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Urinary tract infection in Children Hospitalized at Constanta Clinical Infectious Diseases Hospital

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ABSTRACT

Introduction: In pediatrics, the urinary tract infection is one of the most frequent bacterial infection, representing an important health problem due to its high incidence, wide etiology, asymptomatic evolution, and multiple and sever complications, relapses and sequelae."

Material and Method: We evaluated 45 children, aged between 6 months and 16 years, diagnosed and treated for urinary tract infection at the Clinical Infectious Diseases Hospital, of Constanta County, in a period of 3 years and 6 months.

Results: During studied period, between January 2014 and June 2017 from a total of 9343 patients admitted to the Constanta Clinical Infectious Diseases Hospital, we selected 45 children (4.81‰) diagnosed with urinary tract infection.

The average age of children with urinary tract infections was 5 years and 5 months. The gender distribution revealed a 2:1 balance in girl's favor. The most affected group of age was 1-3 years. Fever was the dominating symptom. Urine cultures were positive for 37 cases, meanwhile for eight cases had been negative. The predominant germs are E. coli for female and for male Proteus. We noticed that for E. coli the highest sensitivity is preserved to Ertapenem -15 cases, followed

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by Ceftriaxone and Ciprofloxacin -10 cases each, and Gentamycin -9 cases.

Conclusions: Pediatric urinary tract infection should be considered in every patient under 3 years with unexplained fever.

Keywords: urinary, infection, germs, pediatrics

Introduction

Discussing about pediatric urology is difficult, complex and often encountered. We analyze from congenital and acquired malformation until benign or malignant tumors. All of those usually have one single type of clinical manifestations- urinary tract infection (UTI) [1].

One major point in pediatric activity is represented by UTI, which were on 3rd place as frequency of cases. It has been classified as an important stress factor for the family, the patient itself and for the medical team due to the high risk of permanent kidney damage, especially when are involved other medical reasons such as malformations, or tumors [2].

In pediatrics, the UTI is one of the most frequent bacterial infection, representing an important health problem due to its high incidence, wide etiology, asymptomatic evolution, and multiple and sever complications, relapses and sequelae [3]. We focused our attention on early diagnosis and adjusting the treatment according to the present manifestations, possible evolution to chronic disease, relapses and permanent kidney damages.

Material and Method

We evaluated 45 children, aged between 6 months and 16 years, diagnosed and treated for urinary tract infection at the Clinical Infectious Diseases Hospital, of Constanta County, during 2014 - 2017 (3 years and 6 months).

The analyzed group was gathered after fulfilling a set of rules, such as: demographic affiliation, therapeutically standards, laboratory and clinical findings, parents/ caregivers signing the inform consent and obtaining the favorable opinion of the ethics committee of the hospital.

In order to gather written information we elaborated surveillance charts. They were completed using patients 'observation charts from January 2014 until June 2017, laboratory data (urinalysis – physical, chemical and microscopically findings) and microbiology data (urine culture and sensitivity test).

The urinary tract infection diagnose was established after evaluating the therapeutically and clinical data (general and urinary signs and symptoms), laboratory findings (urinalysis – physical, chemical and microscopically, urine culture and sensitivity test).

Leukocyturia associated with positive urine culture (germs in urine more than 10⁵ colony-forming units /ml) were considered the decisive argument for diagnosis.

Results

During a period of 3 years and 6 months, between January 2014 and June 2017 from a total of 9343 patients admitted to the Constanta Clinical Infectious Diseases Hospital, we selected 45 children (4.81 ‰) diagnosed with urinary tract infection. The addressability for this infection in our hospital is not very common; the cases diagnosed with urinary tract infection in our hospital were patients with prolonged fever or patients that associate this infection with other infectious diseases pathology.

25 patients were diagnosed at their first episode of UTI. The other 20 children with urinary infection were diagnosed after a complete laboratory and clinical evaluation regarding their unfavorable evolution under treatment for other diseases or for prolonged fever syndrome.

The year 2014 is leader with 20 cases, followed by year 2015 with 11 cases, and years 2016, and 2017 each with 7 cases.

The average age of children with urinary tract infections was 5 years and 5 months.

The gender distribution revealed a 2:1 balance in girls favor, having 30 diagnosed cases and only 15 for boys. In each studied year repartition by sex evidenced also that girls were more affected than boys: in year 2014 were 13 girls from total 20 cases; in year 2015 were 9 girls from 11 cases; and in year 2016 and 2017, each with 4 girls from total 7 cases.

Repartition by environmental area evidenced that majority of children were from urban area -35 cases, just 10 cases were from rural area.

The most affected group of age was 1-3 years with 17 cases, followed by 7-12 years with 14 cases, 4-6 years with nine cases, 13-16 years with three cases. In infants less than 1 year, we discovered just two cases.

