Bilateral Xanthogranulomatous Pyelonephritis

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Xanthogranulomatous pyelonephritis is an uncommon form of chronic bacterial pyelonephritis characterized by the destruction of renal parenchyma and the presence of granulomas, abscesses, and collections of lipid-laden macrophages (foam cells) replacing the renal parenchyma. This case report illustrates the clinical course of bilateral diffuse xanthogranulomatous pyelonephritis with a subtle manifestation in contrast to those typically presenting with fever, flank pain or urinary tract infection. The patient therefore received supportive treatment for 18 months without hemodialysis, instead of the curative treatment, bilateral nephrectomy, which would have caused immediate loss of residual renal function and dependence on hemodialysis. [*J Chin Med Assoc* 2008;71(6):310–314]

Key Words: nephrectomy, pyrexia, urinary tract infection, xanthogranulomatous pyelonephritis

Introduction

Xanthogranulomatous pyelonephritis (XGP) is an uncommon form of chronic bacterial pyelonephritis characterized by the destruction of renal parenchyma and its replacement with granulomas, abscesses, and collections of lipid-laden macrophages (foam cells).[1] There are 1.4 cases per 100,000 population per year.[2] Most of them are unilaterally involved. Bilateral XGP is extremely rare. Poorly functioning kidney is always the consequence, and the outcome is grave for patients with bilateral XGP. Nephrectomy is deemed as curative treatment. With regard to the immediate loss of residual renal function and the relevant surgical risks, whether or not to undergo bilateral nephrectomy is a dilemma for these patients. Therefore, looking for a parameter by which to make the decision of nephrectomy becomes important. This case and previous reports show that nephrectomy might not be necessary for patients with bilateral XGP without pyrexia.

Case Report

A 47-year-old woman presented with malaise of 1 month's duration. She denied any history of dysuria, urinary frequency, fever, chills, weight loss, abdominal or flank pain, urinary calculi and urinary tract infection, except hypertension in the past 10 years. There was no significant family history. On examination, she was afebrile and mildly obese (body height, 154 cm; body weight, 76 kg), with a blood pressure of 134/82 mmHg. Pale conjunctivae were revealed. No palpable mass or tenderness was noted in the abdomen and flank. Complete blood count of peripheral blood showed normocytic anemia (hemoglobin, 8.7 g/dL; hematocrit, 26.2%) with normal white blood cell (WBC) count (8,000/mm^3) and platelet count (342,000/mm^3). Blood biochemistry revealed elevated blood urea nitrogen (102 mg/dL), elevated serum creatinine (11.1 mg/dL) and normal C-reactive protein level (0.5 mg/dL). Urinalysis indicated WBC 11–20/high-powered field (normal, 0–5), and urine culture yielded *Proteus mirabilis* (6,000 colonies/mL). Urine acid-fast stain, culture and polymerase chain reaction for tuberculosis were negative. Urine cytology was negative for 3 studies. Plain film of the abdomen revealed irregularly shaped faint calcification at bilateral upper abdomen. Renal ultrasound showed right kidney 13.4 cm and left kidney 10.9 cm in size, with bilateral renal pelvic stones and multiple cystic areas in renal parenchyma (Figure 1A). Post-gadolinium enhanced T1-weighted

