URINARY SYSTEM BIRTH DEFECTS IN SURGICALLY TREATED INFANTS IN SARAJEVO REGION OF BOSNIA AND HERZEGOVINA

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Abstract

Congenital anomalies of the urinary system are relatively common anomalies. In Bosnia and Herzegovina there is no existent unique evidence of congenital anomalies and registries. The aim of this study was to obtain the frequency of different urinary tract anomalies types and their sex distribution among cases hospitalized in the Department of Pediatric Surgery of the University of Sarajevo Clinics Centre, Bosnia and Herzegovina, during the period from January 2002 to December 2006. Retrospective study was carried out on the basis of clinical records. Standard methods of descriptive statistics were performed for the data analysis. Among 289 patients that were surgically treated 62,37% of the patients were male patients, while 37,63% were female patients. Twenty nine different urinary system anomalies types were found in this study. These were: vesicoureteral reflux (99 cases or 30,75%), hypospadias (62 cases or 19,26%), pelviureteric junction obstruction (42 cases or 13,04%), megaureter (35 cases or 10,87%), duplex pelvis and ureter (16 cases or 4,97%), bladder diverticulum (8 cases or 2,48%), ureterocoele (7 cases or 2,17%), stenosis of the external urethral opening (6 cases or 1,86%), ectopic kidney, duplex kidney and pelvis (each 5 cases or 1,55%), polycystic kidneys and urethral stricture (each 4 cases or 1,24%), multicystic kidney (3 cases or 0,93%), kidney agenesis, ureter agenesis, urethral diverticulum, ectopic ureter, horseshoe kidney and fetal kidney (each 2 cases or 0,62%), renal aplasia, urethral atresia, renal cyst, urachal cyst, epispadias, bladder exstrophy, renal hypoplasia, renal malrotation and Prune-Belly syndrome (each 1 case or 0,31%). According to this study, urinary tract anomalies were more common in male than in female patients (62,37%). Generally, the most frequent anomaly type was vesicoureteral reflux in total number of 99 cases, and in females (66 cases), but hypospadias was the most common anomaly in males (62 cases). The anomalies of other systems associated with urinary system anomalies were found in ten cases. These were: cryptorchidism, congenital inguinal hernia, open inner inguinal ring, uterus bicornis unicollis and one case of multiple anomalies.

KEY WORDS: congenital anomalies, urinary system, frequency, sex distribution

Introduction

Congenital anomalies were defined as structural defects, chromosomal abnormalities, inborn errors of metabolism and hereditary disease diagnosed before, at, or after birth (1). Congenital anomalies represent a significant problem because of their frequency, unclear origin and the consequences for the society. The data of congenital anomalies in the different parts of the world are different due to differences in ecological, socio-economic, geographic and other conditions of living. The European Economic Community's Committee on Medicinal and Public Health Research started already in 1979., a multicentric epidemiological study of congenital anomalies through the project called EUROCAT (European Concerted Action on Congenital Anomalies and Twins) (2). Congenital anomalies are registered in almost every country all over the world on special designed questionnaires. The management and outcome, however, vary considerably between the developed and the developing countries. Due to the significance of congenital malformation in perinatal morbidity and mortality and its various types and diverse incidences in several countries, it is important for each population, even on regional basis, to know the distribution and incidence of congenital malformations (3). In Bosnia and Herzegovina there is no existent unique evidence of congenital anomalies and registries (4). Congenital anomalies of urinary system are relatively common contributing 3% of live births (5). About 30 % of all anomalies are anomalies of the urinary system. Anomalies of kidney form a significant percentage of them (6). Congenital and hereditary urinary tract abnormalities include a wide spectrum of defects ranging from gross abnormalities of morphogenesis, often incompatible with life (i.e., bilateral renal agenesis), to more subtle disorders of renal function (i.e., tubular dysfunction) frequently recognised later in life. Defects can be bilateral or unilateral, and different defects often coexist in an individual child (7). Because congenital anomalies of the kidney and urinary tract (CAKUT) play a causative role in 30 to 50 percent of cases of end-stage renal disease (ESRD) (8), it is important to diagnose and initiate therapy to minimize renal damage, prevent or delay the onset of ESRD, and provide supportive care to avoid complications of ESRD. CAKUT are problems that often require surgical intervention or, in the worst case, lead to renal failure and the need for dialysis and/or renal transplantation (9). Prenatal diagnostics allows their early detection (10). One third of anomalies, which are detected in prenatal ultrasonography become urinary tract abnormalities. Diagnostics followed by an effective treatment prevents the development of irreversible changes in kidneys. Urinary tract infections, especially recurrent cases, are an obligatory indication to perform urinary tract imaging (11). The aim of this study was to obtain the frequency of different urinary system anomalies types and their sex distribution among cases hospitalized in the Department of Pediatric Surgery at the University of Sarajevo Clinics Centre, Bosnia and Herzegovina, during the period from January 2002 to December 2006.

