MANAGEMENT OF CONSOLIDATED PYONEPHROSIS MIMICKING PYELUM STONE IN A PATIENT WITH URETEROLITHOTOMY HISTORY: A CASE REPORT

[1]Akhmad Dikhyak Ferdiyansah, [2,3]Dimas Panca Andhika, [1]Prima Ardiansah Surya.

[1] Department of Urology, Faculty of Medicine/Universitas Airlangga, Surabaya.
[2] Department of Anatomy, Histology, and Pharmacology, Faculty of Medicine/Universitas Airlangga Surabaya.
[3] Universitas Airlangga Hospital, Surabaya.

ABSTRACT

Objective: *This study presents a case of consolidated pyonephrosis mimicking a pyelum stone.* ***Case(s) Presentation:*** *A 34-year-old woman presented with right flank pain and intermittent fever. NCCT showed severe right hydronephrosis with a 2.5 x 2.0 x 2.8 cm pyelum stone (1300 HU). Supine PCNL was performed, revealing consolidated pus. The stone, found incidentally, was later treated with RIRS.* ***Discussion:*** *Consolidated pyonephrosis may mimic a stone radiologically. Prompt infection control and urinary diversion are critical to prevent sepsis.* ***Conclusion:*** *Multiple procedures were required in atypical stone disease to prevent systemic complications.*

Keywords: *Pyelum stone, consolidated pyonephrosis, infection.*

ABSTRAK

Tujuan: *Laporan kasus ini membahas kasus pionephrosis terkonsolidasi yang menyerupai batu pielum.* ***Presentasi Kasus:*** *Perempuan 34 tahun datang dengan nyeri pinggang kanan dan demam hilang-timbul. NCCT menunjukkan hidronefrosis berat dengan batu pielum 2,5 x 2,0 x 2,8 cm (1300 HU). Dilakukan PCNL posisi supine dan didapatkan pus yang terkonsolidasi. Batu yang ditemukan secara insidental selanjutnya dilakukan tindakan RIRS.* ***Diskusi:*** *Pionephrosis terkonsolidasi dapat menyerupai batu secara radiologis. Kontrol infeksi dan diversi segera penting untuk mencegah sepsis* ***Simpulan:*** *Beberapa prosedur diperlukan untuk mencegah infeksi sistemik pada penyakit batu yang atipikal.*

Kata kunci: *Batu pielum, pionephrosis terkonsolidasi, infeksi.*

Correspondence: Dimas Panca Andhika; c/o: Department of Urology, Universitas Airlangga Hospital. Jl. Dharmahusada Permai, Mulyorejo, Kec. Mulyorejo, Surabaya, Jawa Timur 60115, Indonesia. Phone: (+62)85646264117. Email: dimaspancaandhika@gmail.com.

INTRODUCTION

Pyonephrosis is a suppurative destruction of the renal parenchyma and the renal collecting system caused by obstruction.[1] Pyonephrosis can lead to septic shock, renal insufficiency, and even death.[2] The most common cause of pyonephrosis is kidney stones, with other etiologies including congenital urinary tract abnormalities and secondary pyonephrosis following urinary tract surgeries.[1] A thickened and dilated renal pelvis in pyonephrosis is a critical concern that requires prompt management.[3]

Epidemiological data on pyonephrosis remain limited. In a study of 550 patients with pyelonephritis, the prevalence of pyonephrosis was found to be 10.9%, with an average age of 54.62±12.14 years, and 41% of cases were male.[4] Another study reported that 56.5% of pyonephrosis patients were female, with a median age of 58.5 years.[5] The most common clinical symptom of pyonephrosis is flank pain, with or without fever, occurring in 76.66% of patients. Escherichia coli was identified as the most frequent causative organism in 33.33% of pyonephrosis cases, consistent with the prevalence of this microbe in ascending urinary tract infections.[3]

Obstruction leads to urine stagnation, causing dilation of the renal pelvis, which in turn triggers infection and can result in sepsis and septic shock.[6] Consequently, pyonephrosis is a urological emergency requiring immediate drainage.[3] Treatment for pyonephrosis involves appropriate antimicrobial therapy and urgent drainage of the infected renal pelvis.[7] Management options for pyonephrosis include percutaneous nephrostomy,

ureteral stenting, pyeloplasty for UPJ obstruction, and nephrectomy.[6]

