Case Report

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Pathology Section

Renal Actinomycosis Camouflaging as Malignancy: A Diagnostic Challenge

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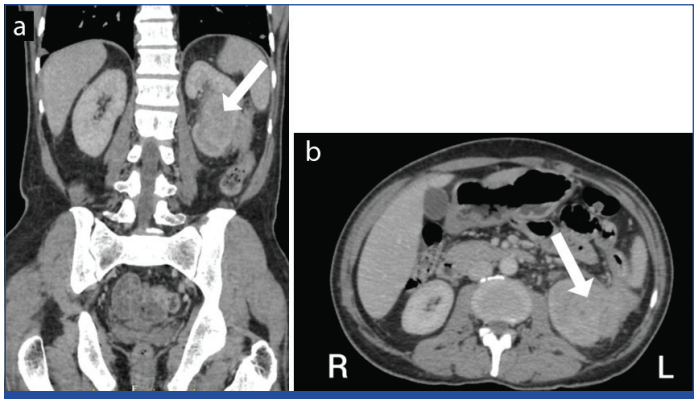
ABSTRACT

Actinomycosis is an unusual infection that typically appears in the thoracic, cervicofacial, and abdominal areas. However, the occurrence of renal actinomycosis in adults remains rare, with few cases reported since 1990. Actinomycosis is often considered "the most misdiagnosed disease" due to its tendency to be overlooked even by experienced clinicians. Hereby authors report a case of a 55-year-old male with pyrexia of unknown origin and weight loss, presenting with pallor upon general examination. Further investigation revealed microcytic hypochromic anaemia and neutrophilic leukocytosis on peripheral blood smear. A heterogeneous mass with internal vascularity in the left kidney was identified on abdominal ultrasound. Subsequent Computed Tomography (CT) abdomen confirmed an ill-defined lesion in the mid and lower pole of the left kidney, with extrarenal extension into the perinephric space, and a filling defect in the left renal vein. A provisional diagnosis of a left renal tumour infiltrating the spleen and splenic flexure of the colon was made. The patient then underwent a left radical nephrectomy, splenectomy, and limited colonic resection. Histopathological examination confirmed actinomycosis with abscess formation in the kidney and colon. The patient was treated with crystalline penicillin for eight weeks until considered disease-free. Renal actinomycosis poses challenges in diagnosis due to its ambiguous clinical and laboratory features. Often mimicking malignant neoplasms on imaging, it can confuse even experienced clinicians. Early detection is crucial for precise medical intervention and to reduce unnecessary surgeries.

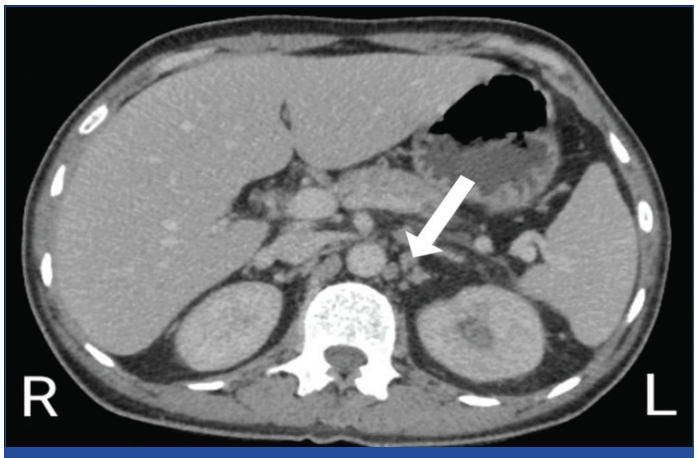
Keywords: Nephrectomy, Splendore-Hoeppli reaction, Sulfur granules

