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Case report
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URINOMA MIMICKING PANCREATIC PSEUDOCYST – CASE REPORT

URINOM ILI PSEUDOCISTA PANKREASA – PRIKAZ SLUČAJA

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Summary

Introduction. A urinoma is a localized urine collection in the retroperitoneum, occurring outside the urinary tract. Although relatively rare, traumatic urinomas in pediatric patients pose significant diagnostic and therapeutic challenges. Initial diagnosis primarily relies on ultrasonography, but computed tomography (CT) and magnetic resonance imaging (MRI) provide clearer differentiation and localization. The treatment strategy focuses on preventing potential complications and promoting urinary tract recovery. **Case Report.** We present the case of a seventeen-year-old male with a penetrating abdominal injury. Prompt abdominal exploration revealed and managed minor colon and spleen lacerations. Upon readmission due to the fever and abdominal pain, further diagnostics initially misinterpreted the formed traumatic urinoma as a pancreatic pseudocyst. Postoperative computed tomography, cystoscopy, and retrograde pyelography subsequently confirmed the existence of a urinoma. **Conclusion.** Through this case report and its atypical manifestation, we aim to highlight the importance of differential diagnosis, the complexity of abdominal injuries, and diagnostic and treatment protocols in pediatric populations. Emphasizing a multidisciplinary strategy is crucial to optimizing treatment outcomes.

Key words: Pancreatic Pseudocyst; Urinoma; Diagnosis, Differential; Abdominal Injuries; Wounds, Penetrating; Ureter; Treatment Outcome; Adolescent; Tomography, X-Ray Computed; Nephrostomy, Percutaneous

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Introduction

A urinoma is an encapsulated collection of leaked urine, typically resulting from trauma, obstructive urinary pathologies, or iatrogenic surgical injuries [1–4]. Despite its rarity, timely recognition and treatment of urinomas are critical due to the potential for severe complications if left untreated. While usually associated with

Sažetak

Uvod. Urinom predstavlja lokalizovanu kolekciju urina u retroperitoneumu, izvan urinarnog sistema. Iako relativno retki, urinomi prouzrokovani traumom predstavljaju velike dijagnostičke i terapijske izazove u pedijatrijskoj populaciji. Dijagnostika ultrasonografijom značajna je u prvobitnoj proceni ali kompjuterizovana tomografija i magnetno-rezonantni imidžing ipak pružaju jasniju diferencijaciju i informacije o samoj lokalizaciji. Strategija lečenja bazira se na prevenciji potencijalnih komplikacija i podsticanju oporavka urinarnog trakta. **Prikaz slučaja.** Predstavljamo prikaz slučaja sedamnaestogodišnjeg dečaka sa penetrantnom povredom abdomena. Reč je o pacijentu kod kojeg je načinjena promptna eksploracija abdomena kada su verifikovane i zbrinute manje laceracije kolona i slezine. Nakon otpusta pacijent se ponovo vraća na kliniku sa tegobama u vidu febrilnosti i bolova u trbuhu. Daljom dijagnostikom, inicijalno previđena povreda uretera i formiran urinom, okarakterisan je kao pseudocista pankreasa. Postoperativnom kompjuterizovanom tomografijom, cistografijom i retrogradnom pijelografijom jasno je izdiferencirano postojanje urinoma. **Zaključak.** Ovom atipičnom manifestacijom i prikazom slučaja cilj nam je bio da istaknemo važnost diferencijalne dijagnoze, kompleksnost abdominalnih povreda u pedijatrijskoj populaciji, kao i same dijagnostike i lečenja, sa akcentom na važnost multidisciplinarnih strategije radi optimizacije ishoda lečenja.

