Brazilian Journal of Urology
Official Journal of the Brazilian Society of Urology
Vol. 27 (5): 478-482, September - October, 2001

THE ROLE OF REFLUXING DISTAL URETERAL STUMPS AFTER NEPHRECTOMY

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ABSTRACT

Objectives: Classically, the refluxing distal ureteral stump has been removed at nephrectomy through a flank and a lower abdominal incision. There is little data in the literature about the natural history of these stumps. In the present work we evaluated the possible complications affecting the ureteral stump after total or partial nephrectomy for vesicoureteral reflux.

Material and Methods: Between June of 1974 and May of 1991, 25 nephrectomies followed by partial ureterectomy for vesicoureteral reflux into a non-functional kidney, were performed at our institution. Sixteen total and 9 partial nephrectomies respectively were performed. The reflux to operated units was graded according to the International Grading System as grade 1 (n = 1), grade 2 (n = 4), grade 3 (n = 9), grade 4 (n = 8) and grade 5 (n = 1).

Results: Ureteral stump removal was performed in 3 patients (13%). No correlation between the need for ureteral stump removal and age, sex, grade of preoperative reflux, associated contralateral reflux and ureteral histology became apparent.

Conclusion: The remaining ureteral stump after total or partial nephrectomy for vesicoureteral reflux presents a low rate of complications even in the presence of a high-grade reflux.

Key words: ureter; vesico-ureteral reflux; nephrectomy; reflux
Braz J Urol, 27: 478-482, 2001

INTRODUCTION

Classically, the refluxing distal ureteral stump has been removed at nephrectomy through a flank and a lower abdominal incision. Little data about the natural history of these stumps is available in the literature. The theoretical advantage of removing the ureteral stump ("stumpectomy") is to avoid infection and development of symptoms mimicking pyelonephritis (1). Krarup &Wolf recommend a dual approach, removing the whole ureter along with the kidney when it is associated with a reflux of a high grade (2). In cases of complete ureteral duplicity, conjoint reimplantation of the double ureter and either high or low ipsilateral ureteroureterostomy has been performed when both renal units are functioning. Although some authors have recommended a lower ureteroureterostomy in these cases to avoid the retention of a remaining long ureteral stump remaining (3), others have found little complications when a long, refluxing ureteral stump is left in place after partial nephrectomy or ureteroureterostomy (4,5). The natural history of refluxing ureteral stumps still requires further study. We present here an evaluation of the complications affecting ureteral stump after total or partial nephrectomy and ureterectomy for vesicoureteral reflux.

MATERIAL AND METHODS

Twenty-five nephrectomies and a partial ureterectomy for vesicoureteral reflux into a non-functional kidney were performed at our institution between June of 1974 and May of 1991. The

diagnosis of nonfunctioning kidney was made by intravenous urography or by DMSA. Nephrectomy was performed through a flank incision, and partial ureterectomy was made at level of the iliac vessels. After this interval (1991), the patients with reflux who undergone nephrectomy had a total ureterectomy performed by a dual approach by flank and lower abdominal incision and were not included in the study. Our patient population was divided in 2 groups: The first consisted of 20 patients with vesicoureteral reflux associated with simple or double systems, but free of complex lower urinary tract anomalies (the primary reflux group); the second group included 5 patients with posterior urethral valves or ureterocele. There were no dysfunctional voiding symptoms in the primary reflux group.

The mean age of the patients (one male and 19 female) of the primary reflux group was 6.5 years, ranging from 15 days to 28 years. The vesicoureteral reflux was unilateral in 19 patients and bilateral in 1. Thirteen patients presented simple ureteral reflux to a single system, 3 to the lower and 4 to the upper pole of a complete duplicated system. All 7 patients with a double system underwent partial nephrectomy. Data from all patients are presented on the table. Reflux was associated with posterior urethral valves in 3 and with ureterocele in 2 patients. Reflux to the operated units was graded according to International Grading System (6), as grade 1 (n = 1), grade 2 (n = 4), grade 3 (n = 9), grade 4 (n = 8), grade 5 (n = 1), and in 2 patients the grade was not determined. Nephrectomy was performed at the right side in 14 patients and at the left side in 11.

