



URINARY TRACT INFECTION IN PATIENTS WITH SOLITARY KIDNEY

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Summary. *Since the introduction in wider use of kidney transplants from living related donors, the incidence of solitary kidney (SK) has been growing, generating new questions for the nephrologist about this particular item, especially its possible evolution towards CRF. In our study we evaluated the association urinary tract infection (UTI) UTI-SK (incidence, clinical aspects, evolution). We investigated 103 SK patients hospitalized in The Nephrology Department-Timisoara from 1983 to 1995 (36 males, 67 females, mean age 45 ± 11 years). UTI was found in 49.51% of the cases (germs involved: E. coli-58.06%, Clostridium perfringens-9.67%, Proteus-3.22%, Enterobacter-3.22%, others-9.67%, association-16.12%). A high percentage, 60.71% of the patients developed UTI 14.2 years (on average) after nephrectomy, and 39.29% before it. HT was more frequent in patients with UTI (50.98% of the cases). CRF was present in 49.01% of the cases with UTI but only in 28.84% of the SK patients without UTI ($p=0.0357$). In conclusion, we can note that UTI is frequently associated to SK and accelerates its evolution toward CRF.*

Key words: *Solitary kidney, urinary tract infection, hypertension, chronic renal failure*

Introduction

Solitary kidney (SK) has always been a problem for the nephrologist because of its particular clinical, therapeutical and evolutive aspects. There is no specific pathology related to SK, but an increase in the incidence of the ordinary pathology is obvious (1,2). It is generally accepted that the urinary tract infection (UTI) is the most frequent morbid association in a person with SK. However, there are studies which consider the condition of a single kidney as normal and recommend renal transplantation from living related donors.

The aim of this paper is to evaluate the relation between UTI and SK (incidence, clinical, evolutive and therapeutical approach).

Materials and Methods

This is retrospective study performed on a group of 103 patients with SK, hospitalized in The Nephrology Department-Country Hospital Timisoara from 1983 to 1995 (36 males, 67 females, mean age 45 ± 11 years).

They were followed up for: blood pressure, obstructive nephropathy, urine culture, leukocyturia, haematuria, creatinine clearance, serum creatinine, the efficacy of antibiotherapy (where it was indicated).

Results

UTI was found in 51 patients (49.51% of the SK cases).

Thirty-one patient showed positive urine cultures with E. Coli in 58.06% of the cases, Clostridium perfringens-9.67%, Proteus-3.22%, Enterobacter-3.22%, others-9.67%, association of two or more germs-16.12%.

In 20 patients urine cultures were negative but these patients had received antibacterial therapy before being admitted to hospital.

Obstructive nephropathy was found in 44 patients (42.71% of the cases). A total of 65.90% of them showed UTI.

The time relation between nephrectomy and UTI could be exactly determined in 28 patients: 17 of them underwent nephrectomy 14.2 years (on average) before UTI and 11 showed UTI history 8 years (on average) before nephrectomy.

Antibiotherapy was effective in all cases.

HT was found in 50.98% of the SK patients who associated UTI and in 38.46% who did not.

CRF was present in 49.01% of the cases with SK and UTI (25 patients, 14 of them being hypertensive), whereas patients with SK without UTI showed CRF in 28.84% of the cases.

Discussion

In the late 80s-early 90s, when kidney transplantation was developed as a common solution for end-stage renal disease, doctors had to give an answer to living related donors if single kidney is the first step towards CRF or not.

In countries in which living related donor transplants are very frequent (Norway), the studies which have been undertaken demonstrate that SK is not a risk factor for CRF (3). Nevertheless, there are other papers which underline the idea that, in time, the process of renal sclerosis is more accelerated in persons with SK if oral protein intake is not reduced.

That is why in our study we have investigated the most frequent pathology associated to SK condition and its cardinal complications.

Our study has revealed a high incidence of UTI in patients with SK (49.51% of the cases), but they underwent an implicit selection by their addressability towards a nephrology department.

Thirty-one patient showed positive urine cultures, whereas 20 showed negative urine cultures (these patients had received antibacterial therapy before their admission to our ward). It is still possible that these patients developed clinical and biological signs of UTI due to a cytokine reaction provoked by the adhesion of unviable parts of *E. coli* to the uroepithelium of upper urinary tract (4).

