

Evaluation of Pregnancy Hydronephrosis? Does Ureteral J Stent Effect Preterm Birth?

Gebeliğe Bağlı Hidronefrozun Değerlendirilmesi? Üreteral J Stent Erken Doğumu Tetikler Mi?

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Özet

Amaç: Çalışmanın amacı, yan ağrısı ve hidronefroz olan gebe kadınlarda tedavi yöntemlerini değerlendirmek ve tedavinin erken doğum eylemine etkisini incelemektir.

Gereç ve Yöntemler: Nisan 2014 ve Ocak 2020 tarihleri arasında hastanemize başvuran ve yan ağrısı olan gebe kadınları retrospektif olarak değerlendirdik. Hidronefroz olan ve üroloji kliniğine başvuran toplam 54 hasta çalışmaya dahil edildi. Klinik, radyolojik ve laboratuvar bulguları kaydedildi. Hastalar cerrahi girişim yapılanlar Grup 1 olarak, konservatif tedavi uygulananlar Grup 2 olarak sınıflandırıldı. İki grup arasında hastaneye yatış haftaları, hastanede kalış süreleri ve doğumun gerçekleşme haftası karşılaştırıldı.

Bulgular: Çalışmaya 54 hasta dahil edildi. 22 hastaya (40.7%) cerrahi işlem uygulandı (Grup 1), 32 (59.2%) hastaya ise konservatif tedavi uygulanarak taburcu edildi (Grup2). Cerrahi sonrası alt üriner sistem enfeksiyonu 1(4.5%) hastada gözlenirken 3(13.6%) hastada transfüzyon gereksinimi olmayan hematüri gözlemlendi. Hastaneye yatış süreleri (p:0.43) ve doğum haftaları (p:0.09) açısından istatistiksel olarak anlamlı fark gözlenmedi. Hastanede kalış süreleri arasında ise fark mevcuttu (p<0.05). Taburculuk sonrası üreteral stente bağlı doğuma kadar komplikasyon gözlenmedi ve doğum sırasında DJ stentler çekildi.

Abstract

Objective: The aim of this study was to evaluate the treatment modalities in pregnant women with side pain and hydronephrosis and to examine the effect of treatment on preterm labor.

Material and Methods: There cords of pregnant women with flank pain who presented between April 2014 and January 2020 were retrospectively reviewed. Evaluation was made of 54 patients treated in the Urology Clinic for hydronephrosis and side pain treated. Clinical, radiological and laboratory findings, surgical interventions, and any complications were all recorded and evaluated. Classified the patients under going surgical procedures as group 1, and those followed by conservative treatment as group 2. Length of hospital stay, hospital arrival weeks and birth weeks of the groups were compared.

Results: 54 pregnant women included in the study, 22 patients (40.7%) required surgical intervention (Group1), and 32 patients (59.2%) applied conservative management (Group2). Postoperatively, lower urinary tract infection was observed in 1(4.5%) patient, hematuria without transfusion was required in 3(13.6%) patients. Hospital arrival weeks (p:0.43) and birth weeks (p:0.09) of the groups were compared and no significant statistically. But length of hospital stay (p<0.05) was significantly different. No complications were

This study was approved by the Ethic Committee of Medicalpark Karadeniz Hospital (Approval no: 2020/01/179). All research was performed in accordance with relevant guidelines/regulations, and informed consent was obtained from all participants.

Sonuç: Gebelik hidronefrozunda yapılacak cerrahi girişimin erken doğumu tetiklediği ve gebeliğe zarar vereceği düşünülür. Ancak cerrahi işlem uyguladığımız hastalarda anne ve bebek için majör bir komplikasyona rastlamadık ve tüm bebeklerin normal zamanda doğduğunu tespit ettik. Aksine gebelikte geçmeyen ağrı ya da altta yatan bir nedenden dolayı oluşan hidronefrozda cerrahiden kaçınmak bebek ve anne için ölüm dahil ciddi riskler oluşturabilir.

Anahtar Kelimeler: hidronefroz, gebelik, üreteral stent

observed until delivery due to ureteral stent after discharge, and DJ stents were removed from birth.

