

# Hydronephrosis and Ureteral Obstruction in Crohn's Disease\*

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## ABSTRACT

Hydronephrosis and ureteral obstruction are rare sequelae of Crohn's disease. Chronic obstruction can ultimately lead to dysfunction of the affected kidney, and atypical presenting symptoms create pitfalls in diagnosis. Few reviews in the literature focus on this process and are limited to isolated case reports and case reviews. We performed a PubMed search using such terms as "Hydronephrosis" AND "Crohn's disease" AND/OR "ureteral obstruction". References from selected papers were reviewed for relevance and used for information-gathering as well. Ureteral obstruction most commonly occurs on the right side, due to ileal involvement. Clinical diagnosis is difficult, as symptoms are notably not genitourinary in origin; rather they are more musculoskeletal in nature. Treatment centers on disease control and temporary drainage of the affected kidney. Though rare, hydronephrosis and ureteral obstruction may develop as a result of inflammatory bowel disease. Due to atypical presenting symptoms, a high clinical suspicion is needed to affirm the diagnosis and ensure proper treatment.

**Keywords:** Hydronephrosis; Ureteral Obstruction; Crohn's Disease

## 1. Background/Etiology

First described by Hyams *et al.* in 1943, ureteral obstruction is a rare but clinically significant sequella of Crohn's disease [1]. As the pathophysiology of Crohn's disease involves inflammation, fistulas, local abscess formation, and fibrosis, obstructive hydronephrosis can occur if any of these processes involve areas of the bowel adjacent to the ureters. Hydronephrosis occurs most commonly on the right side via involvement of the terminal ileum; as other areas of the bowel may be affected including the sigmoid colon, in rare cases obstruction may be seen on the left side. Obstruction usually occurs at the level of the linea terminalis. The incidence of ureteral obstruction is difficult to ascertain, as much of the literature focuses on isolated case reports and case reviews; the reported incidence is 0.3% - 25% [2-5]. At presentation, patients are usually in the 3<sup>rd</sup> decade of life [6-8] and though Ben-Ami and Block report 5.6 years and 3.9 years respectively with Crohn's disease prior to diagnosis, others have reported patients presenting as long as 22.6 years after initial Crohn's diagnosis [3,6-8].

## 2. Pathophysiology

Ureteric compression occurs due to development of a phlegmon with subsequent inflammation and retroperitoneal fibrosis. Presence of abscess or fistula in the anterior retroperitoneal compartment has been implicated in ureteral obstruction and at times, a dense cicatrix encasing the ureter may arise as well [8,9]. Obstruction is usually noted at the level of the linea terminalis or SI joint [2,6,7,10-12]. Most commonly, hydronephrosis will occur on the right side due to enteritis of the terminal ileum and the location of the right ureter posterior to the terminal ileum. Left-sided hydronephrosis occurs with sigmoid colon or jejunal involvement and as such, the ureter may be obstructed more proximally with jejunal disease. One case report describes left ureteral obstruction arising due to a right lower quadrant mass; the mass was associated with a fistulous tract extending through the root of the mesentery to the left retroperitoneal space [13].

## 3. Diagnosis

Surprisingly, urinary symptoms are quite rare in cases of Crohn's-related ureteral obstruction. Present reported only 1 of 10 patients experiencing irritative voiding symptoms, while other authors report a complete absence of

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urinary complaints in their respective series [8,13]. Common physical findings reported by many include flank pain, hip pain, or anterior thigh pain resulting in difficulty walking [7-8,12-13]. Abdominal, vaginal, or rectal examination may reveal the presence of a mass in the right or left lower abdominal quadrants [8].

Computed tomography allows for full visualization of any conglomerate mass in relationship to the level of ureteral obstruction, though bowel wall thickening and inflammation may be the only signs of direct involvement. Intravenous pyelography will show hydronephrosis with tapering of the affected ureter, usually at the level of the pelvic brim. Medial deviation of the ureter is sometimes seen as well [13].

One would suspect that ureteral involvement with Crohn's disease would lead to urinary tract infections; however this is certainly not commonplace. In a series of 27 patients by Block *et al.*, only 15 had grossly abnormal urinary sediment on routine examination; 12 patients had normal urinalyses and 21 patients had sterile urine cultures [8]. Should a urinary tract infection arise, *E. coli* is the most common pathogen, with *Pseudomonas aeruginosa*, *Streptococcus faecalis*, *Aerobacter aerogenes*, Enterococci, and Klebsiella implicated as well [8].