In this case report, we focus on our findings of pyonephrosis mimicking a renal pelvis stone, a case that has not been previously described. This case report has been prepared in accordance with the SCARE guidelines.[8]

CASE(S) PRESENTATION

A 34-year-old woman came to the hospital with complaints of pain in her right flank for 1 week, intermittently, accompanied by intermittent fever. The patient had no history of hematuria, stone expulsion, or previous history of massageinthe flank area. Patients experience complaints of nausea but do not experience vomiting. The patient has been taking antibiotics for 3 days before admission. In the assessment of disease history, the patient did not suffer from diabetes mellitus or hypertension. The surgery that the patient had undergone, right ureterolitotomy, accompanied by Double-J (DJ) stent insertion in 2012; the DJ Stent was removed in the same year.

The general condition assessment showed that the patient was conscious, with a blood pressure of 117/68 mmHg, HR 88x/m, RR 19x/m, and body temperature of 37.8^0 C. The physical examination results on the right flank showed a scar post-operation, and the results of the Costovertebral Angle (CVA) knock pain were positive on the right flank. The laboratory examination results showed leucocystosis 26.41 and creatinine serum 0.87.

The results of Non-contrast Computed Tomography (NCCT) showed that the right kidney had severe hydronephrosis, stone size 2.5 x 2.0 x 2.8 cm in the pyelum with 1300 HU. The results of the left kidney examination were normal. The liver showed an enlargement of size 18.2 cm. Figure 1 shows the results of NCCT with radiological expertise stated with Consolidated Pyonephrosis. The patient was planned for right supine Percutaneous Nephrolithotomy (PCNL); during the surgery, when a ureter catheter was inserted, pyuria was found at about 200 cc.

We performed PCNL and DJ Stent insertion at this time for source infection control and urinary diversion. Figure 2 shows the results of Right Retrograde Pyelography (RPG) during surgery and Figure 3 shows the durante of PCNL surgery, and Figure 4 shows the post-operation evaluation with ultrasonography, with a DJ stent D inserted. The patient subsequently planned for Retrograde Intrarenal Surgery (RIRS) on the right kidney one month later.Abdominal plain photo examination showed the DJ Stent inserted well. The results of the post-operative laboratory examination were haemoglobin 12.1, leucocytes 14.3, and platelets 381. Right RIRS was performed one month after DJ Stent insertion; during surgery, we found a 1 cm pyelum stone and reinsertion of DJ Stent D, and figure 5 shows the BOF after RIRS evaluation with DJ Stent D was inserted.

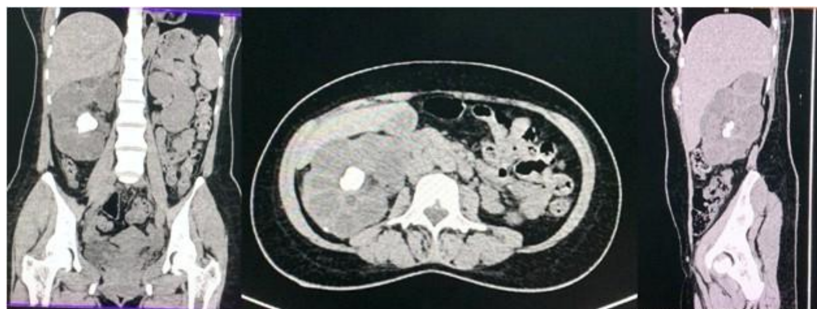

Figure 1. NCCT with Consolidated Pyonephrosis.

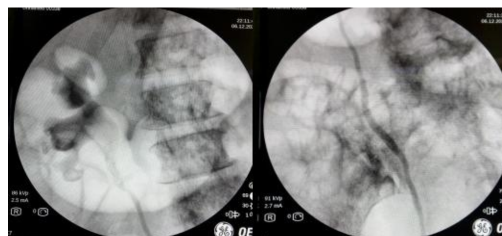

Figure 2. Right Retrograde Pyelography (RPG) during surgery.