Patients and Methods

Retrospective study was carried out on the basis of the clinical records in the Department of Pediatric Surgery of the University of Sarajevo Clinics Centre, Bosnia and Herzegovina. From 1st January 2002 to 31st December 2006, a total of 289 patients with urinary tract malformations were hospitalized. The cases were divided in groups by different types of urinary tract malformations. Standard methods of descriptive statistics were performed for the data analysis.

Results

The structure of patients with urinary anomalies treated in the Department of Pediatric Surgery of the University of Sarajevo Clinics Centre according to the gender is shown in Table 1. A total of 289 cases were treated in the period from 2002 to 2006. Out of that number 181 (62,37%) were male patients, while 108 (37,63%) were female; sex ratio 1,68:1.

GENDER	**N°**	**%**
MALE	181	62,37
FEMALE	108	37,63
TOTAL	289	100,00

TABLE 1. Total number and gender of treated urinary sytem anomalies

Twenty nine different urinary system anomalies were found during this study and these were: vesicoureteral reflux (VUR) (99 cases or 30,75%), hypospadias (62 cases or 19,26%), pelviureteric junction obstruction (42 cases or 13,04%), megaureter (35 cases or 10,87%), duplex pelvis and ureter (16 cases or 4,97%), bladder diverticulum (8 cases or 2,48%), ureterocoele (7 cases or 2,17%), stenosis of the external urethral opening (6 cases or 1,86%), ectopic kidney, duplex kidney and pelvis (each 5 cases or 1,55%), polycystic kidneys and urethral stricture (each 4 cases or 1,24%), multicystic kidney (3 cases or 0,93%), kidney agenesis, ureter agenesis, ure-

