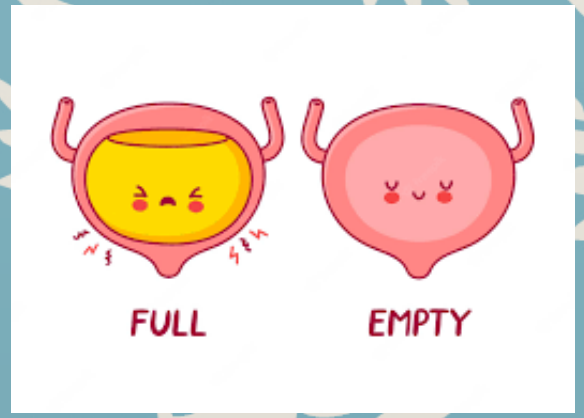
UROLOGIC CONSIDERATIONS DURING PREGNANCY

Graham A. Bobo, MD
Tulane Urology



Lower Urinary Tract Symptoms

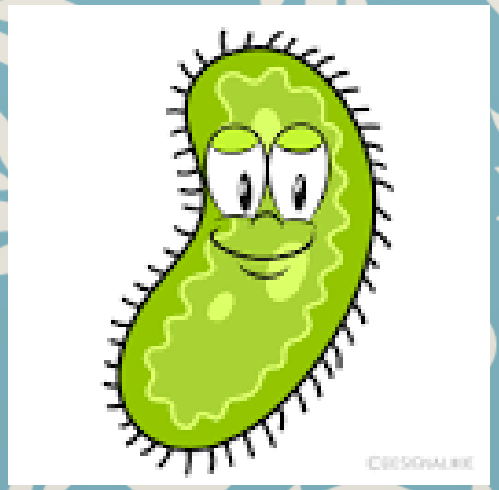
- Various physiologic changes during pregnancy result in new storage and voiding symptoms:
  - Rising estrogen levels stimulate bladder hypertrophy.
  - Progesterone results in bladder hypotonia and increased bladder capacity.
  - Extravesical compression of the gravid uterus decreases bladder capacity.
  - Urine volume increases due to increased glomerular filtration and sodium excretion, reabsorption of edema/extracellular fluid, and polydipsia.

LUTS Cont.

- These physiologic changes result in symptoms such as urinary frequency, nocturia, urinary hesitancy, retention, and incontinence.
- Urinary frequency and nocturia are the most common complaints.
- Post-partum urinary retention can occur in 1.7-17.9% of pregnancies.
- Risk factors for post-partum UI include epidural anesthesia, long duration of labor, episiotomy, high birth weight, C-section, obesity, instrument assisted delivery, and nulliparity.

LUTS Cont.

- Stress urinary incontinence is the most common form of urinary incontinence during pregnancy with a prevalence of 41% and increases with gestational age. This is due to increased strain on the pelvic diaphragm and the relaxing effect of progesterone on the bladder.
- Risk factors for SUI include obesity, pre-existing SUI, gestational diabetes, advanced age, and constipation.
- First-line agents in treatment include kegel exercises, PFPT, and pessary placement.



Asymptomatic Bacteriuria and Symptomatic UTIs

- ASB occurs in about 2-10% of pregnancies and lower UTIs/cystitis occurs in 1-2% of cases.
- UTIs in pregnancy should be treated as there is increased risk of preterm birth, low-brith weight, and pre-E.
- Treatment considerations for UTIs should both consider bacterial sensitivity and decreasing fetal toxicity.
- The aminopenicillins and cephalosporins are considered safe and generally effective during pregnancy.
- In patients with a penicillin allergy, nitrofurantoin is a commonly used alternative.

Antibiotic Considerations

- Nitrofurantoin is considered safe, however, there are some reports of cleft lip/palate when given in the first trimester, additionally, it should be avoided near term due to hemolytic anemia in fetuses with G6PD. It should also be avoided in pyelonephritis.
- Other antibiotics to avoid in pregnancy include: 1) FQ because of fetal cartilage effects, 2) sulfonamides due to risk of hyperbilirubinemia, 3) trimethoprim due to increased risk of congenital abnormalities including NTD, 4) aminoglycosides due to renal toxicity, and 5) tetracyclines due to bone defects and discoloration of deciduous teeth.

Antibiotic Considerations Cont.

