Nephroquiz for the Beginner
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Acute renal failure in a young woman with endometriosis

Introduction

A 27-year-old woman was known to have a solitary left kidney since the age of 17. In her early 20s she was investigated for recurrent lower abdominal pain related to her menstrual periods. At the age of 25 (1997), pain in the right inguinal area was explored surgically, and endometriosis in the proximity of the round ligament was found and excised. Cyclic pelvic pain was investigated further and a laparoscopy showed endometriosis in the Douglas pouch. The patient was also known to have a bicornuate uterus, which was considered to be a risk factor for endometriosis.

While waiting for definitive surgery of pelvic endometriosis (December 1997), she presented recurrent episodes of fever, anorexia, nausea and fatigue accompanied by pelvic pain beginning in the middle of her menstrual periods and lasting for a few days afterwards. She noted progressive polyuria and nocturia. She came to medical attention in April 1998, during a more severe cyclic episode with vomiting and headache. She was found to be severely hypertensive (blood pressure 200/120) with an elevated serum creatinine at 201 µmol/l (baseline value of 89 µmol/l in 1989). An ultrasound showed hydronephrosis of the solitary left kidney with hydroureter. A retrograde pyelogram demonstrated severe obstruction of the distal ureter of the solitary kidney (Figure 1). A double J catheter was advanced with difficulty into the left ureter through the tight distal stenosis. Her clinical symptoms corrected readily together with improvement in serum creatinine.

Questions

What is your diagnosis?
What would be the treatment of choice?
If the standard urological approaches were unsuccessful, what additional treatment would you consider?

Fig. 1. Initial retrograde pyelogram (April 9, 1998) demonstrating hydronephrosis of the solitary left kidney with tight obstruction of the lower ureter at the level of the pelvis.
Answers

Endometriosis is a common disorder affecting 5–10% of women of reproductive age [1]. Involvement of the urinary tract by endometriosis occurs in ~1% of women with pelvic endometriosis, principally affecting the bladder with infrequent lower urinary symptomatology [1–4]. In a seminal paper, Kerr reported 47 cases of endometriosis involving the ureter, bringing attention to this underdiagnosed condition and emphasizing the importance of making a correct diagnosis as early as possible, and then making every effort to restore and preserve renal function [5]. Since then, involvement of the ureter has been described sporadically. In a review of 62 cases of ureteral obstruction by endometriosis published in the English literature, Klein and Cattolica [6] noted that the main challenge in the treatment of ureteral endometriosis is its early diagnosis; they emphasized that the condition should be suspected in a premenopausal woman with unilateral or bilateral distal ureteral obstruction of uncertain cause. The clinical characteristics of involvement of the ureters by endometriosis, and how common it is, are not clear because its recognition usually depends on alteration in renal function with a significant rise in serum creatinine. Ureteral involvement by endometriosis causing renal failure is a rare observation. Obstructive uropathy can be associated with unilateral or bilateral ureteral involvement; to our knowledge, only one case of obstructive uropathy by endometriosis of a single kidney has been described previously [7]. In this case, one kidney had been previously removed and involvement of the ureter of the remaining kidney by endometriosis caused anuria on presentation.

The involvement of the ureter is rarely intrinsic by implantation of endometrial tissue in the wall of the ureter, but rather due to external compression by adjacent endometriosis and its attendant inflammation and fibrosis. Combined lesions have also been described. More rarely, iatrogenic ureteral lesions have been reported following surgical procedures performed for the treatment of endometriosis. The majority of cases due to extrinsic involvement are nearly always limited to the distal third of the ureter, although rare cases of proximal ureteral involvement have been described.

In our patient, a ureteroscopy performed a few weeks after presentation (May 1998) showed no evidence of intrinsic involvement of the distal ureter, but demonstrated external compression. Since this was probably secondary to endometriosis, it was elected to proceed with an open repair which was done in June 1998, when she underwent the resection of a non-communicating right uterine rudimentary horn and ipsilateral haematosalpinx. During the same procedure, ureterolysis of the distal left ureter was performed. Three weeks later, immediately following removal of the double J catheter, she developed anuria, and hydrenephrosis of the solitary left kidney was again demonstrated, requiring a nephrostomy. Complete obstruction of the distal ureter was still present on nephrostogram 2 weeks later (Figure 2).

