

Case Report

Ascending colon cancer and situs inversus totalis: a case report in Sanglah general hospital Denpasar, Bali

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ABSTRACT

Situs inversus totalis is a rare congenital condition that occurs in one out of 4,000-20,000 people, characterized by complete transposition of the thoracic and abdominal viscera that creates a mirror image. The etiologic nature of this anomaly is not known. Situs inversus totalis is typically associated with normal life expectancy unless a gastrointestinal or cardiac anomaly is present. This anomaly is not a premalignant condition. Association between colorectal cancer and situs inversus totalis is rare. The transposition of the organs imposes special demands on the diagnostic and technical skills of the surgeon. We report a case of colorectal cancer and situs inversus totalis in a 51-year-old male presenting with intermittent left lower abdominal pain and change of bowel habit since 9 months before admission. We found a palpable solid mass on the left paraumbilical region, mobile, with no tenderness. Laboratory results show moderate anemia with high CEA level. Fecal Occult Blood Test (FOBT) was positive. Plain chest radiography showed suspected situs inversus. We found descending colon tumor on colonoscopy, with histopathology result intramucosal carcinoma. The contrast abdomen CT scan showed situs inversus and irregular thickening on ascending colon with partial stenosis. We performed extended left hemicolectomy and intraoperative we found a mass in the hepatic flexure of the colon with no sign of lymph node and liver metastases. The histopathologic diagnosis was adenocarcinoma moderately differentiated. The patient was diagnosed with adenocarcinoma of ascending colon T3N0M0, stage II.

Keywords: Ascending colon cancer, Situs inversus totalis

INTRODUCTION

Colorectal cancer is the most common malignancy in the gastrointestinal tract. With an estimated 98,000 newly diagnosed cases, this disease will be responsible for an estimated 9.5% of cancer-related deaths in the year 2014.¹ The risk factors are aging, hereditary risk factors, environmental and dietary factors, inflammatory bowel disease, and other risk factor such as cigarette smoking.^{1,2}

There is scant information in the radiology literature about the abdominal manifestations of situs anomalies in adults. In part, this is because adults with situs anomalies undergo imaging less frequently than children. In fact, situs anomalies are often detected incidentally in adults during imaging evaluation for unrelated conditions, such as cholecystitis and appendicitis.^{1,3} Situs inversus totalis (SIT) is a rare anomaly that is characterized by mirror-image location of the abdominal organs and, in most

cases, the cardiac apex relative to situs solitus.¹⁻⁶ The incidence rate of SIT is 1 per 4,000-20,000 people.³

CASE REPORT

A 51-year-old male presented with intermittent left lower abdominal pain since 9 months before admission. He also complained about change of bowel habit: diarrhea, bloody stool and decreasing body weight. The patient's family history was essentially negative for SIT, familial and hereditary disease, or colorectal cancer.

The patient had normal physical examination, except for anemic palpebral conjunctivae and palpable solid mass on the left paraumbilical region, mobile, and no tenderness. On digital rectal examination, there was no palpable mass.



Figure 1: Clinical picture.



Figure 2: Plain chest radiograph.

Additional examinations obtained were laboratory examination and radiologic examination. Laboratory findings show hemoglobin level of Hb 6.5 g/dL (range 13-17g/dL), CEA 54.09 ng/mL, and Fecal Occult Blood Test (FOBT) was positive. Plain chest radiography showed suspected situs inversus, old process on left paracardial, suspect pneumonia. Plain abdomen

radiography increasing bowel gas distribution with a lot of fecal material retention and no signs of obstruction. Colonoscopy revealed descending colon tumor with pathology anatomical result intramucosal carcinoma. CT scan abdomen showed situs inversus, irregular thickening on ascending colon (on the left side), with contrast showed heterogenous contrast enhancement causing partial stenosis colon on that level with fat stranding around, suspect mass, multiple renal cyst on both kidneys.



Figure 3: Plain abdominal radiograph.