- Patients with pyelonephritis or 3 or more culture confirmed UTIs during pregnancy should be considered for suppressive antibiotics such as a low dose amoxicillin, cephalexin, or nitrofurantoin daily.
- ACOG recommends all women be screened for asymptomatic bacteriuria at their initial visit. If positive, these women should be treated and continued to be screened throughout pregnancy. Untreated asymptomatic bacteriuria develops into pyelonephritis in 15-45% of pregnant women.
- Most cases of pyelo occur in the third trimester when hydronephrosis and urinary stasis is more prevalent.

Hydronephrosis

- Occurs in 43-100% of pregnant women. Often asymptomatic.
- Risk increases with gestational age. Thought to be caused by expanding renal vascular and interstitial volume, hormonal changes, and mechanical compression of the distal ureters by the gravid uterus.
- Most often seen in the right ureter due to its course.
- Can have a variety of presentations including flank pain and pyelo.

Urolithiasis

- Renal colic is the most common non-obstetric cause of hospitalization during pregnancy and occurs from 1 in 200 to 1in 1500 pregnancies.
- Risk of urolithiasis during pregnancy is roughly the same as the general population.
- Most common stone is calcium phosphate over calcium monohydrate.
- Stone disease is associated with adverse gestational events such as preeclampsia, premature rupture of membranes, and premature onset of labor.

Imaging Modalities In Pregnancy

- US is the imaging modality of technique to determine if there are renal stones, however, it is poor at determining physiologic hydronephrosis from obstruction due to a calculus.
- Adjunct techniques used to assist in differentiation include: 1) transvaginal US, 2) evaluation of ureteral jets on the symptomatic side, 3) calculating the absolute and relative resistive indices for each kidney.
- If US is non-diagnostic and clinic suspicion is still high, then MRI using T2-weighted sequences without IV contrast can suggest a ureteral defect. Ureteral dilation above or below the pelvic brin ("double kink sign") can also point towards an obstructing stone.
- NCCT is the gold standard of diagnosis. ACOG states "exposure to less than 50 mGy has not been associated with an increase in fetal anomalies or pregnancy loss" Normal low dose CT exposes patients to ranges of 2-14 mGy.

Imaging Modalities Cont.

- Second-line imaging for patients in their first trimester includes non-contrast MRI and those in their second and third trimesters have the options of either MRI or low dose CT.

Treatment Considerations

- Stone passage during pregnancy is very common, with estimated 66-84% of patients not requiring surgical intervention.
- Per 2016 AUA guidelines, pregnant women with ureteral stones and well-controlled symptoms should be offered observation as first-line therapy. Pain control should be with acetaminophen as NSAIDs and aspirin increase risk of bleeding, spontaneous abortion, and cardiac malformation/ductal closure.
- Alpha blockers or calcium channel blockers cannot be recommended due to unknown adverse safety profiles, however, tamsulosin is generally considered to be safe in pregnancy.
- For those who fail conservative management, URS is the standard intervention. SWL is contraindicated in pregnancy.

Treatment Considerations Cont.

- URS with ureteral stent placement should be done with minimal fluoroscopy or under US guidance.
- Stent changes should be exchanged every 4-6 weeks due to high risk of early incrustation and higher incidence of bacterial growth. Due to frequent changes, stent placement is not unfavorable option in the first and second trimesters.