It was used Fisher's test to compare proportions. The differences were statistically significant when p value was lower than 0.05.

RESULTS

Ureteral stump removal was performed in 3 patients, one in the primary reflux group (5%) and 2 in the second group (40%). A 4-year-old seen 1-1/2 years after nephrectomy for grade 3 reflux to the lower unit presented 3 episodes of lower urinary tract infection considered to have originated at the ureteral stump. The stump was removed and a good outcome without any further urinary infection was observed. A 6-month-old boy with posterior urethral valve had grade 5, and contralateral grade 4 refluxes. After 2 episodes of assymptomatic bacteriuria promptly treated with antibiotics, he presented fever due to a retroperitoneal abscess secondary to a stump infection. The ureteral stump was removed (2 years and 9 months following nephrectomy), and the retroperitoneal abscess drained. Due to a solitary kidney nephropathy, this patient underwent kidney transplantation. A 4-year-old girl had upper pole nephrectomy due to ureteral reflux and ureterocele. She presented postoperative lower and upper urinary tract infections and had the ureteral stump removed 10 months after nephrectomy.

No correlation between the need for ureteral stump removal and age, Sex, degree of preoperative reflux, presence of associated contralateral reflux, and ureteral histology was found (Table). Evidence of ureteral chronic inflammation was observed at histology in all cases that needed stump removal, as well in 80% of those who did not required it. No secondary surgery was necessary (stumpectomy) for the 13 patients with simple vesicoureteral reflux to a single system. Among 10 patients with high-grade reflux (4 or 5), only one (10%) needed a stump operation.

DISCUSSION

The natural history of the refluxing ureteral stump in a duplicated system after partial nephrectomy seems well established. Huismann et al. studied 20 children with ureteral duplication and vesicoureteral reflux who had undergone ipsilateral ureteroureterostomy (4). Ureteral stumps left in 13 patients did not lead to recurrence urinary infection. Mor et al. studied the long term outcome of cases of 39 children with duplex systems and vesicoureteral reflux who underwent lower pole heminephrectomy for treatment of nonfunctioning lower renal moieties (5). Only 3 patients developed recurring urinary infection, requiring "stumpectomy". Jelloul & Valayer found no ureteral stump complications in 19 ipsilateral ureteroureterostomies (7).

Table *- Patients demographic data, distribution of ipsilateral and contralateral vesicoureteral reflux (VUR- according to its grade), postoperative urinary tract infection (UTI) with and without fever (according to the episodes of infection), ureteral histology after partial upper ureterectomy, and "stumpectomy".*

Patient	Age (months)	Sex*	Diagnosis	Ipsilateral VUR	Contralateral VUR	UTI without Fever	UTI with Fever	Ureteral Histology	Stumpectomy
1	10	F	Simple VUR †	4	0	0	0	Normal	No
3	3	F	Simple VUR	4	0	0	0	NI‡	No
4	300	F	Duplex system	3	0	3	1	CI	No
5	14	F	Duplex system	4	0	1	0	CI	No
7	10	F	Simple VUR	3	0	0	0	Normal	No
8	120	F	Simple VUR	4	0	0	0	CI	No
9	24	F	Duplex system	2	0	0	0	CI	No
10	216	F	Simple VUR	3	0	0	0	CI	No
11	72	F	Simple VUR	4	0	0	0	Normal	No
14	36	F	Simple VUR	3	0	0	0	CI	No
15	0.5	M	Simple VUR	5	0	0	0	Normal	No
16	36	F	Simple VUR	4	0	2	0	Normal	No
17	48	F	Duplex system	3	0	1	0	CI	No
18	15	F	Duplex system	2	2	0	0	CI	No
19	336	F	Simple VUR	2	0	0	0	CI	No
20	36	F	Simple VUR	3	0	0	0	CI	No
21	108	F	Simple VUR	4	0	2	0	CI	No
25	48	F	Duplex system	3	0	3	0	CI	Yes
2	24	F	Duplex system	2	0	6	1	CI**	No
22	48	F	Simple VUR	3	0	0	0	Normal	No
6	7	F	Ureterocele, duplex system	3	0	0	0	NI	No
23	48	F	Voiding dysfunction, ureterocele, duplex system	NI	0	2	1	CI	Yes
12	6	M	Posterior urethral valve	4	3	0	0	CI	No
13	24	M	Posterior urethral valve	NI	0	0	0	CI	No
24	6	M	Posterior urethral valve	5	4	2	0	CI	Yes

