

Renal Impairment Among Patients With Pelvic Organ Prolapse in a Tertiary Care Center

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ABSTRACT

Background

Pelvic organ prolapse is a multidimensional phenomenon. The manifestations of renal involvement following pelvic organ prolapse ranges from acute to chronic renal failure and may also lead to end stage renal failure. Prolonged duration and its severity in pelvic organ prolapse are responsible for renal impairment.

Objectives

This study will find out the incidence of renal impairment among women with pelvic organ prolapse undergoing surgical management. It will also help to establish the association of renal impairment with degree and duration of pelvic organ prolapse.

Methods

This prospective study includes cases of pelvic organ prolapse who underwent surgical management from the year 2009-2012 in Dhulikhel hospital. Total 140 cases were assessed with age, duration and different symptoms. Clinical examination was done to find out the degree of prolapse and graded according to Baden Walker classification. Urine routine and microscopic examination, renal function test and abdominopelvic sonography were performed routinely. Renal impairment was assessed using hydronephrosis and creatinine clearance. Creatinine clearance was calculated using patient's weight and serum creatinine value by Cockcroft and Gault formula.

Results

Among 140 cases, 8 (5.7%) patients had procedentia, 106 (75.7%) had third degree, 22 (15.7%) had second degree, and four (2.8%) patients had first degree uterine prolapse. The mean duration of prolapse was found to be 11.47 years. Total 5 (3.57%) patients had hydronephrosis. Four had moderate and one had severe hydronephrosis. Total 49 (34.1%) patients had moderate to severe renal failure. Forty six (32%) in stage III moderate reduction in creatinine clearance, 2 (1.4%) with severe reduction and 1(0.7%) in end stage renal failure.

Conclusion

Renal impairment is a common entity among women with pelvic organ prolapse. Both hydronephrosis and degree renal impairment correlates correspondingly with the duration and severity of prolapse.

KEY WORDS

Creatinine Clearance, hydronephrosis, pelvic organ prolapse, renal impairment

INTRODUCTION

Pelvic organ prolapse (POP) is common in multiparous or elderly women. Pelvic organ prolapse related symptoms are vague. The common symptoms are the symptoms of lower genital, urinary and gastrointestinal symptoms.¹ Uterine prolapse and renal dysfunction sometimes occur owing to long-term hydronephrosis. The association of POP and hydronephrosis has long been recognized. Hydronephrosis associated with POP was first reported in 1824 by Fiorep.² Since the time several investigators have studied this relationship. The incidence of hydronephrosis with POP in patients undergoing surgery for prolapse varies from 7-17%.^{3,4} Hydronephrosis is an important cause of acute, chronic and end-stage renal failure.⁵ Hydronephrosis is usually asymptomatic, but impairment of renal function is generally limited to neglected cases. The complications occurring solely due to POP and if detected early has importance to prevent irreversible renal damage.⁶

The prevalence of POP in Nepal varies from 20-37%. Many studies have suggested the factor being lifting heavy weight and inadequate rest during post partum. Research in Nepal have shown that POP occurs at much younger age and most of them present shortly after childbirth.^{7,8} Because of the early onset women will be symptomatic for longer period of time. The incidence of hydronephrosis related with POP in Nepal remained underestimated.

METHODS

This prospective study included 140 cases who underwent surgical management for POP from the year 2009-2012 in Dhulikhel Hospital. Diagnosis of POP was made and its severity graded as per history and clinical examination. After taking the consent from institutional review committee research was started. The exclusion criteria were patients with any benign or malignant uterine condition and pre-existing renal, ureteric or bladder disorder.

Before surgery all patients were assessed for age, duration of POP and different symptoms associated with POP. The degree of prolapse was graded according to Baden Walker classification. Weights of all patients were recorded. Investigations like urine routine and microscopic examination, renal function test were done. Ultrasonography of abdomen and pelvis were routinely done to find out hydronephrosis and its severity was graded. Creatine clearance was calculated to find out the renal impairment associated with POP. Creatinine clearance is defined as the volume of plasma that is completely cleared of creatinine in a unit of time (ml/min).⁹ Creatinine clearance (CRCL) was calculated by using Cockcroft and Gault formula which is as $CRCL = [(140 - \text{age}) \times \text{Body weight (KG)}] / (\text{Serum creatinine (mg/dl)} \times 72) : (\times 0.85 \text{ for females})$.¹⁰ Stages of Renal impairment were classified according to CRCL And included Stage I Normal GFR, Stage II Mild reduced, Stage III Moderately reduced,

Stage IV severely reduced and Stage V end stage renal failure. All these parameters were recorded and statically analysed using Microsoft Excel 2010 in statistical package for social sciences (SPSS) version 14 for windows.

