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Laparoscopic Treatment of Zinner Syndrome: A Case Report

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Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
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Patient: Male, 36-year-old
Final Diagnosis: Other congenital malformations of other male genital organs (seminal vesicle cyst) • other congenital malformations of the vas deferens (obstruction or atresia) • unilateral renal agenesis (absence of one kidney) • Zinner syndrome
Symptoms: Episodic perineal pain and a sensation of heaviness, particularly after ejaculation • long-standing intermittent dull pain in the left lumbar region • lower urinary tract symptoms • primary infertility
Clinical Procedure: —
Specialty: Urology
Objective: Rare disease
Background: Zinner syndrome is a rare congenital anomaly of the male genitourinary system, characterized by the classic triad of features: a seminal vesicle cyst, unilateral renal agenesis, and vas deferens obstruction. This article presents a clinical case of a 36-year-old patient with this rare condition and describes the results of his successful laparoscopic surgical treatment.
Case Report: A 36-year-old man with a 2-year history of infertility and chronic pelvic pain received a diagnosis of Zinner syndrome, characterized by the triad of left renal agenesis, ipsilateral ureteral atresia, and a large seminal vesicle cyst. He underwent successful laparoscopic excision of the cyst. The cyst contents (approximately 120 mL of light-brown fluid) were aspirated, followed by meticulous enucleation. The cyst, remnant seminal vesicle tissue, and distal atretic ureter (3 cm) were completely resected. Histopathological examination confirmed a benign, multilocular cyst lined by columnar epithelium with glandular metaplasia and chronic inflammation, with no evidence of malignancy.
The postoperative course was uneventful. At 3-month follow-up, the patient reported complete resolution of pain and normalized urination. Semen analysis showed significant improvement: ejaculate volume increased to 1.6 mL, sperm concentration to 1.4×10^7/mL, and progressive motility to 35%, indicating partial recovery of ejaculatory function. The case demonstrates that laparoscopic surgery is an effective treatment for Zinner syndrome, alleviating symptoms and potentially improving fertility parameters.
Conclusions: This case highlights the importance of timely recognition of Zinner syndrome, especially in patients with unilateral renal agenesis and pelvic pain, and demonstrates the effectiveness of the laparoscopic approach as a method of choice in the symptomatic course of this pathology.
Keywords: Zinner Syndrome • Laparoscopic Surgery • Renal Agenesis • Seminal Vesicle Cyst • Male Infertility • Case Report
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Introduction

Zinner syndrome is a rare congenital malformation of the male genitourinary system characterized by a classic triad of features: a seminal vesicle cyst, unilateral renal agenesis (aplasia), and obstruction of the vas deferens [1,2]. The condition was first described by A. Zinner in 1914 and is considered the male equivalent of Mayer-Rokitansky-Küster-Hauser syndrome in women [3,4]. As of 2020, approximately 214 cases of this anomaly had been reported in the literature. Zinner syndrome is classified among congenital anomalies of the kidney and urinary tract resulting from abnormal development of the mesonephric (Wolffian) duct [3].

The incidence of Zinner syndrome is extremely low, estimated at approximately 1 in 20 000 men. Typically, the anomaly remains asymptomatic until puberty and young adulthood. Diagnosis most commonly occurs in the third to fourth decade of life, when seminal vesicle cysts reach a significant size (> 5-6 cm) and become clinically apparent [5].

The clinical presentation of Zinner syndrome is variable. Many patients experience lower abdominal, lumbar, or perineal pain, discomfort during urination, painful ejaculation, blood in semen, and irritative voiding symptoms, including frequency and urgency [6]. Recurrent urinary tract infections, epididymitis, or prostatitis are common due to stasis of secretions in the abnormal seminal vesicle [7]. An important manifestation is impaired fertility. According to the literature, up to 45% of patients with Zinner syndrome experience infertility due to obstruction of the vas deferens and associated organ hypoplasia [8]. Given the rarity and non-specificity of symptoms, the diagnosis is often delayed or made incidentally during evaluation for other conditions [9].

Zinner syndrome is of interest to urologists and radiologists as a rare but clinically significant condition. Despite its extremely low incidence, timely diagnosis is important because progressive enlargement of the seminal vesicle cyst can lead to chronic pelvic pain, impaired bladder function (urinary tract obstruction), and reduced quality of life for patients.