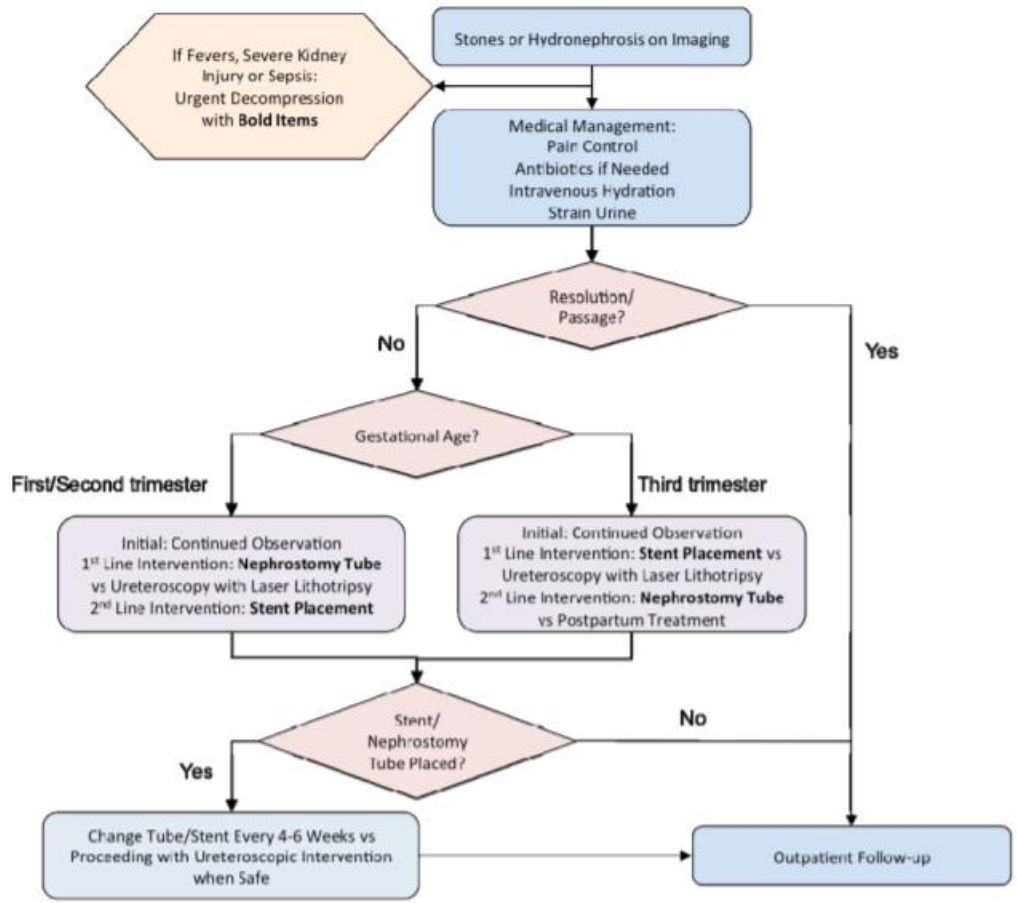


Figure 4. Algorithm for treatment of symptomatic stones and hydronephrosis in pregnancy

Labor Considerations

- Both bladder and ureteral injury during C-section is quite rare.
- Traditional management of an inadvertent cystotomy at the time of section consists of a two-layer water-tight closure with absorbable suture material in combo with prolonged catheterization.
- First step in diagnosis of a ureteral injury involves cystoscopy to assess for the presence of clear ureteral efflux, with retrograde ureteropyelography representing the gold standard to evaluate ureteral integrity. Injury can be anywhere from mid to distal ureter.
- Those with a history of bladder augmentation should consider C-section.

Long-Term Complications

- POP is a risk factor of vaginal delivery.
- Instrument and forceps delivery has also been strongly correlated with prolapse.
- The most common cause of urogenital fistula in the US is from gynecologic surgery, however, the most common cause world-wide is obstructed labor. This is due to pressure from the fetal vertex causing pressure necrosis of the surrounding vaginal tissues.
- In all cases of vesicovaginal fistula, CT imaging should be performed. This is to assess for ureteral injury as well as fistula formation.

Questions

30. A 30-year-old woman received a renal transplant two years ago. Her creatinine is 1.1 mg/dL and she has no proteinuria. She is planning a pregnancy and should be advised:

A. to proceed.
B. that a Cesarean section delivery will be required.
C. that a late delivery is expected.
D. that there is a greater risk of birth defects.
E. to reduce immunosuppression during pregnancy.

Question #30 ANSWER=A

There have been many successful pregnancies reported after renal transplantation

and vaginal delivery is appropriate without the concern for a pregnancy that extends beyond normative gestational age values. Most women can deliver vaginally without risk to the allograft. The risk of birth defects is not significantly different from age-matched women in the general population. Because the volume of distribution increases during pregnancy, the dose of immunosuppressive medications may be increased to prevent renal allograft rejection. Impaired renal allograft function and proteinuria are significant risk factors for pre-eclampsia, hypertension, rejection, and graft failure.

Armenti VT, Radomski JS, Moritz MJ, et al: Report from the National Transplantation Pregnancy Registry (NTPR): Outcomes of pregnancy after transplantation, in Cecka and Terasaki (eds), CLINICAL TRANSPLANTS 2004, chap 9, pp 103-114.

Cararach V, Carmona F, Monleon FJ, Andreu J: Pregnancy after renal transplantation: 25 years' experience in Spain. BR J OBSTET GYMAECOL 1993,100(2):122-125.

Gritsch HA, Blumberg JM: Renal transplantation, in Wein AJ, Kavoussi LR, Partin AW, Peters CA (eds): CAMPBELL-WALSH UROLOGY, ed 11. Philadelphia, Elsevier, 2015, vol 2, chap 47, p 1069.