RESULTS

Among 140 cases who underwent uterovaginal prolapse surgery 84 (60%) were case of uterine prolapse with cystocele and rectocele, 6 (4.28%) were uterine prolapse with cystocele, rectocele and enterocele, 29 (20.71%) were case of uterine prolapse with cystocele, 2 (1.4%) were uterine prolapse with rectocele and 19 (13.57%) were case of uterine prolapse only.

While measuring the grade, 8 (5.7%) patients had procedentia, 106 (75.7%) had third degree, 22 (15.7%) had second degree, and 4 (2.8%) patients had first degree uterine prolapse.

The mean age of the patients was found to be 52.26 ± 10.65 years. The mean duration of suffering with prolapse was found to be 11.47 years.

Fig 1 shows the major urinary symptoms for which the lady presented to the hospital. Here the category: other, indicates symptoms as pain lower abdomen, vaginal discharge and incontinence of urine. Among the different types of incontinence the majority was stress urinary incontinence. Eleven patients had active urinary tract infection on evaluation. Nine of them had third degree prolapse and one patient each had first degree prolapse and procidentia and is seen in those who have problem of

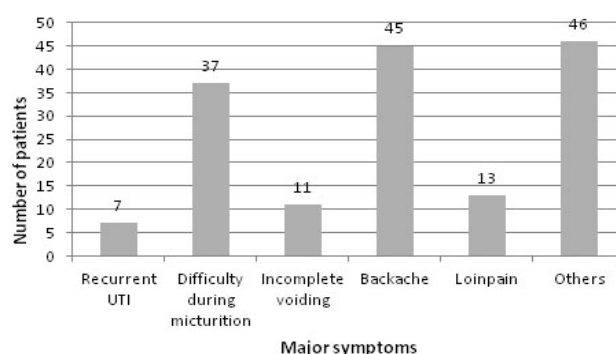


Figure 1. The major urinary symptoms for which the lady presented to the hospital.

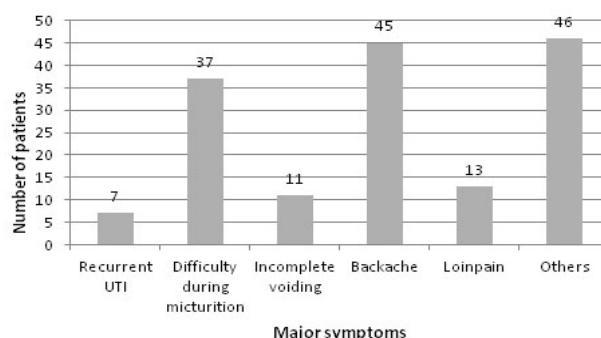


Figure 2. The various stages of renal impairment.

prolapse for longer period of time.

Fig 2 shows the various stages of renal impairment as per creatinine clearance calculated from Cockcroft and Gault Formula.

Table 1 shows the relation between the degree of hydronephrosis with degree of uterovaginal prolapse and duration of disease. We found total 5 (3.57%) patients to have moderate to gross hydronephrosis. Among them 4 patient had third degree prolapse and one patient had procidentia.

Table 1. The relation between the degree of hydronephrosis with degree of uterovaginal prolapse and duration of disease.

Sl.No.	Degree of Hydronephrosis	Degree of Uterovaginal Prolapse	Duration of Prolapse
1	Moderate	Third	5 years
2	Moderate	Third	5 years
3	Moderate	Third	12 years
4	Moderate	Third	20 years
5	Severe	Procidentia	30 years

Table 2 shows the correlation between stages of renal failure and associated hydronephrosis.

Table 2. The correlation between stages of renal failure and associated hydronephrosis.

Stage of Renal Impairment	Associated hydronephrosis in number
Kidney damage with normal or elevated GFR(GFR ≥90)	1
Kidney damage with mild reduction of GFR (GFR = 60-89)	1
Kidney damage with Moderate Reduction of GFR (GFR = 30-59)	3
Kidney damage with Severe Reduction of GFR (GFR = 15-29)	0
Renal Failure/ End stage renal disease (GFR = <15 or on dialysis)	0

DISCUSSION

Pelvic floor dysfunction, including POP is one of the common conditions affecting at least one third of the adult women. Women with POP presents for medical care for diverse symptomatology. Many researches on POP are based on its incidence, aetiology, symptoms and symptomatic relief after correction. Very few researches have been done regarding the complication that follows with increasing the severity of POP.

