

Incidence and Effect of Hydronephrosis on Urodynamic Parameters in Patients with Pelvic Organ Prolapses

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ABSTRACT

Background:

Pelvic organ prolapse is a serious problem seen nearly in half of the women who gave birth. The prevalence of hydronephrosis is significantly correlated with prolapse severity. Objective: To evaluate the frequency and effect of hydronephrosis on urodynamic parameters in those patients.

Patients and methods:

A prospective study conducted between August 2019 - February 2020 in Rizgary Teaching Hospital and Clinic including 66 patients attended the outpatient clinic and had symptomatic advanced stage pelvic organ prolapse. Urinary system ultrasonography and urodynamic examination were performed for all patients before the operation.

The severity of prolapse in the study population was evaluated using the POP-Q system.

Results:

The mean age of the patients was 62.3 ± 10.53 years (32-79 years). The mean body mass index of the patients was found to be 28.28 ± 3.47 . The frequency of hydronephrosis among the patients was 19.7% (13/66 patients). As a result of our analysis it was found that the weight ($p = 0.0001$) and body mass index ($p = 0.004$) were higher in the case group with hydronephrosis.

Conclusion:

According to the results of this study, the frequency of hydronephrosis in these patients was 19.7%, and no relationship found between hydronephrosis and urodynamic parameters. In line with these data, urinary ultrasonography is recommended for all patients with prolapsed pelvic organ due to the high frequency of hydronephrosis

Keywords: Ureterohydronephrosis, Pelvic Organ Prolapse, Urodynamic Study

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1. INTRODUCTION

Pelvic organ prolapse, a type of pelvic floor disorder, can affect many women. The presence of prolapse has effect on both aesthetics and sexuality. Patients usually feel pressure at first, and if the prolapsed area comes to the hymen level, patients may notice that there is a sagging tissue. Patients sometimes try pushing the prolapsed area inside to perform micturition and defecation (this movement is called reduction). This causes frequent urination and inability to empty the bladder adequately. Sexual complaints could also be questioned in patients with prolapse. The "pelvic floor" is a group of muscles that form a kind of hammock across your pelvic opening (1-4).

Normally, these muscles and the tissues surrounding them keep the pelvic organs in place. These organs include your bladder, uterus, vagina, small bowel, and rectum. Sometimes, these muscles and tissue develop problems. Some women develop pelvic floor disorders following childbirth. And as women age, pelvic organ prolapse and other pelvic floor disorders become more common. When pelvic floor disorders develop, one or more of the pelvic organs may prolapse; bladder, uterus, vagina, small bowel and rectum. Conditions associated with pelvic floor disorders include one or more of the following: pelvic organ prolapse, urinary incontinence and anal incontinence(1-4).

Risk factor for prolapse is anything that increase pressure in the abdomen which leads to pelvic organ prolapse. Common causes include:

- Pregnancy, labor, and childbirth (the most common causes)
- Obesity
- Respiratory problems with a chronic, long-term cough
- Constipation
- Pelvic organ cancers
- Surgical removal of the uterus (hysterectomy)

Genetics may also play a role in pelvic organ prolapse. Connective tissues may be weaker in some women, perhaps placing them more at risk. Some women notice nothing at all, but others report these symptoms with pelvic organ prolapse: feeling of pressure or fullness in the pelvic area, backache low in the back, Painful intercourse, feeling that something is

falling out of the vagina, urinary problems such as leaking of urine or a chronic urge to urinate, constipation, spotting or bleeding from the vagina. Symptoms depend somewhat on which organ is drooping. If the bladder prolapses, urine leakage may occur. If it's the rectum, constipation and uncomfortable intercourse often occur. A backache as well as uncomfortable intercourse often accompanies small intestine prolapse and uterus (5).

Treatment of pelvic organ prolapse depends on how severe the symptoms are, which include a variety of therapies, including:

- Behavioral treatments, such as doing Kegel exercises
- Mechanical treatments, such as inserting a small plastic device called a pessary into the vagina to provide support for the drooping organs
- Surgical treatment, either to repair the affected tissue or organ or to remove the organ (such as removal of the uterus by hysterectomy)

When pelvic organ prolapse is discovered during a routine pelvic exam, a variety of tests may be ordered: CT urography, ultrasound and MRI scan of the pelvis with urodynamic study. The purpose of the urodynamic test is to help understand the physiological mechanisms of lower urinary tract dysfunction, thus increasing the accuracy of the diagnosis and facilitating the targeted treatment. Urodynamic study is useful when medical history, physical examination and initial tests are insufficient to make the correct diagnosis and determine the appropriate treatment. Urodynamic evaluation is mainly used in gynecology in women with complicated stress incontinence or mixed incontinence. Urodynamic testing can also help clarify overflow incontinence mechanisms. Urodynamic testing is rarely required in patients with urge incontinence, except in cases where there is no response to conservative treatment (6)

