

## **Prevalence and management of renal stones during pregnancy**

**Ahmed Imad Khudhur**

Department of Gynecology, Baghdad Teaching Hospital, Baghdad Medical City Complex, Ministry of Health, Baghdad, Iraq

Corresponding author email: medicalresearch100@yahoo.com

**Rasha Salim Mohsin**

Department of Urology, Al-Kindy Teaching Hospital, Ministry of Health, Baghdad, Iraq

**Haider Ahmed Khalil Al hamad Aziz**

Department of Gynecology, Baghdad Teaching Hospital, Baghdad Medical City Complex, Ministry of Health, Baghdad, Iraq

### **Abstract**

Stones are very common and very complex in their treatment during pregnancy. Aimed of this work to determine the prevalence and management of renal stones during pregnancy. A combine prospective-retrospective cross-sectional study was conducted. Eighty-eight women were enrolled; they complained from renal colic, and hematuria. All having renal stones by ultrasonography. Conservative treatment used included analgesia, diuresis, and antibacterial. Invasive interventions were reserved for women with continued symptoms. Most of women aged above 18 years. Regarding gestational age, group (28-35) weeks composed of 31.82%, and 68.18% belonged to group (36-40) weeks. Of 88 women, 33 ladies were primigravidas and 55 ladies were multiparous. Forty-eight ladies had a history of stones. The most common symptoms are abdominal pain and dysuria. Renal US was used in 88 women. Of those, only women with negative findings, calculi were diagnosed by MRU in 27 women and by SSLD-CT in 21 women. Treatment included analgesia for pain for all women. About 87.50% of women received anti-biotic. Invasive procedures were required for 23.86% of women. Fifty-three women who delivered vaginally, and by cesarean section in 30. The incidence of abortion was 5.68%. Old aged, late gestational age, multiparous, history of stones, maternal HT and DM may be effected the stone formation in pregnancy. Pain and dysuria are the sound for calculi in pregnancy. Ultrasonographic evaluation of pregnant women is a reasonable diagnostic procedure of calculi to be used because of its safety and convenience. Pregnancy outcomes not necessarily impacted by stones.

**Keywords: pregnancy; renal stones; UTI; renal pain; urolithiasis**

### **Introduction**

Renal stones are rare through pregnancy, and can cause of non-obstetric abdominal pain [1]. The management of stones in this situation is difficult because physiological and pathological changes, and also limited diagnostic tests and treatment options [1]. Many reasons to develop stone in pregnancy which are the dilatation of urinary system, elevated progesterone levels lead to drop ureter peristalsis [2], enlarging

gravid uterus compressing on beside organs [3], Hydronephrosis [4, 5], increments flow of plasma and GFR [6], and raised urinary excretion of calcium, uric acid, sodium, and oxalate [7, 8]. Otherwise, the overall risk of urolithiasis is same as in pregnant and non-pregnant women [7,9,10]. Calcium phosphate stones are the most common stones reported in pregnancy [10,11]. This is thought to be secondary to the renal excretory changes and greater urine pH [11,12].

The incidence of stones during pregnancy is been 1 in 1500 [9,13,14], this is more common in multiparous women, second and third trimester, and history of renal disease and hypertension [15–20]. Renal colic, or severe flank pain, radiating to the groin is main symptoms [21]. Other including nausea, vomiting, dysuria, frequency, and haematuria [16].

Renal stones during pregnancy associated with a significant elevate in the risk of recurrent miscarriage, mild preeclampsia, chronic hypertension, gestational diabetes mellitus, premature rupture of membranes and caesarean deliveries [22,23]. Dipstick urine-analysis, kidney function, calcium, ultrasonography, MRU, and low-dose CT scanning are used in diagnosis [1].

Management is include analgesia, hydration, and antibiotics if infection is suspected. Indications for intervention include severe pain, persistent vomiting, sepsis, obstruction, renal failure, large stones, and premature onset of labour [24-26]. Active management of renal stones include ureteral stent or percutaneous nephrostomy (PCN) tube, or lithotripsy, percutaneous nephrolithotomy, or ureteroscopic stone removal (URS) [1].

Aimed of this work to determine the prevalence and management of renal stones during pregnancy.

## **Methods**

A combine prospective-retrospective cross-sectional study was conducted in our hospital in 2020. Eighty-eight women were enrolled; they complained from renal colic, and hematuria. All having renal stones by ultrasonography. Our preferred method for initial imaging is renal ultrasonography, Magnatic rasonace urograhoy (MRU), and single-shot low dose CT scan (SSLD-CT). Conservative treatment used included analgesia, diuresis, and antibacterial. Invasive interventions were reserved for women with continued symptoms such as obstruction. Clinical manifestation, diagnostic imaging, management, and pregnancy outcomes were analyzed.

