomography
GI	:	Gastrointestinal
GERD	:	Gastroesophageal Reflux Disease
GB	:	Gallbladder
BMI	:	Body Mass Index
WBC	:	White Blood Cell Count
RBC	:	Red Blood Cell Count
HGB	:	Hemoglobin
HCT	:	Hematocrit
MCV	:	Mean Corpuscular Volume
MCHC	:	Mean Corpuscular Hemoglobin Concentration
D2	:	D2 Lymphadenectomy

Keywords: Situs Inversus Totalis, Gastric Cancer, Gastric Adenocarcinoma, D2 Lymphadenectomy, Gastrectomy, Mirror-image Anatomy, Case Report; Preoperative Planning, Computed Tomography

Citation: Bayamurat Damai, Bumchin Byambadorj, Erkhembayar Enkhbat, Jargalsaikhan Duntee, Khaliunaa Battulga, et al. Total Gastrectomy for Gastric Carcinoma with Situs Inversus Totalis. J Chem Can Res. 2026. 4(1): 1-4. DOI: doi.org/10.61440/JCCR.2026.v4.33

Introduction

Situs inversus totalis (SIT) is a rare anatomical condition, in which all the thoracic and abdominal viscera appear in the reverse position. Situs inversus totalis (SIT) is a congenital condition with complete mirror image transpositions of the thoracic and abdominal viscera. The overall incidence of SIT is reported from 1:4,000 to 1:8,000. It seems that SIT does not influence normal health or life expectancy. Although there is no definite relationship between SIT and malignant tumors, several malignant neoplasms have been reported in association with SIT [1,2].

We are reporting this case because Situs Inversus Totalis (SIT) is a rare condition, and in this case, a successful open total gastrectomy was performed. This case report has been prepared in accordance with the Surgical Case Report (SCARE) guidelines.

Materials and Methods

A 53-year-old male (height 169 cm, weight 69 kg; body mass index 24.6 kg/m²) presented with epigastric pain radiating to the right costal margin and back. He also reported dyspepsia, inability to tolerate solid food, decreased appetite, constipation, fatigue, and unintentional weight loss. On presentation, his blood pressure was 120/80 mmHg.

The symptoms began approximately one year prior to admission. At that time, upper gastrointestinal endoscopy revealed a gastric ulcer, for which he received medical treatment. However, over the past two months, his symptoms progressively worsened. A repeat upper gastrointestinal endoscopy performed at the National Cancer Center demonstrated a suspicious gastric lesion, and histopathological examination of biopsy specimens confirmed malignancy. Surgical management was subsequently planned.

Past Medical History

The patient was born in 1972 in Ulaanbaatar, Mongolia, and works as a nomadic herder. He lives with his wife and one child. He reported a long-term smoking history of approximately 40 years.

His past surgical history was notable for inguinal hernia repairs performed in 1990 and 2000. He had no history of trauma, chronic medical illnesses, or regular medication use. He reported no known drug or injection allergies.

Laboratory Investigations on Admission

On admission, hematological investigations were within normal limits, with a white blood cell count of 7.22 $\times 10^9$/L, red blood cell count of 5.07 $\times 10^{12}$/L, hemoglobin level of 161 g/L, and hematocrit of 46.7%. Red blood cell indices showed a mean corpuscular volume of 92.2 fL and a mean corpuscular hemoglobin concentration of 344 g/L.

Biochemical analysis demonstrated a serum urea level of 3.9 mmol/L and uric acid level of 5.1 mg/dL. Liver function parameters were within normal ranges, including alkaline phosphatase of 115 U/L and total bilirubin of 11.1 µmol/L. Serum electrolytes revealed sodium of 136 mmol/L, chloride of 94.5 mmol/L, and phosphate of 1.3 mmol/L. Lipid profile showed a total cholesterol level of 5.89 mmol/L and triglycerides of 0.70 mmol/L.

Imaging Studies

Computed tomography: Contrast-enhanced abdominal computed tomography performed at the National Cancer Center of Mongolia on April 11, 2025, demonstrated situs inversus. Mild gastric wall thickening with mucosal enhancement was noted in the cardia and along the lesser curvature, and correlation with endoscopic findings was recommended. The gallbladder appeared folded. Bilateral simple renal cysts consistent with Bosniak category I were identified. In addition, an indirect inguinal hernia was observed on the left side.

Endoscopic Findings and Histopathology

Upper gastrointestinal endoscopy performed on March 25, 2025, demonstrated gastroesophageal reflux disease (GERD) grade M and a hiatal hernia. The gastric mucosa showed diffuse superficial gastritis with atrophic changes, classified as closed-type C-II. A well-defined ulcerative lesion was identified on the lesser curvature of the gastric antrum. Histopathological examination of biopsy specimens from the lesion revealed a moderately differentiated adenocarcinoma.