Conclusion: Although it is thought that surgical intervention in pregnancy hydronephrosis will harm preterm birth and pregnancy, there was no major complication of intervention to mother and infant in study. If neglected, many complications may be occur including the death of the mother and the infant.

Keywords: hydronephrosis, pregnancy, ureteral stent

INTRODUCTION

Hydronephrosis, which is seen as low grade in approximately 90% of pregnancies, is considered a normal physiological event (1,2). Dilatation often resolves spontaneously a few weeks later after the birth (3). Increased progestational hormones, estrogen and prostaglandin-like agents can cause hydronephrosis in the urinary tract without obstruction (4).

Physiological dilatation and urinary stone are the main causes of hydronephrosis and renal colic in pregnant women (5,6). Although an incidence of 1/1500 is frequently cited in pregnancies, the incidence of urolithiasis varies widely from 1 in 200 to 1 in 2000 (7,8). It is quite difficult to explain the true incidence in pregnancy because only symptomatic stones can be defined in pregnancy. However, stone incidence during pregnancy may be more frequent as a result of dilatation of the collecting system and falling stones in the kidney (9). The first choice in the treatment of renal colic during pregnancy should be conservative treatment including antibiotics, analgesia and hydration (10). Surgical intervention may be needed if there is a suggestion of febrile urinary tract infection, sepsis, obstructive uropathy, obstruction of a solitary kidney, or acute renal failure (11). The aim of this study was to evaluate the treatment options in our hospital for symptomatic hydronephrosis in pregnant women and to examine the effect of the selected treatment on preterm labor.

MATERIAL AND METHODS

Of the 8221 women who had delivery in the Obstetrics and Gynaecology department of our hospital between April 2014 and January 2020. 54 patients were admitted to the Urology Clinic because of symptom-

atic hydronephrosis (flank and side pain). Renal sonography was applied to each patient. Hydronephrosis was graded according to the maximum diameter of the calyx, as detailed by Zwergel: 5-10 mild, 10-15 moderate and >15 severe hydronephrosis (12) (Table 1). Serum creatinine, white blood cell counts and urine culture were examined in all patients. Pyuria was defined as >10 WBC/mm³ of urine (13). Bacteriuria was defined according to Schaeffer (14). All patients were first treated with conservative management of analgesics and intravenous fluids, and intravenous antibiotics (cefuroxim and/or ceftriaxone) were added if necessary (signs of infection, fever, leukocytosis).

The criteria for failure of conservative treatment were deteriorating renal function (i.e. increase in serum creatinine or BUN values), non-resolution of signs of infection after 48 hours, and intractable pain. Thus, ureterorenoscopy and ureteral stents were applied to these patients. Classified the patients undergoing surgical procedures as group 1, and those followed by conservative treatment as group 2. Hospital arrival weeks, length of hospital stay and birth weeks of the groups were compared. Urological interventions, such as ureterorenoscopy and ureteral stent insertion or laser lithotripsy and JJ stent were performed when conservative therapy failed or in cases of febrile urinary tract infection, obstructive uropathy, or acute renal failure (Table 2). All interventions were performed under spinal anesthesia. Ultrasonography was used to confirm JJ stent placement and all stents were removed on the birth of the infant.

Statistical Analysis

Variables were shown as mean±standart deviation, median and range. Normal distribution was evaluated

Table 1. Degrees of hydronephrosis Ru:renal unit

	Mild (n:44 Ru)	Moderate(n:52 Ru)	Severe (n:12 Ru)
Conservative	20 (37%)	10 (18.5%)	2 (3.7%)
Surgery	2 (3.7%)	16 (26.6%)	4 (7.4%)
All patients with HUN	22 (40.7%)	26 (45.1%)	6 (11.1%)

Table 2. Features of patients

Conservative treatment (group 2)	N:32 (59.2%)
Surgical treatment (group 1) n (%)	N:22 (40.7%)
Ureteral stone	5 (9.2%)
Renal stone	2 (3.7%)
Intractable pain	22(40.7 %)
Acute pylenephritis	6 (11.1%)

by Kolmogorov-Smirnov test and histogram. Then, independent-T test and Mann-Whitney-U test were used according to normal distribution. All statistical analysis were made by SPSS 20. 0 (Chicago,IL).

