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Extensive Xanthogranulomatous Pyelonephritis with Psoas and Erector Spinae Extension: A Clinico-Radiological Discrepancy in an Asymptomatic Patient

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ABSTRACT

Background: Xanthogranulomatous pyelonephritis (XGP) is a rare, severe chronic granulomatous inflammation characterized by the replacement of renal parenchyma with lipid-laden macrophages. It is typically associated with chronic obstructive uropathy and recurrent infections. While the disease is classically highly symptomatic—presenting with flank pain, fever, and systemic toxicity—its variable clinical spectrum can occasionally mask advanced retroperitoneal involvement. Case Presentation: We report a marked clinico-radiological discrepancy in a 40-year-old male who presented for a routine outpatient computed tomography (CT) urography following a resolved episode of right-sided renal colic. Despite being hemodynamically stable and completely asymptomatic at the time of the examination, cross-sectional imaging revealed advanced XGP. The imaging demonstrated a dense (700 HU) obstructing pelvic calculus causing marked right caliceal dilatation with severe parenchymal thinning. This was complicated by extensive contiguous spread breaching Gerota's fascia, forming large loculated collections extending into the perinephric space, the right psoas muscle, and the adjacent erector spinae musculature. Conclusion: This case highlights the insidious pathogenesis of XGP. It underscores the critical role of CT imaging in staging the disease and identifying advanced extrarenal and musculoskeletal extension, even when the clinical presentation is deceptively benign.

KEYWORDS :

Xanthogranulomatous pyelonephritis ,Computed tomography ,Nephrolithiasis ,Retroperitoneal abscess, Psoas muscle ,Extrarenal extension

MAIN ARTICLE

INTRODUCTION

Xanthogranulomatous pyelonephritis (XGP) is an uncommon, atypical form of chronic bacterial pyelonephritis that results in the irreversible destruction of renal parenchyma [1]. Pathologically, the condition is characterized by the diffuse or focal replacement of the normal renal architecture by an inflammatory infiltrate predominantly composed of lipid-laden macrophages (xanthoma cells) [1]. The pathogenesis is strongly associated with a combination of chronic urinary tract obstruction and recurrent, inadequately treated bacterial infections [2].

Clinically, XGP predominantly affects middle-aged adults and typically presents with a protracted course of flank pain, fever, palpable masses, and lower urinary tract symptoms, often resulting in significant morbidity [2]. Due to its locally invasive nature, marked by an intense fibrotic reaction and contiguous spread into adjacent anatomic spaces, XGP is frequently referred to as a "pseudotumour," posing a diagnostic challenge as it can clinically and radiologically mimic renal cell carcinoma or other retroperitoneal malignancies [3]. While the severity of symptoms usually correlates with the extent of local invasion and extrarenal spread, the disease can occasionally exhibit an insidious course. We report an unusual case demonstrating a profound discrepancy between a benign clinical presentation and advanced retroperitoneal imaging findings, featuring massive involvement of the psoas and erector spinae muscles in an asymptomatic 40-year-old male.

CASE PRESENTATION

A 40-year-old male patient was referred for a scheduled outpatient CT urography. The indication for the scan was a follow-up investigation of a recently resolved episode of acute right-sided hyperalgesic renal colic. Notably, at the time of the imaging appointment, the patient reported a complete cessation of symptoms. He was afebrile, hemodynamically stable, and physically well-appearing, with no clinical signs of systemic infection or flank tenderness.

Despite the unremarkable clinical evaluation, the CT examination revealed severe right-sided urological pathology. Imaging demonstrated a large, hyperdense calculus (700 Hounsfield Units) impacted within the right renal pelvis. This primary obstructing lesion caused

substantial enlargement of the right kidney, characterized by marked true caliceal dilatation and diffuse cortical thinning (Figure 1).

Further evaluation of the retroperitoneal spaces revealed advanced local extension of the disease process. The inflammatory tissue and associated suppuration had transgressed the renal capsule and Gerota's fascia, resulting in an extensive perinephric collection (Figure 2). The granulomatous process extended posteromedially, infiltrating the deep retroperitoneal musculature. This contiguous spread formed a well-defined secondary loculated collection within the right psoas muscle, with further posterior tracking into the adjacent erector spinae muscle group (Figure 3).

DISCUSSION

The development of XGP is fundamentally linked to obstructive nephrolithiasis and an abnormal host immunological response to chronic infection, leading to localized tissue necrosis and macrophage accumulation [1]. Cross-sectional imaging, particularly CT, is the gold standard for the diagnosis and preoperative staging of XGP. The classic triad of findings includes a centrally located obstructing calculus, an enlarged kidney, and multiple hypoattenuating dilated calyces exhibiting the characteristic "bear paw" sign, reflective of parenchymal replacement by xanthogranulomatous tissue [4].

