ORIGINAL ARTICLE

THE KNOCKED-OUT UNILATERAL KIDNEY! CAUSES AND PRESENTATION

Kashif Bangash, Asaf Alam*, Mohammed Amin, Khursheed Anwar*****

Department of Urology, KRL Hospital, Islamabad, *Pakistan Institute of Medical Sciences (PIMS) Islamabad, **Ayub Teaching Hospital, Abbottabad, ***Pakistan Atomic Energy Commission (PAEC) General Hospital, Islamabad-Pakistan

Background: Due to lack of awareness and non-availability of proper medical facilities in Pakistan, patients with kidney problems tend to seek urological consultation very late when their kidney has already knocked-out. The aim of the study was to find the various presenting complaints of patients having unilateral loss of kidney function and their aetiologies. The study also targeted the patient's awareness regarding their disease. **Methods:** This descriptive case-series of 103 consecutive patients who were diagnosed as having less than 20% of function on DTPA Renal Scan were evaluated. The aetiology of the non-functioning kidney (NFK) was made on either imaging findings or during the exploration, and/or on histopathology if necessary. The results were analysed using SPSS 16.0. **Results:** The aetiology of the unilateral renal failure included those that were secondary to nephro-pelvic stones in 39.8% and ureteric stones in 14.6%. Of the other aetiologies culminating in a unilateral NFK, 7.8% of the patients had chronic pyelonephritis, 20.4 % had PUJO and 5.8% were Genito-urinary Tuberculosis; 3.9% had VUR and were found incidentally, 3.9% developed non-functioning kidney iatrogenically. About 39.8% of the patients knew about their primary disease causing destruction of renal function since long. The remaining 60.2% were unaware that they had developed NFK already when they presented. **Conclusion:** Proper education through awareness program both for the public and general practitioners can detect early threats to the kidney and hence decrease the loss of a kidney. This will also decrease the number of nephrectomies carried out for the benign conditions.

Keywords: Non-functioning kidney, solitary kidney, benign nephrectomy

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INTRODUCTION

Kidney is a paired organ and like other body organs is vulnerable to many threats like infections, trauma, tumours, stone formation, vascular problems and obstruction to drainage system by reflux disease, strictures or enlarged prostate etc.[1] In patients with unilateral renal disease adaptive phenomenon in the solitary kidney occurs which leads to hypertrophy and improvement of overall renal function.[2] This is why most of the times a person might even not know if his one kidney is out of order. But in other cases negligence from the patient, once he comes to know that his kidney is in danger, could be the cause of a unilateral non-functioning kidney.

The presentation of a patient is having a unilateral non-functioning, or poor functioning kidney, varies from simple flank pain to complex mixed symptoms like palpable mass, high grade fever or haematuria depending upon the etiological factors. Sometimes the patients seek medical attention for some other reasons and a unilateral non-functioning kidney is identified incidentally during evaluation of the non-renal disease.

Nephrectomy may be the treatment of choice in most of the non-functioning kidney if the symptoms are life threatening and intractable. In developing countries, majority of nephrectomies are performed for benign conditions.[1,3] A watchful policy can also be offered in patients with silent NFK or the symptoms are not bothersome and can be managed conservatively.

Pakistan is located in the stone belt area and renal stone disease remains a major problem.[4] Long standing calculus disease is known to cause functional impairment of kidney. The pathological processes identified in a poorly functioning kidney secondary to calculus disease include parenchymal atrophy, chronic pyelonephritis, xanthogranulomatous pyelonephritis and rarely associated urothelial carcinoma.[5] Therefore most of the renal problems in this part of the world are due to stones and when not treated in time leads to unilateral or even bilateral kidney loss. Moreover tuberculosis is also not less common in developing countries and involves the urogenital system. Renal tuberculosis comprises 20% of all extra-pulmonary tuberculosis, and is the most common extra-pulmonary system to be affected by this disease.[6] In advanced cases tuberculosis can lead to end stage renal disease wherein nephrectomy is performed. Due to lack of awareness, all these patients with renal stones or other reversible renal pathologies often present late when there is irreversible loss of renal function.