E.coli was found in 58,06% of the cases, *Clostridium perfringens*-9.67%, *Proteus*-3.22%, *Enterobacter*-3.22%, others-9.67%, association-16.12%, respectively, as expected in cases with many and/or prolonged periods of hospitalization (5).

Four patients had congenital SK and all of them developed UTI in the absence of obstructive nephropathy, revealing a high risk of UTI in patients with congenital SK, which, however, needs further studies in order to be quantified.

Obstructive nephropathy (ON) is a risk for UTI [RR=1.77 (1.19<RR<2.62)] (Fig.1). A major part (42.71%) of SK patients showed obstructive nephropathy (44 patients: 29 of them developing UTI, see Fig.1). As stated before, obstructive nephropathy is a important risk factor of UTI in SK patients, also.

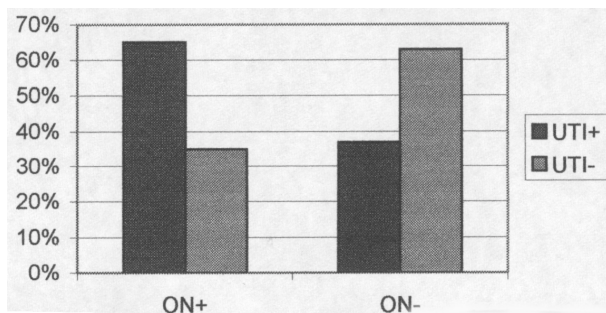


Fig. 1. UTI in patients with obstructive nephropathy (ON).

We could exactly describe the temporal relationship between nephrectomy and UTI in 28 cases: 60.71% of them underwent nephrectomy before developing UTI with an average period of 14.2 years, whereas 39.29% showed UTI before nephrectomy (mean period: 8 years).

There is not a relation UTI-HT in SK patients [RR=1.33 (0.86<RR<2.05)]. (Fig.2). In SK patients, there is no significant relation between HT and UTI, as can be seen in Fig.2.

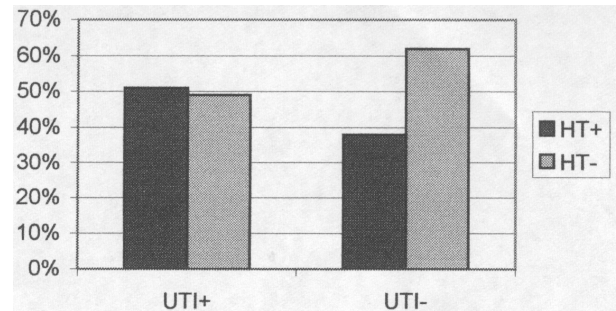


Fig. 2. Relation of UTI and hypertension (HT).

In Fig.3, we represent the relation CRF-UTI in SK patients, which demonstrates that UTI is a risk of developing CRF in these cases. UTI is a risk factor for CRF [RR=1.70 (1.02<RR<2.83)] (Fig.3).

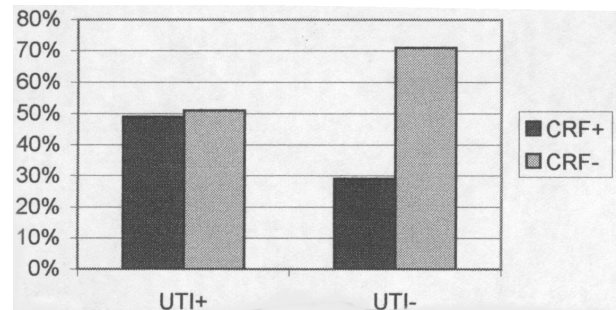


Fig. 3. Relation of UTI and chronic renal failure (CRF).

In Fig.4, we summarize the association CRF-HT in cases without UTI, showing a strong correlation between these two variables. The SK patients without UTI shoe a strong correlation CRF-HT [RR=4.58 (2.28<RR<9.19)] (Fig.4).

