Abnormalities of the urinary tract account for less than 25% of any detected congenital anomaly during pregnancy, and approximately 60% of them are obstructive uropathies. After the diagnosis of obstructive uropathy is made, there is a need for making a decision whether or not to terminate a pregnancy and to determine further diagnostic procedures and best management before and after birth. Making the decision includes multidisciplinary approach, and we have to know the outcome of anomalies. The aim of this study was to determine the outcome of antenatally detected obstructive uropathies in order to optimize counseling of the parents, and to give the right direction to the physician for managing that particular pregnancy. This study included all patients presented to the Consilium for fetal anomalies of Institute for Gynecology and Obstetrics of Clinical Center of Serbia and University Children Hospital, during the three-year-period. Antenatal diagnoses were compared with the results of autopsy, if the pregnancy was determined, or with the information obtained from the parents and clinical and operative findings if the pregnancy was continued. Of 111 antenatally detected urinary tract anomalies, 60 patients were diagnosed with fetal obstructive uropathy. Six pregnancies were terminated, and from 54 surviving infants, 5 had impaired renal function. Most of the children needed two to three surgical interventions on average. The overall conclusion for obstructive uropathies that can be drawn from this series is that the prognosis for renal function is excellent when oligohydramnios is absent before birth and when proper urological care is given postnatally. Almost all renal failures were in the group with progressive oligohydramnios in which labor was induced preterm. Poor outcome of fetuses with bilateral urinary tract obstruction combined with prolonged periods of oligohydramnios has been repeatedly described. Acta Medica Medianae 2008;47(1):47-51.

Key words: congenital anomaly, obstructive uropathy, outcome

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Introduction

Congenital anomaly is a disorder in the fetal development which can appear in any time of pregnancy, and can be expressed in antenatal as well as in postnatal period of life. The prevalence of any detected congenital anomaly during pregnancy is approximately 1-2%. Abnormalities of the urinary tract account for less than 25%, and near 60% of them are obstructive uropathies. Depending on the site of obstruction we differentiate hydrenephrosis, ureterohydronephrosis and megabladder. Ultrasonography is the best noninvasive method for detection the anomalies. During the ultrasound examination we can not only detect the anomaly, but also the site of obstruction, and using some ultrasound parameters (the amount of amniotic fluid, the echogenicity of renal parenchyma and corticomedular cysts), we can estimate renal function. Since only 25% of the cases with renal dysplasia are detected by ultrasound, biochemical assessment of fetal urine obtained by the function of fetal bladder, represents a complementary tool for assessing renal function and for diagnosis and prediction renal dysplasia. Biochemical parameters that are used are: sodium, chlor, calcium and beta 2-microglobuline. Isotonic fetal urine is indicative for irreversible pathologies of the proximal tubules. Amniocentesis and chordocentesis are used in order to exclude chromosomal abnormalities, since pyelectasis and lazy ureters are soft markers of trizomy, especially trizomy 21. Data of antenatal diagnosis are important for assessing prognosis. They may be helpful in making difficult decisions as to whether or not to terminate a pregnancy before viability, in determining the need for further diagnostic procedures and on the best management before and after birth. For making that decision we need multidisciplinary approach, and we have to know the outcome of anomalies.
Aims

The aim of this study was to determine the outcome of antenatally detected obstructive uropathy in order to optimize the counseling of parents.

Material and methods

This study included all patients presented to the Consilium for fetal anomalies of Institute of Gynecology and Obstetrics of Clinical Center of Serbia and University Children Hospital. The members of the Consilium are: gynecologist, perinatologist, pediatrician-cardiologist, pediatric surgeon, pathologist, and depending on the type of anomaly, surgeons from different fields were consulted. From all pregnant women who were presented to the Consilium between January 1, 2005 and December 31, 2007 because they were suspected to have some type of congenital fetal anomaly, we separated only those with fetal urinary tract anomaly, especially those with fetal obstructive uropathy. All patients underwent expertise ultrasound examination, and some of them underwent amniocentesis, choriodocentesis or fetal bladder puncture. Patients who were diagnosed with fetal renal anomaly incompatible with life were advised to terminate pregnancy. Patients with good prognosis for the infant were referred to the Institute for Gynecology and Obstetrics for delivery, and after delivery the infants were referred to the University Children Hospital. Follow-up data were obtained by chart review of Pediatric Urology and by contacting the pediatricians and general practitioners for information having obtained consent from parents. Clinical findings and/or autopsy reports were used to determine the postnatal outcome. Prenatal diagnoses were confirmed by postnatal ultrasound scans, radiological investigations, biochemical data on kidney function and surgical records.

