Trauma and reconstruction

Reno-duodenal fistula as a rare complication of percutaneous nephrostomy: A case report

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**ABSTRACT**

Renoduodenal fistula is a rare condition where a pathological tract is formed between the kidney and duodenum. This condition is caused by various etiologies, such as tuberculosis, malignancy, percutaneous nephrostomy procedure, cryoablation procedure in malignancy, and chronic infection. In this case, we report a case reno-duodenal fistula caused by large staghorn calculus, precipitated by a previous history of trauma. Renoduodenal fistula is a rare condition that often presents without symptoms. This condition can be caused by chronic infection of the kidney, and one of the etiology is an infected large staghorn calculus.

**Introduction**

Renoduodenal Fistula is a condition where a pathological tract is formed between the kidney and duodenum. Urodigestive tract can be formed in various levels, such as renoalimentary fistula including reno-duodenal fistula, ureterocolon fistula, vesicorectal fistula, rectoprostatic fistula, and many more. Various conditions can cause a reno-alimentary fistula to form, such as chronic inflammation in the urinary tract due to tuberculosis that gives rise to erosion in the adjacent small bowel or large bowel. Fistula also can be iatrogenic, where a bowel injury happened in percutaneous nephrolithotomy procedure or percutaneous nephrostomy procedure. Nowadays, the etiology of renoalimentary fistula has changed from tuberculosis to malignancy and percutaneous intervention. As more patients with small renal tumors are now undergoing advanced forms of tumor treatment, surgeons should be mindful of renoalimentary fistulae as a potential complication of this condition.

**Case presentation**

A 64 years old woman was admitted to the hospital with a chief complaint of intermittent left flank pain for five months before admission. The pain radiated to the umbilicus. The complaint was accompanied by fever for three weeks before admission and got worse in the last week. The patient had a history of urinary stone and a history of cloudy urine one month before admission.

A plain abdominal x-ray showed a complete staghorn stone of the left kidney. We decided to perform an emergency percutaneous nephrostomy of the left kidney, with initial pus 300 ccs. Afterward, we performed an antegrade pyelography examination with fluoroscopy. The antegrade pyelography image showed the contrast fluid leaked out of the pelvicalyceal system, and filled a structure we suspected as the duodenum and we suspected a fistula reno-alimentary formed, to the duodenum (Fig. 1). We decided to perform an explorative laparotomy. Intraoperatively we found a fistula between the medial-superior segment of the left kidney, right at the point of the staghorn stone, with the distal part duodenum (pars IV) with a diameter more than half a circle (Fig. 2). We decided to perform fistulectomy, stump closure of duodenum and proximal jejunum with Cornell technique, followed by pylorotomy and side to side gastrojejunostomy anastomosis. For the left kidney, we performed a subcapsular nephrectomy.

At the removed left kidney we found a hard, brownish staghorn stone accompanied by multiple calyceal stones sized the largest of 30 × 20 mm and the smallest of 2 mm in diameter, and 20 ccs of pus. We found that most of the renal parenchyma was fibrotic. At the left kidney, we found the nephrostomy hole at the inferior segment of the kidney, and the fistula right at the point of the stone, at the superior medial segment of the kidney (Fig. 3).

**Discussion**

A fistula between the upper urinary tract and digestive tract is a rare condition. Renoalimentary fistula comprise fewer than 1% of a fistula between the urinary and intestinal tracts, the vast majority of which are
colovesical fistulae. Various pathological processes can cause the fistula to form. The majority of renoalimentary fistula caused by iatrogenic, such as percutaneous nephrostomy procedure, penetrating or blunt trauma, malignancy (colon cancer, renal cell carcinoma, and transitional cell carcinoma), a chronic inflammatory process caused by stone, infection, or diverticle.

Renoalimentary fistula occurs when an abnormal tract is formed between the kidney and digestive tract. The fistula causes drainage of urine to the digestive tract or vice versa. When enteric content enters the urinary tract, it can cause urinary tract infection, abscess formation, and
end up with sepsis and kidney injury, even death. In this case, the formation of the reno-duodenal fistula between the superior and medial segment of the left kidney and duodenum may be caused by iatrogenic complication of percutaneous nephrostomy. The hydronephrotic left kidney enlarges to right and approach the duodenum pars IV. Several previous study also reported an iatrogenic complication which induce reno-duodenal fistula such as nephrostomy and percutaneous nephrolithotomy. Imaging studies that could be used to diagnose renoalimentary fistula were antegrade pyelography and abdominal CT scan with contrast. In both imaging, we could see the contrast substance fills the digestive tract structure. In this case, suspicion towards renoalimentary fistula was based on bowel structure filled with contrast in antegrade pyelography examination, while ultrasonography and plain abdominal x-ray did not give us a significant clue.

We decided to perform fistulectomy followed by left subcapsular nephrectomy, considering the non-functional left kidney and source infection control. We performed duodenal stump closure to prevent enteric content leakage into the peritoneal cavity that potentiates peritonitis. We also performed side to side gastroduodenal anastomosis to digestive tract diversion, followed by pyloroplasty to allow bile reflux to the anastomosis, with expectations of the near normal digestive process.

Conclusion

Renoduodenal fistula is a rare condition that often symptomless. This condition is often caused by iatrogenic. But it also can be caused by chronic infection of the kidney, and one of the etiology is an infected large staghorn calculus.

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