Ključne reči: pseudocista pankreasa; urinoma; diferencijalna dijagnoza; povrede abdomena; ubodne rane; ureter; ishod lečenja; adolescent; CT; perkutana nefrostomija

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trauma or surgical complications, the presentation of a urinoma as a pseudocyst following abdominal injury is exceedingly rare. Urinomas pose diagnostic challenges due to their varied etiologies and clinical presentations. Identifying a urinoma requires a comprehensive understanding of its diverse origins, often necessitating a multidisciplinary diagnostic approach that includes imaging modalities and biochemical analyses. Ultrasonography is instrumental in the initial assessment by detecting free fluid collections. However, computed tomography (CT) and magnetic resonance imaging provide superior delineation of the urinoma's

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Abbreviations

CT	– computed tomography
CECT	– contrast-enhanced computed tomography
GU	– Genitourinary

extent, localization, and potential complications, thus aiding in differential diagnoses. Treatment strategies for urinomas focus on addressing the underlying cause, mitigating potential complications, and promoting urinary tract healing [5, 6]. This case report details an atypical scenario where a patient, initially misdiagnosed with a pancreatic pseudocyst following abdominal trauma, subsequently developed a urinoma with intricate consequences. The case underscores the diagnostic challenges and the necessity for multiple interventions, highlighting the importance of accurate and timely diagnosis.

Case report

Initial examination and management

The 17-year-old patient was admitted with a stab wound to the abdomen. Upon arrival, the patient exhibited stable vital signs: a pulse rate of 89/min, blood pressure of 120/85 mmHg, and arterial oxygen saturation of 100%. Clinical assessment revealed a penetrating wound in the left hypochondrium with a protruding omentum, which abdominal ultrasonography confirmed by detecting the presence of free fluid. An immediate exploratory laparotomy uncovered two abdominal wall wounds, including a minor splenic vessel injury and a 7 mm colonic perforation. Both the colonic perforation and the splenic vessel injury were surgically repaired with single sutures, and an abdominal drain was placed. Postoperatively, the patient was admitted to the intensive care unit, and the postoperative phase was uneventful. The drain was removed four days later and the patient was transferred to the abdominal surgery department. The remainder of his hospitalization stay was without fever or pain, and was discharged on the 12th postoperative day.

Postoperative complications, further diagnostics, and urinoma management

One week after discharge, the patient returned with a high fever and abdominal pain. Subsequent ultrasound imaging revealed dense free fluid in the pelvic area and a distinct formation (132x60 mm) in the upper left abdomen near the left kidney. He was readmitted for further monitoring and treatment. Follow-up ultrasound imaging revealed an encapsulated, oval-shaped fluid collection (140x80 mm) surrounding the pancreatic tail and another collection compressing the left kidney's pelvicalyceal system. A decision was made to perform a re-laparotomy. During the exploratory procedure, a tense bursa omentalis was noted, revealing a pseudocyst measuring 15x10 cm. The cyst was opened, and 400 ml of clear, yellowish fluid was obtained. Samples of this fluid were taken for microbiological and biochemical

analysis. The posterior wall of the pseudocyst consisted of hyperemic pancreatic tissue, with no visible pancreatic lesions. Abdominal drains were placed in the Douglas' space, bursa omentalis, and the pseudocyst. The pseudocyst was initially considered to be a pancreatic cyst. Postoperatively, the patient was again placed in the intensive care unit with dual antibiotic therapy. During postoperative care, laboratory results showed increased inflammatory parameters, and an unusually large amount of clear fluid was observed in the drains, prompting a CT scan.

The CT scan correctly diagnosed a left-sided urinoma, which had caused a perirenal abscess and consequent grade III hydronephrosis. The diagnosis was confirmed through cystoscopy and retrograde pyelography, revealing a lesion in the proximal third of the left ureter. A urinary catheter was then introduced. Follow-up CT imaging showed ongoing communication between the proximal left ureter and the urinoma (94x49x67 mm) adjacent to the left kidney, prompting the placement of a percutaneous nephrostomy. The patient was discharged in stable condition, symptom-free, with a functioning nephrostomy after one month of hospitalization.

