INDICATIONS AND LIMITS OF DIAGNOSIS FLEXIBLE URETEROSCOPY

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Abstract

Introduction. Nowadays, flexible ureteroscopy has become a routine procedure in many centers. The aim of this study was to evaluate the indications and limits of diagnostic retrograde flexible ureteroscopy.

Material and methods. Between October 2002 and January 2007, diagnostic retrograde flexible ureteroscopy was performed in our department in 40 cases. It was aimed to evaluate a filling defect of the upper urinary tract (9 cases), unilateral hematuria (14 cases), obstruction of the upper urinary tract (2 cases, 1 with cutaneous ureterostomy), abnormal urinary cytology (6 cases) and follow-up after conservative treatment of upper urinary tract urothelial tumors (9 procedures in 4 patients). A 7.5 F Storz flexible ureteroscope was used in all patients.

Results. Diagnostic flexible ureteroscopy identified upper urinary tract lesions in 29/31 cases (93.5%): pyelocaliceal tumors (12 cases), lithiasis (8 cases), pyelocaliceal diverticulum (1 case), caliceal vascular lesions (7 cases), suggestive lesions of urinary tuberculosis, later confirmed by bacteriological work-up (1 case). In 2 cases of hematuria no suggestive lesions were identified. In one of these cases, flexible approach of the lower calyx couldn't be performed. In one of the 4 patients with upper urinary tract urothelial tumors, tumoral recurrence was identified. In 2 cases, minor postoperative complications occurred: renal colic (1 case) and fever (1 case).

Conclusions. Retrograde flexible ureteroscopy may be a useful investigative method of upper urinary tract pathology, especially in those cases in which imagistic evaluation doesn't offer suggestive information. In some cases, approach of the inferior calyx may be difficult using this method.

Key words: diagnosis flexible ureteroscopy, hematuria, lithiasis, tuberculosis, upper urinary tumors, vascular lesions

Introduction

Despite the technological advances in imaging techniques, there are still a number of cases in which clinical, laboratory and imaging data are insufficient to establish the exact diagnosis, or to precisely locate the lesion on the ureter or the collecting system. In such cases, direct visual inspection of the upper urinary tract may be required, but, due to

the complexity of the pyelocaliceal system, such goal may be impossible to achieve using only rigid or semirigid endoscopes.

Due to its theoretical ability to access in a retrograde manner the entire upper urinary tract, flexible ureteroscopy proved to be not only an effective treatment instrument, but also a powerful diagnosis tool.

Allowing rapid and exact diagnosis, the use of this technique may improve the success rate of urological interventions and decrease the proportion of cases with elusive diagnosis, such as “essential” hematuria etc.

The diagnosis flexible ureteroscopy is used in the Urological Department of “Saint John” Emergency Clinical Hospital since October 2002, dramatically improving rapid and correct diagnosis of cases in which paraclinical investigations didn’t reveal specific aspects.

Material and methods

Between October 2002 and January 2007, 40 diagnostic flexible ureteroscopic procedures were performed in the Urological Department of “Saint John” Emergency Clinical Hospital.

The indications for this method were as follows:

- filling defect of the upper urinary tract - 9 cases
- unilateral hematuria - 14 cases (fig. 1)
- obstruction of the upper urinary tract - 2 cases, 1 with cutaneous ureterostomy

- abnormal urinary cytology with normal cystoscopic aspect - 6 cases
- follow-up after conservative treatment of upper urinary tract urothelial tumors - 9 procedures in 4 patients

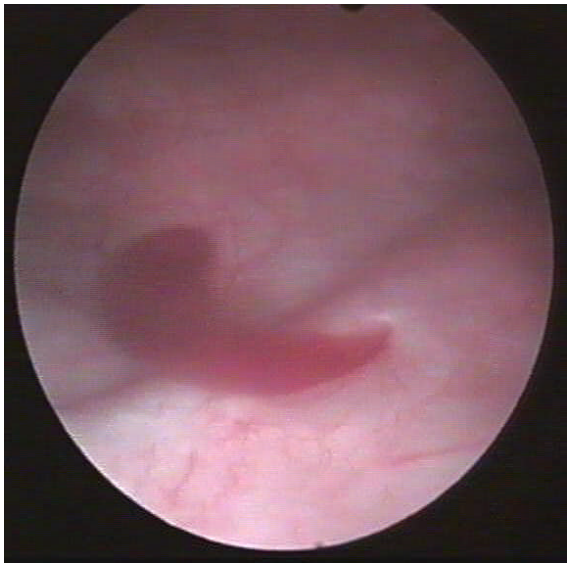


Fig. 1. Hematuria from the left ureteral orifice (cystoscopic aspect)

In all these cases, equivocal results provided by imaging techniques imposed endoscopic evaluation. A 7.5 F Storz flexible ureteroscope, with a primary active deflection and a secondary passive one, together with 8 and 10 F semirigid Storz ureteroscopes were used in all cases.

