

## CASE REPORT

# Reno-duodenal fistula as a complication of longstanding renal tract calculus

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## Abstract

We present a rare case detailing the investigations and subsequent treatment of a lady who presented with a reno-duodenal fistula and perinephric abscess as a complication of staghorn calculus and recurrent upper urinary tract infections. Treatment involved antibiotics, nephrostomy, endoscopic closure of the fistula tract with clips, radiological drain insertion and, ultimately, nephrectomy with primary omental patch closure of the duodenal defect. We discuss the incidence of fistula tract formation as a complication of staghorn calculi, as well as investigations and management strategies employed in the literature to treat such complications, which span from conservative treatment to nephrectomy and closure of the intestinal defect. We illustrate the post-operative complications such patients are prone to and discuss these in context of the case. Whilst such cases are rare clinicians should be vigilant for complications associated with chronic inflammatory processes occurring in the urinary tract and investigate accordingly.

## INTRODUCTION

Renal tract calculi are common with estimates of between 6% and 15% of the Western population suffering them. They have a multitude of risk factors associated with them, such as poor fluid intake, diet, obesity as well as associations with other medical problems such as hyperparathyroidism and as iatrogenic complications of medications such as antiretrovirals (1).

Staghorn calculi describe the subset of urinary tract calculi that are located within the renal pelvis and morphologically have branches occupying some, or all, of the calyces. Whilst historically they comprised ~20% of urinary tract calculi that number has reduced with more interventional treatment of smaller calculi to 4% in developed countries (2).

Multiple complications are associated with conservative management of staghorn calculi, including reduced kidney function, recurrent infection leading to urosepsis and ultimately abscess formation. Given this, treatment is predominantly interventional, in the cohort of suitable surgical candidates. Most recent European Association of Urology guidance states that percutaneous nephrolithotomy should be employed in the first instance when dealing with complex stones including partial and complete staghorn calculi, with the addition of retrograde procedures in combination as required. Open and laparoscopic treatment of such calculi should be reserved for cases where percutaneous procedures are unlikely to be, or have already proven to be unsuccessful (3).

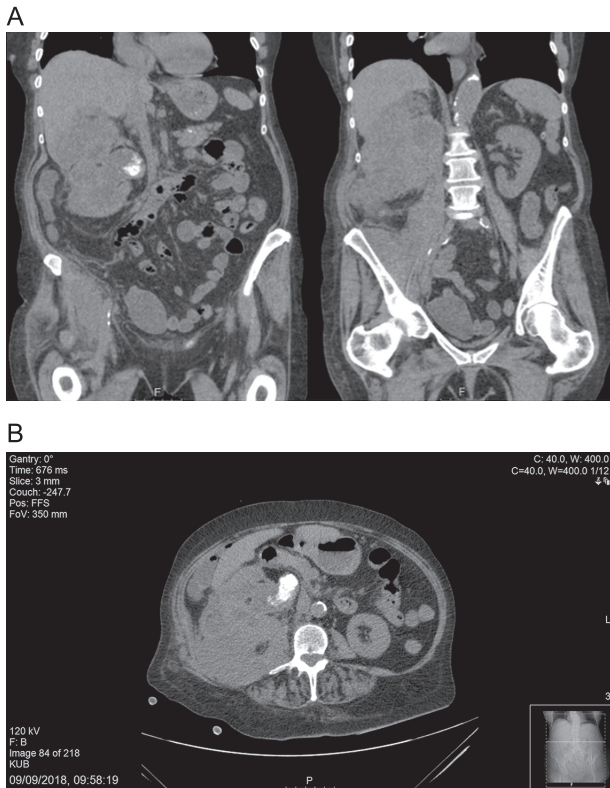
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**Figure 1:** Coronal sections from initial CTKUB demonstrating the right-sided perinephric abscess tracking down the retroperitoneum with associated staghorn calculus. (B) Axial section from the same CTKUB scan performed on presentation, demonstrating the right peri-renal abscess with associated staghorn calculus.