Discussion

SIT is characterized by a left-to-right reversal of the abdominal viscera with dextrocardia, which is in contrast with situs inversus viscerum which means a complete mirror-image transposition of the abdominal visceral organs with normal orientation of the thoracic organs. SIT could be accompanied by several abnormalities, such as cardiac malformation, long QT syndrome, bronchiectasis, rhinosinusitis, polysplenia, or some urologic anomalies [2,3].

The exact etiology of SIT remains unclear. It is thought that SIT has a genetic predisposition to autosomal recessive inheritance abnormalities which could lead to inhibition of extra-embryonic fluid flow by immobility of nodal cilia during the embryonic period and consequently cause the development of situs inversus [4]. Recently, it was proved that the KIF3 complex (an intracellular motor protein) and cell adhesion factors (including N-cadherin and β-catenin) were involved in the development of situs inversus, and the growth as well as the progression of synchronous cancer [5].

In this case, the preoperative contrast CT revealed no malformations among the abdominal organs and no abnormal vascularization. Also, the findings of the operative exploration confirmed this preoperative evaluation.

Surgical intervention for patients with SIT is technically more complex, due to the anatomical abnormalities. Some surgeons recommend exchanging the positions of operator and assistant during surgery, which was believed to facilitate the surgical team's adaptation to the mirror image of the standard procedure and help avoid intraoperative complications. However, we performed the operation with our usual setup and positioning [6]. With detailed preoperative assessment and careful manipulation, abdominal organs and vessels were detectable without difficulty, and an uneventful operation without major bleeding was performed in our case.

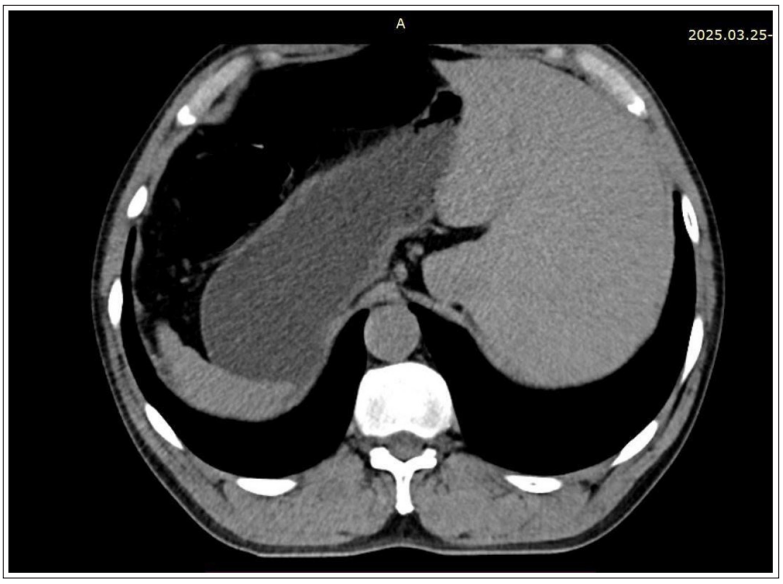

Figure 1: Contrast Enhanced Computed Tomography Picture.

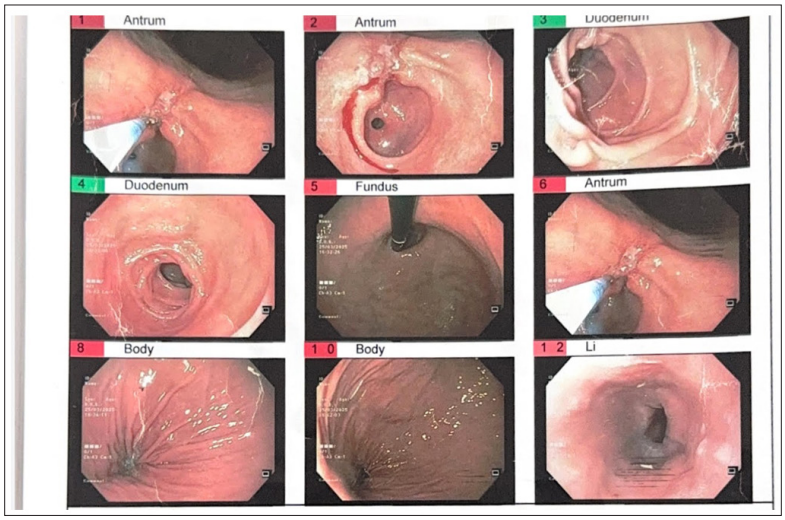

Figure 2: Endoscopic Findings.