Follow up

Two months later, the patient was readmitted for further analysis and control diagnostic tests. Intravenous urography revealed a slight narrowing of the left ureter below the ureteropelvic junction, without any impediment to contrast flow. A decision was made to place a JJ stent through the nephrostomy. Three months later, both the JJ stent and nephrostomy were removed. The post-interventional course was uneventful, with complete resolution of all intra-abdominal collections and no further dilatation of the pelvic system.

Discussion

Genitourinary (GU) trauma is often overlooked in acute trauma settings because life-threatening injuries take precedence. However, GU trauma accounts for approximately 10% of all injuries seen in the emergency room. Ureteral trauma is particularly uncommon, constituting less than 1% of all urologic injuries [7, 8]. Urinoma can form as a result of collecting system disruption at any level from the calyces to the urethra [3]. Diagnosing ureteral injuries in acute trauma settings requires a high index of suspicion [7]. In our case, an initial laparotomy was performed due to evidence of intra-abdominal injury on ultrasound, the presence of increased intra-abdominal fluid, and blood loss. Although the laparotomy revealed splenic vessel and colonic perforations, the ureteric injury was overlooked.

Unfortunately, no single imaging modality is ideally suited to diagnose an acute ureteral injury. Although ultrasound is widely used in trauma cases, it has proven unreliable in evaluating ureteral injuries due to their small caliber and retro-

peritoneal location of the ureters. On ultrasound, a urinoma typically appears as an ellipsoid or crescent-shaped anechoic cyst adjacent to the kidney, without direct communication with it. According to the European Association of Urology guidelines, computed tomography (CT) and an intra-operative single-shot intravenous pyelogram (IVP) are the most useful diagnostic tools for ureteral injuries [7]. Well-established CT protocols for diagnosing urinoma involve scanning both the abdomen and the pelvis before and after administering 100-150 ml of contrast. Images are typically taken 5-20 min following contrast injection. When unexplained free intraperitoneal fluid is identified on a CT scan in a hemodynamically stable patient after trauma, management options include observation, diagnostic peritoneal lavage, diagnostic laparoscopy, and exploratory laparotomy. The advent of laparoscopy has enabled surgeons to diagnose or rule out intra-abdominal injuries in a minimally invasive manner [9]. Benefits of diagnostic laparoscopy compared with peritoneal lavage include accurate visualization of the source and extent of bleeding, as well as the potential for therapeutic intervention and repair of injured intra-abdominal structure [9]. In our case, the initial abdominal exploration did not reveal any genitourinary injury, nor was it expected, likely due to the lack of fluid accumulation and absence of urinary symptoms. Consequently, no further diagnostic procedures were indicated, and the patient was discharged from the hospital in stable condition.

The differential diagnoses for a cystic structure adjacent to the kidney include mesenteric and pancreatic cyst, enteric duplication cyst, renal tumor, ureteric duplication, and lymphangioma. Due to these varied possibilities, it is crucial to accurately identify the exact localization of the free fluid collection and properly classify it [9].

After the second-look laparotomy, the cyst was characterized as a pancreatic pseudocyst due to its localization and characteristics. A pancreatic pseudocyst is defined as a localized fluid collection, rich in amylase and other pancreatic enzymes, surrounded by a well-defined wall of fibrous tissue. The majority occur as a common complication of chronic pancreatitis, but they may also occur with abdominal trauma [10]. Both pancreatic cysts and urinomas can be clinically asymptomatic or may manifest later in the course of treatment with symptoms such as pain [8]. It is important to differentiate perinephric urinomas, the collection of urine surrounding the kidney, from other etiologies because urinomas can lead to various complications. The main differences between perinephric urinomas and other cystic structures lie in their content and etiology. The fluid in urinomas typically has high creatinine levels and low glucose levels relative to serum, while pancreatic pseudocysts contain amylase and other pancreatic enzymes. Due to the location and structure of the cyst, the initial impression was that