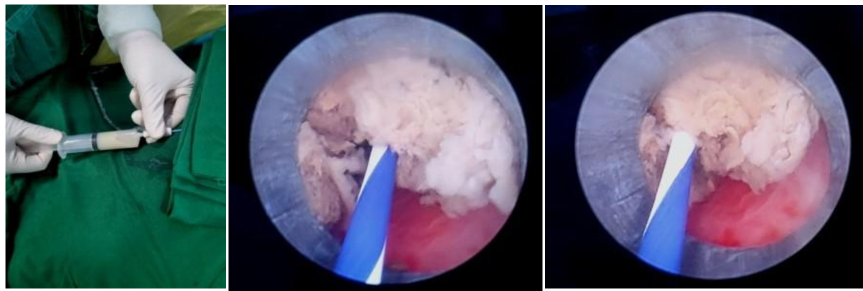

Figure 3. Durante of PCNL surgery.

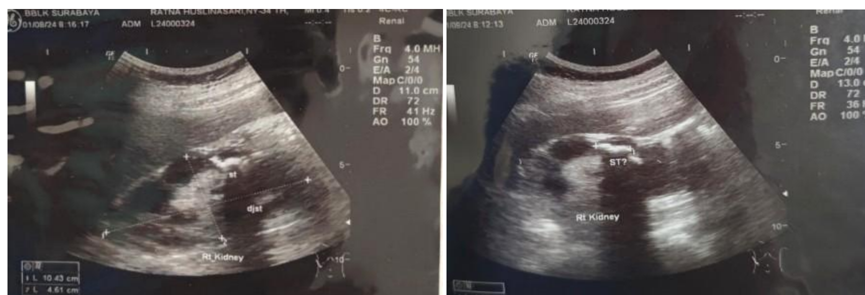

Figure 4. Post-operation evaluation with ultrasonography.

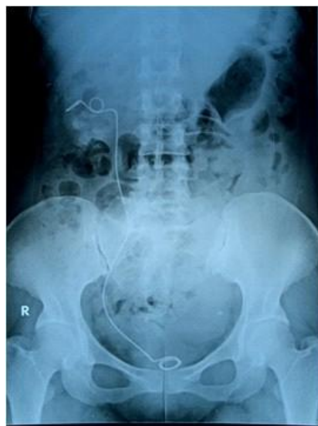

Figure 5. BOF post-RIRS evaluation with DJ Stent D was inserted.

DISCUSSION

Pyonephrosis that mimics renal pelvis stones is a rare case, as seen in the findings of this study, where consolidation in the renal pelvis resembled a renal pelvis stone. In this study, the diagnosis of pyonephrosis was confirmed during surgery. In the first surgery, it was difficult to locate the kidney stones because the kidney was filled with discharge, leading to the procedure being stopped, and a DJ stent was placed for drainage. An attempt to drain the infected discharge was employed to reduce kidney swelling by draining the discharge from the renal cavities.A common procedure is using percutaneous nephrostomy.[1] As in this case, the DJ-Stent placed to manage the infected and obstructed kidney has shown results comparable to percutaneous nephrostomy tube insertion.[9] The etiology of pyonephrosis in this case was kidney stones, consistent with previous studies that reported lithiasis-induced obstruction as the dominant cause of pyonephrosis.[1]

Early identification of pyonephrosis is crucial for timely and appropriate management, as delayed treatment can lead to sepsis and septic shock.[6] Severe loss of kidney function can result in radical nephrectomy, as long as the contralateral kidney is functioning normally.[10] Pyonephrosis identification started with symptoms including flank pain, kidney enlargement, fever, and pyuria.[1] Other studies have also found that fever, flank pain [4,11], and pyuria are predominant symptoms leading to a diagnosis of pyonephrosis.[4] In this study, the patient presented with fever, flank pain, and nausea as the main complaints. The absence of pyuria in the case of consolidated pyonephrosis reported in this case study makes this finding particularly interesting. The history of ureterolithotomy and DJ-stent placement in the same kidney ten years prior raises questions about whether this history contributed to the development of pyonephrosis.

Leukocytosis and anemia also support the diagnosis of pyonephrosis.[4,11] Fever accompanied by

leukocytosis also helps differentiate pyonephrosis from hydronephrosis in cases of kidney enlargement.[5] The leukocytosis observed in this study aligns with previous cases and should have raised suspicion of pyonephrosis.

