Original Article

Study of Ureteric Stones Complications (Preterm Delivery & Urinary Tract Infection) During Last Trimester of Pregnancy

Ureteric Stones Complications During Last Trimester of Pregnancy

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ABSTRACT

Objective: The study was conducted to assess the ureteric stone complications (urinary tract infection & preterm delivery) particularly during the last trimester of pregnancy.
Study Design: A retrospective cohort study
Place and Duration of Study: This study was conducted at the Urology & Gynecology & Obstetrics Department of Mukhtar A Sheikh Hospital Multan from March 2020 to March 2021 for a period of one year.
Materials and Methods: Total 400 pregnant women with no ureteric stones and 35 pregnant women with ureteric stones were included in the study. The inclusion criteria were the women who delivered a live and singleton infant and were presented with ureteric stones in the last trimester. The exclusion criteria were to exclude the women whose time of discharge at birth and gestational age at delivery were found to be inconsistent. Written permission to conduct the study was obtained from the Institutional Review Board and Ethical Committee. The data retrieved included the demographic variables, history of the patient, gestational age, outcomes, and all the associated risks of ureteric stone on preterm delivery. Besides this, the percentage analysis of the frequency of urinary tract infection (UTI) before delivery was also calculated in both groups.
Results: The mean ages of the pregnant women presented with and without ureteric stones were 25 and 27 years respectively with a standard deviation of ±4.3 & ±5.2. It was observed that 12% (4) of the pregnant women with ureteric stone delivered preterm infants while only 5% (20) of the pregnant women without ureteric stone delivered preterm infants ($p<0.001$). Preterm PROM occurred in 3.4% (14) and 10% (3) of pregnant women that presented without ureteric stones & with ureteric stones respectively. A statistically significant difference was seen in the frequency of UTI in both groups with 5% (20) and 25% (9) pregnant women presenting with UTI among the ones with no ureteric stones and with ureteric stones respectively.
Conclusion: The study concluded that there is a comparatively high risk of preterm delivery and urinary tract infection in women who present with complain of ureteric stone in the last trimester of their pregnancy.
Key Words: ureteric stones, preterm delivery, urinary tract infection

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INTRODUCTION

Ureteric stone in pregnancy is a well-known and major health concern. It is frequently associated with non-obstetrical abdominal pain resulting in hospital admission.

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The incidence of ureteric calculi during pregnancy varies in the range of 1/200 to 1/2000 [(1)]. However, these values are not different from the incidence reported in other women. It has been observed that multiparous women are more frequently affected as compared to primiparous women. Most of the cases are reported from the women during the second or third trimester of their pregnancy[(2)]. Smooth muscle relaxant, dilatation of urinary tract due to ureteric obstruction in the presence of a gravid uterus, the effect of progesterone & infection all predisposes to the formation of ureteric calculi during pregnancy. Consequently, it leads to hydronephrosis in 90% & 67% of the pregnant females on the right and left side respectively[(3)]. These normal physiological & anatomical changes not only result in stasis and calculi formation but also makes it difficult to diagnose the underlying condition. The stones are composed of calcium phosphate and are more commonly present in

ureters than in the renal pelvis. The physiological dilatation of the collecting system favors the migration of renal stones into the ureter [4].

It is so necessary to treat ureteric stones as they can have a serious impact on the health of the mother & fetus. Up to 40% of women can suffer from preterm labor & delivery due to early rupture of membranes. It can also result in "complications like obstructive uropathy, hypertension, higher incidence of cesarean section, gestational diabetes mellitus, recurrent abortions and pre-eclampsia" [5]. In such situations, it gets difficult to diagnose ureteric calculi accurately. The typical clinical presentation of ureteric stone in pregnant females includes hematuria, fever, colicky pain radiating to the labial region, and tenderness. These signs and symptoms are sometimes misleading and get diagnosed "as diverticulitis, appendicitis, and placental abruption"[6]. One of the reasons for misdiagnosis is the limited use of radiological techniques during pregnancy. Only ultrasonography is considered as a diagnostic test for ureteric calculi due to the lack of ionizing radiation [7].

A retrospective cohort study design was utilized in the current research article to analyze the effect of ureteric stone on preterm delivery particularly in the female who presented with this condition in the last trimester.

MATERIALS AND METHODS

A retrospective cohort study design was used. The data of the women who were admitted during the prenatal or intrapartum period with complain of ureteric stones was retrieved. The cases included were admitted to the hospital during one year. The inclusion criteria were the women who delivered a live and singleton infant and were presented with ureteric stones in the last trimester. The exclusion criteria were to exclude the women whose time of discharge at birth and gestational age at delivery were found to be inconsistent. For comparative analysis, the data of the healthy women with no complaint of ureteric stones and who also delivered a live singleton infant during the same period (years) was retrieved. Written permission to conduct the study was obtained from the Institutional Review Board and Ethical Committee.

The data retrieved included the demographic variables, history of the patient, gestational age, outcomes, and all the associated risks of ureteric stone on preterm delivery. Gestational age was determined by record of ultrasonography reports & by date of last menstrual period taken from details provided in the patient's history.

The gestational age of fewer than 37 weeks was categorized as preterm birth and less than 32 weeks as extreme premature birth. The infants born with less than 2500 grams were considered infants with low birth weight. The number of infants that died within one year was also noted. The incidence of premature rupture of membrane at 12 – 24 hours before the onset of labor & the one that happened before 37th week of gestation were also included in the study. Besides this, the percentage analysis of the frequency of urinary tract infection (UTI) before delivery was also calculated in both groups.