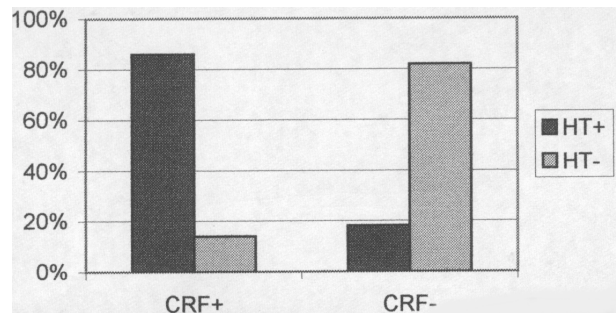


Fig. 4. Association of CRF and HT in patients without UTI.

If we consider the cases with UTI, we can see in Fig.5 that the relation between CRF-HT is not significant. In those cases, HT is determined by multiple factors: the condition of solitary kidney itself, UTI and CRF.

There is not a significant correlation between CRF and HT in UTI patients [RR=1.21 (0.71<RR<2.09)] (Fig.5).

We can note that the incidence of UTI in SK patients is high. If obstructive nephropathy is present, the risk of developing UTI in these patients is even higher. It seems that UTI accelerates the evolution of SK towards CRF.

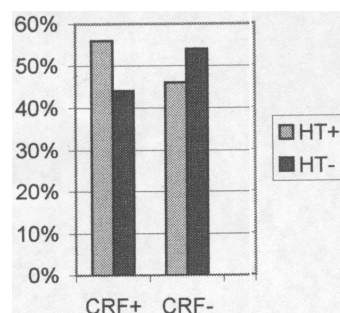


Fig. 5. Association of CRF and HT in patients with UTI.

That is why we consider that UTI should be carefully assessed by the clinician from several points of view.

References

1. Beyer HJ, Hofmann V, Brettschneider D. Value of ultrasound in the treatment of solitary kidney in infancy and in childhood. In: Rickham PP (ed), Progress in Pediatric Surgery. Springer Verlag, Berlin, Heidelberg, 1989: 3-18.
2. Rockstroh H, Samtleben W. Die kompensatorische hypertrophie der restniere. Z Urol 1974; 67: 931.
3. Westlie L, Fauchald P, Talseth T, Jakobsen A, Flatmark A. Quality of life in Norwegian kidney donors. Nephrol Dial Transplant 1993; 8: 1146-1150.
4. Svanborg C, de Man P, Sandberg T. The renal involvement in urinary tract infection. Kidney Int 1991; 39: 541-549.
5. Rubin RH, Cotran RS, Tolkoff-Rubin NE. Urinary tract infection, pyelonephritis, and reflux nephropathy. In: Brenner BM (ed), Brenner and Rector's The Kidney. W.B. Saunders Comp. 1996: 1597-1650.

INFEKCIJA URINARNOG TRAKTA U BOLESNIKA SA SOLITARNIM BUBREGOM

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Kratak sadržaj: Kako se danas široko koristi kalem bubrega od živog davaoca, povećava se učestalost solitarnog bubrega, čime se otvaraju nova pitanja za nefrologa vezana za ovaj bubreg, naročito za moguću evoluciju prema hroničnoj bubrežnoj insuficijencijom (HBI). U ovom radu procenjavana je povezanost infekcije urotakta (IUT) i solitarnog bubrega (učestalost, klinička slika, evolucija). Ispitivana su 103 bolesnika sa solitarnim bubregom (36 muškaraca, 67 žena uzrast 45 ± 11 godina) hospitalizovanih na Nefrološkoj klinici u Temišvaru od 1983. do 1995. godine. IUT je nadjena u 49,51% obolelih (uzročnici: E.coli-58,06%, Clostridium perfringens-9,67%, Proteus-3,22%, Enterobacter-3,22%, druge klice-9,67%, povezanost-16,12%). Visok procenat, 60,71% obolelih, razvili su IUT u proseku 14,2 godine posle nefrektomije, a 39,29% pre tog vremena. Hipertenzija je bila mnogo češća u bolesnika sa IUT, u 50,98% obolelih. HBI je bila prisutna u 49,01% obolelih sa IUT a samo u 28,84% obolelih sa solitarnim bubregom bez IUT ($p=0,0357$). U zaključku, nadjeno je da je IUT često povezana sa solitarnim bubregom i da ubrzava evoluciju bolesti prema HBI.

Ključne reči: Solitarni bubreg, infekcija urinarnog trakta, hipertenzija, hronična bubrežna insuficijencija

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