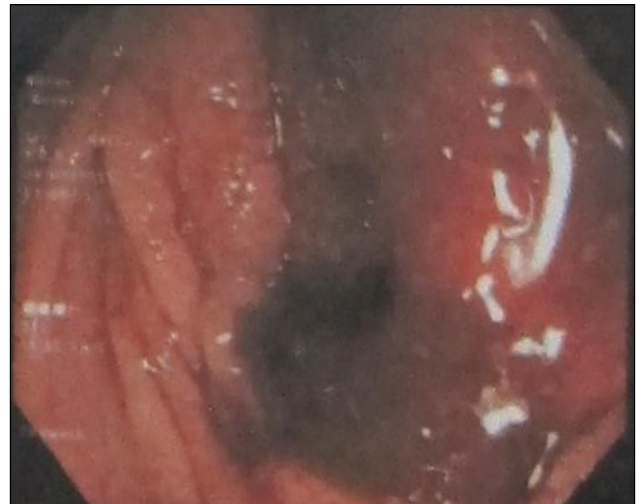


Figure 4: Colonoscopy.

From anamnesis, physical examination, and radiologic and laboratory findings, we assessed the patient with an ascending colon tumor with situs inversus totalis. We planned a left hemicolectomy.

During the operation, we found a mass in the hepatic flexure of the colon with no sign of lymph node and liver metastase. The liver and gall bladder lied on the left upper quadrant of the abdomen. Extended left

hemicolectomy was carried out followed by ileocolic anastomosis.

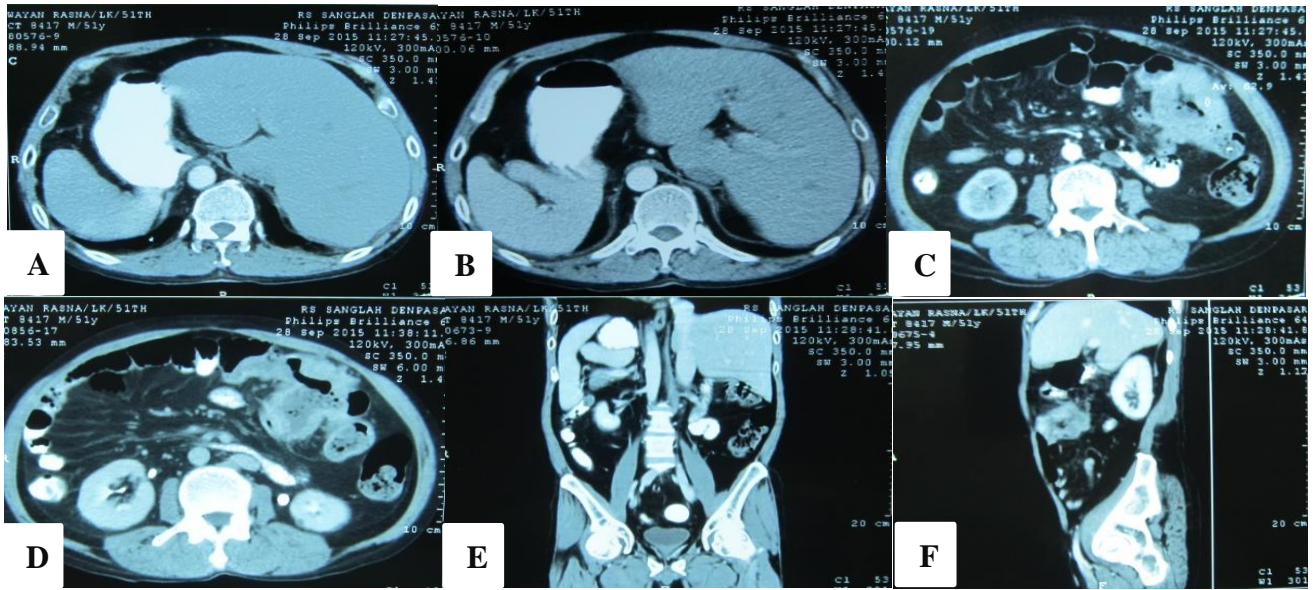


Figure 5: Abdominal CT-Scan with contrast. (A and B) The liver was on the left side, while the spleen was on the right side (axial view). (C and D) The ascending colon was on the left side (axial view). (E) Situs inversus (coronal view). (F) Situs inversus (sagittal view).