Results

Table 1. The list of antenatally detected obstructive uropathies, number of survivors and mortality rate

<table>
<thead>
<tr>
<th>Type of anomaly</th>
<th>Total number</th>
<th>Survivors</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unilateral hydronephrosis</td>
<td>16 (26,6%)</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Bilateral hydronephrosis</td>
<td>29 (48,3%)</td>
<td>26</td>
<td>3</td>
</tr>
<tr>
<td>Unilateral megaureter with hydronephrosis</td>
<td>3 (5%)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Bilateral megaureter with hydronephrosis</td>
<td>4 (6,66%)</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Megabadder</td>
<td>8 (13,3%)</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>54 (90%)</td>
<td>6 (10%)</td>
</tr>
</tbody>
</table>

During the three-year period, 391 patients were examined, and 111 of them were confirmed to have some fetal urinary tract anomaly (28,1%). All patients were classified into three groups: fetal obstructive uropathy, fetal structural renal anomalies and fetuses with the anomaly of kidney number, fusion and position. Sixty patients were diagnosed with fetal obstructive uropathy (59, 4%) (Table 1).

Mortality

In 6 cases (10%), pregnancy was terminated before viability. The average time of termination was 24th week of pregnancy. There were two cases of obstructive uropathy associated with some other anomaly, then three cases with megabadder and severe oligohydramnios and one case of bilateral hydronephrosis, severe oligohydramnios and biochemical parameters which were pointed out to renal dysplasia. All fetuses were males (Table 2).

Table 2. The list of terminated pregnancies, average time of termination, gender and autopsy findings

<table>
<thead>
<tr>
<th>Mortality</th>
<th>Average time of termination</th>
<th>Gender</th>
<th>Autopsy finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urinary tract anomalies</td>
<td>Extrarenal anomalies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 (10%)</td>
<td>26 weeks of gest.</td>
<td>male (100%)</td>
<td>6 (100%)</td>
</tr>
</tbody>
</table>

Survivors

Fifty-four infants (90%) survived the antenatal period (Table 3). In one case (1,85%), the diagnosis was false positive. In two cases (3,78%), the diagnosis was wrong. Thirty infants (55,5%) had a solitary uni/or bilateral renal pelvis dilatation. In most cases, the size of dilated pyelon was between 10 and 25 mm. The cause of dilatation was vesicoureteric junction obstruction in 19 infants, and in the rest 11 VUR. Eleven infants (36,6%) underwent surgery, and needed two to three surgical interventions on average. One child (3,33%) has hypertension. Another 16 infants (29,6%) had a uni/or bilateral hydronephrosis in combination with uni/or bilateral megaureter. The causes of obstruction were: one case of vesicoureteric junction obstruction, 6 cases of ureter and pyelon duplex, 1 case congenital megaureter, 2 cases of posterior urethral valves and the rest infants had VUR or combination of VUR and contralateral pyelo-ureteric junction obstruction. Ten infants underwent surgery (62,5%), and needed two to three surgical interventions on average. Five infants (9,25%) had hydronephrosis in combination with mega-ureter and megabadder. In 4 cases the cause was posterior urethral valve and in one case narrowed urethra. All infants undergone surgery (100%) and also needed on average two to three interventions. Two infants (40%) had impaired renal function after the surgical interventions. In 4 cases (7,4%), labor was electively induced before 37 weeks of gestation because of the development of anhydramnions, and all infants had fist surgical interventions in the first days of life. Two infants with impaired renal function are in this group.
Table 3. The list of survived children, causes of obstruction, number of children who underwent surgery and with impaired renal function

<table>
<thead>
<tr>
<th>Postnatal diagnose</th>
<th>cause</th>
<th>Number of infants</th>
<th>Number of infants who underwent surgery</th>
<th>Number of infants with impaired renal function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solitary uni/bilatera hydronephrosis</td>
<td>-pyelo-ureteric junction obstruction -VUR</td>
<td>30(55,5%)</td>
<td>11(36,6%)</td>
<td>1(3,33%)</td>
</tr>
<tr>
<td>Hydronephrosis associated with megaureter</td>
<td>- pyelo-ureteric junction obstruction - vesico-ureteric junction obstruction -congenital megaureter -pyelon et ureter duplex -posterior urethral valve -VUR</td>
<td>16(29,6%)</td>
<td>10(62,5%)</td>
<td>2(12,5%)</td>
</tr>
<tr>
<td>Megabladder</td>
<td>- posterior urethral valve -narrowed urethra</td>
<td>5(9,25%)</td>
<td>5(100%)</td>
<td>2(40%)</td>
</tr>
</tbody>
</table>