In the era of widespread use of imaging modalities, including ultrasound, computed tomography (CT), and magnetic resonance imaging (MRI), such congenital anomalies are being detected more frequently, including in young patients before the onset of pronounced symptoms [10].

The management strategy for patients with Zinner syndrome remains an important clinical consideration. Depending on the severity of symptoms and cyst size, treatment can range from active surveillance to surgical intervention. Modern minimally invasive technologies, such as laparoscopic and robot-assisted surgeries, enable the effective removal of seminal vesicle cysts with minimal trauma. These observations underscore the necessity for timely detection and, when indicated, surgical treatment of this anomaly to prevent potential complications [10].

Thus, the present report describes a case of Zinner syndrome successfully managed with surgery, highlighting the diagnostic approach and considerations for selecting the optimal treatment strategy for this rare condition.

Case Report

The patient, a 36-year-old man, had a long-standing history of periodic dull pain in the left lumbar region. He also reported episodic pain and a sensation of heaviness in the perineum, which were particularly pronounced after ejaculation. Dysuric symptoms manifested as frequent urination with small voided volumes and a sensation of incomplete bladder emptying. The patient was sexually active; however, his wife had not conceived during their 2-year marriage, raising suspicion of a male infertility factor.

On examination, the patient's condition was satisfactory. No signs of impaired sexual development were identified. Digital rectal examination revealed a bulging of the rectal wall to the left of the prostate gland, with no signs of infiltration; palpation was moderately painful. Laboratory test results did not reveal active inflammation or impaired function of the solitary right kidney.

As part of the diagnostic workup, the patient underwent laboratory and instrumental investigations. Complete blood count and biochemical parameters, including creatinine and urea levels, were within the reference range. Urinalysis showed no pathological changes, such as erythrocyturia or leukocyturia. The level of prostate-specific antigen was within the reference range (0.6 ng/mL). Semen analysis demonstrated an ejaculate volume of 1.1 mL (reference value, > 1.5 mL), a sperm concentration of 9×10^6/mL (reference value, > 1.5×10^7/mL), progressive sperm motility of 25% (reference value, > 32%), and severely impaired sperm morphology, with normal forms accounting for 2%. These findings indicated oligozoospermia, reduced motility, and low ejaculate volume, consistent with an obstructive cause of fertility impairment.

Transabdominal ultrasound examination of the kidneys revealed the absence of the left kidney (agenesis), while the right kidney was enlarged in size (length 14 cm) with diffuse cortical thickening, interpreted as compensatory hypertrophy. Pelvic ultrasound revealed a thin-walled, round cystic lesion, approximately 5.5 cm in diameter, located posterior to the urinary bladder on the left side. The cyst had anechoic content

