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Case Report

Peritonitis Due to Ruptured Pyonephrosis: First Case Report in a Child and Management in Rural Chad in Africa

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Abstract

Pyonephrosis is a rare condition characterized by the destruction of renal parenchyma, which can lead to severe complications such as secondary peritonitis in cases of rupture. In this article, we report a rare case of acute peritonitis in a 12-year-old girl caused by ruptured pyonephrosis, occurring in a rural setting in Chad. The patient, with no prior medical history, was admitted for acute abdominal syndrome. She had experienced intermittent lumbar pain for six months, self-medicated without medical consultation. Radiological assessment revealed a markedly dilated right kidney with echogenic content suggestive of pyonephrosis overlying a renal calculus, along with abdominal fluid collection. A confirmatory CT scan could not be performed due to the unavailability of imaging facilities. Exploratory laparotomy revealed purulent intra-peritoneal fluid and a necrotic right kidney, necessitating nephrectomy. The patient recovered well postoperatively. Beyond its surgical relevance, this case highlights the urgent need for increased awareness regarding early medical consultation and improved access to advanced diagnostic tools in rural areas. To the best of our knowledge, this is the first reported case of pediatric peritonitis due to ruptured pyonephrosis managed entirely in a rural African setting.

Keywords

Urolithiasis, Pyonephrosis, Complication, Peritonitis, Health Policy

1. Introduction

Pyonephrosis is an infectious disease characterized by obstructive hydronephrosis leading to suppurative destruction of the renal parenchyma [1]. It is uncommon in adults, rare in children, and extremely rare in neonates [2]. The main reported etiological factors include recurrent urinary tract infections, urolithiasis, obstructive diseases such as ureteral stricture or ureteropelvic junction obstruction. Other causes, such as retroperitoneal fibrosis or cancer, have also been reported. Various complications have been associated with pyonephrosis, including rupture with the formation of an intraperitoneal collection resulting in secondary peritonitis [3]. This entity (ruptured pyonephrosis complicated by peritonitis)

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has been considered an extremely rare event by Shifti et al. [4]. Computed tomography (CT) is the best imaging modality to confirm the diagnosis of this condition, demonstrating extravasation into the retroperitoneal and intraperitoneal spaces [5]. In this article, we report the first documented case of peritonitis secondary to ruptured pyonephrosis in a child, managed entirely in a rural setting.

2. Case Report

We present the case of a 12-year-old girl with no known medical history, referred from a primary healthcare center for fever, bowel dysfunction, and a general deterioration of health (as per the referral note). The patient history obtained at admission, with parental assistance, revealed intermittent right lumbar pain persisting for over six months, managed with self-medication, which had progressed to pain in the right iliac fossa. This was accompanied by fever and a general decline in health, mainly characterized by anorexia. Worsening symptoms and the onset of bowel obstruction prompted the parents to take her to a primary healthcare center, from where she was referred.

Clinically, she was conscious with a performance status of 2 and a fever of 39°C. Physical examination revealed good conjunctival coloration, diffuse abdominal tenderness, and guarding in the right abdominal quadrants. Acute appendicular peritonitis was suspected. Laboratory investigations showed evidence of a biological inflammatory syndrome (white blood cell count of 28,000/mm³; C-reactive protein was not performed due to unavailability) and hypercreatininemia of 2023 umol/l. Abdominal ultrasonography revealed significant renal dilation with echogenic content and peritoneal effusion. A plain abdominal X-ray (kidney, ureter, and bladder view) showed a radiopaque shadow in the renal area.

After venous access was established, the patient underwent stabilization, hydration, and probabilistic antibiotic therapy with ceftriaxone, metronidazole, and gentamicin (adjusted to renal function). The patient was then taken to the operating room for an exploratory laparotomy. A bladder catheter was inserted.

Upon abdominal exploration, approximately 300 mL of pus was drained. The abdominal cavity was otherwise unremarkable except for significant bulging in the right retrocolic area. Mobilization of Toldt's fascia allowed the spontaneous exteriorization of the right kidney, which was swollen, filled with pus, and partially necrotic. After freeing the surrounding structures and controlling the pedicle, a nephrectomy was performed. Retroperitoneal effusion was also noted. The surgery concluded with thorough lavage, placement of a drain, and abdominal wall closure. The direct examination of the collected pus revealed numerous leukocytes and Gram-negative staining.

