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Case Series

Confronting renal calculi in pregnancy: A case series of clinical outcomes and approaches

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Abstract

Renal calculi, though rare in pregnancy, present a significant clinical challenge due to their potential to cause serious complications for both the mother and fetus. The management of renal calculi in pregnant patients requires a delicate balance to minimize maternal symptoms and complications, such as urinary obstruction or infection, while also safeguarding fetal well-being. Given these challenges, this study aims to explore effective diagnostic and management strategies tailored to pregnant individuals with renal calculi, ensuring optimal outcomes for both mother and child. This case series includes four pregnant women diagnosed with renal calculi, managed based on clinical severity. It involves pregnancies varying in gestation age across all three trimesters, with varying severity of clinical symptoms ranging from calculi size of 5 mm to 9 mm. Management strategies varied from conservative treatment with hydration and analgesia to minimally invasive interventions to relieve symptoms. The easiest modality of investigation was urine routine analysis and the investigation of choice was ultrasonography, whereas most commonly used minimally invasive procedure was double J stenting. All cases had favorable maternal and fetal outcomes. The management of renal calculi during pregnancy requires a balance between minimizing fetal risks and addressing maternal complications. Advances in minimally invasive techniques have improved outcomes, emphasizing the need for a multidisciplinary approach.

Keywords: Renal calculi, Pregnancy, Ureteroscopy, Stent placement, Conservative management, Hydronephrosis.

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1. Introduction

Renal calculi during pregnancy are uncommon, with an incidence reported at less than 0.1%.[1] Physiological changes during pregnancy such as increased urinary calcium excretion, reduced ureteral peristalsis, and urinary stasis make pregnant women susceptible to urolithiasis.[2] While most renal stones during pregnancy remain asymptomatic, symptomatic cases can lead to serious complications including renal colic, which may precipitate preterm labor.[3] Given the associated risks with imaging and surgical interventions during pregnancy, conservative management is often preferred when feasible; however, surgical options may become necessary in complicated cases. This article presents four case studies from our institution alongside a review of current literature regarding effective diagnostic and management strategies tailored specifically for pregnant individuals with renal calculi.

2. Methods

We retrospectively reviewed the clinical records of four pregnant women diagnosed with renal calculi at our institution. Clinical data including demographic details, clinical presentations, imaging findings, management approaches, and outcomes were analyzed. Informed consent was obtained from the patients, and informed consent was secured for the case presentations.

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3. Case Series

3.1. Case 1: Conservative management in the second trimester

A 28-year-old gravida 2, para 1 woman presented at 22 weeks of gestation with acute right flank pain radiating to the groin, accompanied by mild hematuria and nausea. She had no prior history of urinary tract infections (UTIs) or renal stones. Her blood pressure and renal function were within normal limits; a urinary tract infection was ruled out. Ultrasound revealed a 5 mm stone in the right proximal ureter with hydronephrosis. Given the patient's stable condition and lack of infection, conservative management was initiated—including hydration, analgesia, and antispasmodic medications. Over the following 10 days, the patient experienced gradual improvement with resolution of hydronephrosis and spontaneous stone passage. She continued her pregnancy without complications and delivered a healthy baby at 38 weeks via vaginal delivery.

3.2. Case 2: Ureteroscopy and stenting in the third trimester

A 32-year-old gravida 3, para 2 woman with a previous caesarean section presented at 33 weeks of gestation with severe left flank pain radiating to the groin that was unrelieved by conservative measures. She had a history of recurrent renal stones but no prior surgical interventions. On examination, the patient was afebrile with stable vital signs. Ultrasound confirmed a 9 mm stone in the left proximal ureter along with mild hydronephrosis; serum creatinine was elevated at 1.8 mg/dL. After discussing treatment options, the patient opted for ureteroscopy and placement of a double-J stent under regional anesthesia. Postoperatively, her renal function normalized and she experienced relief from symptoms. She delivered a healthy baby at 37 weeks via caesarean section; the stent was removed six weeks postpartum.