* *F - female, M - male; **CI - chronic inflammation; ‡ No information finding in the chart; † Simple vesicoureteral reflux to a single system.*

There have been only few series demonstrating the natural history of the ureteral stump after nephrectomy and partial ureterectomy in a solitary collecting system. According to some authors, the ureteral stump is a reservoir of urinary infections and should be removed by a dual approach with complete excision of the kidney and ureter (1,2,8). Krarup & Wolf reported cases of 2 patients who presented urinary tract infection due to a residual ureter (2), and recommended the excision of the entire ureter when severe reflux is present. Persad et al., evaluated 8 patients with refluxing ureteric stumps, who presented recurring urinary tract infection and symptoms mimicking pyelonephritis (1). The stump was removed in all cases, and as expected, histological examination of the previously removed kidney confirmed severe reflux nephropathy in all 8 cases. They concluded by recommending that the entire ureter should be excised when total or partial nephrectomy is undertaken in cases of reflux nephropathy. However, this conclusion was not supported by the fact that the number of nephrectomies for vesicoureteral reflux performed at their institution was not reported. Therefore, the number of non-infected stumps cannot be evaluated. To our knowledge only one series of studies has addressed this issue: Cain et al., studied 38 patients who underwent nephrectomy or partial nephrectomy and ureterectomy for reflux into a non-functioning kidney (9). A follow-up for up to 45 months showed an average of positive urine cultures in 6 patients. Among these, 2 presented symptomatic urinary infection and underwent ureteral stump removal. Urinary tract infections were more frequent in patients with urological problems more complex than simple primary reflux.

We found a low (5%) incidence of stump removal after a total or partial nephrectomy for primary reflux. In similarity to findings by Cain et al. (9), none of our 13 patients with primary reflux into a single system needed “stumpectomy” suggesting that stump removal be correlated to more complex cases. Our results did not support the view that patients with a high-grade reflux have a higher rate of stump complications as stated by Krarup & Wof (2). Nine out of 10 patients (90%) with refluxes grade 4 or 5, did not need “stumpectomy”. Furthermore, ureteral histological findings were not predictive for ureteral stump removal. The small number of patients with posterior urethral valves or ureterocele, limits the capacity of our series to permit significant conclusions, even though in the five patients cited, the reoperative rate was 40%. Also, we do not have an urodynamic study of the patients who needed stump removal. Thus, the role of the voiding dysfunction in the prediction of reoperation could not be established. One of the patients who underwent stump removal, presented bladder dysfunction refractory to medication, and had presented many episodes of febrile urinary infection after nephrectomy. Whether his recurring urinary tract infections were due to a residual stump, bladder dysfunction, or a combination of both could not be clarified.

CONCLUSION

The ureteral stump left after total or partial nephrectomy for primary vesicoureteral reflux presents a low rate of complications even when there is reflux of a high grade. Although the number of patients was too low to permit significant conclusions, more complex cases such as posterior urethral valves and ureterocele presented a high rate (40%) of reoperative rate.

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Received: July 27, 2000
Accepted after revision: August 13, 2001

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