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STUDY TO KNOW THE EFFECT OF URINARY STONES ON PRETERM LABOUR: A RETROSPECTIVE ANALYSIS

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Abstract:

Antepartum nephrolithiasis is a multifaceted clinical situation that necessitates frequent intervention, such as placement of percutaneous nephrostomy tube (PCNT) placement and ureteral stent, particularly in the context of infection of the urinary tract.

Aim: *This study aim is to examine obstetric problems related with admittance for nephrolithiasis and to additional assess the present outcomes and practices for patients who need surgical interference*

Study Design: *A Retrospective analysis.*

Place and Duration: *In the Obstetrics and Gynecology Department Unit II of Nishtar Hospital Multan for two year duration from January 2018 to January 2020.*

Methods: *This study comprised gravid females who were admitted for delivery. Antepartum nephrolithiasis admissions were recognized, as were PCNT placement or urological interference (ureteroscopy/ ureteral stent). Descriptive statistics were done, as was multivariable logistic regression to recognize prognosticators of preterm delivery and UTI. 405 cases of complex antepartum nephrolithiasis (0.14%) of 4080 births in this setting were identified.*

Results: *65% of these patients were conservatively treated, urological interventions were done in 20% (n = 81) and in 8.15% (n = 33); PCNT placement was done. Preterm delivery proportions augmented from a baseline of 6.50% for subjects without a stone to 10%% for cases with stones who were conservatively managed, who were done with urologic intervention have 12.01% risk of preterm delivery, and who had PCNT placement have 21% risk. In multivariate analysis; PCNT placement and urological intervention, conservative treatment individually amplified the preterm labor risk (all p <0.001).*

Conclusion: *Antepartum nephrolithiasis is a correlated condition affecting one in 350 females, preterm labor and urinary tract infection rate are higher. Urethral stent intervention or PCNT placement increases independently the risk. However, the nephrostomy tube has increased risk of preterm labor in patients with antepartum nephrolithiasis and urinary tract infections.*

Key Words: *Pregnancy, Nephrolithiasis, Premature, Urinary tract infection, Obstetric labor.*

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INTRODUCTION:

Kidney stones are one of the major causes of emergency in wards and hospitals in developing countries. The lifespan possibility of calculating the nephrolithiasis is expected to be between 5.2 and 8.8%, and hospital calculations[1-2]. Admission is 126 per 100,000 people per year due to nephrolithiasis. Nephrolithiasis is traditionally more common in men. Innovative epidemiological studies were made 35 years ago[3]. The index of kidney stones is estimated to be 3.5 times greater. However, more recent studies show the incidence in females in Pakistan, the gender gap in cases has contracted expressively, and the comparative prevalence today is 1.1 times the highest among Pakistani males In addition, the most dramatically increased kidney stones occur in women of childbearing potential[4]. Since 1970, women between the ages of 20 and 29 have noticed a seven-fold increase in kidney stone related events, the largest increase in all age groups and sexes[5-6]. Symptomatic kidney stones noted in one in 200-1500 pregnancies and the most usual cause for admission to a non-obstetric hospital is acute renal colic, most prenatal stones in pregnant women were conservatively managed, 48–81% of cases with spontaneous evacuation[7]. Intractable renal colic and passage failure of stones is related with serious complications of premature delivery, early rupture of the membrane. However, urosepsis and urinary tract infections, preeclampsia and pregnancy loss are the reported high variable complication rates. For patients who were failed for evacuation of stones constantly experience pain or if complications were noted, surgical intervention is required[8]. Traditional intervention in placing the stent during pregnancy in the ureter or percutaneous nephrostomy and postponing the preferred treatment till delivery[9]. Decompression technique is very operative and can be done with nominal anesthesia. Though, these are momentary procedures and can be taxing for people. Considering this, recent surgical treatment with ureteroscopy is regarded as preferred method in the antepartum period.

Our determination is to examine obstetric problems related with admittance for nephrolithiasis and to additional assess the present outcomes and practices for patients who need surgical interference.

METHODS:

This study comprised gravid females who were admitted for delivery and was held in the Obstetrics and Gynecology Department Unit II of Nishtar Hospital Multan for two year duration from January 2018 to January 2020. Antepartum nephrolithiasis admissions were recognized, as were PCNT placement or urological interference (ureteroscopy/ ureteral stent). Descriptive statistics were done, as was multivariable logistic regression to recognize prognosticators of preterm delivery and UTI. 405 cases of complex antepartum nephrolithiasis (0.14%) of 4080 births in this setting were identified. Table 1 in the Annex provides detailed information about patient's conditions in this study.

Performance criteria

In this study, the exposure variable was hospitalization due to an episode of nephrolithiasis. Each pregnant patient described above was evaluated for hospitalization before delivery. Nephrolithiasis has been described using the ICD9-CM codes described above for kidney stones and / or ureters. Treatment of prenatal stones has been defined by interferences counting ureteral stenting, PCNT/ or ureteroscopy using ICD9-CM codes. When procedural intervention was not documented, patients were classified as "untreated". Urinary tract infection and preterm birth were diagnosed. Because both diagnoses increase the risk of preterm labor, asymptomatic bacteriuria and symptomatic urinary tract infection are classified as urinary tract infections in this study.