it was a pancreatic pseudocyst. However, postoperatively, the large amount of fluid drained raised suspicion of a urinary tract injury, which was later confirmed with CT and retrograde pyelography. As Ogreden et al. suggested, CT is adequate for definitive diagnosis of urinoma [3], but contrast-enhanced computed tomography (CECT) is the preferred modality, as contrast extravasation can be used to identify urinary leaks [5, 8, 13, 14]. Renal scintigraphy is also used in patients with compromised renal function, as it can diagnose preserved function in the residual renal parenchyma, identify the nature of the perinephric collection, and establish communication of this collection with the pelvicalyceal system. This provides a low radiation alternative to serial CECTs in follow-up [5]. According to the literature, ultrasound-guided percutaneous aspiration can confirm the diagnosis of a urinoma if the aspirated fluid shows elevated levels of creatinine and decreased levels of glucose relative to serum [13, 14]. In our case, the initial diagnosis was confirmed through cystoscopy and retrograde pyelography, which revealed a lesion in the proximal third of the left ureter, leading to the introduction of a urinary catheter. Follow-up CT imaging showed ongoing communication between the proximal left ureter and the urinoma, prompting the placement of a percutaneous nephrostomy.

Complications of urinomas include the risk of infection, paralytic ileus, abdominal and flank pain, and electrolyte imbalance [12]. Sterile urine in contact with the retroperitoneum can trigger an inflammatory response, whereas infected urine may lead to an acute abdomen, retroperitoneal abscess formation, and retroperitoneal fibrosis in later stages [3]. Overall, the presence of a urinoma is associated with irreversible ipsilateral renal dysfunction in 70% to 80% of cases [9].

Once a correct diagnosis of post-traumatic urinoma is established, the treatment strategy involves initially placing drains and, if needed, a percutaneous nephrostomy.

While many urinomas are small and resolve spontaneously, large and expanding urinomas often require intervention [5, 6]. The primary objective of ureteral repair is the preservation of renal function. Hence, the most important factor in the management of these injuries is to maintain drainage of urine from the kidney [7]. The American Urological Association Urotrauma Guidelines recommend urinary drainage via a ureteral stent, percutaneous nephrostomy tube, or both [14-18]. Compared to percutaneous nephrostomy, ureteral stents may offer advantages such as improved patient comfort, avoidance of additional catheter and urinary bag care, and reduced risk of dislodgment, especially in the pediatric population [12]. As suggested, we initially placed a ureteral stent, but later a nephrostomy was necessary to ensure effective drainage and healing.

A nephrostomy tube is usually a temporary measure with a positive prognosis, placed only until the urethral injury heals. The long-term prognosis for

patients with urinomas depends on several factors, but with prompt and appropriate treatment, most patients maintain normal renal function. Proper drainage can significantly reduce the risk of infection as well as the need for antibiotic administration. The risk of recurrence is low if the underlying cause is effectively addressed and treated. Most patients return to their normal activities and have a good quality of life following successful treatment of urinoma.

Conclusion

The uniqueness of this case lies in the initial misinterpretation of a urinoma as a pancreatic pseudocyst, highlighting the diagnostic challenges associated with such rare presentations. This atypical manifestation underscores the importance of differential diagnosis, especially in complex post-traumatic scenarios involving abdominal injuries in pediatric patients. For diagnosing of urinomas, the gold standard imaging modality is a computed tomography scan, with contrast-enhanced computed tomography playing

a crucial role in the differential diagnosis of other cystic formations and effectively identifying urinary leaks. The treatment strategy for urinomas primarily focuses on preserving renal function and preventing complications. Drainage is often unnecessary for small urinomas, as they may resolve spontaneously. However, for large, non-reabsorbed urinomas, and in cases where there is a risk of sepsis, drainage should be the treatment of choice. Early placement of drainage systems, such as ureteral stents, percutaneous nephrostomy tubes, or both, is crucial to prevent sepsis and other complications. In this case, the patient's management involved multiple surgical interventions, drainage procedures, and ultimately placement of the nephrostomy and JJ stent.

This case highlights the crucial role of a multidisciplinary approach in optimizing treatment outcomes for pediatric patients with traumatic abdominal injuries. Continuous follow-up imaging is also necessary to monitor and manage any persistent urinoma-related complications, ensuring a tailored and effective plan for the successful resolution of the condition.