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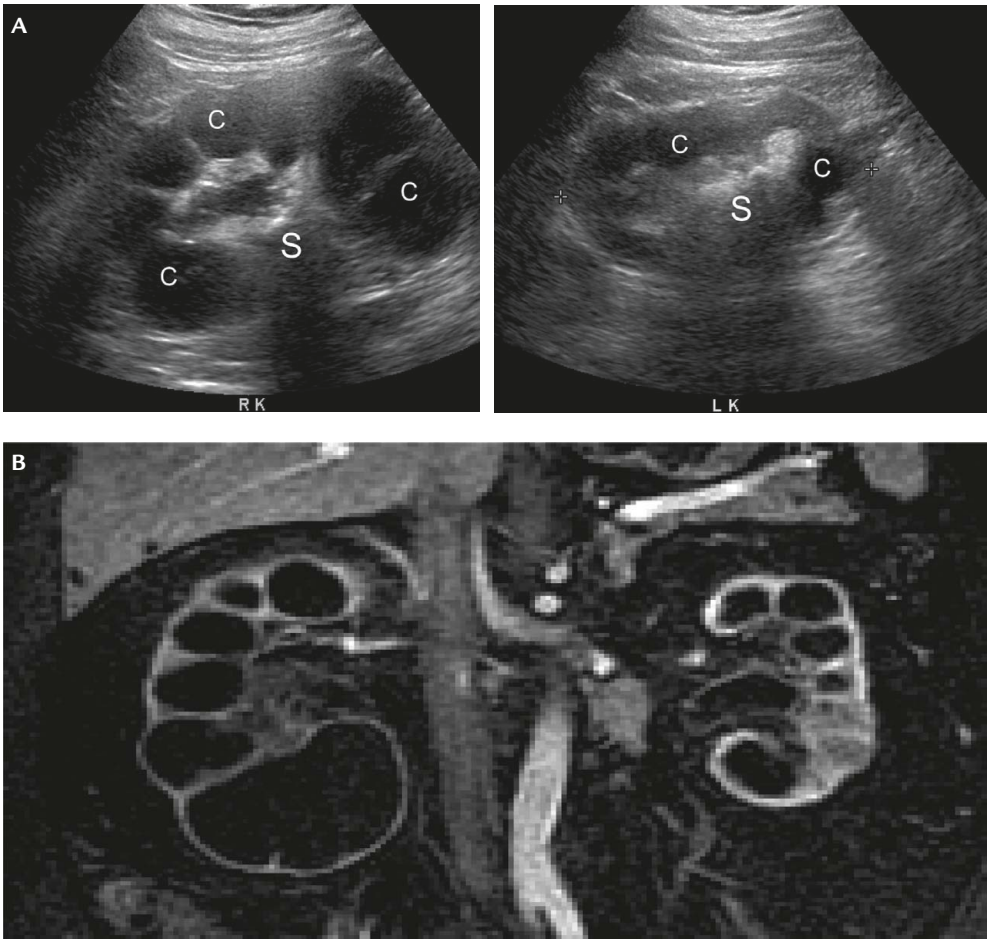

Figure 1. (A) Sonography shows bilateral renal pelvic stones (S) and multiple cystic areas (C) in the renal parenchyma. (B) Post-gadolinium-enhanced T1-weighted coronal magnetic resonance imaging also demonstrated the cystic areas in the renal parenchyma.

coronal magnetic resonance imaging (MRI) also demonstrated cystic areas in the renal parenchyma (Figure 1B) without malignant or metastatic lesions. The diffuse infiltration of mononuclear cells, histiocytes, plasma cells and focal aggregation of foamy macrophages in the renal biopsy tissue (Figure 2) supported the diagnosis of bilateral XGP.

The patient was discharged after arteriovenous fistula creation. The symptom of malaise improved after correction of anemia (hematocrit, from 26.2% to 28.2%) using erythropoietin therapy. The patient has sustained relatively stable renal function (serum creatinine, 10.6 mg/dL currently) and uneventful life without renal replacement therapy in the past 18 months of follow-up.

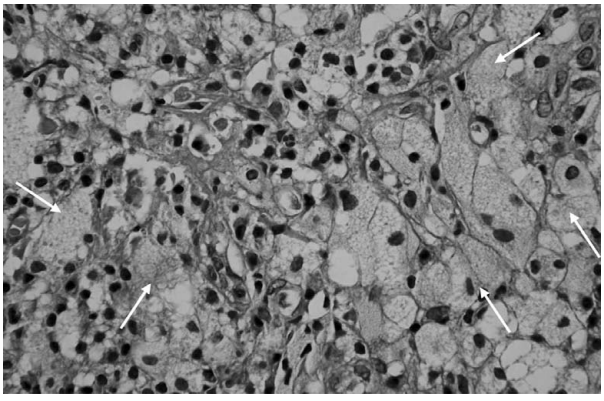

Figure 2. Histopathology of right kidney biopsy shows diffuse interstitial infiltration of mononuclear cells, histiocytes and plasma cells and focal aggregation of foam cells (arrows) (hematoxylin & eosin, 400×).

