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Asymptomatic bacteriuria in patients on continuous ambulatory peritoneal dialysis

The symptoms and signs of urinary tract infections (UTI) depend on the host response to the infecting bacterial strain (5, 7, 8, 9, 10, 12). Patients on chronic ambulatory peritoneal dialysis (CAPD) show chronic immunodeficiency state connected with renal failure (RF) and dialysis procedure (3, 5, 9, 11). Chronic inflammatory state and chronic infections appear to be some of the most important factors of morbidity and mortality in patients (pts) on dialysis (1, 4, 6). We did not find data about the frequency of asymptomatic UTI in CAPD pts with diuresis. There are many factors which could predispose these patients to urinary tract infections: immunodeficiency state connected with uremia; abdominal distension connected with the presence of dialysis fluid in peritoneal cavity and constipation; old age; diabetes (1, 10, 13). It is worth to note that these patients are often treated with antibiotics because of peritonitis. Taking into consideration the above mentioned factors we decided to estimate the frequency of asymptomatic urinary tract infections in chronic renal failure patients on CAPD, and to identify bacterial strains and their susceptibility to chemotherapy.

MATERIAL AND METHODS

The prospective study included 43 (22F, 21M) clinically stable, asymptomatic CAPD pts with diuresis ranged from 300 to 2500 ml per 24 h. Clinical data of the studied patients are shown in Table 1. Clean catch urine specimen was obtained from each patient for detection and quantification of leukocyturia and bacteriuria. Urine was cultured using

the standard calibrated loop technique. All organisms were identified by standard technique. Results are reported as colonies per millilitre of urine. 15 ml of urine were centrifuged for 5 min at 2,500 rpm and sediment suspended in 1ml of urine was examined microscopically.

Table 1. Clinical data contributed by 43 patients

Diagnosis of primary renal disease	Pts without infection (31)	Infected pts (12)
Chronic gln	11	3
Diabetes t. 1	2	2
Diabetes t. 2	5	5
Nephrosclerosis	6	2
Interstitial nephritis	4	0
Other	3	0
Age	54±15.4 (22-76)	53.9±11.9 (37-72)
Gender	13 F 18 M	9 F 3 M
Time on dialysis (m)	17.9±16.4 (3-78)	19.2±14.9 (6-52)
Diuresis ml/24 hrs	1,290±747 (300-2,500)	745±476 (300-2,000)

RESULTS

Urine from 31 patients had no significant organism growth; from 12 patients (28%) urine grew > 100,000 colonies per ml. Eight patients had been infected with *E. coli*, 2 pts with *Proteus mirabilis*, one with *Enterococcus gallinarum*, one with *Klebsiella oxytocea*. Infected pts had significantly lower urine volumes per 24 hours, 7/12 infected pts and 7/31 of not infected patients were diabetic. None of the patients reported any symptoms suggesting the presence of UTI.

Examples of results of urine culture:

	50-year-old male diabetic CAPD patient *E. coli* 10^5	47-year-old female CAPD patient with glomerulonephritis *E. coli* 10^5
Amoxicillin	R	R
Ampicillin	R	R
Carbenicillin	R	R
Ceftriaxone	R	R
Cephalothin	R	R
Ciprofloxacin	R	R
Gentamycin	R	R
Nitrofurantoin	R	S
Norfloxacin	R	R
Ofloxacin	R	R
Tetracyclin	R	R
Trimetoprim/sulfa	R	R

These patients had leukocyturia < 10 WBC/HPF. 67% percent of infected pts and 13% of noninfected pts had leukocyturia >10 WBC/HPF.

DISCUSSION

In our study 28% of asymptomatic CAPD patients with diuresis grew, greater than 1 x 10^5 /ml of single microorganism in their urine culture. Chaudhry et al. who analysed a group of HD with diuresis found asymptomatic urinary tract infection in 31% of patients /2/ UTI are particularly common in CAPD pts but may be overlooked as source of infection in CAPD dialysis population. Such reservoir for infection in CAPD pts could lead to pyelonephritis, perinephric abscess. Several factors depress the immune system patients on dialysis and thus make them more susceptible to infection (2–6, 9). Similarly to patients without uremia in CAPD patient, women and diabetics were more susceptible to infection in our study.

