

# Laparoscopic Appendectomy in a Female Patient With Situs Inversus: Case Report and Literature Review

Jonathan Y. Song, MD, Nasir Rana, MD, Carlos A. Rotman, MD

## ABSTRACT

**Background:** Situs inversus is an uncommon condition caused by a single autosomal recessive gene of incomplete penetration. A potential diagnostic dilemma can occur in the young female patient with a history of situs inversus who presents with pelvic pain.

**Methods:** A 32-year-old multiparous patient with a known history of situs inversus presented with complaints of pelvic pain. A medical history and full physical examination were indicative of possible endometriosis.

**Results:** The patient underwent an operative laparoscopy, which revealed stage II pelvic endometriosis based on the American Fertility Society Revised Classification for Endometriosis (R-AFS), with appendicular and periappendicular adhesions involving the cecum. Ablation of endometriosis and an appendectomy were performed.

**Conclusion:** The authors believe the laparoscopic approach to an appendectomy is ideal in a patient with situs inversus and should be performed at the time of laparoscopy performed for another reason.

**Key Words:** Situs inversus, Laparoscopic, Appendectomy, Pelvic Pain.

## INTRODUCTION

Situs inversus (SI) is an uncommon condition caused by a single autosomal recessive gene of incomplete penetration, which occurs in 1 in 5000 to 1 in 10000 live births.<sup>1</sup> A potential diagnostic dilemma can occur in the young female patient with a known history of SI, who may present with pelvic pain. Although the differential diagnosis of pelvic pain is quite extensive, in the patient with SI, a correct preoperative diagnosis can be difficult to obtain, as the symptoms and signs are often misleading.<sup>2,3</sup> About 50% of patients with left-sided appendicitis, for example, have pain on the right side.<sup>2</sup> The appendix is usually located near the cecum in the left lower quadrant in SI.<sup>4</sup> Although the viscera are transposed, the components of the nervous system are not, allowing the patient to experience diffuse abdominal pain. As a result, incisions in inappropriate sites have been documented in greater than 40% of such cases.<sup>5,6</sup>

In addition to a thorough history, a physical examination, and imaging studies, laparoscopy provides the surgeon with pertinent information that can contribute to the optimal care of the patient. The authors report a case with a literature review, where a laparoscopic appendectomy was performed as part of the surgical treatment for pelvic pain due to endometriosis in a patient with SI.

## CASE REPORT

A 32-year-old gravida 2 para 2 patient with a known history of SI presented with complaints of pelvic pain. A medical history and full physical examination were suspicious for endometriosis. A transvaginal ultrasound revealed no identifiable pelvic pathology. After thorough counseling, the patient underwent an operative laparoscopy for the evaluation of her pelvic pain. Findings confirmed the diagnosis of pelvic endometriosis (R-AFS stage II). Furthermore, appendicular and periappendicular adhesions involving the cecum were noted. The cecum and appendix were located on the left side and the sigmoid on the right. The liver showed the left pole on the right side of the abdomen, and the gallbladder was located on the left. All visible endometriotic implants were ablated. The cecum and the appendix were mobilized, and adhesiolysis and appendectomy

Oak Brook Institute of Endoscopy, Oak Brook Medical and Surgical Center, Oak Brook, Illinois, USA (Drs Song, Rana, Rotman).

Rush Medical College, Oak Brook, Illinois, USA (Drs Rana, Rotman).

Address reprint requests to: Jonathan Y. Song, MD, 302 Randall Rd, Ste 302, Geneva, IL 60134, USA. Telephone: 630 845 1600, Fax: 630 677 1557, E-mail: JGSong@MSN.com

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were performed. The patient went home the same day and had an uneventful postoperative recovery. The pathology was consistent with appendicular and periappendicular adhesions with serosal congestion.