Statistical analysis

Descriptive statistics were developed. Continuous variables were stated as interquartile and median range (IQR) and a Wilcoxon rank sum test was executed to govern significance. Using a chi-square test; Categorical variables were evaluated. Multifactorial logistic regression models are individually tailored to measure the effect of admission and / outcomes of preterm labor and UTI on delivery. Because the aim of these models is to govern the self-governing impact of stones and treatment, all related diseases demographic factors were included to create a multidimensional and unbalanced model. The premature delivery model included urinary tract infection as interdependent variables, given the well-recognized relationship between asymptomatic bacteriuria/ urinary tract infection and preterm labor. For multivariate analyzes, corrected shape factors (AOR) are reported with a 95% confidence interval (95% CI). The data was analyzed using SPSS 21.0.

RESULTS:

During the study phase, 4080 women were identified who requested delivery. A total of 405 pregnant women entered with antenatal nephrolithiasis. Table 1 shows the population characteristics stratified by the introduction of prenatal analysis.

65% of these patients were conservatively treated, urological interventions were done in 20% (n = 200) and in 8.15% (n = 33); PCNT placement was

done. Preterm delivery proportions augmented from a baseline of 6.50% for subjects without a stone to 10%% for cases with stones who were conventionally managed, who were done with urologic intervention have 12.01% risk of preterm delivery, and who had PCNT placement have 21% risk. In multivariate analysis; PCNT placement and urological intervention, conservative treatment individually amplified the preterm labor risk (all p <0.001).

Table 1

			Antepartum Stone Admission		
	No N = 4080	**N (%)**	***Yes N = 405***	**N (%)**	**p value**
Patient demographics Age (years), median (IQR)	28 (24–33)	-	27 (23–32)	-	< 0.001
Medical comorbidities Diabetes mellitus	40	0.98%	6	1.48%	0.08
Anemia	290	7.11%	39	9.63%	< 0.001
Hypertension	80	1.96%	10	2.47%	0.002
Congestive heart failure	2	0.05%		0.00%	< 0.001
Hypothyroidism	75	1.84%	5	1.23%	0.6
Chronic renal insufficiency	1	0.02%		-	< 0.001
Chronic pulmonary disease	120	2.94%	17	4.20%	< 0.001
Obesity	180	4.41%	22	5.43%	0.005
Depression	50	1.23%	11	2.72%	< 0.001
Trimester of stone diagnosis		0.00%		-	
No stone	4080	100.00%		-	
First		-	45	11.11%	
Second		-	125	30.86%	
Third		-	235	58.02%	
Stone intervention		-		-	< 0.001
No stone	4080	100.00%		-	
Stone, no intervention		-	290	71.60%	
Stone, urologic intervention		-	81	20.00%	
Stone, IR intervention		-	33	8.15%	
Stone location Kidney		-	305	75.31%	
Ureter		-	102	25.19%	
Unspecified		-	7	1.73%	
UTI prior to delivery	25	0.61%	163	40.25%	< 0.001
Sepsis prior to delivery	2	0.05%	6	1.48%	< 0.001
Acute renal insufficiency prior to delivery	1	0.02%	2	0.49%	< 0.001

300 females were diagnosed with urinary tract infection during delivery. Table 2 shows the characteristics of the stratified UTI populace at birth. At delivery, UTI encountered patients had a greater occurrence of antepartum stone admission that females deprived of a urinary tract infection. Patients receiving PCNT had the highest urinary tract infection .In multivariate analysis and PCNT (aOR 21.2), which regulates features and concomitant diseases, conservative treatment of nephrolithiasis.

Table 2 Baseline characteristics, stratified by urinary tract infection at delivery

			Urinary tract infection		
	No ***N = 4080***	**N (%)**	***Yes*** ***N = 300***	**N (%)**	**p value**
Patient demographics Age (years), median (IQR)	28 (24–33)	-	27 (23–32)	-	< 0.001
Medical comorbidities Diabetes mellitus	40	0.98%	8	2.67%	0.08
Hypertension	80	1.96%	14	4.67%	0.002
Anemia	290	7.11%	47	15.67%	< 0.001
Hypothyroidism	75	1.84%	7	2.33%	0.6
Congestive heart failure	2	0.05%	2	0.67%	< 0.001
Chronic pulmonary disease	120	2.94%	18	6.00%	< 0.001
Chronic renal insufficiency	1	0.02%	2	0.67%	< 0.001
Depression	50	1.23%	10	3.33%	< 0.001
Obesity	180	4.41%	26	8.67%	0.005
Trimester of stone diagnosis		0.00%		0.00%	
No stone	4080	100.00%	254	84.67%	
First		-	6	2.00%	
Second		-	33	11.00%	
Third		-	7	2.33%	
Stone intervention		-		0.00%	< 0.001
No stone	4080	100.00%		0.00%	
Stone, no intervention		-	254	84.67%	
Stone, urologic intervention		-	29	9.67%	
Stone, IR intervention		-	10	3.33%	
Stone location Kidney		-	7	2.33%	

Table 3 shows features of the early stratified population. Premature births were higher in patients who had breaks in prenatal analysis.