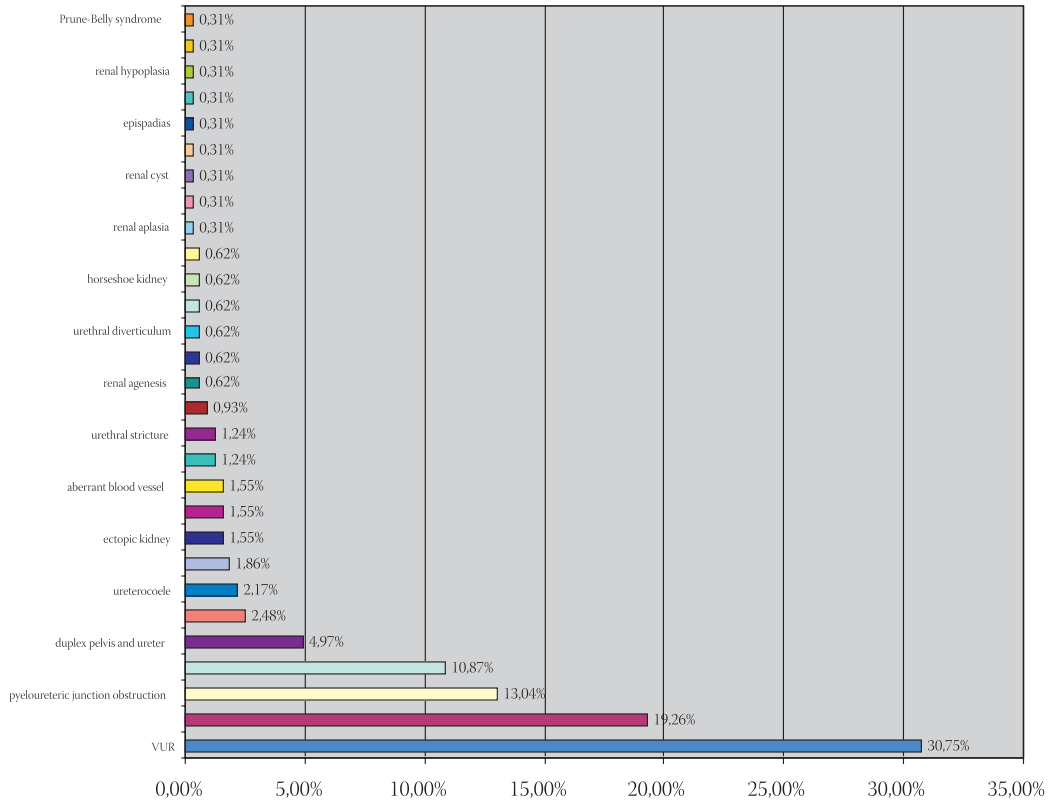

FIGURE 1. Frequency of particular types of urinary system birth defects

thral diverticulum, ectopic ureter, horseshoe kidney and foetal kidney (each 2 cases or 0,62%), renal aplasia, urethral atresia, renal cyst, urachal cyst, epispadias, bladder extrophy, renal hypoplasia, renal malrotation and Prune-Belly syndrome (each 1 case or 0,31%) (Figure 1). Figure 1. shows the frequency of different urinary system birth defects types.

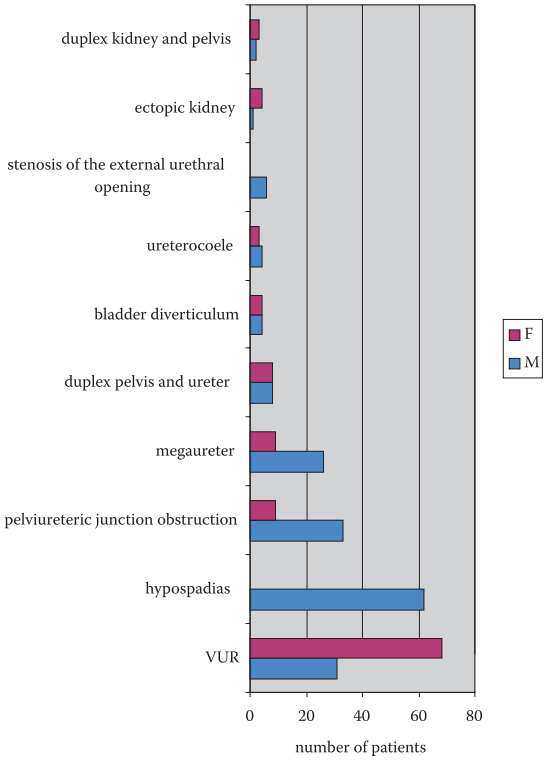

FIGURE 2. Sex distribution of the ten most frequent types of urinary system malformations cases

Figure 2 shows sex distribution among most common urinary system anomalies. The most common malformation found in girls was vesicoureteral reflux (66 cases or 56,7%), followed by pelviureteric junction obstruction and megaureter (each 9 cases or 7,50%), duplex pelvis and ureter (8 cases or 6,67%), ectopic kidney and bladder diverticulum (each 4 cases or 3,33%), duplex kidney and ureter and ureterocoele (each 3 cases or 2,50%), polycystic kidney disease (2 cases or 1,67%), renal agenesis, renal aplasia, urethral agenesis, ectopic ureter, bladder extrophy, renal hypoplasia, horseshoe kidney, fetal kidney, multicystic kidney and aberrant blood vessel (each 1 case or 0,83%). The most common anomaly found in boys was hypospadias (62 cases or 30,69%), followed by pelviureteric junction obstruction (33 cases or 16,34%), vesicoureteral reflux (31 cases or 15,35%), megaureter (26 cases or 12,87%), duplex pelvis and ureter (8 cases or 3,96%), stenosis of the external urethral opening (6 cases or 2,97%), urethral stricture, bladder diverticulum, aberrant blood vessel and ureterocoele (each 4 cases or 1,98%),