Discussion

Bilateral XGP is extremely rare. Middle-aged women are the most frequently affected.[3] Reviewing the literature, only 9 cases of bilateral diffuse XGP and 5 cases of bilateral focal XGP have been reported in the last 40 years (Table 1).[4–17] Several etiologic factors have been proposed, and genitourinary tract obstruction due to

Table 1. Clinical manifestations and outcomes of reported cases of bilateral diffuse and focal xanthogranulomatous pyelonephritis

Reference	Sex	Age (yr)	Pyrexia	Pain	Flank mass	Calculi	Urine culture	Type	Nephrectomy	Follow-up
Rossi et al[4] (1968)	F	52	+	+right flank	+right	–	*E. coli*	Diffuse	–	Died 1 wk after onset
Vandendris et al[5] (1976)	M	53	–	+left flank	–	–	N/A	Focal	+partial	Alive
Husain et a1[6] (1979)	F	50	–	+	+bilateral	Bilateral staghorn	*E. coli*, *Proteus*	Diffuse	+bilateral	Alive
Smith[7] (1981)	M	37	+	+abdomen	+right	–	*E. coli*	Diffuse	–	Alive
Braun et al[8] (1985)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Diffuse	N/A	Died of uremia
Golomb et al[9] (1986)	F	48	+	–	–	Bilateral staghorn	*Proteus*	Diffuse	+bilateral	Died of sepsis 18 d postoperatively
Kural et al[10] (1987)	F	39	–	–	+bilateral	N/A	N/A	Diffuse	+bilateral	Alive for 11 mo
Goswami et al[11] (1988)	M	25	+	–	+bilateral	–	*E. coli*	Diffuse	–	Died of sepsis 48 hr after onset
Bazeed et al[12] (1989)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Diffuse	N/A	Died of uremia
Akhtar & Qunibi[13] (1992)	M	44	+	–	–	Bilateral staghorn	*Proteus*	Diffuse	+bilateral	Alive
Perez et al[14] (1993)	M	75	–	+left flank	–	Right renal calcification	*E. coli*	Focal	+partial	Alive
Ozcan et al[15] (1995)	F	13	–	+left flank	–	–	Nil	Focal	+left	N/A
Suzer et al[16] (1996)	F	13	–	+left flank	–	–	*E. coli*	Focal	+left	Alive
Karadeniz et al[17] (2002)	M	6	–	–	+bilateral	–	*E. coli*	Focal	+right	Alive
Current case (2008)	F	47	–	–	–	Bilateral pelvic stone	*Proteus*	Diffuse	–	Alive

N/A = not available from report.

calculi and chronic urinary tract infection are the most well-recognized ones.[18–21] Patients usually complain of abdominal or flank pain (48–89%), malaise (33–67%), fever (61–44%), weight loss (26–64%) and palpable mass (35–68%).[17,20–22] Proteinuria, anemia, leukocytosis and azotemia may occur concurrently.[18–21] In this case, age, gender, laboratory reports, imaging manifestations and renal histopathologic findings were compatible with the diagnosis of bilateral XGP. Peculiarly, malaise was the only symptom instead of the common ones, such as flank pain, weight loss, fever and recurrent urinary tract infection.