RESULTS

The study included a total of 54 pregnant women with a mean age of 26.1 ± 2.5 and 26.9 ± 3.3 respectively group 1 and group 2. Gestational periods, hydronephrosis sides and degree of admission to the hospital are summarized in the tables (Table 3 and 4). All pregnant patients had hydronephrosis and flank pain. On US imaging, a ureteral stone >6 mm was observed in 5 patients (9.2%) and a renal stone >5 mm in 2 patients (3.7%). A total of 22 (40.7%) patients with ureter stone, persistent flank pain or urinary tract infection required (The presence of a urinary culture composed of greater than 100,000 colony-forming units of a single organism in a symptomatic pregnant woman confirms the diagnosis of urinary tract infection and Escherichia coli was positive in six patients) a surgical intervention (group 1) (Table 2). Conservative treatment without any surgical procedure (group 2) was applied to 32 (59.2%) patients. The most common indication for sur-

gery was intractable pain (22/22), with 6 cases of acute pyelonephritis (6/22).

A ureteral stent (Boston Scientific Percuflex Plus,4.8F) was inserted after ureterorenoscopy (Ultra-thin Wolf 6. 5 fr) for all 22 patients under spinal anesthesia. If there are ureter stone: A double-J stent was inserted after ureteral stones were fragmented with laser pneumotics or collected in one piece by basket.The average duration of hospitalization was 5.1 ± 0.7 and 2.6 ± 0.7 days respectively group 1 and 2 and statistically significant ($p < 0.05$). Gestational weeks when they apply to the hospital were 29.3 ± 2.6 and 30 ± 2 ($p:0.22$), The birth weeks of the patients were 38.9 ± 1 for group 1 and $39.4 \pm 1,1$ for group 2 and not statistically significant ($p:0.09$) (Table 3). Complications of hematuria (n:3) and LUTS (n:1) were observed in 4 patients and were treated conservatively in hospital (Table 4). All the fetuses were delivered without complications and no pregnancy complication was observed in any patient. No urological intervention was done until birth. A kidney stone (5 mm) was detected on the postpartum imaging of 1 patient but no additional intervention was required.

Table 3. Hospital stay and birth week

	Group 1	Group 2	P values
Hospitalization week	29.3 ± 2.6	30 ± 2	0.22
Birth week	38.9 ± 1	39.4 ± 1.1	0.09
Length of stay	5.1 ± 0.7	2.6 ± 0.7	<0.05

Table 4. Complications of surgery

Macroscopic Hematuria	3 (13.6%)
LUTS	1 (4.5%)
Migration of stent	0
Premature birth	0

DISCUSSION

Although pregnancy-related hydronephrosis is often physiological and may become symptomatic, if not treated it can lead to life-threatening outcomes for both mother and infant.

Colic pains in pregnant women are usually seen in the 2nd and 3rd trimesters (15). In some studies, the rate of recovery without surgery has been reported as 73% (12) and 94% (6). Of the current study 45 (83.3%) patients were in 2nd and 3rd trimesters and patients, symptoms resolved in 59.2% after two to five days of conservative management (antibiotics, analgesia, hydration).

Some authors have reported a mean duration of hospitalization of 5.3 days (16), while in this study, all patients length of hospital stay was 3.8 days. Long-term hospital duration may be due to conservative therapy for more than 90% of patients. The reason for the short time in the current study may be the early diagnosis and the treatment before the disease progresses the application of invasive procedures and improvement in the short-term in the majority of patients (40.7%).