A defining feature of advanced XGP is its propensity to violate anatomic boundaries. As reported by Lee et al. [5], the inflammatory process frequently extends beyond the perirenal space to involve the pararenal spaces, the psoas muscle, the diaphragm, and adjacent intra-abdominal organs. In our case, the CT accurately mapped the primary obstructing 700 HU pelvic stone and the extensive infiltration into the perinephric fat, psoas, and erector spinae muscles. Such musculoskeletal involvement requires aggressive surgical management and broad-spectrum antibiotic therapy [2].

The singularity of this case lies in the marked clinico-radiological paradox. According to Kuo et al. [2], patients presenting with significant extrarenal involvement consistently demonstrate high rates of systemic toxicity, weight loss, and severe localized pain. Our patient’s clinical status was highly deceptive; the initial acute colic was likely caused by a mechanical shift of the calculus, but the massive, destructive granulomatous process and subsequent abscess formations had developed silently. This presentation underscores the "pseudotumour" behavior of XGP [3], proving that extensive retroperitoneal and musculoskeletal destruction can occur without commensurate systemic symptoms.

CONCLUSION

This case illustrates the variable and potentially insidious clinical course of xanthogranulomatous pyelonephritis. A well-appearing clinical status following an episode of renal colic does not reliably exclude the presence of severe, tissue-destroying infectious processes. CT urography is indispensable not only for establishing the diagnosis of XGP in the presence of an obstructing calculus but also for accurately mapping silent extrarenal extension into the deep retroperitoneal musculature, which is critical for guiding multidisciplinary management.

FIGURES :

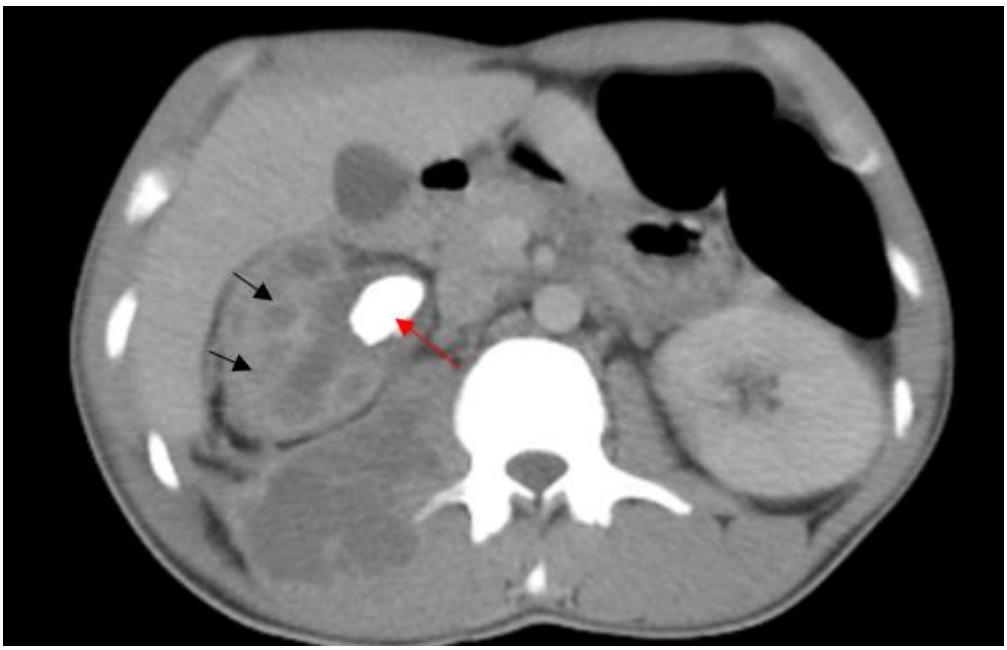

Figure 1: *Computed tomography (CT) images demonstrating the primary etiology and its immediate consequence: a large, hyperdense impacted right renal pelvic calculus (700 HU) (Red arrow) causing severe upstream obstructive uropathy, characterized by marked caliceal dilatation (Black arrows) and diffuse parenchymal thinning.*