As it is shown in examples of our 2 patients, microorganisms which caused infection were resistant to many common chemotherapeutics and antibiotics. There are many reasons for it. Very often they have hospital origin infection with resistant bacterial strain (10, 11). Another important factor determining resistance of bacterial strain is connected with repeated treatment of CAPD patients with many antibiotics because of peritonitis. From the clinical point of view there are very important two questions: whether and how to treat such asymptomatic urinary tract infection. This question is especially important for patients from transplantation waiting list.

CONCLUSIONS

1. Urinary tract in CAPD patients with diuresis represents potentially clinically significant reservoir for infection.
2. Diabetes mellitus and low urine volumes are additional predisposing factors for UTI in peritoneally dialyzed patients.
3. *E. coli* is the most common bacterial strain.
4. Pyuria is a valuable parameter of urinary tract infection in CAPD patients.
5. Bacterial strains found in urine of end stage renal disease patients are very often resistant to the most common antibiotics and chemotherapeutics.
6. The question whether asymptomatic urinary tract infection in dialysis pts should be treated still remains to be answered.

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SUMMARY

Chronic inflammatory state and chronic infections appear to be one of the most important risk factors of morbidity and mortality in patients (pts) on dialysis The aim of our study was to determine the frequency of urinary tract infections (UTI) in clinically asymptomatic patients on CAPD. The study included 43 (22F, 21M) clinically stable asymptomatic CAPD patients with diuresis ranged from 300 to 2500 ml per 24 h. Clean catch urine specimen, was cultured and identified by standard technique. Urine from 31

patients had no significant organism growth, from 12 patients grew over 100,000 colonies per ml; 8 patients had been infected with *E. coli*, 2 pts with *Proteus mirabilis*, one with *Enterococcus gallinarum*, one with *Klebsiella oxytocea*. 7/12 infected pts were diabetic, 67% infected and 13% not infected pts had pyuria. Conclusions: Immune system disturbance and renal failure can predispose to common asymptomatic UTI in CAPD pts. *E.coli* is the most common bacterial strain found in infected dialysis pts. Diabetes mellitus is and additional predisposing factor for UTI in patients on CAPD. Pyuria is a valuable parameter of UTI in CAPD patients.

Bezobjawowe zakażenia układu moczowego u chorych leczonych ciągłą ambulatoryjną dializą otrzewnową

Przewlekłe zakażenie i przewlekły proces zapalny są znanymi czynnikami ryzyka zachorowalności i umieralności chorych dializowanych (ChD). ChD są bardziej podatni na infekcje z powodu zaburzeń odporności komórkowej i humoralnej. Zakażenia przebiegają u nich często ze słabo wyrażonymi objawami ogólnymi. Celem pracy było określenie częstości bezobjawowych zakażeń układu moczowego (BZUM) u chorych leczonych ciągłą ambulatoryjną dializą otrzewnową (CADO). Badaniami objęto 43 osoby (22 K, 21 M), średni wiek badanych wynosił 54 lata (od 22 do 76 lat), diureza dobowa od 300 do 2500 ml. Badani chorzy nie wykazywali żadnych objawów klinicznych infekcji. Posiewy moczu były wykonywane dwukrotnie. Jednocześnie była określana leukocyturia.W wyniku przeprowadzonych badań uzyskano następujące wyniki: 31 chorych miało ujemne posiewy moczu. U 12 chorych uzyskano wzrost bakterii > 100000 kolonii na ml, 8 wśród nich było zakażonych *E.coli*, 2 – *Proteus mirabilis*, 1 – *Enterococcus gallinorum*, 1 – *Klebsiella oxytocea*. Leukocyturię powyżej 10 leukocytów w polu widzenia miało 8/12 chorych z BZUM (67%) i 4/31 niezakażonych (13%). 7/12 zakażonych miało cukrzycę. Wnioskujemy, że w danej grupie chorych dializowanych CADO z zachowaną diurezą najczęstszym patogenem była *E. coli* (w badanym materiale u 28%). Cukrzyca sprzyja występowaniu BZUM u ChD, znamienna leukocyturia może sygnalizować BZUM u leczonych CADO.