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TRUS-guided drainage of the ectopic ureter entering the prostatic urethra and TRUS-guided transurethral neo-orifice formation using holmium laser

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Keywords
ectopic ureter, TRUS, holmium laser, pancreatic cyst, neo-orifice

Abstract

A fifty-nine year-old male was hospitalized for exacerbation of chronic pancreatitis. As a gigantic cyst of the pancreatic tail was identified, it was fused with the jejunal loop. Due to persistent fever and severe symptoms in the storage and voiding phases, the patient was referred to a urologist. Because transrectal ultrasound examination revealed a fluid collection resembling the left seminal vesicle filled with purulent material, a transrectal puncture procedure was performed. The analysis of computed tomography scans led to the diagnosis of duplicated collecting system of the left kidney with the enormous ureter of the upper moiety that entered the prostate gland. In order to permanently decompress the hydronephrosed upper moiety of the left kidney, the patient was deemed eligible for endoscopic treatment. A transurethral incision through the bladder wall and the adjacent segment of the ectopic ureter was made with holmium laser under transrectal ultrasonography guidance, thus creating a neo-orifice of this ureter.

Case presentation

A 59-year old patient was admitted to the gastrenterology department for endoscopic resection of large bowel polyps. Abdominal US conducted before the procedure revealed a fluid collection measuring 15 × 8.5 cm between the pancreas, spleen and the superior pole of the left kidney. Due to the location of the lesion, its fluid nature and the history of pancreatitis, it was assumed that the lesion probably corresponded with a post-inflammatory cyst of the body and tail of the pancreas. The first abdominal CT scan excluded the pelvis (range of scanning: diaphragmatic domes – inferior renal poles) and was performed in the native, arterial and venous phases. The scan revealed a very large thin-walled fluid collection of a cystic nature with the size of 10 × 14 × 18 cm that displaced the tail of the pancreas and spleen, and significantly deformed the left kidney (Fig. 1). Four months later, the patient was admitted to the surgery department with abdominal pain, fever and minor symptoms in the storage and voiding phases. Due to the suspicion of chronic pancreatitis exacerbation (with a tail cyst), the patient was deemed eligible for surgery. The jejunal loop was fused with the pancreatic tail, and 2.5 L of fluid, described as serous, was evacuated intraoperatively from the peritoneal cavity. After the surgery, the patient spent 3 weeks at the ICU in a grave condition. Because a thick-walled collection, measuring 10 × 7 cm with internal echoes, and located between the left kidney

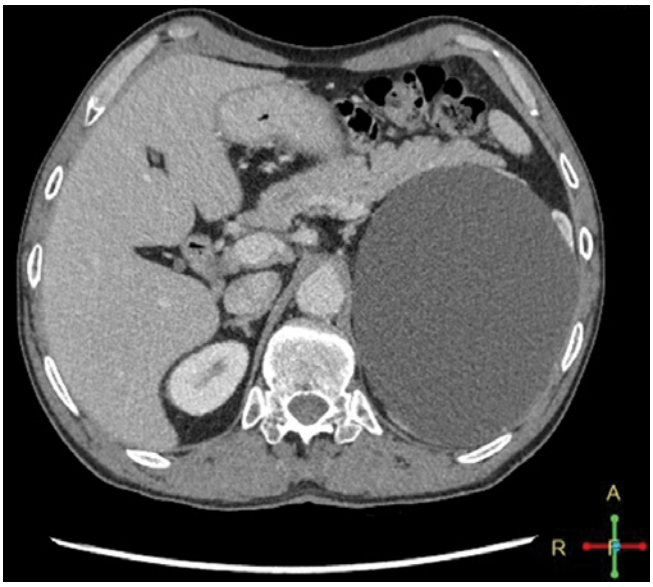

Fig. 1. *Axial contrast-enhanced computed tomography. On the left, note a huge fluid collection with smooth outlines, impinging on the tail of the pancreas (interpreted as a cyst of the tail of the pancreas)*

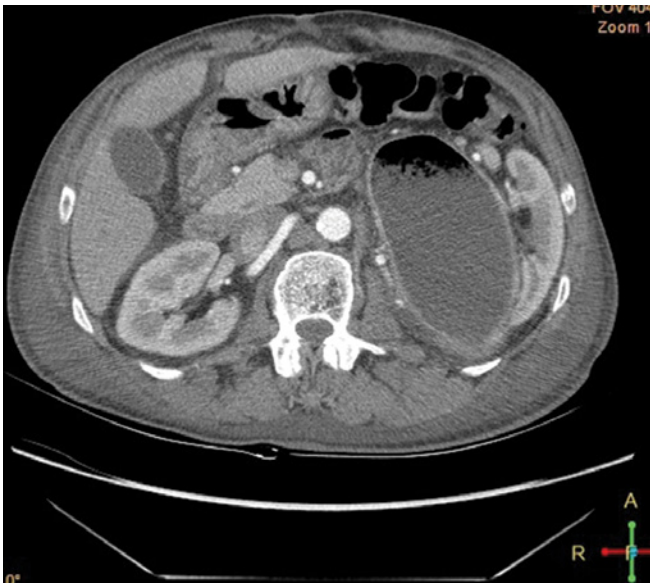

Fig. 2. *Axial computed tomography, arterial phase. The cystic lesion that compensates the upper left renal pole contains both dense material and gas*

and spleen was found in a US scan, an abscess was suspected and another abdominal CT was ordered. The second CT scan, performed in the native, arterial and venous phases, encompassed both the abdominal cavity and pelvis (range of scanning: diaphragmatic domes – symphysis). An extensive thick-walled fluid area with some content level was observed. It measured 14 × 14 × 9.5 cm, and was located between the spleen and the left kidney (Fig. 2). The structure narrowed as is went down towards the small pelvis. It was traced down to the level of the prostate gland. Both the prostate gland and seminal vesicles showed no pathology in CT. Attention was paid to some fluid between the pelvic loops. Based on the available clinical data and the CT scan, the finding was interpreted as an intestinal loop that evacuated the contents of a pancreatic pseudo-cyst of edematous walls. The patient was deemed eligible for a repeated laparotomy.