Dilation of the ureteral orifice was performed only if “per primam” insertion of the endoscopes was impossible. After the inspection of the ureter using the semirigid ureteroscopes, the flexible endoscope was ascended into the collecting system. If a guidewire was used in order to slide the flexible ureteroscope through the upper urinary tract, its tip was carefully maintained under the level of the uretero-pelvic junction, thus

preventing the iatrogenic lesions of the intrarenal collecting system, which may raise further differential diagnosis problems.

After ascending the flexible ureteroscope through the uretero-pelvic junction, systematic inspection under fluoroscopic control of the renal pelvis and all of the calices was thoroughly performed (fig. 2).

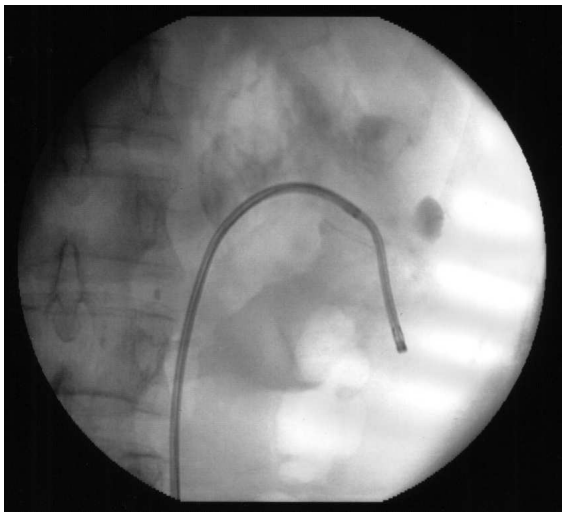


Fig. 2. Inspection of a secondary inferior calyx (intraoperative fluoroscopy)

Results

Dilation of the ureteral orifice was necessary in only 10% of the cases (4/40 patients).

Direct visual inspection using the flexible ureteroscope, identified upper urinary tract lesions in 93.5% of the cases (29/31 patients).

Pyelocaliceal tumors were diagnosed in 12 cases (fig. 3, 4, 5, 6), all being evaluated regarding the stage and grade by cold-cup biopsies taken through the flexible ureteroscope.

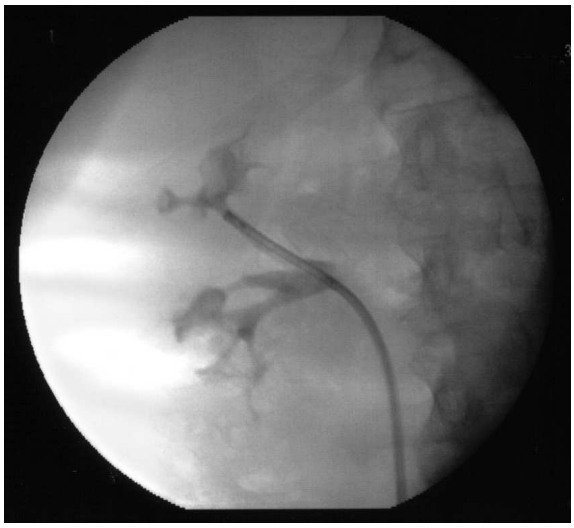


Fig. 3. Filling defect in the superior calyx (retrograde pyelography)



Fig. 4. Superior calyx transitional cell carcinoma

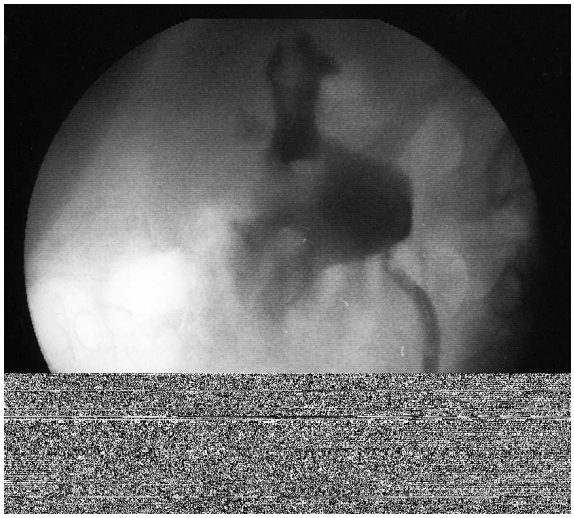


Fig. 5. Filling defect in the superior calyx (retrograde pyelography)



Fig. 6. Superior calyx transitional cell carcinoma

Pyelocaliceal lithiasis was diagnosed in 8 cases, a pyelocaliceal diverticulum (fig. 7, 8) in 1 case, caliceal vascular lesions (fig. 9) in 7 cases, and suggestive lesions of urinary tuberculosis (later confirmed by bacteriological work-up) in 1 case (fig. 10, 11).