polycystic kidney (3 cases or 1,49%), urethral diverticulum, renal malrotation, multicystic kidney and duplex kidney and ureter (each 2 cases or 0,99%), renal agenesis, urethral atresia, renal cyst, urachal cyst, ectopic kidney, ectopic ureter, epispadias, horseshoe kidney, foetal kidney and Prune-Belly syndrome (each 1 case or 0,50%). The highest number of malformations was treated in 2006. (79 cases; 24,53%), followed by the number of malformations treated in 2002. (65; 20,18%), 2004. there were 64 malformations (19,88%), 2003. there were 60 malformations (18,63%) and the lowest number was presented in 2005. with 55 malformations (17,08%) (Figure 3).

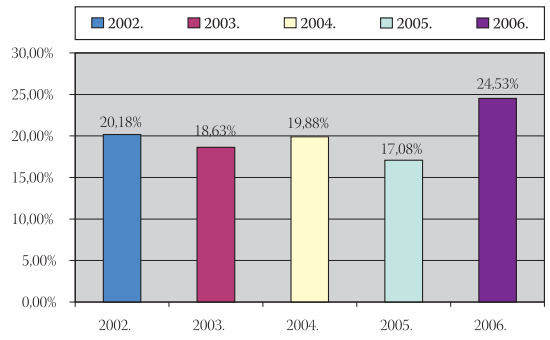

FIGURE 3. Frequency of anomalies in the observed period

The distribution of different types of hypospadias was as followed: penile hypospadias (34 cases or 54,84%), glandular hypospadias (13 cases or 20,97%), coronal hypospadias (6 cases or 9,68%) penoscrotal hypospadias (5 cases or 8,06%), scrotal hypospadias (2 cases or 3,23%), and finally subglandular and perineal (each 1 case or 1,61%). Structure of different hypospadias types treated in the Department of Pediatric Surgery from January 2002 to December 2006 is shown in Figure 4.

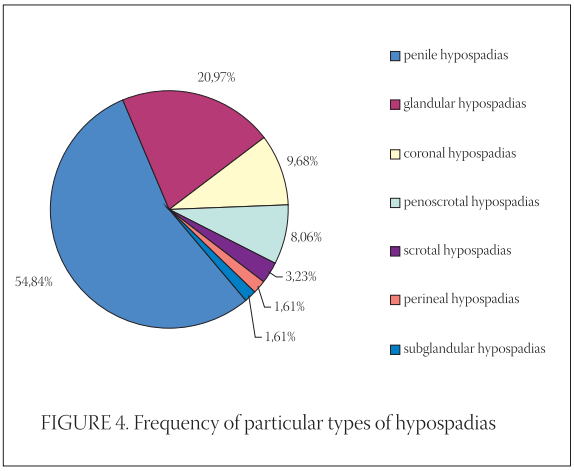

FIGURE 4. Frequency of particular types of hypospadias

Multiple malformations were found in ten cases (3,46 %); in seven male patients and three female patients. The anomalies of other organ systems associated with

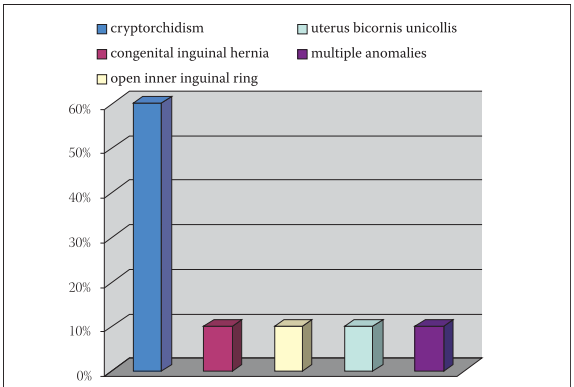

FIGURE 5. Anomalies of the urinary system associated with anomalies of other organ systems

malformations of the urinary system found during this study were: cryptorchidism, congenital inguinal hernia, open inner inguinal ring, uterus bicornis unicollis and only one case of multiple anomalies.