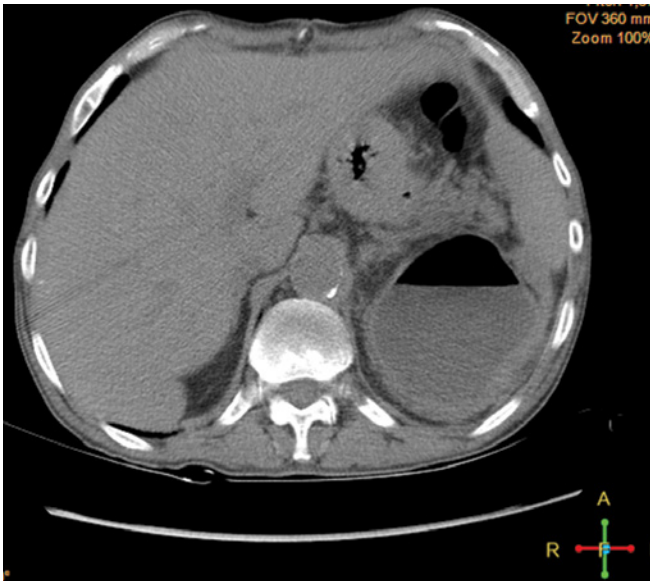

Fig. 3. *Axial computed tomography. Above the left kidney, there is a thick-walled fluid space with air-fluid level interpreted as a cyst of the tail of the pancreas*

In the third follow-up abdominal and pelvic CT scan, conducted after seven days, the image of the fluid collection between the spleen and pancreas was comparable; moreover, "edematous enlargement of the gastrointestinal wall" was noted. Additional signs were: increased density and blurred mesenteric fat, progression of pelvic free fluid, atelectatic or inflammatory changes in the basal lung parts with fluid in both pleural cavities.

Due to wound dehiscence, peritonitis and suspicion of an intraabdominal abscess, another surgery was performed. The peritoneal cavity was rinsed; there were no fluid collections that would require drainage, but a large inflammatory infiltration was noticed at the kidney. The culture from the peritoneal fluid revealed *Enterobacter cloacae* ssp. *cloacae*, and therefore antibiotic therapy (meropenem) was continued.

Three weeks later, the fourth abdominal and pelvic CT was performed. It was found that the size of the pancreatic cyst, edematous enlargement of the gastrointestinal tract as well as inflammatory and reactive changes of the mesenteric fat tissue had reduced. A horizontal fluid level and gas above the fluid were noticed in the cystic lumen (Fig. 3). The free pelvic and pleural fluid regressed completely. A week later, a report from abdominal US conducted due to episodes of

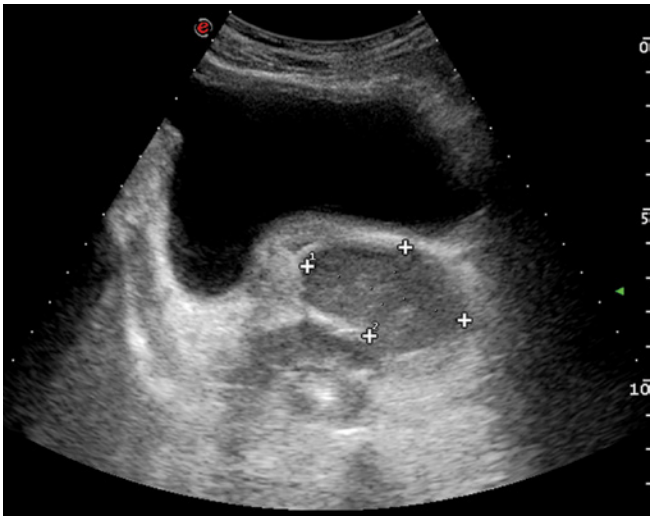

Fig. 4. *Transabdominal ultrasound of the urinary bladder in the transverse section. A collection with dense fluid material, measuring 28 × 49 mm, elevates the urinary bladder in the region of the trigone and left ureteral orifice. The lesion was interpreted as a seminal vesicle abscess. The examination was performed with a convex 6 MHz probe (MyLab C, Esaote, Italy)*

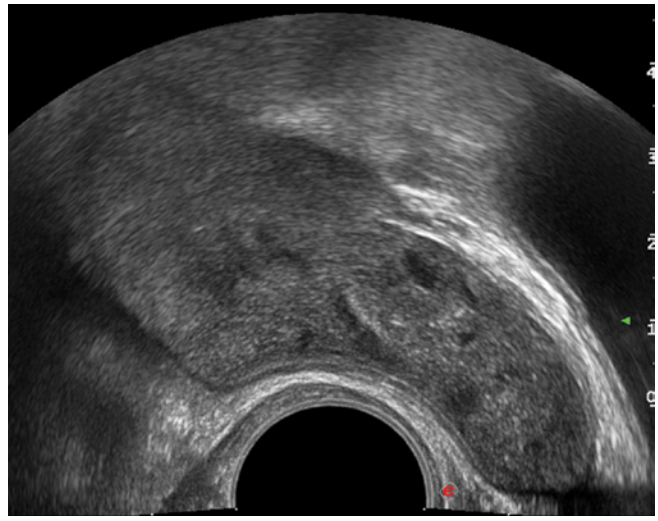

Fig. 5. *A transrectal scan of the lesion that elevates the trigone of the urinary bladder on the left side. Owing to the dense contents, the location and the presence of incomplete septa, the collection was interpreted as a congested seminal vesicle filled with purulent material. The examination was performed with an endorectal 9 MHz probe (MyLab C, Esaote, Italy)*

fever stated as follows: "kidneys of normal size with preserved structure, and no stasis or deposits. A thick-walled collection with internal echoes between the left kidney and spleen compresses and displaces the kidney; approximate size: 85 × 86 mm. A suspicion of a complicated cyst."