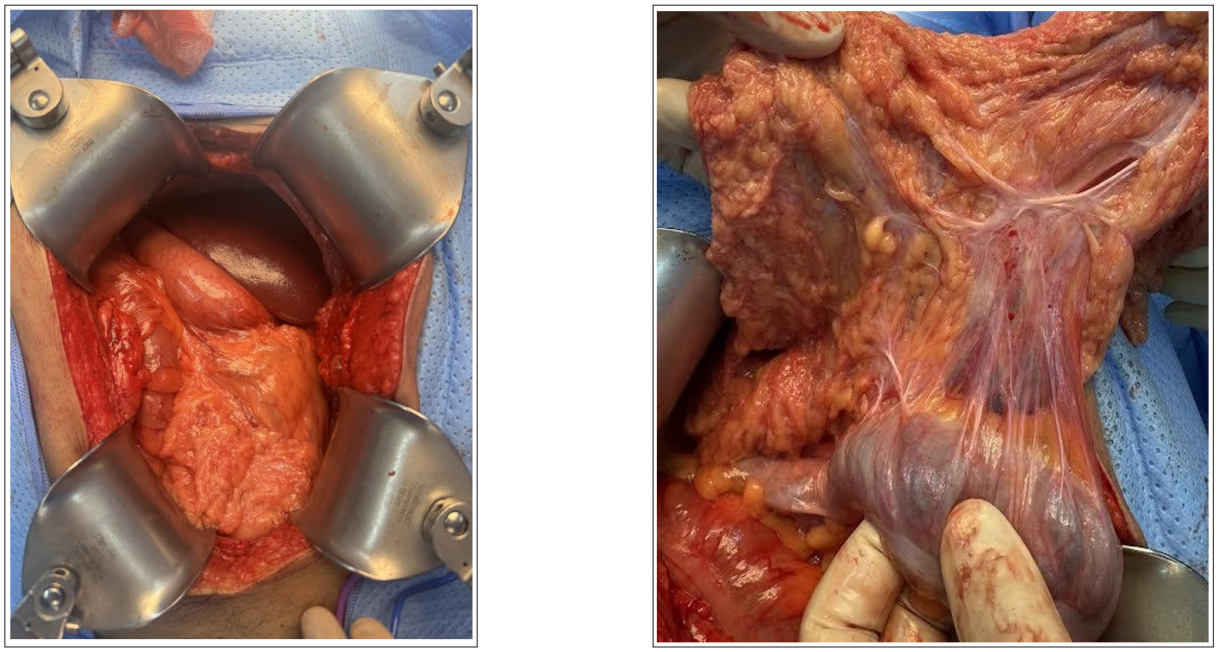

Figure 3: a,b Intraoperative Image Demonstrating Complete Visceral Inversion (Situs Inversus Totalis) as Observed Upon Opening the Abdominal Cavity

Conclusion

The incidence of gastric cancer with SIT is very rare. Appropriate diagnostic modalities are very helpful for diagnosis and preoperative planning. Gastrectomy with D2 lymphadenectomy in patients with SIT can be performed successfully with sufficient preoperative evaluation, comprehensive knowledge of anatomy, and meticulous surgical manipulation. Caution should be given to the possibility of coexisting cardiopulmonary malformations and synchronous cancers [7,8].

Acknowledgments and conflict of Interest

The authors thank the staff of the National Cancer Center of Mongolia for their assistance in the diagnostic evaluation and management of this patient. The authors received no financial support for the research, authorship, and/or publication of this case report. The authors declare no conflicts of interest.

References:

1. Iwamura T, Shibata N, Haraguchi Y, Hisashi Y, Nishikawa T, et al. Synchronous double cancer of the stomach and rectum with situs inversus totalis and polysplenia syndrome. J Clin Gastroenterol. 2001. 33: 148-153.
2. Pan K, Zhong D, Miao X, Liu G, Jiang Q, et al. Situs inversus totalis with carcinoma of gastric cardia: a case report. World J Surg Oncol. 2012. 10: 263.
3. Basso MP, Christiano AB, Gonçalves-Filho Fde A, de Melo MM, Ronchi LS, et al. Colorectal cancer and situs inversus totalis: case report. Arq Bras Cir Dig. 2014. 27: 303-314.
4. Nonaka S, Tanaka Y, Okada Y, Takeda S, Harada A, et al. Randomization of left-right asymmetry due to loss of nodal cilia generating leftward flow of extraembryonic fluid in mice lacking KIF3B motor protein. Cell. 1998. 95: 829-837.
5. Pennekamp P, Menchen T, Dworniczak B, Hamada H. Situs inversus and ciliary abnormalities: 20 years later, what is the connection? Cilia. 2015. 4: 1.
6. Morimoto M, Hayakawa T, Kitagami H, Tanaka M, Matsuo Y, et al. Laparoscopic-assisted total gastrectomy for early gastric cancer with situs inversus totalis: report of a first case. BMC Surg. 2015. 15: 75.
7. Zhu H, Yang K, Hu JK. Gastrectomy for gastric carcinoma with situs inversus totalis: case report and literature review. Hippokratia. 2015 9: 360-362.
8. Lee IY, Lee D, Lee CM. Case Report: Single-port laparoscopic total gastrectomy for gastric cancer in patient with situs inversus totalis. Front Oncol. 2023. 13:1094053.