## **Results**

The demographic of women shown in Table 1. Most of women aged above 18 years and only 12(13.64%) women aged below 18 years. Regarding gestational age, group (28-35) weeks composed of 31.82%, and 68.18% belonged to group (36-40) weeks. Of 88 women, 33 ladies were primigravidas and 55 ladies were multiparous. Forty-eight ladies had a history of stones. Maternal HT and DM were reported in 25%, and 17.05%, respectively.

Table 1. Demographic of the study.

Demographic		No.	%
Maternal age (years)	<18	12	13.64
	≥18	76	86.36
Gestational age (weeks)	28-35	28	31.82
	36-40	60	68.18
Parity	Primigravidas	33	37.50
	Multiparous	55	62.50
Nephrolithiasis or stone history	Yes	48	54.55
	No	40	45.45
Maternal HT	Yes	22	25.00
	No	66	75.00
Maternal DM	Yes	15	17.05
	No	73	82.95

The most common symptoms are abdominal pain and dysuria. Other symptoms listed in Table 2.

Table 2. Symptoms of calculi.

Symptoms	No.	%
Abdominal pain	88	100
Renal pain	47	53.41
Pelvic pain	71	80.68
Nausea and vomiting	30	34.10
Dysuria	88	100
Hematuria	33	37.5
Contraction of uterus	4	4.55
Urgency	10	11.36

Diagnostic confirmation of stones was obtained by US, MRU, or SSLD-CT. In some ladies, multi-diagnostic procedures were necessary required. Renal US was used in 88 women. Of those, only women with negative findings, calculi were diagnosed by MRU in 27 women and by SSLD-CT in 21 women, as showed in Table 3.

Table 3. Diagnosis of calculi.

Methods	No.	%
US	88	100
MRU	27	30.68
SSLD-CT	21	23.86

Treatment included analgesia for pain for all women. About 87.50% of women received anti-biotic. Invasive procedures were required for 23.86% of women because the conservative options not cure the pain, as showed in Table 4.

Table 4. Management of calculi.

Treatment	No.	%
Analgesia	88	100
Anti-bacterial	77	87.50
Invasive procedures	21	23.86

Fifty-three women who delivered vaginally, and by cesarean section in 30. The incidence of abortion was 5.68%.

Table 5. Outcomes.

Pregnancy outcome	No.	%
Normal vaginal delivery	53	60.22
Cesarean section	30	34.10
Abortion	5	5.68

**Discussion**

The incidence of symptomatic nephrolithiasis in our nation was low in comparison to numbers of pregnancies. The incidence of calculi in pregnancy is low in spite of many predisposing factors [27].

We found that most of women aged above 18 years, and frequently gestational age was belonged to group (36-40) weeks. Forty-eight ladies had a history of stones. Maternal HT and DM were reported in 25%, and 17.05%, respectively. The most common symptoms are abdominal pain and dysuria. These are agrees with McAleer and Loughlin [27], Chung et al. [23] and Eskelinen et al. [21].

In pregnancy, flank pain is the most common symptoms, affecting more than ninety percent of women, and haematuria is seen also [28]. Renal stones may also present as preterm labour or uterine contractions [1, 28].

Diagnosis of stones was obtained by US, MRU, or SSLD-CT. In some ladies, multi-diagnostic procedures were necessary required. Renal US was used in all women. This is similar to that obtained with ultrasonography in most studies [14-18, 26, 27]. However, if US negative, we can shift to other options like MRU and SSLD-CT scan. Meher et al. [1] concluded US should be the first line of investigation, and this could also include a transvaginal approach, which is better at detecting ureteral stones that are more commonly found in pregnancy. Where US is inconclusive and symptoms are persistent, an MRU, or low-dose CT scan may be considered.

Management of stones included analgesia, anti-biotic, and Invasive interventions. First-line treatment should be expectant management, but a third of the women may need active intervention [1]. In McAleer and Loughlin study, most patients respond well to first line [27]. However, other authors reported a predicting percent of women having no response to analgesia [20, 23, 25].

Fifty-three women who delivered vaginally, and by cesarean section in 30. The incidence of abortion was 5.68%. in literature, no documented articles deals with pregnancy outcomes influenced by calculi. Otherwise, no clear association between abortions recorded in this study and calculi in pregnancy.

**Conclusions**

Old aged, late gestational age, multiparous, history of stones, maternal HT and DM may be effected the stone formation in pregnancy. Pain and dysuria are the sound for calculi in pregnancy. Ultrasonographic evaluation of pregnant women is a reasonable diagnostic procedure of calculi to be used because of its safety and convenience. Pregnancy outcomes not necessarily impacted by stones.

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