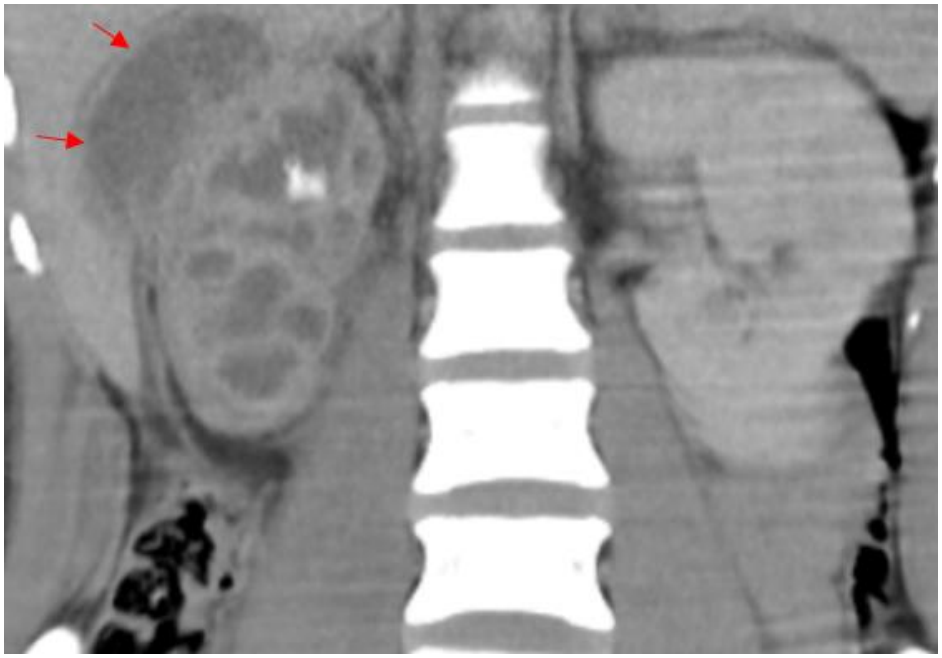

Figure 2: *Contrast-enhanced CT, coroal view, displaying an extensive right perinephric collection (Red arrows) with associated fat stranding and thickening of Gerota's fascia, indicating capsular breach.*

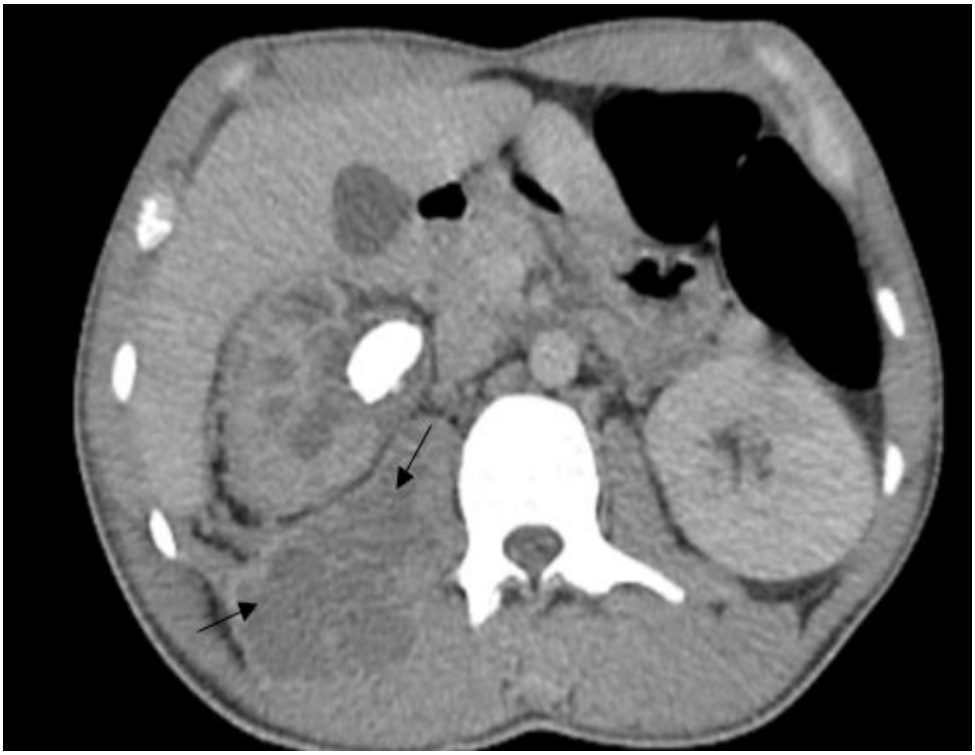

Figure 3: *Contrast-enhanced CT, axial view, illustrating the advanced posterior contiguous spread of the inflammatory process, forming well-defined loculated collections within the right psoas muscle and the adjacent erector spinae musculature (Black arrows)*

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