In previous literature, the diffuse type of XGP presented more frequently with pyrexia, and carried a worse prognosis compared to the focal type. Extensive renal and adjacent tissue damage may develop, such as renocolonic fistula,[23] psoas abscess,[24] nephrocutaneous fistula,[25,26] and paranephric abscess.[27] Up to 80.5% of the affected kidneys were nonfunctioning.[19] Antibacterial agents rarely eradicate infection, and nephrectomy is the treatment of choice.[28] Partial nephrectomy has been reported to be successful only in focal XGP.[14] Preventing complication conflicts with preserving renal function. From the analysis of previous reports, mortality seems to be not related to the type of isolated organism, but pyrexia. There were 3 of 5 (60%) patients with pyrexia during admission who did not receive nephrectomy (Table 1). Two of these 3 (66.7%) pyrexial patients without nephrectomy died. One of the 2 (50%) patients with pyrexia during admission who received nephrectomy died. None of the 3 (0%) bilateral diffuse XGP patients without pyrexia died. None of the 5 patients with bilateral focal XGP who were alive were pyrexial (Table 1). The mortality of bilateral XGP patients with pyrexia after nephrectomy was lower than that of those with pyrexia without nephrectomy (50% *vs.* 66.7%). This observation from the limited previous reports[4–17] indicates that nephrectomy may be beneficial for bilateral XGP patients with pyrexia, but not for patients without pyrexia. Therefore, pyrexia might be used as an indicator for nephrectomy of bilateral XGP. The explanation is that pyrexia might indicate a relatively active inflammation status, which warrants aggressive treatment. In this case, the stable general condition without nephrectomy further supports this observation. However, due to the limited number of cases reported, the significance of pyrexia may need more cases for further investigation.

In conclusion, despite being a rare disease, bilateral diffuse XGP should be kept in the list of differential diagnosis for patients with bilateral pelvic stones, diffuse caliectasis and enlarged kidney even in the absence of fever, body weight loss and recurrent urinary tract infection. Pyrexia might be an indicator for nephrectomy in bilateral XGP. On the other hand, bilateral diffuse XGP patients who are not pyrexial may maintain renal function for months to years without nephrectomy under adequate supportive treatment.

References

1. Tilkoff-Rubin NE, Cotran RS, Rubin RH. Urinary tract infection, pyelonephritis, and reflux nephropathy. In: Brenner BM, ed. *Brenner & Rector's The Kidney,* 7th edition. Philadelphia: Saunders, 2004:1554–5.
2. Parsons MA, Harris SC, Longstaff AJ, Grainger RG. Xanthogranulomatous pyelonephritis: a pathological, clinical and aetiological analysis of 87 cases. *Diagn Histopathol* 1983;6:203–19.
3. Malek RS, Elder JS. Xanthogranulomatous pyelonephritis: a critical analysis of 26 cases and of the literature. *J Urol* 1978; 119:589–93.
4. Rossi P, Myers DH, Furey R, Bonfils-Roberts EA. Angiography in bilateral xanthogranulomatous pyelonephritis. *Radiology* 1968;90:320–1.
5. Vandendris M, Struyven J, Mathieu J, Schulman CC. Bilateral xanthogranulomatous pyelonephritis. *J Radiol Electrol Med Nucl* 1976;57:891–3.
6. Husain I, Pingle A, Kazi T. Bilateral diffuse xanthogranulomatous pyelonephritis. *Br J Urol* 1979;51:162–3.
7. Smith FR. Bilateral xanthogranulomatous pyelonephritis. *Br J Urol* 1981;53:81.
8. Braun G, Moussali L, Balanzar JL. Xanthogranulomatous pyelonephritis in children. *J Urol* 1985;133:236–9.
9. Golomb J, Solomon A, Peer G, Merimsky E, Aviram A, Braf Z. Bilateral metachronous xanthogranulomatous pyelonephritis in end-stage renal failure. *Urol Radiol* 1986;8:95–7.
10. Kural AR, Akaydin A, Oner A, Ozbay G, Solok V, Oruc N, Erozenci A. Xanthogranulomatous pyelonephritis in children and adults. *Br J Urol* 1987;59:383–5.
11. Goswami AK, Suryaprakash B, Malik AK, Vaidyanathan S. Development of fatal bilateral xanthogranulomatous pyelonephritis in a paraplegic patient: case report. *Paraplegia* 1988;26: 62–5.
12. Bazeed MA, Nabeeh A, Atwan N. Xanthogranulomatous pyelonephritis in bilateral patients: a report of 25 cases. *J Urol* 1989;141:261–4.
13. Akhtar M, Qunibi W. Bilateral xanthogranulomatous pyelonephritis involving native kidneys in a renal transplant recipient: association with renal cell carcinoma and amyloidosis. *Am J Kidney Dis* 1992;20:289–93.
14. Perez LM, Thrasher JB, Anderson EE. Successful management of bilateral xanthogranulomatous pyelonephritis by bilateral partial nephrectomy. *J Urol* 1993;149:100–2.
15. Ozcan H, Akyar S, Atasoy C. An unusual manifestation of xanthogranulomatous pyelonephritis: bilateral focal solid renal masses. *AJR Am J Roentgenol* 1995;165:1552–3.
16. Suzer O, Baltaci S, Kuzu I, Safak M, Anafarta K. Bilateral xanthogranulomatous pyelonephritis in a child. *Br J Urol* 1996; 78:950–1.
17. Karadeniz C, Oguz A, Ataoglu O, Citak C, Buyan N, Pinarli G, Ozkaya O, et al. Primary renal lymphoma and xanthogranulomatous pyelonephritis in childhood. *Nephrol* 2002;15: 597–600.
18. Goodman M, Curry T, Russell T. Xanthogranulomatous pyelonephritis (XGP): a local disease with systemic manifestations—