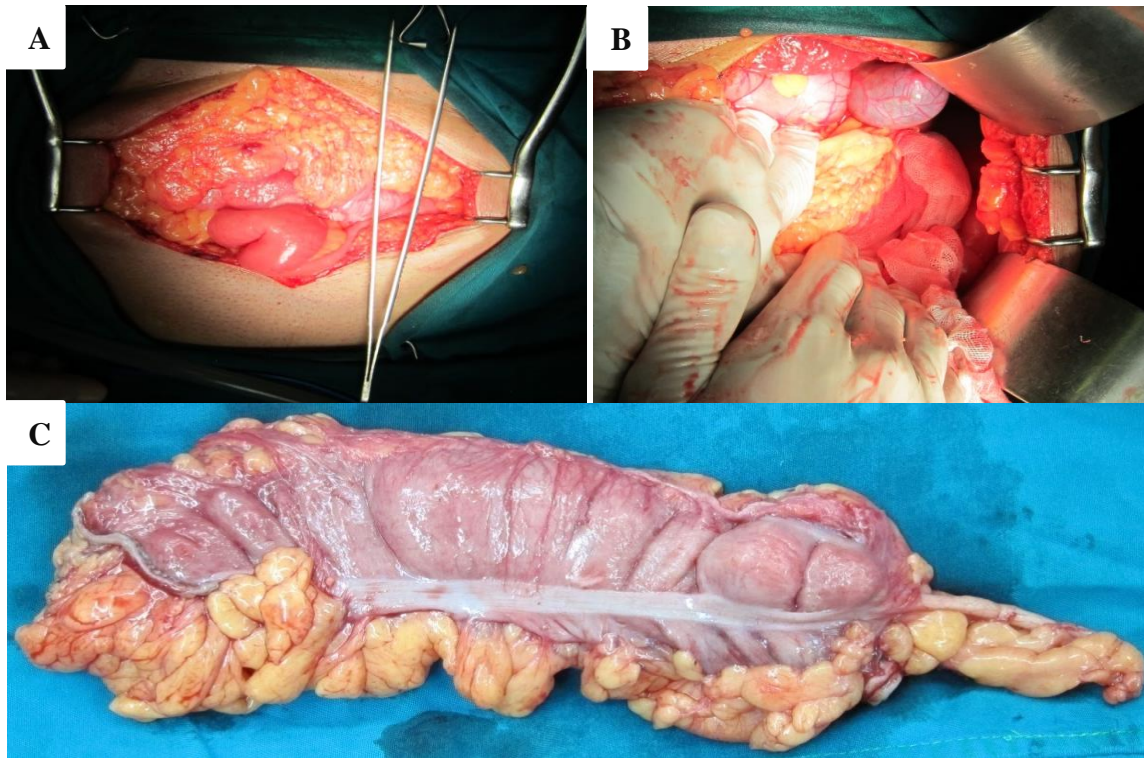


Figure 6: Intra operative finding. (A) Transverse colon tumor intestine and gaster. (B) Liver and gall bladder lie on left side (situs inversus). (C) Left extended hemicolectomy was performed.

Histopathologic examination result was adenocarcinoma moderately differentiated. We diagnosed the patient with

adenocarcinoma of ascending colon T3N0M0, stage II. After an uneventful postoperative course, the patient was

discharged on the 7th day after the operation, without any complication. Currently, the patient had his adjuvant chemotherapy regimen.