CASE REPORT

A 55-year-old male, with no co-mmorbidities, presented with a two-month history of high-grade fever and weight loss. There was no history of persistent cough, night sweats or recent travel. On examination pallor was present and rest of the findings were within normal limits. Hence the patient was investigated for pyrexia of unknown origin. Subsequent laboratory tests showed microcytic hypochromic anaemia with neutrophilic leukocytosis and elevated Erythrocyte Sedimentation Rate (ESR). On radiological investigations, ultrasound of the abdomen and pelvis revealed a heterogeneous, bean-shaped mass measuring 50x44 mm within the left kidney, displaying internal vascularity. Contrast-enhanced computed tomography of the abdomen confirmed the presence of an ill-defined lesion in the mid and lower pole of the left kidney, extending into the perinephric space and causing a filling defect in the left renal vein [Table/Fig-1]. Multiple small to enlarged lymph nodes were also observed in the para-aortic region [Table/Fig-2]. Chest X ray was found to be normal. Based on these findings, a provisional diagnosis of a left renal tumour infiltrating the spleen and splenic flexure of the colon was established. Subsequently, the patient underwent a left radical nephrectomy, splenectomy, and limited colonic resection, [Table/Fig-3] shows the gross specimen. Histopathological examination revealed a dense inflammatory cell infiltrate with abscess wall formation, accompanied by a conglomeration of filamentous gram-positive bacteria exhibiting the Splendore-Hoeppli reaction [Table/Fig-4]. Gram staining effectively highlighted the gram-positive bacterial colonies [Table/Fig-5], with two lymph nodes exhibiting reactive changes, ultimately leading to a histopathological diagnosis of actinomycosis with abscess formation in both the kidney and colon. Following the diagnosis, the patient underwent intravenous antibiotic therapy with penicillin (100,000 U/kg/day, administered every six hours) for a duration of eight weeks. Subsequent regular follow-up appointments were scheduled over three months until the patient was declared free of the disease.



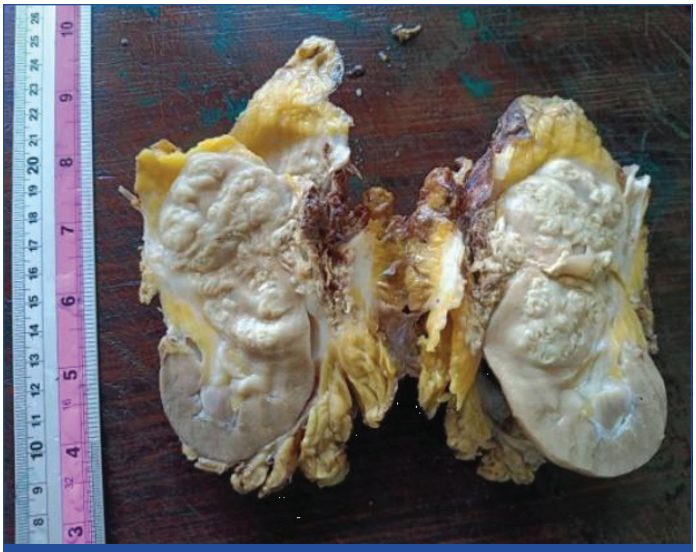
[Table/Fig-1]: Contrast CT of abdomen showing the lesion in left kidney: a) Coronal section; b) Transverse section.



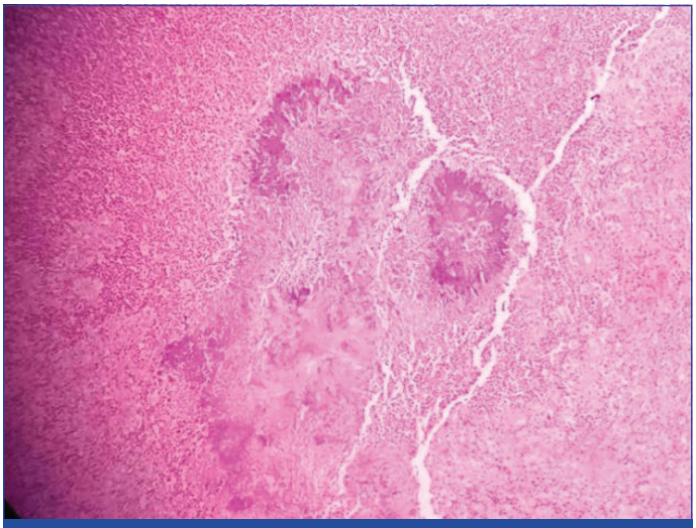
[Table/Fig-2]: Contrast CT of abdomen showing multiple enlarged para aortic lymph nodes.