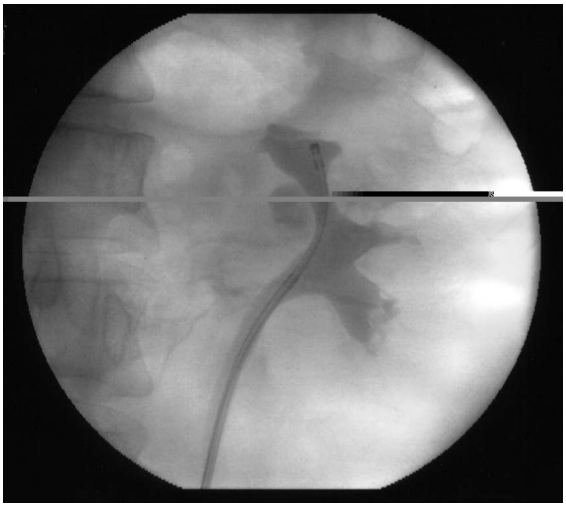


Fig. 7. Superior calyx diverticulum (intraoperative fluoroscopy)

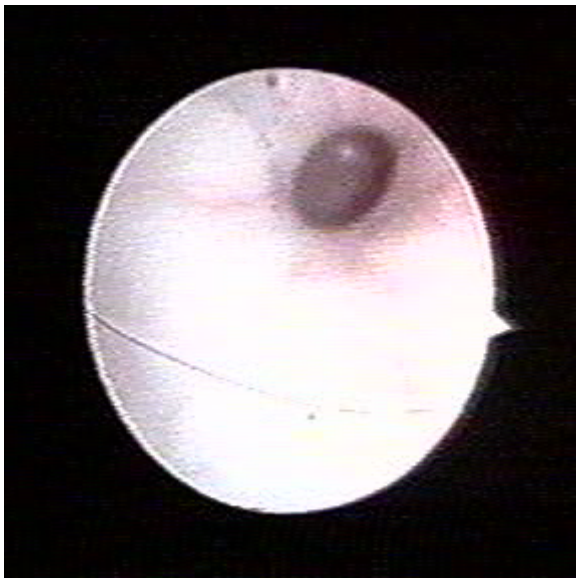


Fig. 8. Flexible ureteroscopic aspect of the caliceal diverticulum neck



Fig. 9. Flexible ureteroscopic aspect of hemorrhagic vascular lesions of the inferior papilla

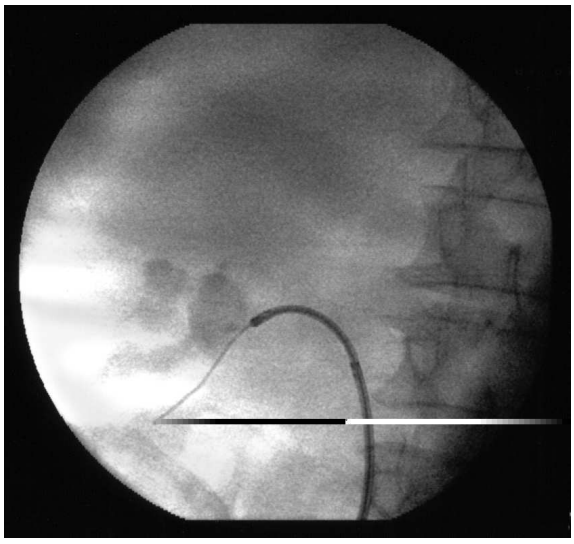


Fig. 10. Flexible ureteroscopy in a patient with renal tuberculosis (intraoperative fluoroscopy)



Fig.11. Ulcerations of the middle caliceal papilla, with veils of exudate in a patient with urinary tuberculosis

In 2 cases of unilateral hematuria with negative cytology, no suggestive lesions were identified. In one of these cases, flexible approach of the lower calyx couldn't be performed.