Data Analysis: The retrieved data was organized and analyzed by using the Standard package for the Social Sciences (SPSS version 25). Demographic variables and associated health complications were expressed using mean & standard deviation. The relative risk associated with birth outcomes due to ureteric stones was expressed using percentage analysis. A Chi-square test was used to obtain a p-value. P-value <0.001 was considered significant.

RESULTS

35 pregnant women presented with ureteric stones & 400 were admitted with no complaint of ureteric stones. All these women delivered a single live infant. Demographic variables of women admitted with and without ureteric stones are provided in Table I. The mean ages of the pregnant women presented with and without ureteric stones were 25 and 27 years respectively with a standard deviation of ±4.3 & ±5.2. Among 400 pregnant women (without ureteric stones) 40.7% (162) were primiparous while 59.2% (237) were multiparous. Among 35 pregnant women (with ureteric stones) 35.7% (12) were primiparous while 64.2% (22) were multiparous. There was a statistically significant difference between the mean age & parity of the group of women who presented with and without ureteric stones. Other noticeable health complications in study participants included renal disorder & hypertension. 8.93% (3) pregnant women with ureteric stone also had underlying renal disorder while 0.41% (2) pregnant women who presented with no complaint of ureteric stone had the renal disorder. Hypertension was observed in the 1.1% (4.4) & 5.7% (2) group of pregnant women with and without ureteric stones respectively.

It was observed that 12% (241) of the pregnant women with ureteric stone delivered preterm infants while only 5% (214) of the pregnant women without ureteric stone delivered preterm infants (p<0.001).

Preterm PROM occurred in 3.4% (14) and 10% (3) of pregnant women that presented without ureteric stones & with ureteric stones respectively. 2% (8) & 3% (1) infants had low birth weight while 1% (41) and 3% (61) infant deaths were reported in pregnant women that presented without ureteric stones & with ureteric stones respectively. A statistically significant difference was seen in the frequency of UTI in both groups with 5% (20) and 25% (9) pregnant women presenting with UTI among the ones with no ureteric stones and with ureteric stones respectively.

Table No.1: Demographic variables of pregnant women admitted with & without complaint of ureteric stones

Variables	Without Ureteric stones n=400	With ureteric stones n=35	P value
Age			
Mean	25	27	<0.001
SD	±4.3	±5.2	<0.001
Parity			<0.001
Primiparous	162 (40.7%)	12 (35.7%)	
Multiparous	237 (59.2%)	22 (64.2%)	
Renal disorder	2 (0.41%)	3 (8.93%)	<0.001
Hypertension	4.4 (1.1%)	2 (5.7%)	<0.001

Table No.2: Birth outcomes and potential risk factors for preterm delivery

Birth outcomes	Without ureteric stones	With ureteric stones	P value
Preterm delivery			
< 37 weeks	16 (4%)	8% (3)	<0.001
< 32 weeks	4 (1%)	4% (1)	<0.001
Preterm	14 (3.4%)	10% (3)	<0.001
PROM	8 (2%)	3% (1)	>0.001
Low birth weight	4 (1%)	4% (2)	>0.001
Infant death	20 (5%)	25% (9)	>0.001
UTI before delivery			

DISCUSSION

Ureteric stones affect approximately 1 in 714 pregnant women. In this study [8]. Our study reports the increased risk of preterm labor and urinary tract infection in pregnant women who presented with ureteric stones. The study included the participants who presented with ureteric stones in their last trimester. Previous studies also show that most cases of ureteric stones are usually admitted in the last trimester of pregnancy[9]. The occurrence of UTI is an indicator of preterm labor [10]. When antepartum ureteric stones are treated conservatively, it results in a significantly higher risk of urinary tract infection at delivery as compared to women with no complaint of ureteric stones. However, the women who require intervention at the time of delivery are also at increased risk of UTI, bacteriuria & infection [11].

The other complication associated with ureteric stones that has gained much attention in the literature is the induction of preterm labor [12]. A case series in past reported induction of preterm labor in 66% of patients who presented with renal stones [7]. Similarly, another study found out that many complications can occur in cases of antepartum stone admission [13]. Furthermore, a comparative study with randomly selected women concluded that there is an 80% increased risk of preterm delivery in pregnant women who receive management therapy for renal stones [14].

Ureteric stones are not associated with perinatal complications.[15] However in our study, we reported that there is a noticeable difference in the number of spontaneous and induced labor in pregnant women with and without ureteric stones.

"Another study performed by Lewis and colleagues observed 7% risk of preterm labor for women with antepartum symptomatic stones compared to 3% of control subjects and an elevated but not statistically significant incidence of premature delivery" [1]. Although some retrospective reviews showed a minimum of 0.08% preterm deliveries in patients suffering from renal stones during their pregnancy. This study however reported an increased rate of obstetric complications associated with the group of pregnant women presenting with antepartum stones [11].

Hereby our study results are in accordance with most of the previous studies. We reported the adverse birth outcomes, the associated risk of preterm labor, and the frequency of UTI in women who presented with ureteric stones in the last trimester of their pregnancy.

CONCLUSION

The study concluded that there is a comparatively high risk of preterm delivery and urinary tract infection in women who present with complain of ureteric stone in the last trimester of their pregnancy.

Author's Contribution:

Concept & Design of Study:	Waqas Khan
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Revisiting Critically:	Waqas Khan, Asma Sajid
Final Approval of version:	Waqas Khan

Conflict of Interest: The study has no conflict of interest to declare by any author.

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