**Figure 2:** Axial section of a CT scan demonstrating the presence of contrast in the D2 segment of duodenum following antegrade infiltration via nephrostomy into the renal pelvis.

## CASE REPORT

This 73-year-old lady presented acutely with generalized right-sided abdominal pain, vomiting and loose stool. She has a urological background of a right-sided staghorn calculus with recurrent upper urinary tract infections and was awaiting a nephrectomy as a recent Radioisotope Renography (MAG-3) scan showed this kidney was non-functional.

Comorbidities include hypothyroidism, hypertension, asthma and primary biliary cholangitis. Physical examination was non-specific. Inflammatory markers were elevated on admission.

A CT of Kidneys, Ureters and Bladder (CTKUB) was performed [Figure 1](#), which demonstrated a right-sided staghorn calculus with associated hydronephrosis and a large heterogenous collection extending inferiorly into the retroperitoneum, consistent with a peri-renal abscess.

A nephrostomy and multiple radiologically guided drains were inserted from which samples subsequently grew a polymicrobial flora including *Proteus mirabilis* & *Prevotella* sp. Urine grew Extended Spectrum Beta Lactamase producing species (ESBL).

Antegrade nephrostogram revealed a reno-duodenal fistula, which was later directly visualized with oesophagogastroduodenoscopy (OGD) & dye [Figure 3](#). An Ovesco clip was placed at this time to attempt to close the tract.

She was treated with intravenous (IV) antibiotics, parenteral feeding due to poor pre-morbid condition and following optimization, an open nephrectomy was carried out via rooftop incision in conjunction with the upper-gastrointestinal surgeons who performed a simultaneous duodenal repair with omental patch and gastrojejunostomy formation [Figure 4](#).

Post-operatively she had a prolonged recovery complicated by difficulty establishing sufficient oral intake, as well as multiple courses of antibiotics & radiological drainage of recurrent infected collections. Samples from the nephrectomy bed grew *Staphylococcus aureus*, ESBL *E. coli* and *Proteus mirabilis*, and she was treated with a total of 20 days Linezolid and Ertapenem. Total length of stay (LoS) was 205 days, with post-operative LoS 67 days and subsequent readmission for infected post-operative collection of 20 days, during which she was treated with further IV antibiotics and a radiological drain. She has now been discharged with normalized inflammatory markers, cultures and is awaiting clinic follow-up to assess her progress.

## DISCUSSION

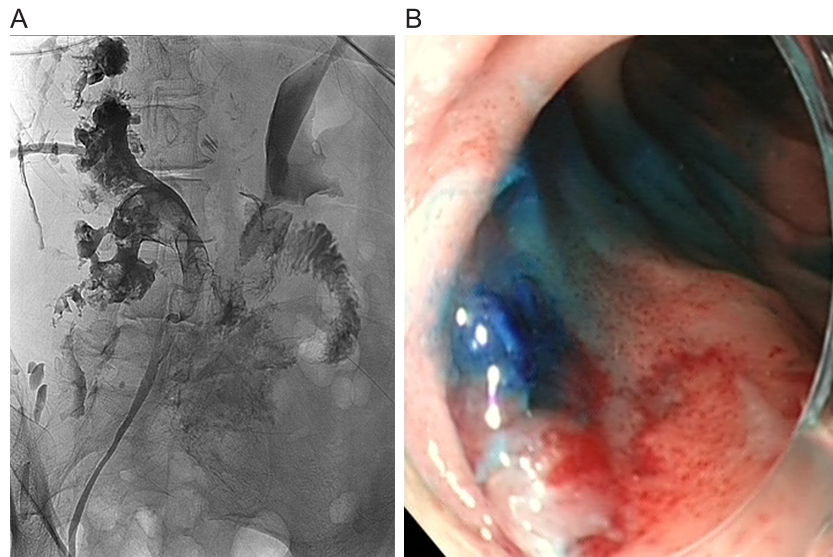
Renal-tract fistulae are a recognized phenomenon originating either from trauma or spontaneously through chronic inflammatory states in the kidney, commonly as a result of calculi, infection and malignancy. Described fistula tracts include renocutaneous, renopleural, renocolic, renogastric and, as in our case, reno-duodenal.