DISCUSSION

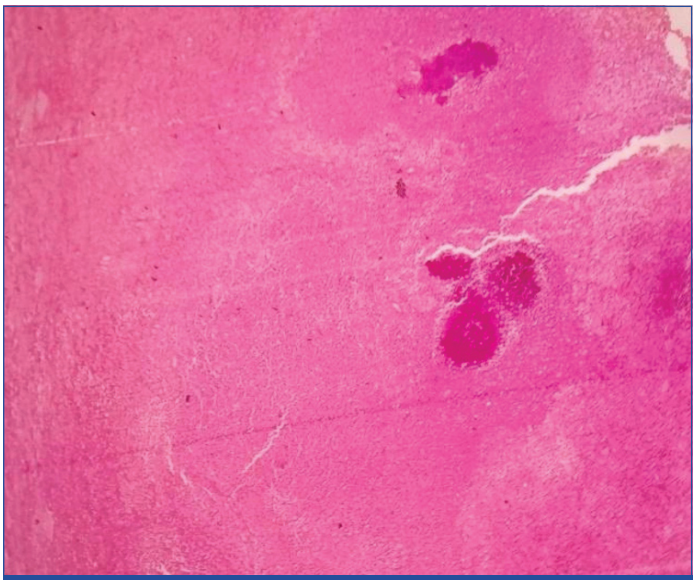
Actinomycosis is an uncommon chronic granulomatous infection caused by the gram-positive anaerobic bacterium *Actinomyces* species, typically manifesting in the thoracic, cervicofacial, and



[Table/Fig-3]: Gross specimen kidney appears enlarged and cut section show lack of cortico medullary differentiation with multilocular pus formation.



[Table/Fig-4]: Intense inflammatory reaction and masses of filamentous gram positive bacteria exhibiting Splendore-Hoeppli reaction (H&E staining, 10x).



[Table/Fig-5]: Gram stain highlighting the bacterial colonies (4x).

abdominal regions [1]. Abdominal-pelvic actinomycosis accounts for 10% to 20% of cases, with its prevalence increasing due to various factors including abdominal surgery (such as appendectomy), prolonged use of contraceptive intrauterine devices, poor oral hygiene, neoplasia, bowel perforation, trauma, foreign body implantation, and visceral perforation [2]. *Actinomyces israelii* is the frequently encountered species in clinical cases [3]. Unfortunately, it often earns the moniker of "the most misdiagnosed disease" as even experienced clinicians may overlook it. Renal actinomycosis in adult patients is exceptionally rare, with few reported cases since 1990 [4]. Typically, its slow clinical progression and tumour-like appearance on radiological assessments often lead to delays in diagnosis. Preoperative diagnosis remains difficult, with most cases only identified through histopathological examination of resected specimens [5]. Isolating *Actinomyces* species in cultures poses significant challenges, typically requiring a gram stain to detect sulfur granules. While sulfur granules are indicative, they are not conclusive, as they can also appear in conditions like nocardiosis, botryomycosis, and chromomycosis. However, gram staining may reveal branching filamentous gram-positive rods at the periphery of the granules, strongly suggesting actinomycosis. *Nocardia* can be distinguished from *Actinomyces* as they exhibit partial acid-fast positivity [2].