Ultrasound imaging (US) in pregnant women is still used as the first imaging method. Ultrasound is preferred in the diagnosis of hydronephrosis as it has the advantages of being non-invasive, readily available and does not expose the patient to radiation (15). However, it can be difficult to differentiate the causes of renal obstruction (17) because of limited sensitivity in the detection of stones and visualisation of the ureter. The sensitivity of US in some cases has been reported to be between 38% and 95% (18,19). In this study, all patients were diagnosed with ultrasound and urinary stones were detected in 7 (12.9%) patients. Postpartum stone rates could not be determined objectively as the patients did not come for regular check-up after birth.

Urinary infection rates in pregnant women with

symptomatic hydronephrosis have been reported as 22.9% (21) and 28% (21). In the current study this rate was determined as 6 patients (11%) with intractable pain and a ureteral stent was implanted with surgical intervention.

Stent placement can cause hematuria and stone formation, and ascending pyelonephritis as a result of vesico-urethral reflux and catheter migration in pregnant women (12,22). The overall complication rate of JJ ureteric stenting, i. e. stent migration, LUTS, and hematuria, was found to be 18% in this study, which is consistent with other series (6–37%). Complications were observed of 2 hematuria and 1 urinary infection.

Ureteral calculi is rare in pregnant women with symptomatic hydronephrosis, affecting approximately 1 in every 1500 to 3000 pregnancies (18,19). This ratio is almost equal to that of non-pregnant women (23). Colic pain due to stones is common in pregnant women in the 2nd and 3rd trimesters. This may be due to the enlargement of the growing uterus to the mouth of the pelvis and compression of the distal ureter during pregnancy. The most common symptoms of ureter or renal stones in pregnancy are flank or abdominal pain, gross or microscopic hematuria, and irritative lower urinary tract symptoms. In the current study all pregnant women with stone pain and microscopic hematuria (7 patients) were in the second trimester.

There are not many studies in the literature about the effect of urological surgical interventions during pregnancy during preterm labor. Derscher et al. found that the risk of preterm delivery increases in urological interventions during pregnancy (24). In another study, it was reported that urological surgical interventions and stent placement to pregnant women are safe and do not increase preterm labor (25). In this study, preterm labor was not observed in any of the patients.

Physiological hydronephrosis seen in pregnancy is

often seen on the right side due to uterine enlargement to the right and dilation of the uterine vein compressing the right ureter (26,27) while the sigmoid colon protects the left ureter from compression. In a previous study, a higher rate of hydronephrosis was detected on the right side due to uterine compression and in the same study, stone incidence was found to be higher in patients with left-side colic pain (15). The results of the current study confirmed that right-side hydronephrosis was much more common than left-side hydronephrosis (Table 5).

Limitations of our study include its retrospective, small sample and single clinic, More accurate results would be able to be obtained with further multi-centre

studies of pregnancy hydronephrosis. After the jj stent was removed, a detailed examination could not be performed, since some of the patients did not come for control.

In conclusion, when evaluating pregnancy hydronephrosis, the cause of hydronephrosis should be determined quickly and treatment should be decided immediately. Patients think that surgery will harm the baby and caused preterm labor. However, if neglected, many complications may be encountered including the death of the mother and the infant. Although the first treatment option is a conservative approach, the surgical options should be considered if there is a life-threatening condition for the mother and infant.

Table 5. General information

	Group 1 (n:22)	Group 2 (n:32)	Total (n:54)
Age (years)	26.1± 2.5	26.9± 3.3	26.6± 3
Trimester			
First.n (%)	3 (13.6 %)	6 (18.7%)	9 (16.6%)
Second. n(%)	13 (59 %)	21 (65.6%)	34 (62.9%)
Third. n (%)	6 (27.2%)	5 (15.6%)	11 (20.3 %)
HUN side			
Right. n (%)	16 (72.7%)	20 (62.5%)	36 (66.6%)
Left. n (%)	6 (27.2 %)	12 (37.5)	18 (33.3 %)

Conflict of interest

All authors declare no conflict of interest.

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Ethical Approval

The study was approved by the Ethic Committee of Medicalpark Karadeniz Hospital (Approval no: 2020/01/179, 25 Feb 2020) and written informed consent was received from all participants. The study protocol conformed to the ethical guidelines of the Helsinki Declaration.

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