Reno-duodenal fistulae are rare comprising 1% of renoalimentary fistulae and most commonly involve the right-sided kidney, due to its proximity to the descending duodenum (4).

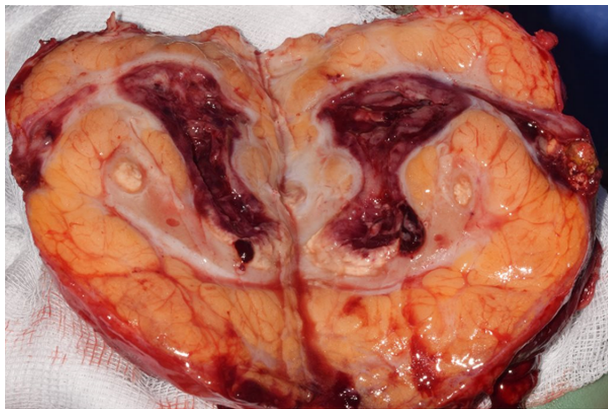
They are typically identified during CT scanning, with a variety of imaging modalities used to confirm the presence of the fistula tract described in the literature including antegrade and retrograde pyelography, contrast-enhanced CT, OGD and  $^{99m}\text{Tc}$  scintigraphy have all been successful in identifying and mapping tracts in various case reports (5).

Classically treatment for these fistulae has consisted of open nephrectomy with duodenal oversow though it has to be noted that other treatment modalities are emerging. Case reports have detailed conservatively treated reno-duodenal fistulae using IV antibiotics with urinary diversion through either ureteric stent insertion or nephrostomy. This has only been demonstrated in cases where the affected kidney has intact renal function and so is not applicable in our case (5).

Endoscopic treatment has also been used to good effect, with a case report in 2014 detailing the use of clips applied via OGD to close a fistula tract in a patient deemed unsuitable for nephrectomy. Four clips were applied endoscopically with IV antibiotics, total parenteral nutrition and subsequent ligation of



**Figure 3:** (A) Nephrostogram demonstrating radio-opaque contrast in the right renal pelvis and ureter, and renal pelvis-D2 fistula tract. (B) Shows the presence of contrast dye inserted via the nephrostomy in the duodenal lumen, thereby identifying the fistula tract opening.



**Figure 4:** Shows the final surgical specimen split cross-sectionally, demonstrating the fistula tract with remnant of the staghorn calculus visualized towards the right-hand side of the image.

the fistula tract using an Endoloop with adequate tract closure demonstrated on post procedure fistulogram (6).

Whilst these reports hint at novel approaches for treating reno-duodenal fistulae it remains difficult to draw firm conclusions due to the rarity of the condition and the low case numbers resulting from this. Similarly long-term follow-up is rarely included in published case reports, again limiting the conclusions of efficacy.

The protracted LoS in our patient was both a function of the required optimization pre-operatively and significant post-operative complications. Such complications have been noted in the literature following 'simple' nephrectomy, and a retrospective analysis of such operations demonstrated that nephrectomies for stone disease carried the highest rates of both intra and post-operative complications compared to other indications for benign nephrectomies (7).

This case demonstrates an atypical complication of long-standing renal tract calculi, particularly staghorn variant, along with other chronic inflammatory processes within the kidney. Clinicians should be vigilant for such complications, mindful of

the need for imaging in those with renal tract calculi and the reasons for intervening in a timely manner in such cases.

#### CONFLICT OF INTEREST STATEMENT

None declared.

#### FUNDING

No funding reported.

#### ETHICAL APPROVAL

No ethical approval was required for this report.

#### CONSENT

A consent form was signed by the patient.

#### GUARANTOR

Samuel S Folkard.

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