22. A 27-year-old pregnant woman in her third trimester has urinary frequency and dysuria. Physical examination demonstrates suprapubic tenderness but no flank discomfort. Urine culture is positive for pan-sensitive E. coli. She should be treated with:

A. tetracycline.
B. trimethoprim/sulfamethoxazole.
C. amoxicillin.
D. ciprofloxacin.
E. nitrofurantoin.

Question #22 **ANSWER=C**

Penicillin and penicillin derivatives have been proven to be the safest antibiotics for use during pregnancy. Aside from allergy, there are no other known contraindications. Nitrofurantoin is usually safe but there is a risk of maternal neuropathy and hemolysis in a fetus with relative G6PD deficiency. Nitrofurantoin should only be used during the first two trimesters of pregnancy due to the risks of hemolytic anemia in the neonate. Trimethoprim/sulfamethoxazole should be avoided during pregnancy, as folic acid antagonists are known teratogens. Tetracycline is contraindicated due to adverse effect on the fetus (tooth discoloration and dysplasia). Ciprofloxacin should not be used during pregnancy due

127. A 35-year-old woman has passed two calcium oxalate stones in the past ten years. No renal calcifications are visible on a KUB. She would like to become pregnant. Her risk of stone formation during her pregnancy will be:

A. decreased.
B. unchanged.
C. increased in the first trimester.
D. increased in the second trimester.
E. increased in the third trimester.

Question #127 ANSWER=B

Important physiologic changes occur to the kidney during pregnancy. These include increases in renal blood flow which will increase the filtered loads of calcium, sodium, and uric acid. Hypercalciuria is further increased by placental production of 1,25(OH) Vitamin D3, which will increase calcium absorption by the intestine and suppress PTH. Simultaneously, pregnant women increase the excretion of stone inhibitors such as citrate, magnesium, and uric acid. Therefore, her overall risk of stone formation during pregnancy is unchanged.

13. A 27-year-old woman has 10^5 CFU Klebsiella per mL on screening urine culture during her sixth week of pregnancy. She is asymptomatic. The next step is:

repeat urine culture in one week.
antibiotic therapy if symptoms occur.
three days amoxicillin therapy.
three days amoxicillin therapy followed by low dose prophylaxis.
urine catheter specimen for culture and sensitivity.

Question #13 ANSWER=C

Either symptomatic or asymptomatic bacteriuria discovered during pregnancy screening examinations increases a woman's risk of developing acute clinical pyelonephritis during the entire pregnancy. For this reason, a pregnant woman discovered to have bacteriuria must be treated when it is discovered. A three to seven-day course of therapy is recommended. Only if the woman has a history of recurrent UTI should prophylactic antibiotics be considered. Selection of the antibiotic agent must be made with care to avoid agents with possible teratogenic effects. The aminopenicillins and cephalosporins are considered safe throughout pregnancy. Unless there is clear evidence of a contaminated specimen, a catheterized urine specimen is not required.

27. A 27-year-old woman at 30 weeks of gestation has gross hematuria. Ultrasound shows a normal fetus and a maternal bladder lesion. Cystoscopy reveals a 3 cm pedunculated papillary lesion. The remainder of the bladder is normal. The next step is:

A. immediate transurethral resection.
B. early delivery followed by transurethral resection.
C. transurethral resection after term delivery.
D. remove tumor with cup biopsy forceps at initial cystoscopy.
E. immediate tumor ablation with Nd:YAG laser.

Question #27 **ANSWER=C**

Hematuria during pregnancy may be mistaken for antepartum bleeding and is most commonly caused by an infection; however, other causes must be considered. Urothelial carcinoma of the bladder during pregnancy is uncommon but can present as hematuria. Ultrasound may detect bladder tumors incidentally or as part of a hematuria evaluation. Although ultrasound is a good screening technique, it is still not reliable and cystoscopy should be considered in all pregnant patients with documented gross hematuria or persistent microscopic hematuria. Bladder tumors in this age group almost always are low-

grade and non-invasive, which is consistent with the findings on cystoscopy in this case. As such, these low-grade tumors do not require urgent removal. Therefore, immediate biopsy, transurethral resection, laser ablation, or early delivery for subsequent tumor resection are not indicated. In fact, immediate resection under anesthesia or cold cup removal in the office has the potential to induce uterine contractions and precipitate premature labor. The tumor resection should be delayed and performed in the standard fashion after a term delivery.

THE END


0072
Copyright © www.bradfitzpatrick.com
"Yeah Doc, I think my wife is ready to have the baby, her **contradictions** are only 30 seconds apart now."