In the next week of hospitalization, the patient was referred to a urologist due to severe symptoms in the storage and voiding phases. A digital rectal examination revealed prostate tenderness, particularly on the left side. A transabdominal (Fig. 4) and transrectal ultrasound (TRUS) (Fig. 5) revealed a collection with dense contents impinging on the left lobe of the prostate and elevating the trigone of the urinary bladder and the area of the left ureteral orifice. The image suggested that the left seminal vesicle was filled with purulent contents. The consulting urologist read the reports from imaging scans performed before, but did not analyze the tomography scan series. The fluid col-

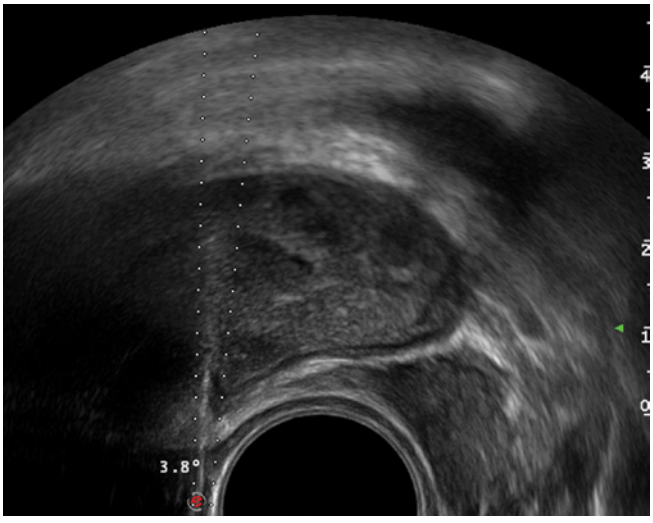

Fig. 6. *An image recorded during ultrasound-guided transrectal puncture of the lesion interpreted as the left seminal vesicle (endorectal 9 MHz probe, MyLab C, Esaote, Italy)*

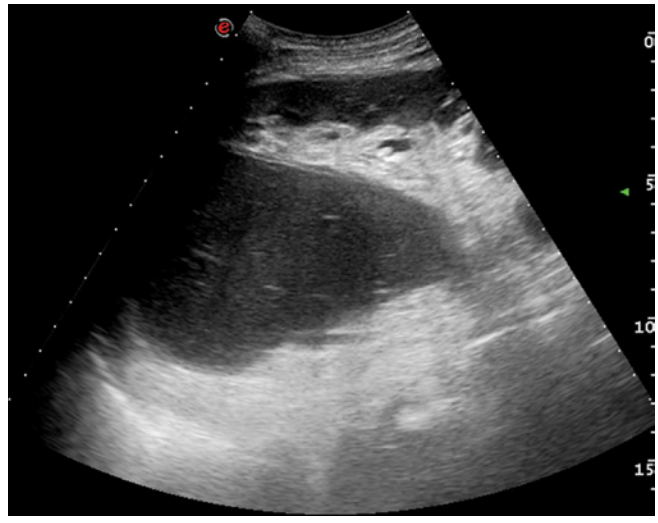

Fig. 7. *An ultrasound image of the left kidney with a collection of dense fluid in the cephalad position. The lesion displacing the tail of the pancreas, spleen and the left kidney was interpreted as a cyst of the tail of the pancreas. The examination was performed with a convex 6 MHz probe (MyLab C, Esaote, Italy)*

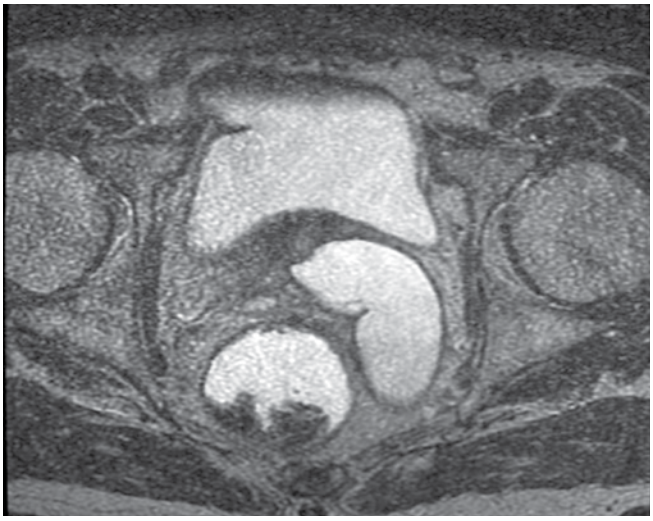

Fig. 8. *Magnetic resonance imaging conducted after the puncture procedure, aspiration of the dense purulent material from the left ectopic ureter and lavage with an amikacin solution. An axial scan performed at the level of the base of the prostate gland presents a narrowing segment of the ectopic ureter that goes beyond the midline to enter the prostatic urethra between the seminal colliculus and the neck of the urinary bladder on the right side*

lection was punctured under local anesthesia from the transrectal access (Fig. 6). The dense contents were washed out with 300 mL of amikacin (1 g/100 mL), and a total of 1000 mL of purulent washings were aspirated. A spectacular improvement in the patient's condition was noted within a day. Due to the amount of aspirated contents from a pseudo-seminal vesicle, CT and US images were re-interpreted (Fig. 7). This led to the diagnosis of duplex collecting system of the left kidney with an enormous tortuous ureter of the upper moiety that entered the prostate gland. The culture of the aspirated content (urine collected from the ectopic ureter) revealed infection with *Escherichia coli* ESBL+, *Klebsiella pneumoniae* ssp. *pneumoniae* ESBL+ oraz *Candida albicans*. The ordered oral drugs, i.e. ciprofloxacin and trimethoprim + sulfamethoxazole, occurred to be adequate as per the detected bacterial sensitivity.