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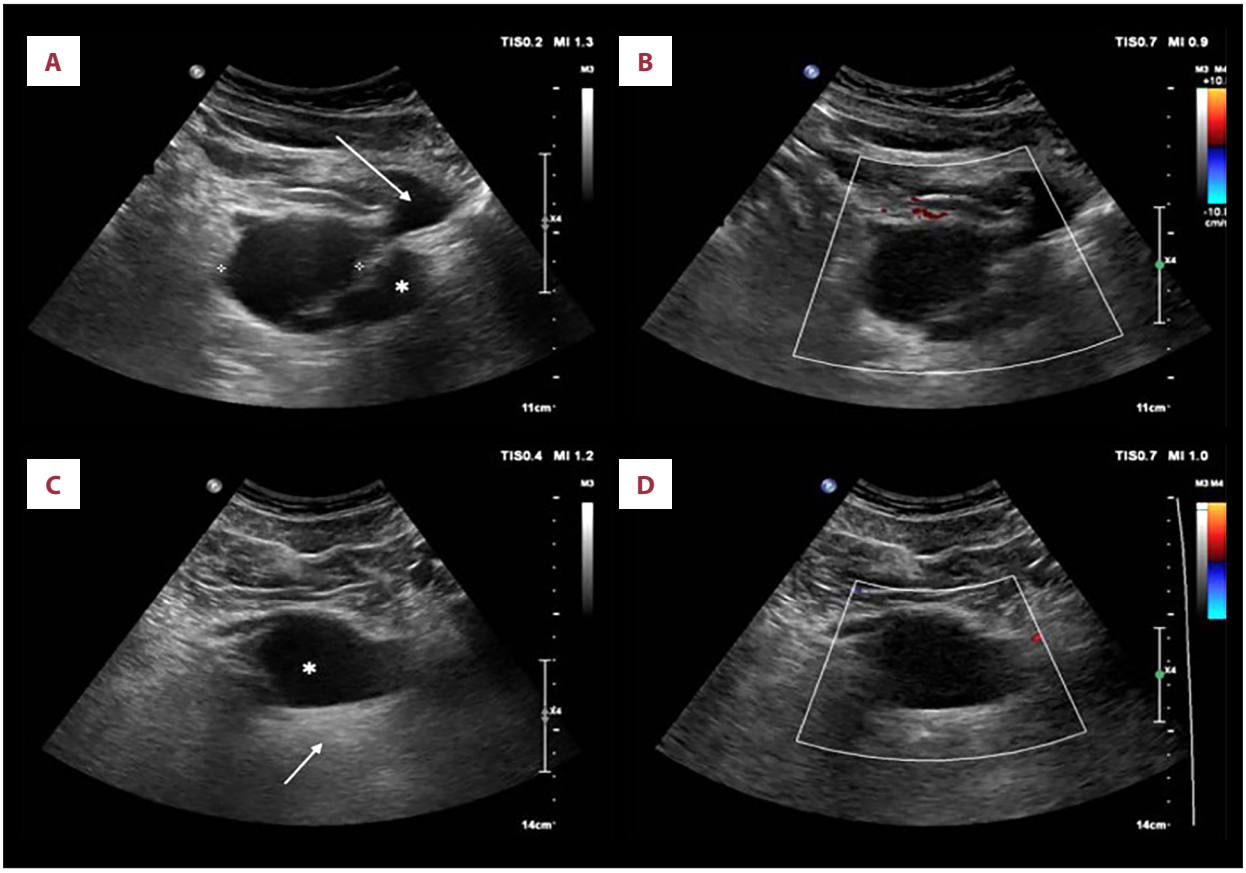

Figure 1. (**A-D**) A sagittal ultrasound of the patient's pelvis reveals a thin-walled cystic lesion (arrow) behind the bladder, in the region of the left seminal vesicle. Doppler imaging reveals no blood flow within the cyst wall, and its contents are uniformly fluid. These findings are characteristic of a seminal vesicle cyst associated with Zinner syndrome.

and a dense capsule and demonstrated posterior acoustic enhancement; Doppler ultrasound revealed no vessels within its wall. The left seminal vesicle was not visualized separately from the cyst; the right seminal vesicle was identified and appeared normal. The urinary bladder was displaced anteriorly by the cystic mass (**Figure 1A-1D**).

To clarify the anatomy, contrast-enhanced multi-slice CT of the abdomen and pelvis was performed, confirming the absence of the left kidney and left ureter. Contrast-enhanced CT showed no abnormalities of the right kidney or urinary tract. Right renal function was preserved, with timely excretion of contrast into the urinary bladder. In the lesser pelvis, posterior and to the left of the urinary bladder, a round lesion measuring 56 × 58 mm (approximately 5.6 × 6 cm) was identified; the density of its contents was 20 to 25 Hounsfield units, consistent with fluid. Following intravenous contrast administration, no enhancement of the cyst wall was observed, consistent with the absence of vascularized tissue. Adjacent pelvic organs were displaced by the lesion but remained clearly demarcated from the cyst. The left vas deferens was visualized up to the region of the seminal vesicle, beyond which its lumen was not traceable due to obstruction. The right vas deferens was normal.

Overall, the multi-slice CT findings were consistent with a left seminal vesicle cyst associated with left renal agenesis and left ureteral atresia, with the ureter terminating blindly at the superior aspect of the cyst. This characteristic triad of findings established the diagnosis of Zinner syndrome (**Figure 2A-2D**).

The patient underwent laparoscopic resection of the left seminal vesicle cyst. The surgery was performed under endotracheal anesthesia in the lithotomy position with a raised Trendelenburg tilt. Four trocars were used: a 10-mm optical port above the umbilicus and three 5-mm working ports in the lower abdomen [11].