3.3. Case 3: Double-J stent placement in third trimester

A 29-year-old gravida 2, para 1 woman presented at 31 weeks of gestation with severe right-sided flank pain accompanied by nausea and vomiting. Clinical examination revealed tenderness in the right renal angle; her blood pressure was elevated at 140/90 mmHg. Ultrasound showed a 7 mm stone in the right distal ureter with moderate hydronephrosis; serum creatinine was slightly elevated at 1.4 mg/dL indicating mild renal impairment. The patient was managed conservatively with intravenous hydration and pain control; however, due to persistent symptoms and risk of renal compromise, a double-J stent was placed under spinal anesthesia. The procedure was well tolerated; symptoms resolved thereafter. The pregnancy progressed uneventfully and she delivered a healthy baby at 39 weeks via vaginal delivery. The stent was removed six weeks postpartum without complications.

3.4. Case 4: Early pregnancy and ureteral stenting for UTI complication

A 26-year-old gravida 3, para 1 woman presented at 11 weeks of gestation with severe left flank pain accompanied by fever and dysuria. Ultrasound revealed a 5 mm stone in the left proximal ureter along with moderate hydronephrosis. Urinalysis showed pyuria and Escherichia coli growth confirming a urinary tract infection (UTI). Her vital signs were stable; she received intravenous antibiotics and hydration. After her fever subsided and urine culture sensitivity returned negative for infection-causing organisms, a decision was made to proceed with ureteral stenting after obtaining informed consent. The procedure was successful; the patient continued her pregnancy without further complications and delivered a healthy baby at 38 weeks; the stent was removed six weeks postpartum.

4. Discussion

Renal calculi during pregnancy present considerable clinical challenges primarily due to physiological alterations that impact renal function and urinary tract anatomy.[4] Key changes include an increase in glomerular filtration rate (GFR), hypercalciuria, and smooth muscle relaxation induced by elevated progesterone levels—all contributing to the pathogenesis of renal calculi. Gestational hydronephrosis affects approximately 90% of pregnant women by the third trimester; it is often exacerbated by mechanical compression from the enlarging uterus leading to renal calyceal and pelvic dilatation. Although hydronephrosis frequently resolves spontaneously following delivery, complications such as urolithiasis may result in obstructive uropathy—causing maternal discomfort while posing risks for renal impairment.

4.1. Diagnostic modalities

Ultrasound is the diagnostic modality of choice for evaluating renal stones in pregnant patients due to its non-invasive nature and absence of ionizing radiation exposure to the fetus. This imaging technique effectively confirms the presence of calculi while assessing hydronephrosis; MRI may be employed as a safe alternative when further diagnostic clarity is required.[4]

4.2. Management strategies

The management of renal calculi during pregnancy can be categorized into conservative and surgical approaches:

4.3. Conservative management

This is typically the first-line strategy for managing smaller stones (generally less than 4 mm). Key components include:

1. Hydration: Increased fluid intake is encouraged to promote urinary flow while facilitating spontaneous stone passage.[5]

2. Analgesia: Safe analgesic options include acetaminophen; however, opioids may be utilized for severe pain—with caution due to potential fetal risks.[6]
3. Dietary modifications: Patients may benefit from dietary adjustments aimed at reducing purine intake to manage uric acid stones alongside maintaining high fluid intake.
4. Surgical management: Surgical intervention becomes necessary when conservative measures are ineffective or in cases involving larger stones (typically greater than 5 mm). Surgical options include:
5. Ureteroscopy (URS): URS has gained prominence as a minimally invasive procedure for definitive stone removal during pregnancy—utilizing laser lithotripsy to fragment stones while minimizing recovery time—demonstrating low maternal and fetal complication rates when performed by experienced specialists.
6. Ureteral stenting: Placement of double-J stents alleviates obstruction effectively but may lead to discomfort while necessitating regular exchanges due to encrustation risks throughout pregnancy.[7]
7. Percutaneous nephrostomy (PCN): This invasive procedure involves creating an access tract into the kidney's collecting system for drainage; it is generally reserved for severe cases where other interventions are impractical due to inherent risks.[8]
8. Extracorporeal shock wave lithotripsy (ESWL): Although effective in non-pregnant populations, ESWL is contraindicated during pregnancy owing to concerns regarding fetal safety as well as positioning requirements.