References

1. Drera B, Poggiani C. Ultrasound follow-up of an unusual giant urinoma in a newborn. *J Ultrasound*. 2016;21(1):65-8.
2. Lundar L, Aksnes G, Mørkrid L, Emblem R. Prenatal extravasation of urine seems to preserve renal function in boys with posterior urethral valves. *J Pediatr Urol*. 2019;15(3):241.e1-7.
3. Ogreden E, Oguz U, Karadayı M, Demirelli E, Tosun A, Gunaydin M. Factors associated with urinoma accompanied by ureteral calculi. *Arch Ital Urol Androl*. 2019;91(1):11-5.
4. Cininta NI, Wardhana MP. Intrauterine nephro-amniotic shunt insertion for fetal bilateral hydronephrosis and urinoma: a case report. *Bali Medical Journal*. 2024;13(1):59-62.
5. Singh TP, Sharma A, Jaiswal H, Sethi RS. Development of a peri-renal urinoma in a follow-up patient with history post-traumatic peri-nephric hematoma: role of renal scintigraphy. *Indian J Nucl Med*. 2021;36(3):348-50.
6. Wong KY, Jeeneea R, Healey A, Abernethy L, Corbett HJ, McAndrew HF, et al. Management of paediatric high-grade blunt renal trauma: a 10-year single-centre UK experience. *BJU Int*. 2018;121(6):923-7.
7. Pereira BMT, Ogilvie MP, Gomez-Rodriguez JC, Ryan ML, Pena D, Martos AC, et al. A review of ureteral injuries after external trauma. *Scand J Trauma Resusc Emerg Med*. 2010;18:6.
8. Hegele A. Renal and ureteral injuries. Diagnosis and treatment. *Urologe A*. 2016;55(4):460-5.
9. Connolly K, Norton ME; Society for Maternal-Fetal Medicine (SMFM). Urinoma. *Am J Obstet Gynecol*. 2021;225(5):B34-5.
10. Tan JH, Chin W, Shaikh AL, Zheng S. Pancreatic pseudocyst: dilemma of its recent management. *Exp Ther Med*. 2021;21(2): 159.
11. Johnson JJ, Garwe T, Raines AR, Thurman JB, Carter S, Bender JS, et al. The use of laparoscopy in the diagnosis and treatment of blunt and penetrating abdominal injuries: 10-year experience at a level 1 trauma center. *Am J Surg*. 2013;205(3):317-20; discussion 321.
12. Cheng JW, Li A, Chamberlin DA. Perinephric urinoma secondary to malignancy in a pediatric patient. *Urology*. 2018;117: 150-2.
13. Swarnim S, Kumar D, Bhatt D, Sana S. Bilateral spontaneous urinoma in a cyanotic child. *Indian Pediatr*. 2018;55(11):997-8.
14. Nabi Z, Singh JR, Nageshwar Reddy D. Gastrointestinal: recurrent acute pancreatitis with a large fluid collection: pseudocyst or else? *J Gastroenterol Hepatol*. 2018;33(5):974.
15. Asanad K, Remulla D, Nassiri N, Nabhani J. Grade IV renal laceration in a 13-year-old boy with cross-fused renal ectopia. *Urology*. 2020;145:243-6.
16. Duarsa GWDP, Satyagraha P, Daryanto B. Non-operative management for high-grade isolated renal trauma in pediatric patients: a case series. *Pan Afr Med J*. 2023;44:71.
17. Sharma A, Pandey S, Aggarwal A, Kumar M. Missed ureteral injury in a young man with stab injury. *BMJ Case Rep*. 2018;2018:22661.
18. Pejić T, Vasić V, Dimitrijević V, Tufegdžić M, Vejnović T, Hadžidokić J. Spontaneous urinoma diagnosed before radical cystectomy: a case report. *Med Pregl*. 2018;71(7-8):257-60.

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