The use of adhesion barrier film as an alternative to omental wrap in open ureterolysis

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Retroperitoneal fibrosis (RPF) is a rarely occurring disease process characterized by the development of fibrous plaques that encase retroperitoneal organs and major vessels. The most common sequelae is obstructive uropathy secondary to ureteral compression. Ureterolysis with intraperitoneal transposition and omental wrapping has historically been a popularized means to relieve ureteral obstruction. We present the case of a 47-year-old man with bilateral hydronephrosis secondary to RPF. Due to insufficient length of omentum, we report the first documented use of SurgiWrap to wrap the ureters to minimize the future possibility of recurrent/continued fibrosis, compression, and ureteral obstruction.

Key Words: retroperitoneal fibrosis, ureterolysis

Introduction

Retroperitoneal fibrosis (RPF) is a rarely occurring inflammatory disease characterized by the formation of collagenous plaques that surround the major vessels and organs of the retroperitoneum.[1] In 1905, Albarran first described RPF causing ureteral obstruction.[2] The disease process did not become widely acknowledged until 1948 when Ormond published two cases of RPF.[3] Epidemiologic data suggests a prevalence of about 1 per 200,0000, with the occurrence of disease two to three higher in men than in women with a median age of presentation between 50 and 60. Two thirds of RPF is considered idiopathic and is thought to be immunologically mediated. The remaining one third of cases are considered secondary to inflammatory disorders, malignancies, medications, and other conditions affecting the retroperitoneum. Histologically, early stage disease demonstrates loose networks of collagen containing many fibroblasts and inflammatory cells with capillary proliferation. This loose network matures into a plaque that is composed of collagen that becomes densely hyalinized with few recognizable cellular elements. Obstructive uropathy is the most common sequelae secondary to ureteral compression by fibrous plaques.

Ureterolysis with intraperitoneal transposition and omental wrapping is performed as a necessary means to relieve ureteral obstruction. Ureterolysis is an effective correction of ureteral obstruction in 90% of patients, though is associated with a significant morbidity (60%) and mortality (9%).[8] Additionally, ureterolysis has been associated with bowel obstruction and prolonged ileus in as many as 43% of patients in a small case study.[8] This is likely due to manipulation of the bowel during ureterolysis and/or using the omentum to wrap and isolate the ureters. Perhaps other materials that could isolate the ureter from the fibrotic reaction could be used to decrease associated morbidities (e.g.bowel obstruction) and protect the ureters from being involved in progressive fibrosis.

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Case report

The patient is a 47-year-old African American man with a past medical history significant for uncontrolled type I diabetes, bipolar disorder and schizophrenia, who was initially evaluated for complaints of abdominal pain. At his initial evaluation the patient had normal serum creatinine levels (Cr. 1.09; Figure 1) and had a CT scan with moderate, unilateral left hydronephrosis. Subsequent operative evaluation demonstrated mid-ureteral stenosis and the patient had a left ureteral stent placed. The patient presented to the emergency room approximately 3 months later with altered mental status. At that time, the patient and family members denied any history of dysuria, hematuria, abdominal pain, fever, or chills. A metabolic work up was consistent with acute renal failure (creatinine of 5.49, potassium 6.2; Figure 1). A repeat non-contrast CT was performed which demonstrated new bilateral severe hydroureteronephrosis associated with a soft tissue mass at the level of the aortic bifurcation and common iliac arteries, see Figure 2. Given the patients altered mental status, the patient underwent bilateral percutaneous nephrostomy tube placement. The patient's creatinine subsequently decreased to his baseline level. His stents were internalized after 1 week of antibiotic therapy.

Several unsuccessful attempts were made to obtain a tissue diagnosis of the retroperitoneal mass by interventional radiology. Each time there was insufficient amount of tissue for diagnosis.

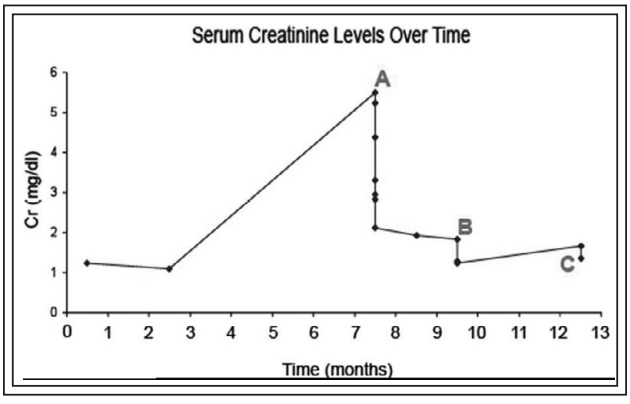

Figure 1. Line graph demonstrating return to baseline renal function following bilateral stent placement and ureterolysis. The patient: (A) presented with acute renal failure and subsequently bilateral stents were placed. (B) underwent bilateral ureterolysis with SurgiWrap and (C) underwent bilateral stent removal in the office.