Recent advancements in minimally invasive surgical techniques have significantly enhanced safety while improving efficacy for pregnant patients requiring intervention. A multidisciplinary approach involving obstetricians, urologists, radiologists—and potentially neonatologists—is imperative for ensuring optimal care for pregnant individuals diagnosed with renal calculi.

5. Conclusion

Managing renal calculi in pregnancy requires early recognition, individualized risk assessment, and timely intervention to ensure optimal maternal and fetal outcomes. Clinical experience suggests that even a single complaint—such as unexplained flank pain or recurrent urinary symptoms—should prompt further evaluation, particularly in women with a history of nephrolithiasis, recurrent urinary tract infections, or metabolic risk factors.

Routine urinalysis revealing microscopic hematuria or signs of infection should not be overlooked and must be followed by appropriate imaging, with ultrasound as the preferred first-line modality. In unresolved or high-risk cases, judicious use of low-dose CT or MRI may be warranted within established safety limits.

We recommend incorporating focused renal symptom screening into antenatal care protocols, especially for at-risk populations. Preventive strategies such as hydration counseling, dietary modifications, and metabolic workup can significantly reduce recurrence and morbidity.

In conclusion, a risk-stratified, protocol-driven approach embedded within routine antenatal care can enhance early detection, prevent complications, and allow for timely, minimally invasive interventions. Future research should focus on refining diagnostic criteria, evaluating the safety of evolving interventions, and establishing comprehensive clinical guidelines for managing renal calculi during pregnancy.

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7. Conflict of Interest

None.

References

1. Chan K, Shakir T, El-Taji O, Patel A, Bycroft J, Lim CP, et al. Management of urolithiasis in pregnancy. *Curr Urol*. 2023;17(1):1–6. https://doi.org/10.1097/CU9.0000000000000181.
2. Liu Y, Zhao C, Meng F, Xiong S, Yuan L, Lin F, et al. Minimally-invasive stone removal in urinary calculi patients during pregnancy: clinical therapeutic effects and low complications. *Am J Transl Res*. 2021;13(8):9614–20.
3. Juliebø-Jones P, Somani BK, Baug S, Beisland C, Ulvik Ø. Management of kidney stone disease in pregnancy: a practical and evidence-based approach. *Curr Urol Rep*. 2022;23(11):263–70. https://doi.org/10.1007/s11934-022-01112-x.
4. Meher S, Gibbons N, DasGupta R. Renal stones in pregnancy. *Obstet Med*. 2014;7(3):103–10. https://doi.org/10.1177/1753495X14538422.
5. Lee MS, Fenstermaker MA, Naoum EE, Chong S, Van de Ven CJ, Bauer ME, et al. Management of nephrolithiasis in pregnancy: multi-disciplinary guidelines from an academic medical center. *Front Surg*. 2021;8:796876. https://doi.org/10.3389/fsurg.2021.796876.
6. Nunge RA, Kendle AM, Alwan S. Pain medication use during pregnancy. *Semin Perinatol*. 2025;49(4):152074. https://doi.org/10.1016/j.semperi.2025.152074.
7. Deng S, Guo D, Liu L, Wang Y, Fei K, Zhang H. Preference for diagnosing and treating renal colic during pregnancy: a survey among Chinese urologists. *Sci Rep*. 2024;14:2914. https://doi.org/10.1038/s41598-024-53608-w.
8. Salehi-Pourmehr H, Tayebi S, DalirAkbari N, Ghabousian A, Tahmasbi F, Rahmati F, et al. Management of urolithiasis in pregnancy: a systematic review and meta-analysis. *Scand J Surg*. 2023;112(2):105–16. https://doi.org/10.1177/14574969221145774.

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