Fever was the symptom most often noticed. In 25 cases, the urinary tract infection had different clinical findings. Out of these just 17 cases presented fever, and other eight cases did not. Repartition of patients according with presence of fever evidenced that in children aged between 1-3 years were seven cases, followed by children between 7-12 years with six cases, and children aged 4-6 years with just 3 cases.



Figure 1 - Symptoms associated with UTI



Figure 2 - Specific urinary tract infection manifestation, according to age

In asymptomatic infections is important to evaluate urinalysis. From the total 20 cases of asymptomatic infections in our study, we found important bacteriuria in 12 cases, leukocyturia in 9 cases, nitrites in 6 cases, microscopic hematuria in 5 cases, leukocyte cylinders in 1 case.

Urine culture had been positive for 37 cases, meanwhile for eight cases had been negative.

After analyzing the gender distribution, we noticed the predominance of E. coli infection in girls with 15 cases, and Proteus mirabillis in boys with five cases.

The urinary tract infections diagnosis was established through urine culture. In four cases, we

isolated two types of bacteria and in 33 cases one type of bacteria.



Figure 3 - Isolated germs from urine culture in relation with sex

The sensitivity of 17 strains of E. Coli isolated from urine culture to antibiotics is presented in figure no. 4. We noticed that the highest sensitivity is preserved to Ertapenem -15 cases, followed by Ceftriaxone and Ciprofloxacine -10 cases each, and Gentamycin -9 cases. The highest resistance was noticed to Ampicillin -9 cases, Amoxicillin/clavulanic acid -8 cases and Nalidixic acid – 6 cases.



Figure 4 - E. Coli sensitivity to antibiotics

The sensitivity of Proteus strains isolated from urine culture to antibiotics is presented in figure no. 5. We noticed that all strains were with sensitivity preserved to Ertapenem, followed by Ceftriaxone whith 6 cases, Amoxicillin/clavulanic acid and Gentamycin, with 5 cases for each. There were registered two strains that were resistant to Ampicillin and Ciprofloxacine, and intermediate to Nalidixic acid.



Figure 5 - Proteus sensitivity to antibiotics

Antibiotic treatment was conducted according with results from microbiology and antibiotic sensitivity tests. When we use monotherapy, the antibiotics of choice were Ceftriaxone or Ertapenem. When we used combinations of antibiotics, we used Ampicillin in association with Gentamycin.

Recurrent urinary tract infection was noticed in 14 cases and in 5 cases, we had persistent infection. At their first episode were 31 cases.

Although our study was an observational one we did not noticed any chronic disease or permanent kidney damages in all cases studied.

Discussions

UTI is one of the most frequent pathologies encountered in pediatric activity [4]. The necessity to evaluate this clinical entity became obvious due to its atypical or asymptomatic manifestations, which lead to a late diagnosis and possible permanent kidney damages (with all that this presumes).

All patients had been thoroughly examined and had a detailed medical history completed. The urine was collected in sterile bottles and has been analyzed according to our laboratory standards methods.

The gender distribution was predominant for females. The international literature sustains our findings. According to Khursheed et al. (in a study published in 2016), after analyzing 304 patients, the predominant group was female. The most affected group age, as in our study, was 1-3 years [5].

Although our studied group is small the most affected group of age was 1-3 years (17 cases), followed by 7-12 years (14 cases), and 4-6 years (9 cases). Our information is in accordance with other studies like that performed by Marild and Jodal. This study was conducted on 41 000 patients and revealed that under 6 years it had encountered de higher incidence of urinary tract infections [6].

From the total of asymptomatic patients 17 cases presented fever with no other apparent symptoms associated, and 7 cases were between 1-3 years. We can underline that fever with or without any other associated clinical manifestations is a suggestive sign for urinary tract infection [5,7,8,9].

From under 1 year until preschoolers (1-3 years old) the clinical manifestations of urinary tract infections are atypical. They vary from diarrhea, loss of appetite, mood disorders, until dehydration, abdominal pain, agitation, pale skin, chills, cold sweats, cyanotic extremities. [10] Children older than 3 years old and adolescents have particular clinical findings: lumbar pain, nausea, headache, weight loss and fatigue. Our finding had the same impact as the international medical literature [7,11,10].

E. coli and Klebsiella for girls and Proteus mirabillis and Klebsiella for boys occupy the first two places as isolated organisms. Our data even at small scale are in accordance with international medical researches [5,11].

The most frequent isolated germ from urine culture is E coli. E. coli is a germ that can affect more often the intestine and the urinary tract [12,13].

Regarding sensitivity of E coli to antibiotic we found that comparative with year 2012 there were no major changes in antibiotics sensitivity in our area [12].

Because undiagnosed urinary tract infections could lead to permanent kidney damage, it is important to recognize and treat any child in order to prevent these complications.

Conclusions

Pediatric urinary tract infection should be considered in every patient under 3 years with unexplained fever.

It is important to elaborate clinical guidelines according to geographical area, patient's age and type of isolated microorganisms.

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