This case report highlights the diagnostic hurdles posed by renal actinomycosis, which can mimic malignant tumours both clinically and radiologically. The patient's clinical presentation of fever and weight loss combined with radiological diagnosis of a mass lesion initially suggested a malignant process. However, contrary to these findings, histopathological examination postsurgery clinched the diagnosis of actinomycosis involving the left kidney and colon. This case underscores the necessity for clinicians to maintain a vigilant approach towards uncommon infections like actinomycosis, even in the absence of typical risk factors or clinical presentations. This case adds to the existing medical literature, providing insights into the complexities of diagnosing and managing rare infectious diseases that mimic malignancy.

In a literature review published in 2018, Niknejad N et al., reported a case of renal actinomycosis. A series of 23 cases were reported since 1990 [2]. Among these, 14 cases were initially identified as renal tumours on imaging. Further investigation of the literature uncovered an additional eight cases of renal actinomycosis with four cases initially identified as renal tumours on imaging [4-11]. A case study by Salman M et al., shares similarities with present case, where renal actinomycosis was initially mistaken for a renal tumour in a five-year-old girl presenting with recurrent fever, abdominal pain, and weight loss. Imaging studies supported a diagnosis of renal tumour, leading to nephrectomy. However, histopathological examination revealed actinomycosis [10]. Therefore, this case marks yet another instance of renal actinomycosis mimicking a malignant tumour. All cases of renal actinomycosis, along with their imaging findings, are presented in [Table/Fig-6], available in the full text and accessible online. Diagnosing renal actinomycosis poses a significant challenge due to its subtle clinical and laboratory features. Early diagnosis is crucial for appropriate medical intervention, preventing unnecessary surgery. In this regard, ultrasound-guided percutaneous biopsy or fine-needle aspiration has been suggested as valuable diagnostic

Sl no.	Author (s) and publication year	Age (years)/ Gender	Imaging findings
1	Peña BYJ et al., 2019 [7]	13/F	Infiltrative lesion
2	Yoon JH et al., 1986 [8]	54/F	Renal abscess
3	Liao WK et al., 2019 [4]	38/M	Renal cystic lesion
4	Segura-Perez E et al., 2020 [9]	5/F	Renal tumour
5	Diab C et al., 2019 [6]	36/M	Xanthogranulomatous pyelonephritis with uro-cutaneous fistula
6	Salman M et al., 2021 [10]	5/F	Renal tumour
7	Walsh J et al., 2021 [5]	51/F	Renal abscess
8	Fulton HM and Shirley RM 2022 [11]	65/F	Perinephric fluid collection of right kidney
9	Present case, 2024	55/M	Renal tumour

[Table/Fig-6]: Cases reported of renal actinomycosis.

tools, both offering a higher likelihood of an accurate diagnosis [6]. The optimal management of renal actinomycosis remains limited, as most cases are diagnosed after nephrectomy, as demonstrated in this case. However, literature reports successful antibiotic management in at least 10 patients, leading to resolution in follow-up imaging [12]. Clinical practice has revealed that actinomycosis can be successfully managed with high-dose antibiotics. This often includes intravenous penicillin G at doses ranging from 18 to 24 million units per day for 1 to 2 months, followed by oral penicillin V at doses of 2 to 4 grams per day for 6 to 12 months. The duration and intensity of treatment depend on factors such as the site of infection, severity of the disease, and the patient's response to therapy [5].

CONCLUSION(S)

The diagnosis of renal actinomycosis remains a challenge for clinicians, radiologists, and microbiologists due to its elusive and ambiguous features. Often masquerading as a malignant neoplasm on imaging, it deceives even the sharpest eyes. In this diagnostic conundrum, histopathology stands as the cornerstone of confirmation. Early diagnosis is crucial for targeted antibiotic therapy and to avoid unnecessary surgeries. Within this context, the utilisation of ultrasound-guided aspiration emerges as a pivotal tool, providing precision and confidence in the pursuit of an accurate diagnosis.

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