The management of obstructive uropathy caused by endometriosis has, in the past, relied essentially on surgical approaches including ureterolysis, distal ureterectomy and ureteral reimplantation or interposition of an ileal segment between the ureter and bladder. More recently, the benefit of the use of hormonal treatment of endometriosis in general has been applied to endometriosis involving the urinary tract, with some success [8]. Reversal of ureteral endometriosis has been reported with treatment with progestin [9] and danazol [7, 10–12]. The more recent case report [7] described a patient who developed obstructive uropathy of a single remaining kidney by endometriosis. In that patient, successful management of the ureteral obstruction included a distal ureterectomy with ureteral reimplantation and treatment with high-dose danazol (400 mg b.i.d.).

One month after placement of the nephrostomy, a trial of danazol was initiated in our patient resulting in the spontaneous passage of urine from the bladder within a few days, allowing the safe removal of the nephrostomy 2 months later (Figure 3). The regimen of danazol 100 mg daily was well tolerated with minimal symptoms of pseudo-menopause (i.e. increased appetite, weight gain, hirsutism, hot flushes, night sweats and muscle cramps). Except for the early occurrence of a 1-day breakthrough vaginal bleeding, danazol induced a state of amenorrhea and disappearance of pelvic pain. The renal function remained

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Fig. 2. Nephrostogram (August 21, 1998) showing recurrent complete distal ureteral obstruction.
stable during a 1-year follow-up period. Our case illustrates that treatment with low-dose danazol may result in similar effectiveness as provided with higher dosages, but with fewer long-term side-effects. Furthermore, compared with other hormonal approaches in the management of endometriosis, the cessation of danazol treatment has not been associated with increased recurrence of pelvic symptoms and infertility [8]. This latter feature was especially important to our patient who wishes to become pregnant in the future.

Several aspects of our case deserve additional comment. Unilateral agenesis of the kidney is often associated with other abnormalities, particularly ipsilateral gynaecological abnormalities [13]. In our patient, the right renal agenesis was associated with a bicornuate uterus and a rudimentary right uterine horn. These gynaecological abnormalities are considered a risk factor for endometriosis from excessive retrograde menstrual flow [1,4]. As the ureteral obstruction became severe before presentation, our patient developed the typical manifestations of obstructive uropathy on the kidney, i.e. polyuria and nocturia indicative of a tubular concentrating defect, hypertension and renal failure. All these manifestations disappeared readily following relief of the ureteral obstruction of the solitary kidney by placement of a double J catheter. With regards to the clinical course, it could be argued that the ureterolysis added to the favourable therapeutic response. However, worsening of renal function occurred after removal of the double J catheter 6 weeks following the ureterolysis, despite waiting a few weeks to differentiate between a significant obstruction vs oedema of the ureter. Therefore danazol must have played a role in the induction of stabilization of renal function.

Furthermore, the response to danazol, i.e. passage of urine per urethra, occurred within a few days of initiation of treatment. Maintenance of stable renal function was evident following removal of the nephrostomy 2 months after the start of danazol treatment. Finally, emphasis should be placed on the good tolerance of low-dose danazol therapy, i.e. a few mild adverse effects largely compensated by the beneficial effect on the urinary tract and the abolition of cyclic pelvic pain. The adverse effects of danazol reflects its anabolic-androgenic and anti-oestrogenic properties (increased appetite, weight gain, hirsutism, and hot flushes and night sweats, respectively) as well as its general side-effects (muscle cramps) [8].

In summary, a 27-year-old woman suffering from severe pelvic and extrapelvic endometriosis developed obstructive uropathy of a solitary left kidney, requiring numerous urological procedures including distal ureterolysis. A bicornuate uterus was considered to be a risk factor for endometriosis; a rudimentary non-communicating right uterine horn with associated right haematosalpinx was resected. Despite these various surgical approaches, complete distal ureteral obstruction recurred. Treatment with low-dose danazol was well tolerated and successful in relieving the urinary obstruction and in preventing its further recurrence, resulting in stabilization of renal function.

References

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