## DISCUSSION

Primarily 2 different anatomic defects result in a left-sided appendix: situs inversus and, less commonly, malrotation of the midgut loop.<sup>4</sup> During the first trimester of pregnancy, normal embryonic development of the abdominal viscera takes place. At approximately 6 weeks of gestation, the midgut herniates into the umbilical cord and returns at 10 weeks after the enlargement of the peritoneal cavity has taken place. Normal developments require a 270 degree counterclockwise rotation, which yields in most cases, a right-sided appendix.<sup>7</sup> SI occurs when the rotation is 270 degrees clockwise as opposed to a counterclockwise rotation.<sup>4</sup> This then results in the complete reversal of all abdominal, and possibly thoracic, viscera with a left-sided appendix.

SI is defined as a mirror-image transposition of the abdominal viscera, which occurs with an incidence of 1/5000 to 1/10 000 live births.<sup>1</sup> Situs inversus totalis, a complete inversion of both the thoracic and abdominal viscera, occurs in the general population with an incidence rate of 1/1400 to 1/35 000.<sup>2,5,8</sup> Appendicitis, including both right- and left-sided disease, occurs at an annual incidence of 1/1000.<sup>9</sup> It has been stated that approximately 6% of the population will experience appendicitis in a lifetime.<sup>10</sup> Acute appendicitis remains as the most common indication for an appendectomy.

The first reported laparoscopic appendectomy performed on a patient (male) with SI was in 1997 in Italy,<sup>11</sup> and a review of the literature reveals that this is the only case of laparoscopic appendectomy in a patient with this type of anatomic anomaly. To the authors' best knowledge, ours is the first reported case of a laparoscopic appendectomy on a female patient with SI.

The authors propose a plausible explanation to the uncommon performance of the procedure at hand. In addition to the rare occurrence of SI and the controversy surrounding incidental appendectomies in general, the infrequent performance of such procedures may also be partly due to the ongoing debate over the indications for laparoscopic versus open surgery for performing an appendectomy. The dispute may also be related to the

surgical comfort level of the surgeon performing laparoscopic surgery. As stated earlier, in the patient with SI, a correct preoperative diagnosis can be difficult to obtain, as the symptoms and signs are often misleading.<sup>2,3</sup> This can result in surgeries where incisions are made at inappropriate sites.<sup>5</sup>

The authors believe laparoscopy can offer significant diagnostic advantages for all patients, regardless of sex, when such anomalies are encountered. Laparoscopy is ideally suited to explore the entire abdomen. As gynecologists, attention should not be restricted to the pelvic anatomy alone, but the entire abdomen should carefully be assessed. The authors believe that laparoscopy performed for pelvic pathology offers the opportunity not only to manage the primary problem, but to also remove the appendix to prevent any misdiagnoses, or complications resulting from delayed diagnoses, to occur in the future.

## CONCLUSION

The authors conclude that patients with a history of SI should receive an appendectomy at the time of laparoscopy performed for another reason. Appendicitis can mimic gynecologic pathology. Forfeiting the opportunity to remove this vestigial organ at the time of surgery, especially in this type of anatomic defect, will only mean that such patients will be subjected to a potential diagnostic quandary in the future. Removing the appendix eliminates any possibility of future misdiagnoses. It will also exclude the risks of complications that come with delayed diagnosis, such as an appendiceal rupture, which can cause infertility in the young female patient. The authors' analysis of their recent data (unpublished) supports the notion that the appendix can be removed laparoscopically with virtually no complication or morbidity.

Another issue at hand is the operative approach to the patient with SI presenting with an acute abdomen or pelvic pain. The authors concur with Contini et al<sup>11</sup> in that a diagnostic laparoscopy should be performed first in all such cases prior to performing any further procedures. The diagnostic scope will not only confirm or dispel the preoperative diagnosis, but it allows an appropriate surgical incision to be made if the surgery cannot be performed laparoscopically.

In conclusion, the authors believe the laparoscopic

approach to an appendectomy is ideal in a patient with SI and should be done prophylactically at the time of laparoscopy performed for any reason.

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