Discussion

In the period from 1st January 2002 to 31st December 2006 a total of 289 cases of anomalies of the urinary system were registered, and out of that number 181 were males (62,37%) and 108 were females (37,63%); sex ratio 1,68:1. Almost one third of the patients had vesicoureteral reflux (30,75%). VUR is followed by hypospadias (62 cases or 19,26%). According to the literature 87% of hypospadias are glandular hypospadias, 10% are penile hypospadias and 3% are the most severe posterior hypospadias (penoscrotal, scrotal and perineal) (6). Other authors quote that the most frequent form of hypospadias are glandular and subglandular hypospadias (almost 65% of all hypospadias), followed by penoscrotal and perineal with 20% and the penile form with 15% (12). The frequency of different types of hypospadias was as followed: penile hypospadias (34 cases or 54,84%), glandular hypospadias (13 cases or 20,97%), coronal hypospadias (6 cases or 9,68%) penoscrotal hypospadias (5 cases or 8,06%), scrotal hypospadias (2 cases or 3,23%), and finally subglandular and perineal (each 1 case or 1,61%). Hypospadias was followed by pelviureteric junction obstruction (42 cases or 13,04%), megaureter (35 cases or 10,87%), duplex pelvis and ureter (16 cases or 4,97%), bladder diverticulum (8 cases or 2,48%), ureterocoele (7 cases or 2,17%), stenosis of the external urethral opening (6 cases or 1,86%), ectopic kidney, duplex kidney and pelvis (each 5 cases or 1,55%), polycystic kidneys and urethral stricture (each 4 cases or 1,24%), multicystic kidney (3 cases or 0,93%), kidney agenesis, ureter agenesis, urethral diverticulum, ectopic ureter, horseshoe kidney and foetal kidney (each 2 cases or 0,62%), renal

aplasia, urethral atresia, renal cyst, urachal cyst, epispadias, bladder extrophy, renal hypoplasia, renal malrotation and Prune-Belly syndrome (each 1 case or 0,31%). Preliminary studies found that periconceptional use of a multivitamin reduced the risk for urinary tract defects (13). There was also noted a reduction in risk for urinary tract defects when multivitamin use was begun after the periconceptional period (14). Prevention of birth defects depends on risk identification and management through community and health service personnel education, population screening, genetic counselling and the availability of appropriate services (15). Many of congenital anomalies can be detected prenatally which demands a larger coordination between primary and other health cares in the sense of screening and genetic testing of possible anomalies. Prenatal verification of congenital anomalies can be achieved through prenatal diagnostics that should be appropriately developed (16). It is necessary to establish a unique system of evidence and registration. Adequate prevention would decrease the percentage of congenital anomalies as well urinary anomalies as all other which would reduce the expenses of treatment and rehabilitation, and which would have an advantageous effect on the whole community (2).

Conclusion

According to this study, urinary system anomalies were higher in males (62,37%). The ten most frequent types were: vesicoureteral reflux (30,75%), hypospadias (19,26%), pelviureteric junction obstruction (13,04%), megaureter (10,87%), duplex pelvis and ureter (4,97%), bladder diverticulum (2,48%), ureterocoele (2,17%), stenosis of the external urethral opening (1,86%), ectopic kidney, duplex kidney and pelvis (each 1,55%). Vesicoureteral reflux was the most frequent anomaly found in female patients although according to this study urinary system anomalies are more frequent in males. The highest number of anomalies was treated in 2006. The other organ system anomalies associated with malformations of the urinary system found in this study were: cryptorchidism, congenital inguinal hernia, open inner inguinal ring, uterus bicornis unicollis and only one case of multiple anomalies. They were found in ten cases, in seven male patients and three female patients. Registration of anomalies through the project EUROCAT should be set up in Bosnia and Herzegovina which would facilitate the obtaining of well documented databases. Population-based registries are a particularly powerful tool for the evaluation of health services, because they represent the experience of a whole community. Without this process there is no possible improvement of the health care.

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