2. METHODOLOGY

This study was a prospective study conducted at Rizgary Teaching Hospital and Clinic, during the period from 1st of August 2019 and 1st of February 2020. A total of 66 patients aged 30-80 years who were attended to the outpatient clinic and had symptomatic advanced stage pelvic organ prolapse were enrolled in the study. Informed consents of the patients were obtained. Corrected urodynamics and urinary ultrasonography were performed in these women with pelvic organ prolapse in the clinic. We planned to investigate the frequency of hydronephrosis in pelvic organ prolapse and the effect of

hydronephrosis on urodynamic parameters by examining the patient records. A total of 81 patients with 3rd and 4th degree pelvic organ prolapse who had undergone urodynamic study and urinary ultrasonography were included in the study at the first stage. Of these patients, 7 patients were excluded from the study because of inadequate anamnesis, 5 patients for kidney disease, and 3 patients for preoperative urodynamic study results. The study group consisted of all patients with hydroureteronephrosis in ultrasonography, regardless of the degree, and the control group for patients without hydroureteronephrosis. In total, 66 patients, 13 in the study group and 53 in the control group, were included in the study. Analyzes were performed using the SPSS 23 (Statistical Package for the Social Sciences) package program.

3. RESULTS

Data of 66 patients who met the study criteria were evaluated. The mean age of the patients was 62.3 ± 10.53 years (32-79 years). The mean BMI of the patients was 28.28 ± 3.47 , (Table 1). The overall frequency of hydronephrosis among the patients was 19.7% (13/66 patients), (Table 2). There was no statistically significant difference in the presence of detrusor overactivity, which is one of the urodynamic parameters, in patients with pelvic organ prolapse without hydronephrosis and hydronephrosis. Detrusor overactivity was detected 6% more in group with hydronephrosis when compared to the group without hydronephrosis, (Table 3). In the examination performed according to the presence of hydronephrosis, a significant difference was found in weight (P.value < 0.001) and BMI (P.value = 0.004). Weight and BMI in hydronephrosis group were higher than their values in those without hydronephrosis, (Figure 1 & 2).

There was no significant difference between the two groups in terms of age, parity and POP durations. There was no statistically significant difference between the other urodynamic parameters in patients with pelvic organ prolapse without hydronephrosis or hydronephrosis.

Table 1. Frequency distribution of hydronephrosis

Hydronephrosis	No.	%
Yes	13	19.70
No	53	80.30
Total	66	100.0

Table 2. Detrusor overactivity in both groups

Detrusor Overactivity	No Hydronephrosis		Hydronephrosis		Total	
	No.	%	No.	%	No.	%
Yes	17	32.1	5	38.5	22	33.3
No	36	67.9	8	61.5	44	66.7
Total	53	80.3	13	19.7	66.0	100.0

P. value = 0.746 statistically not significant

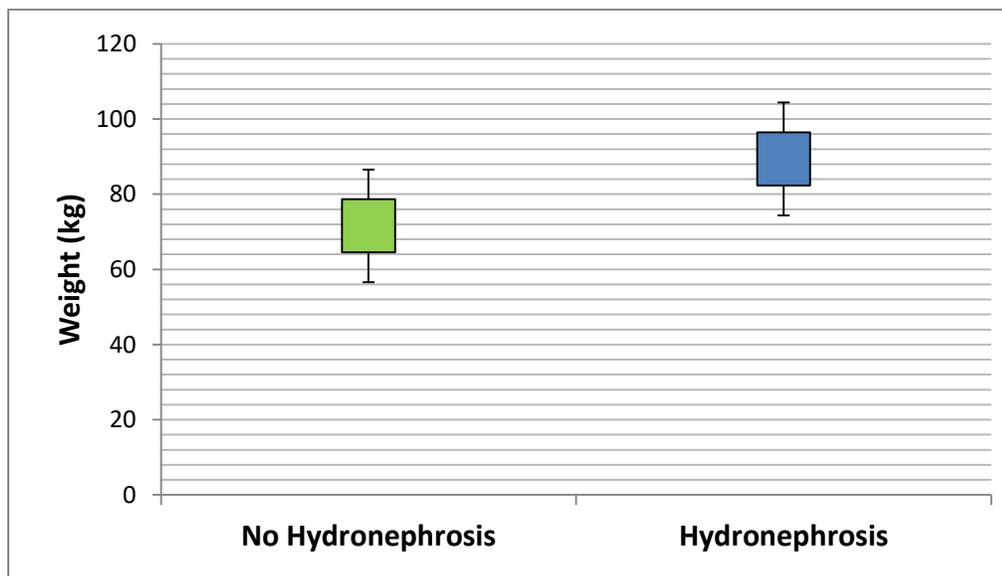


Figure 1. Marker-Line Plot showing the higher weight in patients with hydronephrosis (P. value <0.001).

