In the name of who everything
is from who God

All patients with renal calculi in horseshoe kidneys were noted to have metabolic abnormalities predisposing to stone formation. In this initial series of 11 patients, hypovolemia, hypercalcuria and hypocitraturia were most common metabolic defects. These findings suggest that metabolic derangements play a role in stone formation in patients with a horseshoe kidney. Patients with calculi in anatomically abnormal kidneys should be considered for a metabolic evaluation to identify their stone-forming risk factors in order to initiate preventative selective medical therapy and reduce the risk of recurrent calculus formation.

the Urinary Stone in the especial conditions with kidney: single kidney pregnancy horseshoe transplant

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Horseshoe kidney (HSK) is a congenital disorder that is usually asymptomatic, but that increases the risks of kidney stones and infectious disease. However, renal outcomes such as end-stage renal disease (ESRD) in patients with HSK remain unclear.

Urinary stones following renal transplantation is a rare complication. Less than 150 cases of this complication have been reported in the literature since the earliest report by Hume et al. in 1966[1)]. Many of the clinical features of urinary stones after transplantation differ from those of non-transplant patients. Typical renal colic or pain is usually absent because of denervation of the transplant kidney and ureter. Rarely, the presentation resembles acute rejection or acute tubular necrosis[2,3)]. We retrospectively reviewed our renal transplant recipients to study the incidence of urinary stone disease, risk factors for stone formation, composition of the stones and clinical outcome.

The low incidence of uric acid stone, in spite of hyperuricemia, may be explained by impaired renal excretion of uric acid and high urinary pH (partial renal tubular acidosis) in these patients.

high incidence of complications at the site of the transplanted ureter and the urinary bladder, persistent bacteriuria, alkaline urinary pH and postoperative hypercalcemia and hypercalciuria as a consequence of secondary hyperparathyroidism[10]

Following renal transplantation and restoration of adequate kidney function, the secondary hyperparathyroidism resolves spontaneously in the majority of patients and one would expect normalization of the serum calcium[25,26].

However, David et al. reported hypercalcemia after transplantation in 30% of 64 transplant recipients 1 to 3 years after transplantation[27]. They found that the onset of the hypercalcemia occurred between one day and one year after transplantation and evidence of persistent secondary hyperparathyroidism with raised serum parathyroid hormone was noted in all hypercalcemic patients.

We think that early reconstitution of normal production of 1, 25-$(OH)_2$ vitamin-D by the transplanted kidney, as well as persistent hyperparathyroidism, facilitates post-transplant hypercalcemia. Many authors have the opinion that hyperparathyroidism is the main cause of post-transplant stones and, therefore, calculus formation is an indication for immediate parathyroidectomy[29–33].

Tertiary hyperparathyroidism developing or manifesting itself after a successful renal allograft may resolve spontaneously[25,34], but such involution may take several years. The challenge is whether to treat tertiary hyperparathyroidism soon after renal transplantation by subtotal parathyroidectomy or to try a longer period of conservative management[25,35]. Since target organ damage appears infrequently in post-transplant hyperparathyroidism, a policy of routine parathyroidectomy in asymptomatic hypercalcemic patients seems unwarranted[10,36,37]

In summary, urinary stone formation following kidney transplantation is a rare complication (1.8%). Hyperparathyroidism, hypercalciuria, recurrent urinary tract infection and hypocitraturia are common risk factors, but often multiple factors predispose to stone formation. Ultrasonography appears to be the most useful diagnostic tool to detect stones and determine their location and size. Prompt diagnosis, the removal of stones and stone-preventing precautionary measures help prevent adverse effects on renal graft outcome.

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Most recipients present with hyperuricemia after kidney transplantation, which is one of the side effects of immunosuppressive drugs. Norlen et al. considered that cyclosporine produced hyperuricosuria in approximately 50 to 60% of patients receiving this medication for immunosuppression [34]. Ureteral stricture or obstruction can lead to renal transplant lithiasis. Patients with UTIs are more likely to suffer from renal stones, and renal stones can lead to UTIs.