report of 23 patients and review of the literature. *Medicine (Baltimore)* 1979;58:171–81.
19. Grainger RG, Longstaff AJ, Parsons MA. Xanthogranulomatous pyelonephritis: a reappraisal. *Lancet* 1982;1:1398–401.
20. Brown PS Jr, Dodson M, Weintrub PS. Xanthogranulomatous pyelonephritis: report of nonsurgical management of a case and review of the literature. *Clin Infec Dis* 1996;22:308–14.
21. Chuang CK, Lai MK, Chang PL, Huang MH, Chu SH, Wu CJ, Wu HR. Xanthogranulomatous pyelonephritis: experience in 36 cases. *J Urol* 1992;147:333–6.
22. Levy M, Baumal R, Eddy AA. Xanthogranulomatous pyelonephritis in children. Etiology, pathogenesis, clinical and radiologic features, and management. *Clin Pediatr (Phila)* 1994; 33:360–6.
23. Matsuoka Y, Arai G, Ishimaru H, Takagi K, Aida J, Okada Y. Xanthogranulomatous pyelonephritis with a renocolic fistula caused by a parapelvic cyst. *Int J Urol* 2006;13:433–5.
24. Alan C, Ataus S, Tunc B. Xanthogranulamatous pyelonephritis with psoas abscess: two cases and review of the literature. *Int Urol Nephrol* 2004;36:489–93.
25. Sherman SC, Limkakeng A. Xanthogranulomatous pyelonephritis with a nephrocutaneous fistula. *J Emerg Med* 2005;29: 337–8.
26. Devevey JM, Randrianantenaina A, Soubeyrand MS, Justrabo E, Michel F. Xanthogranulomatous pyelonephritis with nephrocutaneous fistula. *Prog Urol* 2003;13:285–9.
27. Al-Ghazo MA, Ghalayini IF, Matalka II, Al-Kaisi NS, Khader YS. Xanthogranulomatous pyelonephritis: analysis of 18 cases. *Asian J Surg* 2006;29:257–61.
28. Cattell WR. Lower and upper urinary tract infections in the adult. In: Davison AM, Cameron JS, Ritz E, Grünfeld JP, Winearls CG, Ponticelli C, Ypersele CV, eds. *Oxford Textbook of Clinical Nephrology*, 3rd edition. New York: Oxford University Press, 2005:1125–6.