DISCUSSION

Colonic tumors are important for two reasons. First, they are frequent and account for both a significant mortality rate and high cumulative health care costs. Second, the sequence of events leading from a normal mucosa to a manifest cancer occurs largely through preventable precursor stages over the course of several years.²

Incidence

Colorectal cancer is the most common malignancy in the gastrointestinal tract. In the United States, colorectal cancer ranks third in terms of both gender-specific annual cancer incidence and cancer mortality (behind lung and prostate or breast, respectively). With an estimated 98,000 newly diagnosed cases, this disease will be responsible for an estimated 9.5% of cancer-related deaths in the year 2014. The lifetime risk of approximately 6% in our Western civilization means that 1 in 18 individuals of the general population will be affected by colorectal cancer, making it an important public health issue.¹ Worldwide, colorectal cancer shows large geographic differences, with a crude incidence of 6.5/7.7 cases per 100,000 females/males in less developed areas as opposed to 50.9/60.8 in more developed regions.³ The colorectal cancer incidence has a negligible overall predominance of females, who represent in 51.6% of the cases.⁴

Risk factors

Identification of risk factors for development of colorectal cancer is essential to establish screening and surveillance programs in approximately targeted populations.¹

Aging

Aging is the dominant risk factor for colorectal cancer, with incidence rising steadily after age 50 years. More than 90% of cases diagnosed are in people older than age 50 years. The mean age at presentation is around 70–75 years.²

Hereditary risk factors

Approximately 80% of colorectal cancers occur sporadically, while 20% arise in patients with a known family history of colorectal cancer.

Environmental and dietary factors

The observation that colorectal carcinoma occurs more commonly in populations that consume diets high in

animal fat and low in fiber has led to the hypothesis that dietary factors contribute to carcinogenesis.

Inflammatory bowel disease

Patients with long-standing colitis from inflammatory bowel disease are at increased risk for the development of colorectal cancer. It is hypothesized that chronic inflammation predisposes the mucosa to malignant changes and there is some evidence that degree of inflammation influences risk.

Other risk factors

Cigarette smoking is associated with an increased risk of colonic adenoma, especially after more than 35 years of use.

Situs anomalies

Much has been written about the imaging features of situs anomalies in the pediatric population because most children with these anomalies come to clinical and imaging attention due to severe congenital heart disease, immune deficiency, or bowel obstruction related to malrotation. In contrast, there is scant information in the radiology literature about the abdominal manifestations of situs anomalies in adults. In part, this is because adults with situs anomalies undergo imaging less frequently than children. In fact, situs anomalies are often detected incidentally in adults during imaging evaluation for unrelated conditions such as cholecystitis and appendicitis.^{2,3}

The term situs refers to the position of the heart and viscera relative to midline. Situs solitus represents the normal position of the heart and abdominal viscera, with the cardiac apex, spleen, stomach, and aorta located on the left and the liver and inferior vena cava (IVC) located on the right (Figure 7a). Situs inversus indicates mirror-image location of the viscera relative to situs solitus. There are two major subcategories of situs inversus: situs inversus with dextrocardia and situs inversus with levocardia. Situs inversus with dextrocardia is more common and is characterized by mirror image location of the heart and viscera relative to situs solitus, with the cardiac apex, spleen, stomach, and aorta located on the right and the liver and IVC located on the left (Figure 7b). In contrast, situs inversus with levocardia is an extremely rare variant that is characterized by mirror-image location of the viscera relative to situs solitus and a left-sided cardiac apex. Situs ambiguous, or heterotaxia, is defined as the abnormal arrangement of organs and vessels as opposed to the orderly arrangement typical of situs solitus and situs inversus. The two major subcategories of situs ambiguous are situs ambiguous with polysplenia and situs ambiguous with asplenia. Situs ambiguous with polysplenia (also known as left isomerism or bilateral left-sidedness) is characterized in general by midline or ambiguous location of the majority

of the abdominal organs and multiple spleens (Figure 7c). Situs ambiguous with asplenia (right isomerism or bilateral right-sidedness) is characterized by ambiguous location of the abdominal organs and absence of the spleen (Figure 7d).