Postoperative recovery was favorable, with the patient becoming afebrile by the second postoperative day, resumption of bowel movements on the third day, and normalization of laboratory parameters by the fifth day. Upon discharge, the patient and her family were counseled about her single kidney status and advised to seek immediate medical attention in the event of lumbar pain, hematuria, or fever.

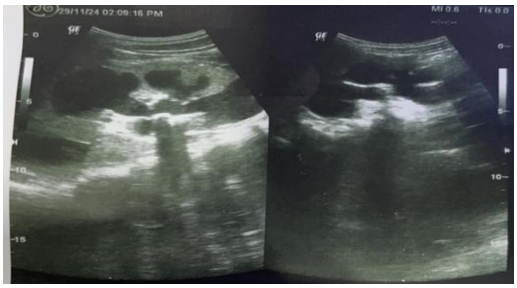

Figure 1. *Echogenic renal dilatation with peritoneal effusion.*

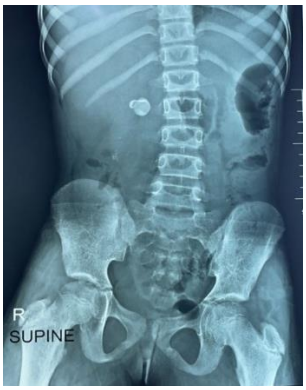

Figure 2. *Standard X-ray with lithiasis projection in the right renal area.*

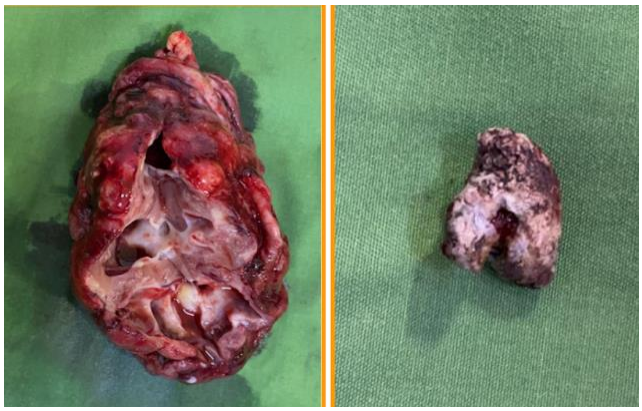

Figure 3. *Kidney (surgical specimen) incised along the lateral border, showing dilated cavities and tissue damage. Calculus responsible for obstruction.*

The surgical specimen was sent to the capital for histological analysis, which concluded with pyonephrosis. Histological examination of the resected renal tissue revealed characteristic signs of pyonephrosis, including cortical and medullary necrosis, acute inflammation with infiltration of neutro-

phils, and the presence of pus in the renal calyces and pelvis. These findings are consistent with a severe infectious process, suggesting acute pyonephrosis. The absence of tumor lesions or other underlying renal pathologies further supports this clinical hypothesis. Follow-up at 3 months was unremarkable.

3. Discussion

Suppurative destruction of the renal parenchyma in pyonephrosis results from the accumulation of debris and purulent material in the renal pelvis and urinary collecting system [6]. Nikolovski et al. [3] identified three key predisposing factors: calculus, obstruction, and infection, all of which were present in our patient. As noted by Tamburrini et al. [2], pyonephrosis is rare, especially in pediatric populations. To our knowledge, this is the first reported case of secondary peritonitis resulting from a ruptured pyonephrosis in a child, and the first to be managed entirely in a rural setting.

In its unruptured form, pyonephrosis typically presents with febrile flank pain [5]. However, when rupture occurs, additional symptoms, such as diffuse abdominal pain and distension, may emerge [4]. The clinical presentation often mimics acute abdomen, with elevated inflammatory markers and sometimes pleural effusion. Abdominal symptoms can obscure the underlying renal cause, leading to misdiagnosis as intestinal perforation or appendicitis [7]. Following rupture, extravasated material is typically infected, and its dispersion may be confined by Gerota's fascia or extend into the retroperitoneum, potentially resulting in fistulization into the abdominal cavity [8]. A history of flank pain, as seen in a case lasting six years [4], may also be reported.