Upon exploration of the abdominal cavity, the peritoneum posterior to the urinary bladder was mobilized, providing access to the pararectal space. A thin-walled, saccular lesion approximately 6 cm in diameter was identified. The lesion was densely adherent to the posterior wall of the urinary bladder and the anterior wall of the rectum. A thin fibrous cord, representing

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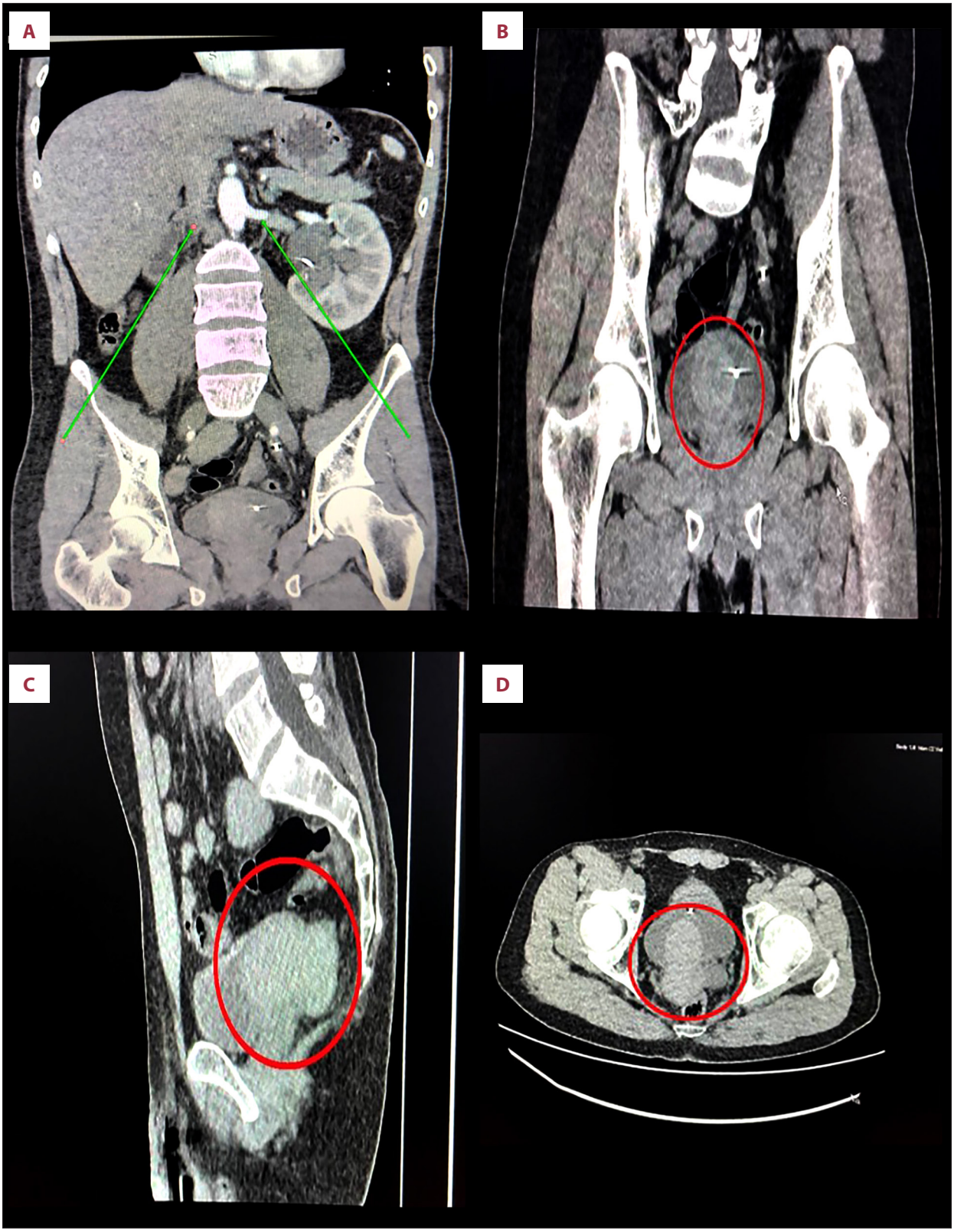

Figure 2. Contrast-enhanced computed tomography of the abdomen and pelvis demonstrating a left seminal vesicle cyst associated with left renal agenesis and left ureteral atresia. The atretic left ureter (**A**) terminates blindly at the proximal aspect of the cyst (**B-D**). This constellation of findings represents the classic triad of Zinner syndrome.