This study aimed to evaluate the presentation of patients having unilateral loss of kidney function and its aetiology. Providing a panorama of the etiological factors of nephrectomies can reduce the non-tumour nephrectomy incidence in this part of the world.

MATERIAL AND METHODS

This descriptive case-series of 103 consecutive patients who were diagnosed as having less than 20% of split function on DTPA Renal Scan were evaluated. Their detailed history of symptoms and examination was performed, and a series of investigations was carried out to confirm diagnosis that included IVU, Ultrasonography, RFTs and DTPA Renal Scan. All those patients having less than 20% of function on the Renal Scan were included in the study. Those patients having renal tumours or have had renal trauma and those with previous history of nephrectomy were excluded from the study. The aetiology of the NFK was made on either imaging findings or during the exploration, if nephrectomy was the plan and/or on histopathology if necessary. Data was analysed using SPSS 16.0.

RESULTS

During the study period, 103 patients were diagnosed as having a unilateral non-functioning kidney that was non-malignant and non-traumatic. In all patients the loss of split function of more than 80% was detected by DTPA renal scan. The study included 57 males (55.3%) and 46 females (44.7%). Age of the patients ranged from 13 to 81 years with mean of 37.7±15.4 years.

The aetiology of the unilateral loss of function included those that were secondary to nephro-pelvic stones in 41 patients (39.8%) and ureteric stones in 15 (14.6%). Of the patients having the stones, 12 had associated chronic pyelonephritis and 7 had pyonephrosis. One patient had xanthogranulomous pyelonehpritis associated with renal stones but that was included in the renal stone aetiology list.

Of the other aetiologies culminating in a unilateral NFK, 8 (7.8%) of the patients had chronic pyelonephritis, 21 (20.4%) had PUJO and 6 (5.8%) were genito-urinary Tuberculosis. Four (3.9%) had VUR and were found incidentally during the workup and 4 (3.9%) developed non-functioning kidney iatrogenically. One of the patients underwent emergency hysterectomy during which ureter was ligated. The other 3 patients underwent surgery for renal stone and later developed NFK on the same side. In 4 (3.9%) of cases the exact cause could not be found. These patients were not having any complaints and were diagnosed incidentally during a routine pregnancy follow-up and for evaluation of an inguinal hernia.

Of all these patients, 98 patients underwent nephrectomy and 5 were treated conservatively with regular follow ups. 41 (39.8%) patients knew about their condition since long. Of them 35 (33.9%) patients did not seek a proper urological consultation and were taking symptomatic treatment from either Hakim or GPs and some refused surgery for their primary disease, later presenting with NFK of the diseased site. The remaining 62 (60.2%) were unaware of any problem to their kidneys. Of them 15 (14.6%) of the NFKs were found incidentally during the workup of other symptoms that were not related to urological disease or urological pathologies not exactly indicating renal threat like posterior urethral valves, urethral stricture or hypertension.

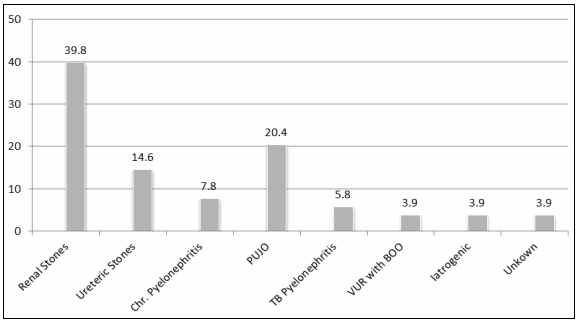

Figure-1: Bar chart showing the pathologies leading to unilateral NFK

Figure-2: A patient treated by a quake for renal stones, later presenting with non-functioning kidney

Table-1: Showing various presenting complaints of patients having unilateral non-functioning kidney

Symptoms	Frequency	Percent
Unilateral Flank Pain (> than 4 months)	35	33.9
Bilateral Flank Pain	3	2.9
Flank Pain with Fever	3	2.9
Flank Pain with Pyuria	11	10.7
Flank Pain with haematuria	15	14.6
Flank Pain with fever and mass	8	7.8
Haematuria	1	1.0
Pain with LUTS	6	5.8
Pain with Haematuria, weight loss and mass	5	7.8
Chronic Sinus discharge from flank	1	1.0
Incidental		
LUTS	9	8.7
Hypertension	1	1.0
No symptoms	4	3.8
Severe skin disease with decreased urine output	1	1.0