In the next 3 months, the patient gained weight: from 49 kg at discharge to 70 kg (body weight from before hospitalization) with the height of 170 cm. The patient had magnetic resonance imaging of the abdomen and pelvis performed in a different center. It confirmed the presence of the left duplex collecting system with duplicated ureter and the ectopic orifice of the upper pole moiety ureter into the area of the prostatic urethra (Fig. 8) with gigantic dilation of both the upper pole and the ectopic ureter. The patient was informed about the risk that his general condition might deteriorate in the event of infection recurrence and about the need of permanent decompression of the upper moiety ureter. Because of very good overall condition and distrust toward medical stuff, the patient initially did not consent to any intervention. He agreed to endoscopic treatment only 9 months after the primary surgery. Taking into account the history of adverse courses of various abdominal procedures conducted before and the patient's concerns associated with a risk of complications, another open surgery was not proposed.

A scheduled procedure consisted in making an incision on the bladder wall over the perivesical region of the dilated ureter in order to create a neo-orifice to the urinary bladder (Fig. 9). To avoid damage to the orifice of the ureter draining the dominating healthy lower moiety of the left kidney, the incision was made between the normal orifice of the left ureter and the bladder neck. The precise determination of the incision site was possible thanks to intraoperative control of the endoscope tip and laser fiber position using transrectal ultrasonography (Fig. 10, 11). The incision was performed with 10 W holmium laser (Fig. 12, 13). When the incision had been performed, it was possible to reach the lower segment of the ectopic ureter and wash out any post-inflammatory residue (Fig. 14). The

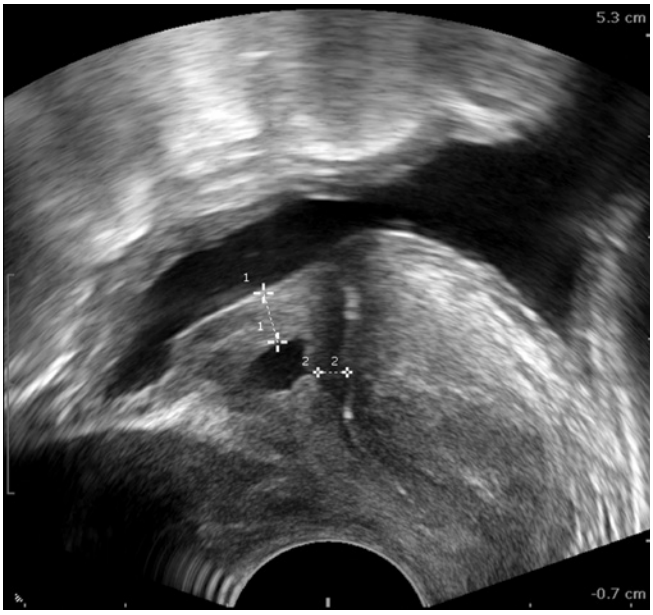

Fig. 9. *A transrectal prostate image in the sagittal section. A cystic lesion in the neighborhood of the prostatic urethra corresponds with the cross-section of the distal segment of the ectopic ureter. It was considered to make an incision and dilatation of the ureter end, narrowed along the fragment of 3 mm, from the side of the prostatic urethra. Another option was to make an incision on the neck of the urinary bladder at hour 6 to the depth of at least 5 mm so that the distal segment of the ectopic ureter, when healed, could open on the border of the neck and trigone of the urinary bladder. Due to the risk of re-stricure and the impossibility of leaving a DJ ureteral stent inserted in this location for the time of the healing period, it was proposed to join the distal segment of the ectopic ureter and urinary bladder between the bladder neck and the opening of the normal lower moiety ureter. The examination was performed with a transrectal end-fire probe with the frequency of 6 MHz (ProFocus Ultraview, BK Medical, Denmark)*

Fig. 10. *A sagittal image of the prostate and urinary bladder. The laser resectoscope tip can be noticed in the urinary bladder. The typical stripes on the resectoscope tip in ultrasonography represent the perforated coat of the tool. The examination was performed with a transrectal end-fire probe with the frequency of 12 MHz (ProFocus Ultraview, BK Medical, Denmark)*

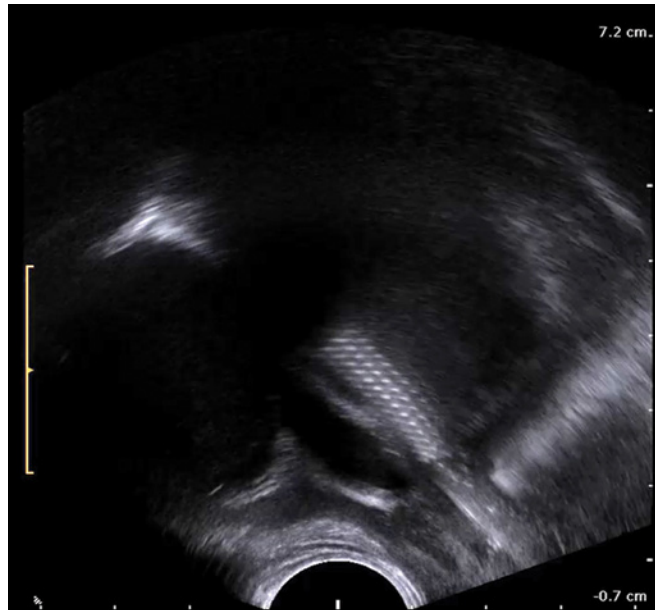

Fig. 11. *Thanks to transrectal imaging, one may trace the resectoscope tip on the ultrasound monitor. The image from the resectoscope camera enables assessment of the urinary bladder mucosa, while ultrasound shows sections through the entire wall of the bladder and its neighborhood, and presents the relationship of the resectoscope with the structures adjacent to the bladder. In this case, ultrasound guidance enables the application of the laser fiber to the bladder wall in order to make an incision precisely above the perivesical segment of the ectopic ureter. Due to the differences in ultrasound wave scattering in different tissues, the resectoscope tip is seen as bent, which should be considered an artifact. The examination was performed with a transrectal end-fire probe with the frequency of 12 MHz (ProFocus Ultraview, BK Medical, Denmark)*