Discussion

The mortality rate was relatively low (10%). The rate was highest in the cases of megabladder and bilateral hydronephrosis and severe oligohydramnios. All pregnancies were terminated before viability (mean 26 week of gestation). Similar data can be found in the great study of the University of Utrecht.

Outcome in the surviving infants was generally good, with impaired renal function in 7% of infants. Approximately, half of survivors needed on average two to three surgical interventions. Postnatal examination of infants revealed that the most frequent causes of obstructive uropathies are pyelo-ureteric junction obstruction, VUR and posterior urethral valves, and less frequent are congenital megaureter, ureter and pyelon duplex, narrowed uretra, and vesico-ureteric junction obstruction. VUR accounted for nearly 12% of antenatally diagnosed obstructive uropathies, which is slightly lower than 15% described by others. Kurjak et al. reported that fetuses with unilateral obstructive uropathy had 27% chance of having contralateral renal anomalies. Our percent is slightly lower (near 21%). Nearly half of infants underwent surgery. Surgery was needed in cases of hydronephrosis and megaureter (near 60%), especially in those infants who were postnatally diagnosed with pyelo-ureteric junction obstruction. Intervention rate was high in the group of infants with antenal diagnose of hydronephrosis when the cause was VUR. VUR predisposes to urinary tract infection and can lead to renal scarring and chronic renal failure and approximately 60% of kidneys with reflux already have an abnormal renogram even in the absence of urinary tract infection. Therefore, all children with anteroposterior renal pelvis dilatation > 10 mm around 32 weeks of gestation should be carefully managed postnatally with low-dosed antibiotics. The highest intervention rate was in the group of infants with megabladder who were postnatally diagnosed with PUV. Four fetuses were diagnosed with this anomaly and all of them undergone surgery, and one infant had impaired renal function after intervention. Surgical interventions in this group of children were: pyeloplasty, reimplantation (mega-) ureter, incision posterior urethral valves. Generally, the outcome was good in all cases when proper urological care was given postnatally. All cases of impaired renal function was in the group of fetuses with isolated megabladder and progressive severe oligohydramnios, when labor was induced preterm.

Conclusion

The overall conclusion for obstructive uropathy that can be drawn from this series is that regardless of the presence of 1 or 2 kidneys and regardless of the degree of urinary tract dilata- tion, the prognosis for renal function is excellent when oligohydramnios is absent before birth and when proper urological care is given postnatally. Almost all renal failures were in the group with progressive oligohydramnios in which labor was induced preterm. Poor outcome of fetuses with bilateral urinary tract obstruction combined with prolonged periods of oligohydramnios has been repeatedly described. Our policy of preterm induction of labor when oligohydramnios develops seems to result in a relatively favorable outcome although the timing of induction is still uncertain and the proof that we actually gave them better chances is still non-existent.
Prenatalni i perinatalni ishod kongenitalne fetalne opstrukтивne uropatije

Sonja Pop-Trajković, Vladimir Antić i Milan Trenkić

Anomalije urinarnog sistema čine nešto manje od četvrtine svih anomalija detektovanih antenatalno, a čak 60% svih anomalija urinarnog sistema čine opstrukтивne uropatije. Nakon postavljanja dijagnoze opstrukтивne uropatije u utero, donosi se odluka o prekidu trudnica. Prekidu trudnice uobičajeno se obično u NJU, a u većini slučajeva se donosi odluka o daljem vođenju klinike u periodu od tri godine.

Prenatalna i perinatalna mortalnost kod anomala urinarnog sustava varira od 10-30% u širokom spektaru anomalija. Udio kod plaća sa anomalijama urinarnog sustava može biti kritično dolazak na antenatalno obdoblje, a smanjenje začetnice namijenja kod anomala urinarnog sustava može biti veoma potrebno. Prenatalna intervencija može biti u cilju poboljšanja kvaliteta života i očuvanja slobodnog i zdravog života kod deci.

References


**Ključne reči:** kongenitalna anomalija, opstruktivna uropatija, ishod