In our patient, ultrasound and radiography were performed. Ultrasound revealed significant renal dilation with calculi and associated abdominal effusion, while radiography identified a calculus in the right renal area. In more resource-equipped centers, computed tomography (CT) would have been the modality of choice. In the case reported by Shifti et al. [4], diagnosis was based solely on ultrasound findings. Renal ultrasound is highly sensitive (90%) and specific (97%) for distinguishing hydronephrosis from pyonephrosis [9]. Although radiographs rarely show free air under the diaphragm, they may reveal radio-opaque calculi. CT remains the most effective diagnostic tool, capable of identifying the underlying renal pathology and confirming extravasation into retroperitoneal and intraperitoneal spaces [7]. However, due to inflammation and adhesions, the precise site of a fistula may not always be identified [7]. In resource-limited, rural settings, where CT is unavailable, advanced imaging remains a significant challenge.

For unruptured pyonephrosis, treatment typically involves rapid urinary diversion (via ureteral stent or percutaneous nephrostomy), antibiotic therapy, and management of the underlying cause [10]. In cases of ruptured pyonephrosis with peritonitis, emergent nephrectomy is often performed [4, 5, 7]. When CT-based diagnosis is available, percutaneous nephrostomy placement prior to surgical exploration is recommended, as it may help prevent septic shock, as demonstrated by Elmoudane et al. [5].

4. Conclusion

Although peritonitis secondary to ruptured pyonephrosis is considered an exceptional condition, it should be included among the differential diagnoses, especially in cases of prior lumbar pain preceding the acute episode or in regions endemic for calculi. Prompt management combining effective resuscitation, antibiotic therapy, and surgical exploration significantly reduces morbidity and mortality in rural settings. Nephrectomy is the most recommended intervention, following an assessment of the contralateral kidney.

Conflicts of Interest

The authors declare no conflicts of interest.

References

[1] Chang CW, Huang CN. Pyonephrosis drained by double-J catheter. *Clin Case Rep*. 2020; 8(12): 3586-3587. Published 2020 Sep 2. https://doi.org/10.1002/ccr3.3204

[2] Tamburrini S, Lugarà M, Iannuzzi M, et al. Pyonephrosis Ultrasound and Computed Tomography Features: A Pictorial Review. *Diagnostics (Basel)*. 2021; 11(2): 331. Published 2021 Feb 17. https://doi.org/10.3390/diagnostics11020331

[3] Nikolovski A, Misimi S, Draskacheva N, Limani N. Pyonephrosis complicated with spontaneous intraperitoneal rupture and diffuse peritonitis: Case report and literature review. *Clin Nephrol*. 2024; 101(3): 147-151. https://doi.org/10.5414/CN111286

[4] Shifti DM, Bekele K. Generalized peritonitis after spontaneous rupture of pyonephrosis: a case report. *Int Med Case Rep J*. 2018; 11: 113-116. Published 2018 May 15. https://doi.org/10.2147/IMCRJ.S159010

[5] Elmoudane A, Boukhannous I, Elalaoui A, Alaoui Mhammedi W, Mokhtari M, Barki A. Pyoperitoneum revealing a spontaneous renal forniceal rupture due to ureteropelvic junction syndrome: About a rare case report. Urol Case Rep. 2022 Sep 21; 45: 102231. https://doi.org/10.1016/j.eucr.2022.102231

[6] Wagenlehner FME, Bjerklund Johansen TE, Cai T, et al. Epidemiology, definition and treatment of complicated urinary tract infections. *Nat Rev Urol*. 2020; 17(10): 586-600. https://doi.org/10.1038/s41585-020-0362-4

[7] Quaresima S, Manzelli A, Ricciardi E, et al. Spontaneous intraperitoneal rupture of pyonephrosis in a patient with unknown kidney carcinosarcoma: a case report. *World J Surg Oncol*. 2011; 9: 39. Published 2011 Apr 12. https://doi.org/10.1186/1477-7819-9-39

[8] JOACHIM GR, BECKER EL. SPONTANEOUS RUPTURE OF THE KIDNEY. *Arch Intern Med*. 1965; 115: 176-183. https://doi.org/10.1001/archinte.1965.03860140056012

[9] Van Nieuwkoop C, Hoppe BP, Bonten TN, et al. Predicting the need for radiologic imaging in adults with febrile urinary tract infection. *Clin Infect Dis*. 2010; 51(11): 1266-1272. https://doi.org/10.1086/657071

[10] Liu, J. J., & Shortliffe, L. M. D. (2012). Renal Abscess and Other Complex Renal Infections. In *Principles and Practice of Pediatric Infectious Diseases, Fourth Edition* (pp. 343-345.e1). Elsevier. https://doi.org/10.1016/B978-1-4377-2702-9.00050-7