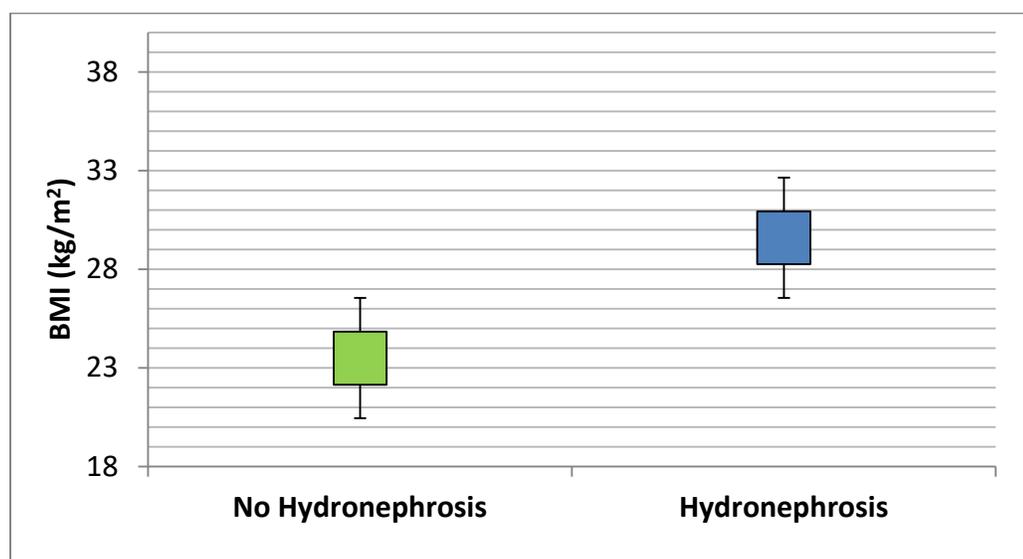


Figure 2. Marker-Line Plot showing the higher BMI in patients with hydronephrosis (P. value = 0.004)

4. DISCUSSION

The relationship between pelvic organ prolapse and hydronephrosis has been known for a long time, but data on the prevalence of hydronephrosis in these patients vary widely. The reason for this variability may be related to the difference in prolapse cases reported in studies and the duration of the prolapse. If left untreated, hydronephrosis or renal failure may develop in severe cases (8). If the prolapse is corrected, a regression in hydronephrosis may be observed (9). The prevalence of hydronephrosis has been shown to be significantly correlated with the severity of prolapse (10). Beverly et al. in his study, hydronephrosis stages were determined according to the grade of prolapse, and hydronephrosis was not observed in patients with prolapse below grade 2 and it was determined that the severity of hydronephrosis increased as the grade increased. Based on this, we included patients with at least grade 3 and 4 prolapse in order to investigate the relationship between urodynamic and hydronephrosis more effectively. Also, patients who had a previous hysterectomy, incontinence, or prolapse surgery were excluded, as ureter or bladder damage cannot be excluded. In our study, a relationship was investigated in terms of urodynamic results and the presence of hydronephrosis in prolapse patients, and no significant difference was

observed. In other words, it is not possible to predict hydronephrosis based on the urodynamic results. Therefore, renal ultrasound should be performed to investigate the presence of hydronephrosis in patients with prolapse who are scheduled for follow-up or surgery, even if urodynamic has been performed. As a result of the study, no significant difference was found in terms of prolapse duration and the frequency of hydronephrosis. In Dongol et al study conducted with stage 1-4 for 140 prolapse patients, it was stated that the possibility of hydronephrosis increased with increasing prolapse duration. The reason for this difference is that may be due to the larger number of patients and prolapse stages in his study (11). As stated previously, the increase in bladder pressure caused by the inadequate relaxation of the detrusor muscle can be dangerous for the kidneys when it is transmitted to the upper urinary system (12). In our study, as a secondary result, the relationship between detrusor overactivity and hydronephrosis was also investigated, but no significant difference was found. In our study, a retrospective analysis was performed on a sample group of 66 people. In order to make a more detailed assessment on this issue, a larger group of patients can be followed and examined for a longer period of time. In the secondary results of our study, a statistically significant difference was found between the groups with and without hydronephrosis in terms of weight and associated BMI. It has been found that weight and BMI are higher in patients with hydronephrosis.

5. CONCLUSIONS

The frequency of hydronephrosis in POP patients was 19.7%, and no relationship was found between hydronephrosis and urodynamic parameters. In line with these data, urinary ultrasonography is recommended for all prolapse patients due to the high frequency of hydronephrosis in these patients and the consequences of hydronephrosis leading to renal failure. Studies involving more patients are needed to obtain definitive results on this subject.

Ethical Approval:

All ethical issues were approved by the author. Data collection and patients enrollment were in accordance with Declaration of Helsinki of World Medical Association , 2013 for the ethical principles of researches involving human. Signed informed consent was obtained from each participant and data were kept confidentially.

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