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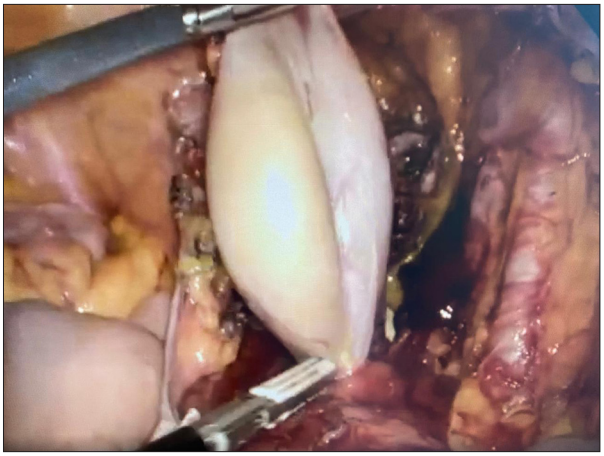

Figure 3. Abdominal cavity examination. A thin-walled saccular formation, approximately 6 cm in diameter, is visualized in the perirectal space, adjacent to the posterior wall of the bladder and the anterior wall of the rectum.

an atrophic ureter terminating blindly into the cyst, was visualized at its superior pole. The left vas deferens was proximally dilated and ended abruptly at the base of the cyst.

The cyst contents, consisting of approximately 120 mL of light-brown fluid, were aspirated via puncture, followed by meticulous laparoscopic enucleation (shelling out) of the cyst walls from the surrounding tissues. Guided by the presumed original location of the seminal vesicle, resection of the cyst along with the tissue of the rudimentary left seminal vesicle was performed. The distal segment of the left ureter (3 cm in length) connected to the cyst was also removed. The left renal vascular pedicle was absent, consistent with atresia. The left half of the bladder trigone (ureteral orifice) was not formed. The prostate gland, right seminal vesicle, and right ureter remained intact.

Hemostasis in the cyst bed was achieved using bipolar coagulation. A drain was placed into the abdominal cavity. Intraoperative blood loss was approximately 50 mL, with no intra- or postoperative complications recorded. The duration of the procedure was 130 minutes. The postoperative course was uneventful; the drain was removed on postoperative day 2. The patient was discharged on postoperative day 5 in satisfactory condition (**Figure 3**).

Macroscopically, the resected specimen was a multilocular, thin-walled cyst measuring 6 cm in diameter with fragments of adjacent tissue. Histopathological examination revealed that the cyst wall was lined by columnar epithelium with focal glandular metaplasia. The wall demonstrated areas of sclerosis and chronic inflammatory changes within the stroma. No neoplastic features were identified, confirming the benign nature of the lesion, consistent with a seminal vesicle cyst. Thus, the diagnosis of a congenital seminal vesicle cyst was morphologically confirmed.

At the 3-month postoperative follow-up, the patient reported complete resolution of pain and normalization of urinary function. Repeat semen analysis demonstrated an increase in ejaculate volume to 1.6 mL, sperm concentration to 1.4×10^7/mL, and progressive motility to 35%. An improvement in sperm morphology was also observed, with the proportion of morphologically normal forms increasing from 2% to 4%. Despite these favorable changes, semen parameters remained below the reference range, indicating persistent subfertility. At the time of follow-up, pregnancy had not yet been achieved by the patient's partner. Continued follow-up with a urologist and a reproductive medicine specialist was recommended, including repeat fertility assessment after 6 months and consideration of assisted reproductive technologies if impaired semen parameters persisted.

Discussion

This clinical case illustrates the typical presentation of Zinner syndrome in a young male patient, characterized by the gradual development of symptoms. In our patient, the seminal vesicle cyst reached approximately 6 cm by the age of 36 years, manifesting with low back pain, perineal discomfort, dysuria, and ejaculatory dysfunction—findings consistent with the most common symptoms reported in the literature.

Infertility was also a significant concern: obstruction of the vas deferens led to a reduced ejaculate volume and oligozoospermia, which correlates with data indicating decreased seminal fluid volume and sperm count in this congenital anomaly [12].

The diagnosis of Zinner syndrome does not present significant challenges with a targeted diagnostic approach. Visualization of the genitourinary system plays a key role in establishing the diagnosis. In our case, ultrasound proved to be an informative screening method, allowing for the detection of renal agenesis and raising suspicion of a seminal vesicle cyst. Transrectal ultrasound typically provides an even more detailed assessment of the seminal vesicles and can be used for targeted aspiration of cyst contents. However, MRI is considered the gold standard for pelvic imaging in men, offering a clear depiction of the cyst's presence and its communication with the seminal vesicle, as well as the condition of surrounding tissues. On MRI, a seminal vesicle cyst has a characteristic appearance, consisting of hypointense signal on T1-weighted images, a bright hyperintense signal on T2-weighted images, and no contrast enhancement [13].