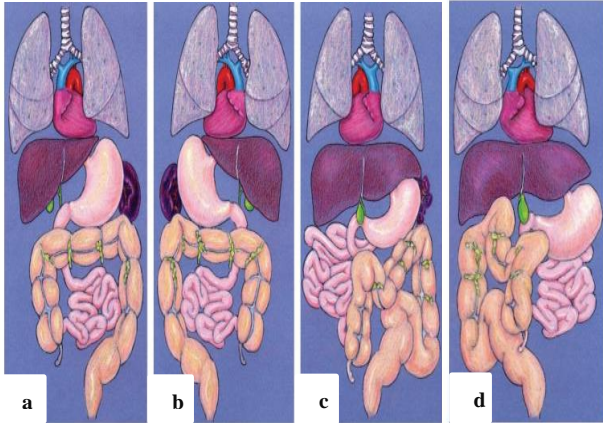


Figure 7: (a) Drawings illustrate situs solitus. (b) Situs inversus. (c) Situs ambiguous with polysplenia. (d) Situs ambiguous with asplenia.²

Situs inversus totalis

Situs inversus totalis is a rare anomaly that is characterized by mirror-image location of the abdominal organs and, in most cases, the cardiac apex relative to situs solitus.²⁻⁶

The incidence rate of SIT is 1 per 4,000-20,000 people and, in a recent Korean study, 5 per 34,723 SIT patients were discovered during colonoscopy.³

The etiologic nature of this anomaly is not known. This condition is typically associated with normal life expectancy unless a gastrointestinal or cardiac anomaly is present.⁴

This anomaly is important in that its recognition may help avoid mishaps at surgery or other interventions, particularly in the emergency setting.

This anomaly is not a premalignant condition. However, many cases of malignant neoplasms and situs inversus totalis have been reported, especially gastric cancer. Association between colorectal cancer and situs inversus totalis is rare.⁴

Solid organs and heart

The majority of patients with situs inversus demonstrate mirror-image location of the solid organs and a right-sided cardiac apex (situs inversus with dextrocardia). Unlike with situs ambiguous with polysplenia and situs ambiguous with asplenia, the pancreas is not truncated. The prevalence of associated congenital heart disease ranges from 3% to 5%. An extremely rare variant of situs

inversus is situs inversus with levocardia. In this anomaly, there is mirror-image location of the abdominal organs with a left-sided cardiac apex. This variant is almost always associated with congenital heart disease. Only a few cases of situs inversus with levocardia and no associated congenital heart disease appear in the literature.

Bowel and mesenteric vessels

Patients with situs inversus demonstrate mirror image location, not only of the solid organs and heart, but also of the bowel and mesenteric vessels. The stomach, jejunum, and descending colon are located on the right, and the ligament of Treitz, ileum, and ascending colon are located on the left. The orientation of the bowel is reversed rather than malrotated relative to situs solitus.

Biliary tract and gallbladder

The branching pattern of the biliary tract and the location of the gallbladder in situs inversus are mirror image relative to situs solitus.

Situs inversus itself has no pathophysiological significance but poses diagnostic and surgical difficulties that arise from the inversion.⁵ Surgical procedures are considered more difficult in patients with situs inversus than other patients because of different anatomic position of organs, especially in laparoscopic surgery.

The preoperative evaluation for situs inversus includes two main objectives: evaluation for gastrointestinal and cardiac anomalies and orientation of the viscera. The extent of evaluation should be based on the complexity of the procedure. Anomalies should be defined by using various imaging technologies to determine appropriate surgical treatment and decrease surgical difficulties and time. Furthermore, the risk of occurrence of intra-operative complications is higher in comparison with the procedures of patients without situs inversus totalis. Besides, incorrect surgical incision and a second operation are avoided.⁴

CONCLUSION

Situs inversus is important in that its recognition may help avoid mishaps at surgery or other interventions, particularly in the emergency setting. This anomaly is not a premalignant condition. Situs inversus itself has no pathophysiological significance but poses diagnostic and surgical difficulties that arise from the inversion. Surgical procedures are considered more difficult in patients with situs inversus than other patients because of different anatomic position of organs, especially in laparoscopic surgery.

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