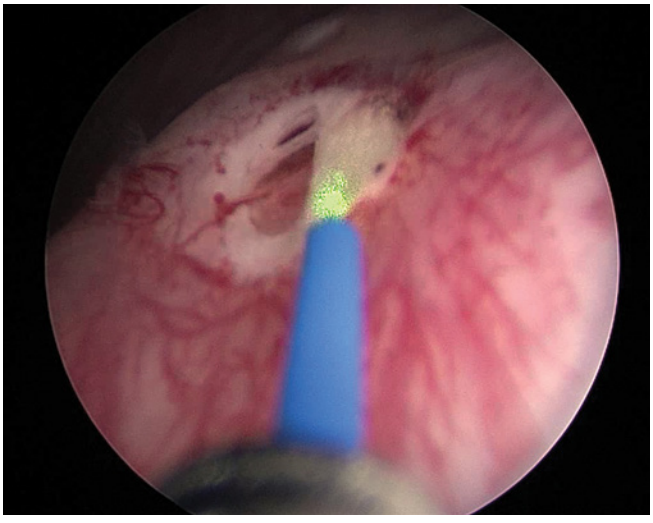

Fig. 12. *An endoscopic image presenting the site where the bladder wall incision is made using holmium laser, above the perivesical segment of the ectopic ureter. In the upper part of the image, one can notice the orifice of the non-dilated ureter of the lower moiety of the left kidney*

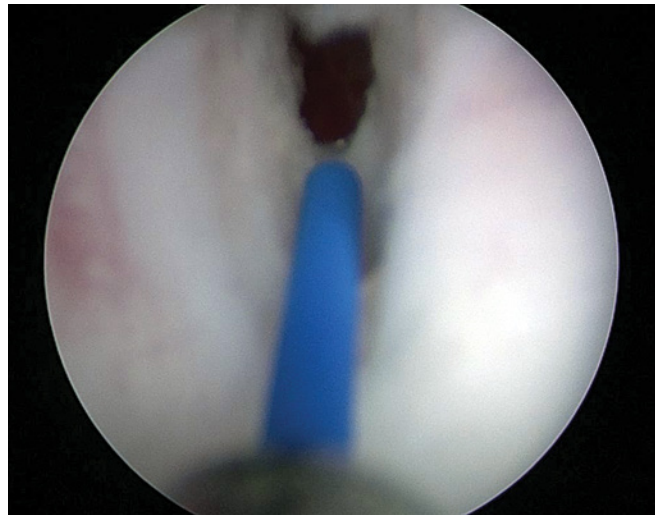

Fig. 13. *An endoscopic image recorded during dilation of the canal that joins the perivesical segment of the ectopic ureter and the bladder, which is supposed to be a neo-orifice of the upper moiety ureter. The fiber diameter was 400 μm, and the holmium laser light had power of 10 W*

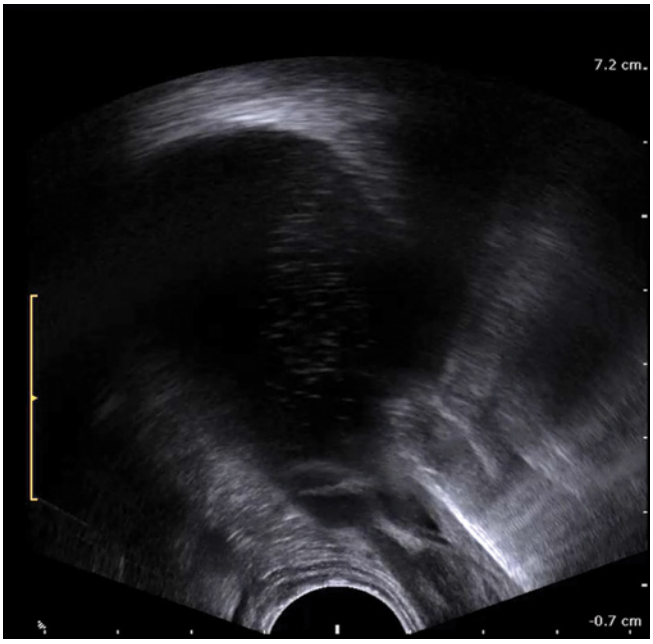

Fig. 14. *Ultrasound imaging enables continuous monitoring of the laser fiber tip location during energy emission. In this case, the moment of the penetration of the laser fiber tip into the ectopic ureter lumen was captured. It is accompanied by the appearance of a hyperechoic gas trail, forming at the tip of the fiber on the background of transsonic urine. The examination was performed with a transrectal end-fire probe with the frequency of 12 MHz (ProFocus Ultraview, BK Medical, Denmark)*

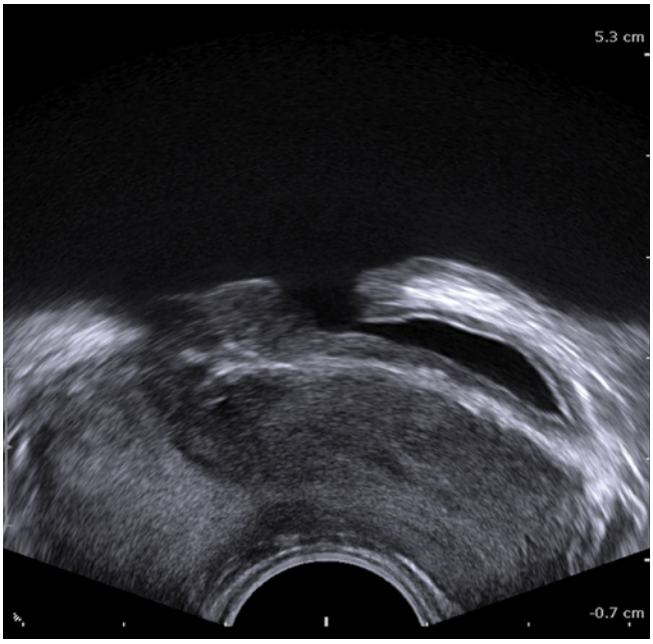

Fig. 15. *The transverse section through the neo-orifice of the ureter to the urinary bladder and the perivesical part of the upper moiety ureter. The examination was performed with a transrectal end-fire probe with the frequency of 12 MHz (ProFocus Ultraview, BK Medical, Denmark)*