The urinary tract obstruction and hydronephrosis is one of the complications that can result in dreadful situation. Though the incidence of hydronephrosis varies from 7-17% this research shows the incidence to be 3.57% which is less as compared to the study done by Germer O and Beverly CM et al.^{3,4} The reported incidence of hydronephrosis is five percent for the first degree POP and increases to

about 40% for procedentia.¹¹ As defined in the literature, advanced prolapse usually leads to hydronephrosis.¹² The research also shows that hydronephrosis is associated with degree of prolapse but there is no correlation with the duration of prolapse. In this study severe hydronephrosis was noted in a case of procedentia and the duration of suffering was 30 years. Same lady was also found to have severe renal impairment as well.

The mechanism of development of hydronephrosis is not very clear. Several theories have been proposed on its origin. Lieberthal in 1941 described the mechanism for hydronephrosis. The cardinal ligaments forms a sling over the ureter and pulls it downward as the uterus descends and there is kinking of the ureter gives rise to the hydronephrosis. The author here failed to describe why the hydronephrosis is not present in all major degrees of POP.¹³ Hadar and Meiraz in 1980 proposed that the ureters become entrapped by the genital hiatus against the fundus of the uterus.¹⁴ This theory was supported by Jay et al in 1992. But, their study fails to explain why hydronephrosis is unilateral as well.¹⁵

Author Kang LM in 2000, explained that the obstruction occurs as the uterus descends; the downward traction of the uterine arteries located over the lower ureters causes the bladder trigone and lower ureters to be dragged outside the pelvis. The caudal displacement of the trigone results in compression of the ureters between the uterus and the medial borders of the genital hiatus. The greater the prolapse the more is the obstruction of the ureter.¹⁶ Regardless of its causation early detection of obstruction and its timely intervention can prevent the future catastrophe. Presence of hydronephrosis warrants prompt intervention. This can be achieved by either correction via surgical method or by applying ring pessary to prevent complications associated with it.

According to the degree of obstruction the patient may have also have normal renal function. Hydronephrosis is usually diagnosed at an advanced stage when the clinical picture has been aggravated by complications due to long term obstruction, resulting in urinary infections and acute or chronic renal failure. This obstruction may progressively worsen leading to acute renal failure, chronic renal failure and end stage renal failure if not detected early.⁵

In this study Creatine clearance calculated to find out the renal impairment associated with POP was compared with the standard.^{9,17} Creatinine Clearance (CRCL) is commonly used to estimate the Glomerular Filtration Rate (GFR). Cockcroft and Gault in 1976 formulated a formula to predict the value of CRCL from serum creatinine.¹⁰

The formula is as:

$$CRCL = [(140 - \text{age}) \times \text{Body weight (KG)}] / (\text{Serum creatinine (mg/dl)} \times 72) : (\times 0.85 \text{ for females})$$

Though value of creatinine clearance using a single value of creatinine may give misleading result, it can be used for

estimation of GFR in clinical setup as other methods are tedious and impractical.¹⁸

Renal impairment will be considered if GFR is less than 60 with moderate reduction in flow. The impairment was found to be high in this study. Only 7(5%) had normal GFR otherwise maximum 84(60%) are in stage II (mild reduction in GFR), 46(32%) in stage III (moderate reduction in GFR), 2 (1.4%) with severe reduction and 1(0.7%) in end stage renal failure. Hence, we had a total of 49 (34.1%) patients with moderate to severe renal failure in association with pelvic organ prolapse.

This impairment when compared with hydronephrosis there are 3(2.1%) cases with Kidney damage with moderate reduction of GFR and one case with normal GFR and 1 with Mild reduction in GFR in patients with hydronephrosis. Here, we can say that the incidence of renal impairment is increased in presence of hydronephrosis.

This study has shown that the incidence of UTI in patient

undergoing surgery to be 11(7.8%). The reason behind less UTI detection is that it was only from the urine routine and microscopic examination just before surgery. The incidence of UTI is 5% for first degree and 40% for fourth degree POP. Since the patients of POP are prone to recurrent urinary tract infection risk of pyelonephritis and urosepsis further increases in hydronephrosis. UTI can be leading cause for acute renal failure in POP.¹¹

CONCLUSION

Renal impairment was found to be common among women with pelvic organ prolapse. Greater the duration and severity of prolapse the higher is the incidence and grades of hydronephrosis, ultimately leading to renal impairment. Screening for renal parameters in women with pelvic organ prolapse is routinely recommended. Studies including larger number of prolapse patients for renal impairment is demanded in the near future to explore its incidence among general population.

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