Table 3: Baseline characteristics, stratified by preterm delivery diagnosis

			Preterm Delivery		
	No ***N = 4080***	**N (%)**	***Yes*** ***N = 280***	**N (%)**	**p value**
Patient demographics Age (years), median (IQR)	28 (24–33)	-	27 (23–32)	-	< 0.001
Medical comorbidities Diabetes mellitus	40	0.98%	6	2.14%	0.08
Hypertension	80	1.96%	13	4.64%	0.002
Anemia	290	7.11%	24	8.57%	< 0.001
Hypothyroidism	75	1.84%	6	2.14%	0.6
Congestive heart failure	2	0.05%	1	0.36%	< 0.001
Chronic pulmonary disease	120	2.94%	11	3.93%	< 0.001
Chronic renal insufficiency	1	0.02%	1	0.36%	< 0.001
Depression	50	1.23%	4	1.43%	< 0.001
Obesity	180	4.41%	15	5.36%	0.005
Trimester of stone diagnosis		0.00%		0.00%	
No stone	4080	100.00%	243	86.79%	
First		-	4	1.43%	
Second		-	15	5.36%	
Third		-	18	6.43%	
Stone intervention		-		-	< 0.001
No stone	4080	100.00%	243	86.79%	
Stone, no intervention		-	19	6.79%	
Stone, urologic intervention		-	11	3.93%	
Stone, IR intervention		-	7	2.50%	

DISCUSSION:

Nephrolithiasis is a situation that affects about 1 in 720 pregnant females. In this analysis, we report that women who had pre-natal nephrolithiasis have an increased risk of urinary tract infections and preterm labor. In patients treated conservatively with stone, the risk of premature delivery is 30% higher than in women without stones, while in patients with ureteral stents or PCNT the risk is 50% and 130% higher, respectively[10-11]. According to previous studies, most calculations were made in the 2nd and 3rd trimesters; though, a quarter of them did not affect the preterm delivery risk[12]. The occurrence of a urinary tract infection during labor was the ultimate preterm labor predictor and was more often 3.5 times. Conservatively treated prenatal stones were higher than women without stones in terms of risk of urinary tract infection; However, patients after surgery have a much higher risk of urinary tract infections. The difference between conservatively treated patients can be explained by the placement of the stent in the ureter and the PCNT placement in the corrected UTI possibilities, degree and presence of invasiveness[13].

The nephrolithiasis effect and renal colic on perinatal impediments, including preterm labor and induction of labor, has been widely discussed in the negative results described in the literature. Prenatal urolithiasis is a rare disease and most studies are limited to several individual institutions and retrospective studies. Drago et al., 1989 case series. They showed the premature delivery induction in 67% (6/10) of patients with symptomatic nephrolithiasis[14]. Furthermost alike to this analysis, Swartz et al. In 1987-2003, Washington conducted a retrospective cohort analysis of admission data based on birth certificates and identified over 2,000 women who had multiple births due to prenatal delivery. Compared to arbitrarily selected group of females without nephrolithiasis, the study showed a 75% risk of premature delivery in mothers with kidney stone. Admission with stones did not rise the other perinatal complications risk, and neither surgery nor admission trimester affected this risk. In another study by Lewis and colleagues at the institution, women with symptomatic prenatal stones had a 7% higher risk of preterm delivery compared with 3% control and a high, but statistically insignificant prepayment rate. Rosenberg et al. Found 195-year-old kidney

disease (0.08%) with a retrospective review of over 200,000 births in the facility over a 10-year period. This study showed that it was significantly higher in risk of various obstetric complications, but not higher in terms of premature or negative labor results[15].

As an important predictor of preterm delivery, our findings regarding procedural interventions are unique compared to previous reports. The direct assessment of surgical treatment of obstetric calculations has not been studied and it is difficult to compare accepted surgical interventions because each of them has its own specific indications. Earlier studies have assessed each procedure unconventionally. Swartz et al. This is by far the largest review of treatment of nephrolithiasis in pregnant women and although the authors do not provide specific data on the treatment of this procedure, the risk of perinatal complications in surgically treated patients is not increased.
In our study, urinary tract infection at birth was the largest self-determining preterm delivery predictor and was common.

CONCLUSION:

Antenatal nephrolithiasis is a situation that affects 1 in 350 females and is associated with a risk of urinary tract infection and premature delivery. Interference with urethral placement or PCNT increases this risk individually, but placing a nephrostomy tube increases the risk of preterm delivery and urinary tract infection in a patient with antenatal nephrolithiasis.

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