#### 4. Treatment

A primary goal in the treatment of Crohn's-related ureteral obstruction is drainage of the affected kidney to prevent the deterioration of renal function. The table below demonstrates available minimally invasive treatment options for ureteral obstruction related to Crohn's Disease. The indwelling ureteral stent can be placed cystoscopically to allow for the maintenance of ureteral patency and drainage of the kidney. While traditional stents require changes every 3 - 4 months, long-term stents can also be considered. Typical stents placed for patients with Crohn's disease are 6 French in diameter. However, in our experience, placement of more flexible 4.7 French stents may be associated with reduced flank and pelvic pain. For patients who do not tolerate ureteral stents due to pain or there is significant ureteral stricture that prohibits stent placement, percutaneous nephrostomy tube drainage may be considered. Drainage via an 8 French to 12 French nephrostomy tube provides excellent renal drainage. Typically placed by interventional radiology and changed every 3 to 4 months, this drainage modality is associated with less pelvic pain. However, patients sometimes find the percutaneous flank drainage bags to be cumbersome. Some situations mitigate placement of a percutaneous nephrostomy tube with a universal stent of the ureter. This form of renal drainage allows both renal drainage and the maintenance of ureteral patency. Used rarely in our practice, these stents can be considered for

patients with hydronephrosis and significant intraperitoneal inflammation that is causing retroperitoneal compression with subsequent inflammation.

**Table 1:** Minimally invasive treatment options for ureteral obstruction:

- Indwelling ureteral stent
- Percutaneous nephrostomy
- Percutaneous nephrostomy with universal stent of the ureter

Along with renal drainage, mild cases of Crohn's disease with subsequent obstruction have successfully been treated medically, while more moderate to severe cases will require surgical intervention. "Pulse therapy" with corticosteroids, in conjunction with mesalamine and renal drainage, proved successful in 4 patients on whom Ben-Ami *et al.* reported in two different studies [3,14]. Angelberger *et al.* reported success with one patient in his series who had a milder form of Crohn's disease than the others in his cohort [6]. While there is a paucity of data on the newer immunostimulatory and immunomodulatory agents used for the management of Crohn's disease with ureteral obstruction, we postulate that similar improvements in the degree of hydronephrosis and renal obstruction will be observed. We postulate that the improvements in obstruction may be quicker with the intravenous forms of the newer immunostimulatory and immunomodulatory agents.

A surgical approach involves resection or bypass of the affected bowel with or without ureterolysis. Bowel resection with primary reanastomosis is commonly performed and the preferred method of treatment, however in severe cases in which it is deemed too difficult to extricate the bowel without injuring the ureter, temporary bypass may be performed with later resection of the affected segment [6-9]. Ureterolysis can be reserved for the presence of a dense cicatrix encasing the ureter, however success rates vary and the ultimate need for ureterolysis is debatable [8,15]. Ureterolysis as a sole modality for the treatment of ureteral obstruction is unlikely to be successful when performed as a monotherapy. It will most likely be successful when combined with primary medical therapy for Crohn's disease or if medical disease remission can be induced prior to ureterolysis. Good methods to follow the relative presence of inflammatory disease include immune markers such as C-reactive protein and the erythrocyte sedimentation rate. Ureterolysis or any other surgical intervention is likely to be most

**Table 1. Minimally invasive treatment options for ureteral obstruction.**

Indwelling ureteral stent
Percutaneous nephrostomy
Percutaneous nephrostomy with universal stent of the ureter

successful when inflammatory markers are at their lowest levels and preferably in the normal range.

Following bowel resection, decompression of the ureter may be seen via intravenous pyelography as early as 7 or 8 days postoperatively [7,8]. Success rates approach 100% [3,8], though occasionally prolonged dilation of the ureter and kidney occurs [7].

## 5. Conclusion

While hydronephrosis and ureteral obstruction are rare sequelae of Crohn's disease, chronic obstruction can ultimately lead to dysfunction of the affected kidney, and atypical presenting symptoms create pitfalls in diagnosis. Consideration of these problems by the treating medical team as well as early identification of obstruction may preserve renal function. Minimally invasive treatments of ureteral obstruction include ureteral stents while more significant cases of obstruction may require ureterolysis. The best treatment modalities for ureteral obstruction will involve maximization of medical therapy for the underlying bowel disease and selection of the appropriate urinary drainage method for obstruction that will cause the patient the least amount of morbidity.

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