post-operative period proceeded with no complications. Follow-up imaging examinations, i.e. abdominal US and MRI, revealed a reduction of the emptied upper moiety of the left kidney and its ureter. TRUS confirmed normal ectopic ureter voiding into the urinary bladder (Fig. 15–18). At 18-month follow-up, the patient reports no lower urinary tract symptoms, and there are no signs of urinary tract infection in laboratory tests.

Discussion

According to the Weigert-Meyer rule referring to duplex collecting systems and the presence of two ureters, the ectopic ureteral orifice (i.e. located beyond the trigone of the urinary bladder) or ureterocele of the upper moiety ureter is located medially and caudally to the orifice of the lower moiety ureter. A ureter entering the prostate gland, which has been described above, is a very rare defect, found only occasionally in adults[1–3].

The location of a ureter orifice in the prostatic urethra is not accompanied by urinary incontinence thanks to the external urethral sphincter situated below. Nevertheless, due to the course of the distal part of the ureter through prostatic tissues, its compression is to be expected, especially in the event of prostatic hyperplasia and edema in inflammatory infiltration. Compression on the lower segment of the ectopic ureter results in impaired urine outflow from the upper moiety, gradual hydronephrotic dilatation of the collecting system and the ureter as well as atrophy of the upper moiety parenchyma. In advanced cases, one may observe a cystic oval remnant of the upper moiety that compresses on the tail of the pancreas and spleen, displaces the lower moiety downward and laterally, and frequently presents the normal parenchymal layer, non-dilated collecting system and narrow ureter. Due to chronic obstruction, the ectopic ureter may reach the diameter of the small intestine, becomes elongated and is characterized by a tortuous course. With urine outflow impairment, the risk of infection of the dilated collecting system and ureter, pyonephrosis and a septic state increases.

In the 59-year-old patient described above, there were no urinary tract signs. Apparently, an immunity decline during the exacerbation of pancreatitis contributed to the development of urinary tract infection with the involvement of the prostate gland, exacerbation of the obstruction of the hydronephrotic upper moiety ureter that entered the prostate gland, upper moiety pyonephrosis and a septic state.

The analyzed case illustrates the considerable influence of a suggestion made on the basis of an ultrasound scan and limited clinical history on the diagnostic and therapeutic process.

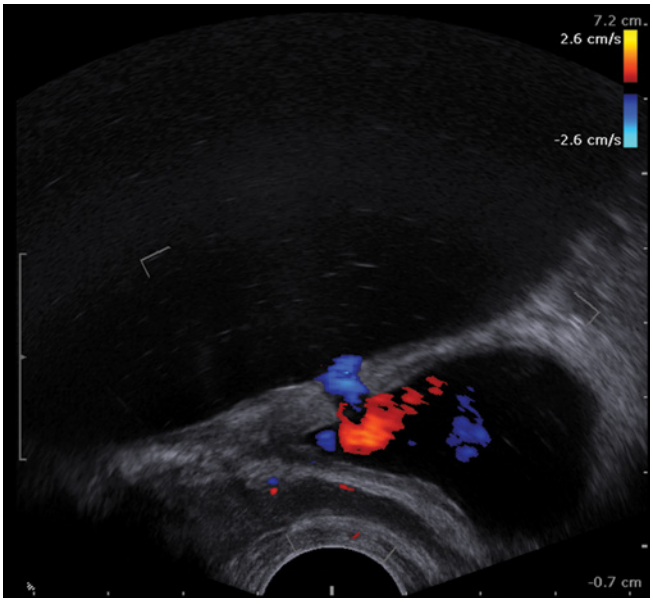

Fig. 16. *A color Doppler image shows a urine stream flowing into the urinary bladder through the neo-orifice. The examination was performed with a transrectal end-fire probe with the frequency of 12 MHz (ProFocus Ultraview, BK Medical, Denmark)*

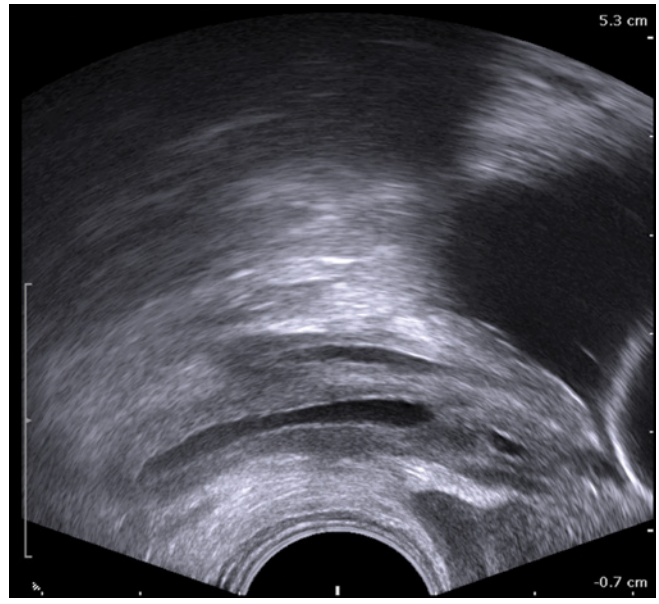

Fig. 17. *The image encompasses the perivesical segments of the upper and lower moiety ureters as the peristaltic wave is passing through the lower moiety ureter (located further from the transducer head). The emptied upper moiety ureter is twice as thick as the lower moiety ureter. The examination was performed with a transrectal end-fire probe with the frequency of 12 Mhz (ProFocus Ultraview, BK Medical, Denmark) after implantation of the balloon Foley catheter into the urinary bladder*

Based on the medical history data concerning the exacerbation of pancreatitis, the abdominal ultrasound scan clearly suggested a cyst on the tail of the pancreas, even though the fluid collection, due to its size (15 cm), was located in the neighborhood of several organs from which it could potentially originate. Due to the considerable volume of the dilated upper moiety, it may be suspected that its ureter was also significantly dilated at that time, not only in the pararenal segment, but also in the perivesical segment. No such structure was identified in US.