In this case, a CT scan was sufficient to detect pyonephrosis, and additional investigations, such as intravenous urography and ultrasound, could have been performed.[1] CT scan is also useful for distinguishing between hydronephrosis and pyonephrosis[11], as well as detecting the cause and assessing the extension of the disease.[12]

The first surgery used PCNL, which is the first-line and gold-standard treatment for kidney stones larger than 20 mm.[13] The second definitive procedure, which addressed the pyonephrosis caused by the renal pelvis stone, was performed using RIRS, a treatment option for stones smaller than 2 cm, [14] with a stone-free rate (SFR) of 69.7% and a success rate of 80.3%.[15]

CONCLUSION

The case in this study highlights that pyonephrosis can consolidate and mimic a renal pelvis stone with the appearance of hydronephrosis in the renal pelvicalyceal system, a finding that has not been previously reported in case reports. In this case, the absence of pyuria, along with the presence of other symptoms such as flank pain, fever, and aleukocytosis, are important finding that should be considered in cases of consolidated pyelonephrosis.

REFERENCES

1. Scarneciu I, Constantina A, Grigorescu D, et al. Pyonephrosis: diagnosis and treatment: report of 65 cases. Jurnal Muzical Brasovean 2015:122--125.
2. Gupta R, Gupta S, Choudary A, et al. Giant Pyonephrosis Due to Ureteropelvic Junction Obstruction: A Case Report. Journal of Clinical and Diagnostic Research 2017;11:PD17–8.
3. Zulfiqar M, Ubilla CV, Nicola R, et al. Imaging of Renal Infections and Inflammatory Disease. Radiol Clin North Am 2020;58:909–23.
4. Kumar LP, Khan I, Kishore A, et al. Pyonephrosis among Patients with Pyelonephritis Admitted in Department of Nephrology and Urology of a Tertiary Care Centre: A Descriptive Cross-sectional Study. Journal of Nepal Medical Association 2023;61:111–4.
5. Boeri L, Fulgheri I, Palmisano F, et al. Hounsfield unit attenuation value can differentiate pyonephrosis from hydronephrosis and predict septic complications in patients with obstructive uropathy. Sci Rep 2020;10:18546.
6. Singgih NA, Lionardi SK, Mintardi M. Giant Pyonephrosis Due to Calculus of Ureter: A Case Report. Majalah Kedokteran Bandung 2023;55:264–8.
7. Liu J-J, Shortliffe LMD. Renal Abscess and Other Complex Renal Infections. Principles and Practice of Pediatric Infectious Diseases, Elsevier; 2012, p. 343-345.e1.
8. Sohrabi C, Mathew G, Maria N, et al. The SCARE 2023 guideline: updating consensus Surgical CAse REport (SCARE) guidelines. International Journal of Surgery 2023;109:1136–40.
9. Flukes S, Hayne D, Kuan M, et al. Retrograde ureteric stent insertion in the management of infected obstructed kidneys. BJU Int 2015;115:31–4.
10. Erol A, Çoban S, Tekin A. A Giant Case of Pyonephrosis Resulting from Nephrolithiasis. Case Rep Urol 2014;2014:1–3.
11. Abderrahmane D, Mahmoud A, Mehdi S, et al. Managing of Pyonephrosis: About 42 Cases. Mathews Journal of Urology and Nephrology 2024;6.
12. Tamburrini S, Lugarà M, Iannuzzi M, et al. Pyonephrosis Ultrasound and Computed Tomography Features: A Pictorial Review. Diagnostics 2021;11:331.
13. Sabler IM, Katafigiotis I, Gofrit ON, et al. Present indications and techniques of percutaneous nephrolithotomy: What the future holds? Asian J Urol 2018;5:287–94.
14. Van Cleynenbreugel B, Kilic O, Akand M. Retrograde intrarenal surgery for renal stones - Part 1. Türk Üroloji Dergisi/Turkish Journal of Urology 2017;43:112–21.
15. Lim SH, Jeong BC, Seo S Il, et al. Treatment Outcomes of Retrograde Intrarenal Surgery for Renal Stones and Predictive Factors of Stone-Free. Korean J Urol 2010;51:777.