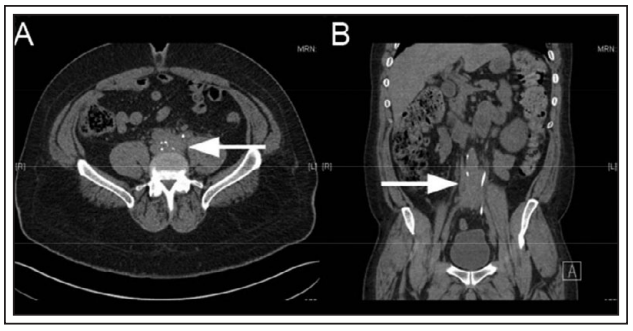

Figure 2. CT abdomen/pelvis without contrast. Retroperitoneal fibrosis at the level of the aortic bifurcation with encasement of both ureters. (A) Axial section demonstrating encasement of left ureter, with double-j stent in place. (B) Coronal section demonstrating encasement of right distal ureter with proximal hydroureteronephrosis. Hydroureteronephrosis demonstrated bilaterally.

A hematology consult was made to assist with concern for a hematologic process as a cause for the retroperitoneal mass. The laboratory results were inconsistent with a hematologic malignancy. Physical and ultrasound examination of his genitalia revealed no obvious testicular masses. His primary care physician and endocrinologist recommended a trial of steroids for suspected idiopathic RPF. However, the patient's diabetic status did not permit hormonal manipulation. Finally, since haldol has been associated with RPF, a psychiatry consult was obtained. Given his dependence of this medical therapy to maintain normal activities of daily living, they psychiatry service strongly recommended against discontinuation. Therefore, surgical treatment options were discussed with the patient, including watchful waiting, chronic stent exchanges and bilateral ureterolysis.

Open surgical bilateral ureterolysis was performed. Intraoperatively the peritoneum was reflected to expose the retroperitoneum. Extensive fibrotic-appearing tissue was identified at the iliac fossa. Both ureters were identified and dissected free from the retroperitoneal mass. Frozen section analysis of the mass confirmed the clinical suspicion of retroperitoneal fibrosis. After mobilization, the ureters were subsequently intraperitonealized. An assessment of the available omentum was then made. It was determined that there was only sufficient length for mobilization and wrapping of one ureter. Therefore, only the left ureter was wrapped with omentum. Since our general surgeons frequently use SurgiWrap to decrease peritoneal adhesions, a decision was made to use SurgiWrap to encase the right ureter to minimize

the probability of future adhesions and/or fibrosis. To this end, a 100 mm x 130 mm sheet of SurgiWrap was circumferentially placed around the intraperitoneal portion of the ureter. Internalized ureteral stents were maintained in both collecting systems.

The patient experienced an uncomplicated peri and postoperative course. He had rapid return of bowel function and was tolerating a consistent carbohydrate diet by postoperative day 3. He has since remained free of abdominal/flank pain. In addition, the ureteral stents were removed 10 weeks postoperatively in the office outpatient setting. His creatinine levels have remained at his baseline, see Figure 1. Subsequent ultrasonagraphy has demonstrated no hydronpehrosis bilaterally and normal renal laboratory parameters.

Discussion

The goals of treatment of idiopathic RPF are to stop the progression of the inflammatory reaction, to relieve the obstruction of the ureters or other retroperitoneal structures, to impede the acute-phase reaction and its systemic manifestations, and to prevent disease recurrence and relapse.[1] Therapy for idiopathic RPF is dependent upon the stage of disease at diagnosis. First line therapy in cases lacking ureteral involvement involves medical therapy. Corticosteroids, immunosuppressants, and recently, tamoxifen, are used to suppress the synthesis of most of the cytokines involved in the acute-phase reaction, reduce the inflammatory component, inhibit collagen synthesis and maturation and induce stable disease remission and regression.[4,7] The preexisting diabetic condition precluded our patient from medical management. In addition, pharmacologic agents that have been associated with RPF should also be stopped. Haldol could not be tapered in this patient due to his schizophrenia.

Since medical therapy could not be provided secondary to his pre-existing medical condition, definitive surgical treatment was indicated. Open surgical ureterolysis with intraperitoneal transposition and omental wrapping of the ureters is judged to be the preferred surgical approach, as the ureters must be freed from the fibrous plaque and shielded from the inflammatory process. In this case, insufficient omentum and peritoneal tissue required that a synthetic material, SurgiWrap, be used as a means of isolation and shielding from inflammatory process.

SurgiWrap adhesion barrier film (MAST Biosurgery, San Diego, CA, USA) is a polymer made from an amorphous bioresorbable copolymer, 70:30 Poly (L-lactide-co-D, L-lactide), a synthetic match to lactic acid. The synthetic material acts to separate opposing tissues and prevents the formation of adhesion immediately adjacent to the film barrier. This film has been used in different surgical procedures and has been associated with decreased adhesions.[7,8] A similar experience in reducing peritoneal adhesions and bowel obstruction has been reported by the general surgeons at our institution.

The prognosis of RPF and subsequent ureterolysis is generally favorable in cases not involving malignancy with long term successful alleviation of ureteral obstruction as high as 90% following ureterolysis. However, patients successfully treated with steroids may relapse, and disease progression has been reported after surgical repair.[5] Although some small studies suggest that intraperitonealization of the ureters may be sufficient to protect the ureters from disease progression, the authors believe that a combination of intraperitonealization and wrapping of the ureters provides enhanced protection. We report that in the short term, SurgiWrap after intraperitonealization is a promising alternative and perhaps may represent an equivalent alternative to an omental wrap in preventing disease recurrence and progression. Future studies evaluating its efficacy in this regard are required.

Disclosure

The authors do not have any disclosures or business relationships with the manufacturers of SurgiWrap. □

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