The first computed tomography scan was restricted to the abdominal cavity. The pelvis was not scanned, nor was the urographic phase included, probably due to a suggestion of a cyst of the tail of the pancreas noted in a US report.

The selection of the patient for the first surgery resulted from the worsening general condition in the course of pancreatitis, whereas no attention was paid to the symptoms of irritation or obstruction of the lower urinary tract, which were reported by the patient. Surgeons fused the tail of the pancreas, probably presenting some postinflammatory changes, with the first jejunal loop. Fortunately, no permanent anastomosis of the intestinal loop with the hydronephrotic upper moiety of the left kidney was made. It should be suspected that laparotomy may have contributed to the development of gasogenic congestive infection of the collecting system. In the next comput-

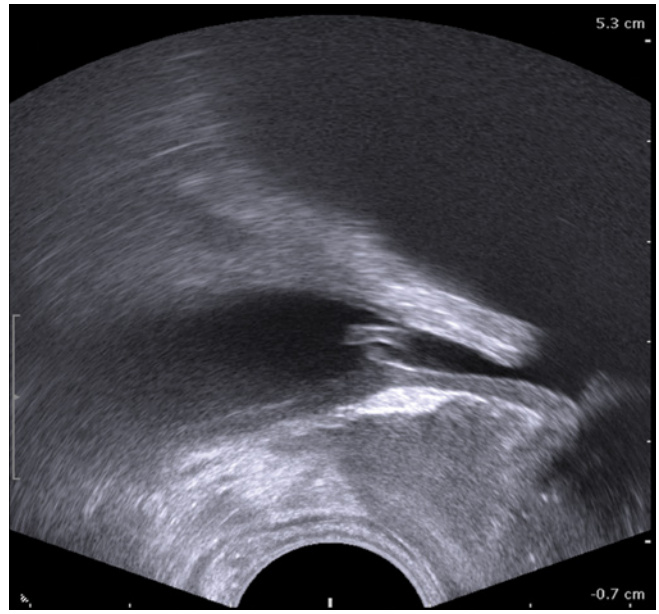

Fig. 18. *The image encompasses the lower part of the upper moiety ureter. In the ureter, approximately 15 mm from the neo-orifice, there is a fold of the ureter wall that counteracts retrograde urine flow from the bladder. The examination was performed with a transrectal end-fire probe with the frequency of 12 Mhz (ProFocus Ultraview, BK Medical, Denmark) 11 months after neo-orifice formation*

ed tomography scan, the upper dilated moiety with the thickened wall and heterogeneous content, also including gas, suggested the presence of an abscess. A wide ureter of a tortuous course, thick wall as well as dense contents and gas imitated inflamed intestinal loop.

The history of cystjejunostomy, known to the radiologists, indicated the correctness of this diagnosis. It was assumed that the conversion of a thin-walled cyst into a thick-walled cistern filled with dense material and including a gas level was a consequence of the surgery. This erroneous interpretation was supported by the fact that gasogenic infection of the urinary tract in such a severe form is very rare, and the clinical data conveyed to the radiologists did not suggest any urinary tract pathology.

The subsequent laparotomies were performed by different surgical teams. They found no pathology that would explain such a severe course of the disease despite antibiotic therapy targeted based on culture results.

These significant discrepancies between the radiological assessment and the situation in the surgical field should have raised doubts about the correctness of the imaging interpretation or surgical treatment, and should have been confronted and explained. It seems that, in this clinical situation, intraoperative ultrasonography during laparotomy could have been valuable.

Unfortunately, none of the CT scans included the excretory phase despite the fact that he lower moiety of the left kidney, which was considered to be normal, was significantly compressed by the pseudocyst. Although it should be expected that the hydronephrotic and even more so pyonephrotic upper moiety would be poorly contrasted, if contrasted at all, the analysis of the normal collecting system morphology and the course of the normal ureter would certainly raise a suspicion of a congenital defect, even in a patient reaching the end of the sixth decade of life. The case presented above leads to the conclusion that the limitation of the range of primary diagnostic tests, conducted due to extensive changes, to the initially assumed extents of pathological processes may lead to wrong conclusions and entail mistakes in the range and protocol of further tests.

It is worth highlighting that patients in the grave condition usually have a catheter inserted into the urinary bladder. It is thought to be the cause of symptoms related with the urinary tract.

When the condition of the described patient improved from grave to stable, and the catheter was removed, the patient started reporting more exacerbated symptoms related with the storage and voiding phases, which prompted urological consultation.

The selection of the patient to a puncture procedure due to a pseudoabscess of the seminal vesicle resulted from the signs of enhanced inflammation noted in the digital rectal examination and an erroneous interpretation of the ultrasound image. The left seminal vesicle was compressed so much that TRUS visualized it as the ampulla of the left ductus deferens. The diameter of the lower segment of the ectopic ureter and folds visible in its lumen as well as dense contents suggested the image of an enlarged seminal vesicle with purulent material. Since, compared to TRUS, computed tomography is characterized by lower accuracy in the imaging of the prostate gland and seminal vesicles[4], it was not considered necessary to reanalyze CT images before the puncture procedure. There are a number of reports supporting the need for a puncture, aspiration of the purulent content and lavage of the vesicles with an antibiotic solution in the case of a seminal vesicle abscess[5–7].