DISCUSSION

Many reports suggest that the rate of nephrectomy for benign conditions has declined during the last few years as compared to malignant conditions. In Norway, the rate of nephrectomy for benign conditions dropped markedly in the 20 years since 1979.[7] There are likely to be several reasons for this: better management of urinary tract infections, better control of hypertension, and improvement in the management of renal stones by minimal or non-invasive techniques (lithotripsy, percutaneous nephrolithotomy). On the other hand, in the developing countries like Pakistan, India and Jordan, it is opposite. In a report of 423 consecutive nephrectomies in a general hospital of Jordan[3], 70% was performed for benign conditions. Similarly, in a series of 135 nephrectomies reported by Rafique[4], 76.6% of the nephrectomies had benign cause.

The various aetiological factors that lead to loss of unilateral renal function have been evaluated in the study. It is not hard to believe that the majority (54.4%) had the renal stone aetiology, causing damage and loss of renal function of the affected side. The renal stones lead to atrophy of the renal parenchyma, chronic pyelonephritis and/or pyonephrosis and rarely xanthogranulomatous pyelonephritis.[5] Pakistan is located in the stone belt area and renal stone disease remains a major problem. Here, renal stones are three times more common in men.[8,9] In the present study, 29 male patients had stone aetiology as compared to 27 females which is contrary to that seen by Rafique.[4] In his study high female preponderance in stone related nephrectomy was seen as compared to males. In a review of 47 nephrectomies from Karachi, 52% were for stone-related aetiology.[10] In our study 12 patients having renal stones had chronic pyelonephritis and 7 had pyonephrosis. These findings were seen with either Ultrasound, DTPA renal scan, during surgery and histopathology of the removed kidney.

The 2nd most common (20.4%) cause of unilateral loss of kidney was neglected Pelvi-Ureteric junction obstruction (PUJO). Datta *et al*[1] showed that it was the most common etiological factor (25.3%) resulting in loss of renal function and was the leading cause of uni-nephrectomy. Rafique[4] found 16% of cases having PUJO who underwent nephrectomy because of non-function.

Beisland *et al*[7] found that five (2.4%) tuberculous kidneys were removed out of 209 nephrectomies carried out for benign conditions during 20 years at two Norwegian hospitals. The report from Jordan[3] showed that tuberculosis accounted for nine (3%) nephrectomies performed for benign conditions. In the present series tuberculosis accounted for 5.8% of the cases who underwent nephrectomy due to non-function. In the study performed by Datta[1], 10.2% of nephrectomies was performed due to renal tuberculosis. Whereas patients with renal tuberculosis are uncommon in developed countries, as many as 15–20% of tuberculous patients in the developing countries are diagnosed with tuberculosis in their urine.[11] Although the proportion of patients with tuberculous NFK is low in our study, but the figure still should not be ignored.

"Why do patients present so late when their kidney has already knocked out?" The question was sorted in the study. Among the patients who presented to us, 39.8% knew about their primary disease. The irony is 35 (33.9%) patients were under the treatment of GPs and Hakims and they never sought a proper urological consultation until late. And those who did seek urological consultation did not follow the treatment, due to either fear of surgery or their socioeconomic conditions, later presenting with grievous symptoms and loss of kidney.

CONCLUSION

A realistic comprehensive picture of the reasons culminating in loss of unilateral kidney function has been provided in the study. Proper education through awareness program both for the public and general practitioners can detect early threats to the kidney and hence decrease the total loss of a kidney function. This will also decrease the number of nephrectomies carried out for the benign conditions.

AUTHOR'S CONTRIBUTION

KB: Generated the idea of the study and its design, drafted the manuscript and helped in data collection. AA: Major contribution in data collection. MA: Performed the data Analysis. KA: Planning of the study and coordination and helped to draft the manuscript. All authors read and approved the final manuscript.

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Address for Correspondence:

Dr Kashif Bangash, House No. 364, Street No. 42, G-9/1, Islamabad-Pakistan
Cell: +92 314 960 1534
Email: drkashifbangash@hotmail.com