In the present case, MRI was not performed, since contrast-enhanced CT provided sufficient diagnostic information. The

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CT scan clearly demonstrated renal agenesis, the cystic nature of the lesion and its size, and the absence of contrast enhancement within its contents. Together with the ultrasound findings, these data allowed for a confident diagnosis to be established with a high degree of certainty. Nevertheless, in general, MRI is recommended for precise topographic diagnosis of Zinner syndrome, particularly prior to planning organ-preserving treatment [13].

When establishing the diagnosis, it is crucial to exclude other possible pathologies presenting with cystic pelvic lesions. In Zinner syndrome, the combination with renal agenesis is an almost pathognomonic feature.

Differential considerations include a Müllerian duct cyst, which is typically located in the midline and associated with normal renal anatomy; an ejaculatory duct cyst or ureterocele, which are usually located within the prostatic region and may be associated with bilaterally normal kidneys; ureterocele, which demonstrates communication with the ureter; and cystic lesions associated with prostatic tumors or abscesses [14]. In our case, the presence of the complete triad of cyst, renal agenesis, and obstruction of the vas deferens left virtually no diagnostic doubt.

The management of Zinner syndrome depends on symptom severity and cyst size. Two main approaches are possible: conservative surveillance or invasive intervention [15]. Active surveillance is justified in asymptomatic patients with small cysts. Such patients are recommended to undergo periodic ultrasound or MRI monitoring and treatment of any complications that may arise, such as antibiotic therapy for epididymitis or urinary tract infection [15].

Cyst puncture and aspiration of its contents is a minimally invasive measure that can provide temporary symptomatic relief; however, the risk of recurrence is high if the secretory source is not addressed. Surgical treatment is the method of choice in the presence of symptoms, infertility, or large cyst size (> 5-6 cm). Previously, open surgery via laparotomy or transvesical approach was the standard, but in recent decades, laparoscopic procedures have become the preferred approach almost universally, with robot-assisted interventions being utilized when feasible [16,17]. The minimally invasive approach provides excellent visualization of the deeply located seminal vesicles and allows for radical cyst excision with minimal trauma to surrounding structures.

According to a review by Liu et al (2021), approximately 66% of patients with Zinner syndrome in the analyzed series underwent surgery, predominantly via a laparoscopic approach [3].

In our case, the laparoscopic approach was performed, demonstrating an excellent outcome: the patient was relieved of symptoms, and reproductive function was partially restored. Laparoscopy also ensures a faster postoperative recovery period (with discharge typically on days 2-5) compared with open interventions, as observed in our patient.

The aspect of fertility deserves special attention. Although cyst removal on the side of renal agenesis cannot fully restore natural fertility, as the affected seminal vesicle and vas deferens on that side are typically irreversibly impaired, surgical treatment can improve semen quality by alleviating chronic inflammation and reducing reflex ejaculatory dysfunction. Furthermore, in some cases, infertile patients with unilateral obstruction can achieve successful fertilization due to the compensatory function of the contralateral side, especially with the application of assisted reproductive technologies. Our patient continues to be monitored for infertility. If necessary, assessment for sperm retrieval from the right testicle and subsequent use of assisted reproductive technologies, including in vitro fertilization or intracytoplasmic sperm injection, is planned. Regarding long-term prognosis, recurrence after successful cyst resection is unlikely, particularly if complete removal of the affected seminal vesicle and the associated atrophic ureter has been performed. The literature describes isolated cases in which, several years after organ-sparing procedures, additional intervention, such as transurethral resection of the ejaculatory duct, was required due to recurrent dilatation of the seminal vesicles [18,19].

Thus, this clinical case demonstrates the successful laparoscopic management of Zinner syndrome, resulting in complete symptom resolution and improvement of semen parameters. This report highlights the importance of considering Zinner syndrome in young men presenting with pelvic cystic lesions, lower urinary tract symptoms, and infertility. Early recognition and appropriate surgical management can lead to favorable clinical outcomes and improved quality of life.