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ESWL is recommended for patients with stones less than 15 mm [43], and PCNL is widely used for renal transplant lithiasis patients with stones larger than 2 cm or when ESWL fails [27]

HSK is the most common renal fusion anomaly, and is characterized by male predominance. In our series, male patients represented 64% of the total number of patients. Renal stones are one of the complications of HSK, and the successful management of these stones can be challenging

Patients with a stone size of >20 mm in the largest diameter were primarily offered PCNL while patients with a stone size below 20 mm were offered ESWL as a primary option. However, all patients who underwent ESWL were managed by the placement of a DJ stent before ESWL. All patients with small nonobstructing stones with a size of <8 mm were treated expectantly with hydration and medical treatment, including alkalization in radiolucent, uric acid, and cystine stones.

Indications, methods of treatment, and outcomes of management of stones associated with HSKs were comparable to those for stones associated with normal kidneys. The management needs to be individually tailored according to stone size and burden, with the possibility of conservative management. In our study, if an intervention was required, ESWL showed a good stone-free rate when accompanied by ureteric stent placement. PCNL and/or URS are both highly effective in achieving a high stone-free rate with minimal morbidities.

Patients with HSK are at risk of ESRD, which may be attributable to the high prevalence of complications. Accordingly, these patients should be regarded as having chronic kidney disease and require regular monitoring of both kidney function and potential complications.

One patient had primary hyperparathyroidism and underwent a parathyroidectomy. Low urine volumes were noted in eight patients on at least one of the two specimens (range 350-1640 mL/day).

What physiological changes lead to kidney stones in pregnant women?

Here, is a rundown on the physiological changes, a pregnant woman faces. These changes usually occur in th second trimester and subside after delivery -

•There are some specific changes that occur in the woman's physiology during pregnancy that may affect the urina tract leading to increased chances of problems with already present urinary stone(s) or these changes can eve increase the chance of formation of new kidney stones.

•Later in pregnancy, the size and position of the uterus can restrict the outflow of urine. The ureters get dilated pregnancy and may not eliminate urine as efficiently, and this may lead to hydronephrosis (swelling of the kidney). Th ureters increase in size (approx. 1 cm) due to increased renal vascular and interstitial volume during pregnancy. Th collecting system and ureters also decrease their ability to contract, resulting in dilation and sometimes pain. The b concern of dilation is stagnant urine. If the urine is not fully eliminated, stone or infection can occur. These change usually occur in the second trimester and subside after delivery.

•Also, during pregnancy, a variety of changes happening with vitamins and minerals can also cause the formation kidney stones. During this state, the body tends to handle calcium less effectively, thereby leading to onset of kidne stones.

•Urinary tract infection, commonly seen during pregnancy may also contribute to development of kidney stones.

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•**?**Any type of manipulation in the bladder, pelvis, ureter or kidney could result in premature labor. However, necessary treatments include:**Stenting** - A stent or PCN tube is placed in the ureter. The tube passes the urine lessening the burden on the contraction of the urinary tract. The tube is not removed till end of pregnancy.

•**Extracorporeal Shock Wave Lithotripsy** – ESWL uses ultrasonic pulses fragment renal stones. It is totally contraindicated during pregnancy as it can cause fetal damage and death though it is highly recommended for non-pregnant women.

•**Ureteroscopic Stone Removal (URS)** - URS is the recommended method for pregnant women where stone removal Is necessary. Holmium is used to fragment stones and is used as an alternative to ESWL.

•**Percutaneous nephrolithotomy (PCNLs)** – An access tract is created in the renal collecting system. Though its safety and efficacy are well-established for non-pregnant women, it is not recommended during pregnancy; reasons include general anesthesia and prolonged prone position.

revention of urinary stones during pregnancy

Prevention of urinary stones during pregnancy is the key and is the best cure. Here are the simple prevention tips -

•Drink plenty of fluids including water and keep the body hydrated.