Both patients were subject to a close follow-up, including clinical assessment, urinary cytology evaluation and intravenous pyelography. Through the next 12 and respectively 18 months, no recurrent hematuria occurred, cytology remained negative and no imaging apparent lesions were detected.

Tumoral recurrence was identified in one of the 4 patients with upper urinary tract urothelial carcinoma. Radical nephroureterectomy with endoscopic resection of the intramural ureter was performed in this patient.

In 2 cases, minor postoperative complications occurred (renal colic in 1 case and fever in 1 case), requiring only conservative management.

Discussions

The proportion of cases in which complete exploration of the upper urinary tract is possible using flexible ureteroscopes varies between 71 and 100% [1, 2, 3, 4].

Most frequently, the access to the inferior calyx is limited [5], among the incriminated factors being the anatomy of the collecting system [6], technical performances of the flexible ureteroscope [1], accessory instruments used for biopsy, impairment of visibility due to blood or pyuric urine [7], etc.

The success rate of diagnosis flexible ureteroscopy in our series of patients is concordant with the results published in literature.

The success rate of this method in diagnosing the cause of unilateral hematuria varies between 78 and 83% [1, 8, 9, 10]. Nakada and Clayman diagnosed and treated, using flexible ureteroscopes, 17 patients with unilateral gross hematuria, identifying suggestive lesions in 82% of cases (discrete lesions in 64% and diffuse lesions in 18% of the cases) [11].

In a similar manner, Puppo and co-workers identified suggestive lesions in 22 out of 23 studied patients, emphasizing the important role of flexible ureteroscopy in diagnosing the etiology of unilateral hematuria [12].

In selected cases, conservative endourologic techniques are the options of choice in the treatment of upper urinary tract transitional cell carcinoma:

- single kidney (congenital, surgical or functional)
- chronic renal failure

- synchronous bilateral tumors
- severe operative risks

Due to the significant risk of recurrence, these patients must be subject to a very strict postoperative follow-up protocol, which includes flexible uretero-pyeloscopy.

In a study on 10 patients (12 kidneys) with such pathology treated in a conservative manner, Amon Sesmero and Estebanez Zarranz performed 42 ureteroscopies (31 using flexible ureteroscopes and 11 using the rigid ones). After a mean follow-up period of 31.9 months, two patients presented tumoral recurrence identified by ureteroscopy and two patients died (one due to distant progression and another due to a metacronous, previously diagnosed bladder tumor) [13]. The conclusion of this study was that flexible ureteroscopy was the most effective follow-up method for these patients, thus allowing early diagnosis of tumoral recurrence.

Complications of diagnosis flexible ureteroscopy are rare and usually minor, not requiring active surgical management [7, 14].

Tumoral dissemination by pyelo-venous, pyelo-tubular or pyelo-lymphatic reflux due to pressure irrigation during pyeloureteroscopy was incriminated as a specific complication in patients with upper urinary tract urothelial cancers. Studies triggered by this hypothesis demonstrated that there are no long-term negative effects associated with this diagnostic procedure in patients that were subject to radical surgical treatment [15].

Kulp and Bagley studied 13 patients with upper urinary tract transitional cell carcinoma diagnosed by ureteroscopy and biopsy and treated by radical nephroureterectomy. The authors identified vascular/lymphatic extension in only one of

these patients. However, in this case, due to the tumor growth characteristics, extension was suspected prior to endoscopy [16].

In a similar manner, Hendin, Streem and Levis studied 96 patients with upper urinary tract transitional cell carcinoma treated by radical nephroureterectomy or distal ureterectomy, with negative margins at hystopathological examination. Patients were divided in two groups: 48 patients who underwent preoperative diagnosis ureteroscopy and 48 in which this procedure was not performed. Metastases developed in 18.8% of the control group patients and in 12.5% of the patients of the study group, while 10.4% of the patients of each group died of distant progression. Kaplan-Meier estimates were 0.67 vs. 0.71 for metastasis-free survival at 5 years and 0.87 vs. 0.76 for overall 5-year survival for the study and control groups, respectively. Statistically similar data for both groups sustained the clinical safety of this investigative method [17].

Conclusions

Retrograde flexible ureteroscopy may be a useful investigative method of upper urinary tract pathology, especially in those cases in which imagistic evaluation doesn't offer suggestive information.

In some cases, approach of the inferior calyx may be difficult using this method.

Follow-up of patients with upper urinary tract urothelial carcinoma treated in a conservative manner must include periodic flexible ureteroscopy, in order to identify tumoral recurrences as soon as possible.

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