Conclusions

Zinner syndrome is a rare triad of renal agenesis, seminal vesicle cyst, and vas deferens obstruction that can present with pain, urinary symptoms, and impaired fertility in young men. In this case report, Zinner syndrome was successfully diagnosed in a 36-year-old patient with typical symptoms using ultrasound and CT, which revealed an absent left kidney and a cystic formation in the seminal vesicle. Laparoscopic removal of the seminal vesicle cyst resulted in complete resolution of clinical manifestations. The surgery was minimally invasive and uneventful, and the patient made a rapid recovery. This case highlights the importance of prompt recognition of Zinner syndrome, particularly in patients with unilateral renal agenesis and pelvic pain, and demonstrates the effectiveness of laparoscopic surgery as the treatment of choice for symptomatic patients with this condition.

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Informed Consent

Informed written consent was obtained from the patient for his clinical information and images to be included in this publication. He was informed that his name and any other identifying information would remain confidential and not be disclosed.

Declaration of Figures' Authenticity

All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

References:

1. AlArifi M, Al-Gahwary M, Gomha M. The association of renal agenesis and ipsilateral seminal vesicle cyst: Zinner syndrome case report. Case Rep Urol. 2019;2019:1242149
2. Cleva M, Montaldo L, Graziani G, Bruschi E, Valentino M. Zinner's syndrome: Case report of a developmental anomaly of the mesonephric duct. J Radiol Case Rep. 2023;17(8):57-64
3. Liu T, Li X, Huang L, et al. Zinner syndrome: An updated pooled analysis based on 214 cases from 1999 to 2020: Systematic review. Ann Palliat Med. 2021;10(2):2271-82
4. Briosa F, Valsassina R, Mira C, Zagalo A. Zinner and Mayer-Rokitansky-Küster-Hauser syndromes: When unilateral renal agenesis meets genital anomalies. BMJ Case Rep. 2019;12(5):e229034
5. Huang Y, Han B, Huang Z, et al. Zinner's syndrome in two young middle-aged men: A case report and review of the literature. BMC Urol. 2025;25(1):129
6. Sada F, Cekaj E, Saraci B, et al. Challenging clinical presentation of Zinner syndrome. Radiol Case Rep. 2022;18(1):256-59
7. Ostrowska M, Grześk M, Kaczyński S, et al. Zinner syndrome – A rare cause of recurrent epididymitis and infertility. Clin Pract. 2021;11(4):942-46
8. Florim S, Oliveira V, Rocha D. Zinner syndrome presenting with intermittent scrotal pain in a young man. Radiol Case Rep. 2018;13(6):1224-27
9. Shah R, Mukherjee S, Bhadada SK, Walia R. Hypogonadotropic hypogonadism with Zinner syndrome: A coincidence or a consequence? BMJ Case Rep. 2024;17(6):e259363
10. Pramod V, Sanjay SC, Tanuj Sai Kumar S. Imaging in Zinner syndrome, a case series: The wolf in sheep's clothing. Urol Case Rep. 2024;58:102889
11. Jarzemski P, Listopadzki S, Kowalski M. Laparoscopic removal of a congenital seminal vesicle cyst in Zinner's syndrome. JSLS. 2014;18(2):367-71
12. Hofmann A, Vauth F, Roesch WH. Zinner syndrome and infertility–A literature review based on a clinical case. Int J Impot Res. 2021;33(2):191-95
13. Bas D, Nalbant MO. Zinner syndrome: Radiologic diagnosis in a rare case. Curr Med Imaging. 2023 [Online ahead of print]
14. Abakar D, Badi FE, Sabiri M, et al. Zinner syndrome. Eur J Case Rep Intern Med. 2021;8(7):002628
15. Kumar S, G KI, Khalil-Khan A, et al. Zinner syndrome. Cureus. 2022;14(11):e31308
16. Dilek İE, Ediz E, Şenoğlu Y. Is Laparoscopic approach adequate for Zinner's syndrome? One patient, two cases. J Urol Surg. 2024;11(4):243-47
17. Alsaikhan B, Alasker A, Nazer A, et al. Robotic-assisted management of Zinner syndrome: A case report and review of the surgical approach. J Surg Case Rep. 2025;2025(7):rjaf162
18. Hevia Palacios M, Álvarez-Maestro M, Gómez Rivas J, et al. Zinner Syndrome with ectopic ureter emptying into seminal vesicle. Case Rep Urol. 2021;2021:8834127
19. Wang MS, Li BJ, Huang ZM, et al. Transurethral endoscopic treatment of seminal vesicle cysts (report of seven cases). Int Urol Nephrol. (2015) 47:717-21

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