•Don’t hold in the urine, even if it means frequent trips to the washroom or toilet

•Reduce intake of high oxalate foods such as nuts, chocolates, dark green leafy vegetables, and berries

•Discuss prophylactic treatment with specialist when planning pregnancy, especially if there is history of kidney stones

•Be physically active and exercise as per doctor’s guidelines

•Instantly consult doctor in case of severe pain in the abdominal area

Kidney stones during pregnancy is difficult to manage as it can lead to obstetric complications and fetal harm. A multidisciplinary team should care for women receiving treatment for kidney stone during pregnancy in India.

A woman's physiology changes dramatically during pregnancy, which can influence her chances of developing a new stone. While some changes increase a woman's likelihood of forming a new stone, others decrease it. The end result is that the rate of stone formation during pregnancy actually appears similar to the rate in non-pregnant women and has been estimated to occur in 1 in 1500 pregnancies.

Changes during pregnancy that have an effect on stone formation:

- A woman's cardiovascular system increases it output.
- Her kidneys increases their filtration activity.
- More calcium is absorbed by the intestines and more is released into the urine.
- Other urinary substances also increase including citrate, which helps prevent stones.
- The upper urinary tract (including kidneys and ureters) become dilated due to compression from th uterus and the effects of hormones. This is more pronounced on the right side and can lead to slower transport of urine and higher chances of infection or stone formation.

They found that stone episodes during pregnancy occurred primarily during the second and third trimesters, which accounted for 39% and 46% of the episodes. Encouragingly, 81% of the pregnant women were able to successfully spontaneously pass their stones in their group of patients, a much higher success rate than in the non-pregnant women (47%).

Stones in the pregnant women were more likely to be calcium phosphate in nature rather than the more common calcium oxalate stones seen in the general population, reinforcing the fact that stone formation during pregnancy is a result of unique pregnancy related changes in physiology. More recent research published by Burgess and colleagues from Minnesota also found a high percentage of calcium phosphate stones but reported a much lower successful spontaneous passage rate of only 48%.

Radiation exposure from x-rays or CT scans used to diagnose a stone is more of a risk to the fetus during the first trimester. While the risk is lower during the second and third trimester, experts do not agree on whether there is a “safe” level or radiation and the philosophy of avoiding unnecessary radiation and minimizing it when it is unavoidable is advisable. This strategy includes using ultrasound or MRI initially to establish a diagnosis. However, these studies are not as accurate as CT for the diagnosis of stones. Because an undiagnosed stone can carry its own risks to the mother and fetus (pain, infection, preterm labor, and hypertension), in certain cases, the risk of obtaining imaging in order to treat a stone may be justified. Low dose CT scan protocols or plain x-rays may be used in these situations to still limit the amount of radiation exposure.

Once a stone is diagnosed, the decision to treat or observe it depends on factors such as whether pain is uncontrolled, infection is present, or kidney function is impaired. When these conditions are not present, a trial of passage or observation with planned treatment after delivery should be considered first because half or more of these stones will pass spontaneously. If intervention is needed, the options include placement of a ureteral stent or nephrostomy tube. If a stent is chosen, it may need to be changed every 2 months or more frequently because of the faster development of stent encrustation (stone particles forming on a stent) that occurs in pregnant women.

A nephrostomy tube, placed through the skin directly into the kidney, avoids this issue but is associated with the inconvenience of requiring an external drainage bag. Treatment during pregnancy is usually limited to ureteroscopy with laser lithotripsy. Shockwave lithotripsy is not performed because of risks from the shockwaves on the developing fetus and percutaneous nephrolithotripsy is avoided because of the belly down position necessary for surgery. Both procedures also require a moderate amount of undesirable x-rays.

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