The puncture of the cistern provided purulent material, which was expected in an abscess puncture, but its amount raised a suspicion of a puncture of a dilated ureter. The aspiration of the material from the lower segment of the ureter emptied also the upper moiety, which was filled with pus and gas.

Despite spectacular improvement of the patient's condition as early as on the first day after surgery, the need for further observation seemed obvious. The patient was subjected to unintentional transrectal drainage of not the seminal vesicle but of the ureter. No such case has been reported so far. Nevertheless, due to the transrectal access, the inflow of infected urine to the pelvis, extravasation of blood in the punctured site or even ureterorectal fistula should be taken into consideration. Seminal vesicle abscess or prostate cyst drainage and lavage with an antibiotic solution involve, in most cases, a single procedure. In the case of the described ureteral puncture, re-accumulation of fluid in the hydronephrotic upper moiety and in the stretched ureter as well as a recurrence of infection could be expected due to residual excretion of the upper moiety. That is why, radical surgery, consisting in the resection of the upper moiety of the left kidney (heminephrectomy) with the entire dilated ureter[8] and with sparing of the lower normal part of the kidney with its normal ureter should have been considered. However, this type of procedure, either open or laparoscopic, carries a risk of damaging the healthy renal parenchyma and the healthy ureter, which quite frequently twists around a fragment of the dilated ureter.

As cases of ectopic ureters entering the prostate gland are reported extremely rarely in adult men, treatment planning should be based on experiences concerning the management of other extravesical ectopic ureters (entering the seminal vesicles or ductus deferens) and methods proposed in pediatric urology for hydronephrosis in ectopic ureter and ureterocele[9].

There are reports about successful decompression of the upper moiety of the duplex kidney through different anastomoses between the upper and the lower moiety ureters[10,11], which could be risky in the reported case due to disproportion in the ureter size and a risk of healthy renal moiety infection. Sometimes, reimplantation of the dilated ureter to the bladder is worth considering, bearing in mind the risk of retrograde flow to this ureter. Moreover, it must be remembered that leaving a perivesical stump of the dilated ureter may carry a risk of recurrent infections. With not guarantees of a positive effect of the procedure, interventions proposed to patients should be planned so as to, first and foremost, minimize the risk of the deterioration of the current condition.

As the patient had undergone multiple surgeries and spent 6 weeks at the intensive care unit and as there were no indications for an urgent intervention, the patient did not consent to any other procedures within the abdominal cavity.

Taking into account the fact that the patient lived up to 59 years of age with the upper moiety draining into the prostatic urethra through a narrow ectopic pathway without any symptoms, the management to consider was the restoration of the patency of the prostatic segment of the ureter or formation of a connection of the lower segment of the ureter with the urinary bladder in a minimally invasive procedure from the transurethral access. Transurethral resection of the bladder neck and the prostatic part could open the distal segment of the ectopic ureter to the site in the prostate gland, but this would be achieved at a cost of retrograde urine flow from the bladder to the ureter and the upper moiety. That is why the scheduled procedure consisted in making an incision on the bladder wall over the perivesical segment of the dilated ureter so as to create a neo-orifice of this ureter to the bladder. The patient expressed informed consent to such management. To avoid damage to the orifice of the ureter draining the dominant healthy lower moiety of the left kidney and to create an oblique channel imitating the intramural segment of the normal ureter, the incision was made between the normal left ureter orifice and the bladder neck. The precise determination of the neo-orifice was possible thanks to intraoperative control of the endoscope tip and laser fiber position using transrectal ultrasonography. The ultrasound image enables the identification of the lower segment of the dilated ureter and determination of the relationship with the adjacent structures, including the normal ureter. In imaging, one may trace the location of the endoscopic tip and laser fiber so as to safely emit energy at a given depth. The resolution of TRUS offers precise assessment of the bladder wall and ureter.

The incision was performed with 10 W holmium laser. Owing to shallow penetration of energy delivered by a narrow end of the fiber, holmium laser helps obtain a perfect incision line with no tendency to deep coagulation and with no risk of extensive thermal damage and shrinkage of the neighboring structures[12,13].

When the incision had been performed, it was possible to reach the lower segment of the ectopic ureter and wash out any post-inflammatory residue. The post-operative period proceeded with no complications.

In order to identify the location of the perivesical segment of the ureter, one may use a needle inserted to the bladder through a cystoscope and make a puncture toward the ureter through the bladder wall[14]. Contrast medium administration through the needle under fluoroscopy guidance confirms its proper location. A guidewire inserted to the ureter through the needle enables proper tissue incision with a cutting electrode or laser fiber and facilitates the connection of the bladder lumen with the lumen of the ureter[15]. Needle insertion in the expected ureter location may be inaccurate, and imaging requires the use of ionizing radiation.

Follow-up imaging examinations, i.e. abdominal US and MRI, revealed a flattening of the emptied upper moiety of the left kidney and its ureter. At 18-month follow-up, the patient reports no lower urinary tract symptoms, and there are no signs of urinary tract infection in laboratory tests.

The presented case highlights the need to confront and verify diagnoses established in imaging with the intraoperative picture. This requires not only good communication, but also openness and humility of both diagnosticians and surgeons.

Transrectal ureter drainage, which was unplanned in this case, may be a suggested management method in the case of similar defects when decompression through the dilated perivesical segment of the ureter is urgently needed and when no other method can be applied.

The method of neo-orifice formation, i.e. transurethral and transrectal ultrasound-guided formation of a fistula between the dilated segment of the ureter and the urinary bladder using holmium laser, has not been described thus far. This method can also be effective in the reconstruction of the ureteral orifice in ureteral stricture or atresia secondary to TURT (transurethral resection of tumor), TURP (transurethral resection of the prostate) and other injuries.

Conflict of interest

Authors do not report any financial or personal connections with other persons or organizations, which might negatively affect the contents of this publication and/or claim authorship rights to this publication.

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