Lithiasis in pregnancy

Introduction
- **Incidence**: similar to that of non-pregnant♀. Affects approx. 1/1500 pregnancies.
- **Chronology**: usually manifests (80-90%) in the 2nd or 3rd trimester.
- **Composition of the stones**: varies slightly from the rest of the population due to the predominance of calcium phosphate stones (70%) over those consisting of calcium oxalate (30%).

Changes in pregnancy that promote lithiasis
- **Ureteropyelocalycectasis**: starting in the 2nd month and lasting into the postpartum period.
  - Due to uterine pressure on the ureter. More common on the right side (due to the pressure of the engorged ovarian vein and the rightward rotation of the uterus) than on the left (uterine pressure is dampened by the interposition of the left colon).
  - Due to the relaxant effect of progesterone on smooth muscle and ureteral peristalsis.
- **Increased glomerular filtration**: promotes the reduction of serum creatinine (<0.8 mg/dL), with implications for decreased reabsorption of calcium and uric acid.
- **Hypercalciuria**: due to increased excretion and to placent al 1,25-dihydroxycholecalciferol, which increases intestinal absorption and mobilization of bone calcium.
- **Hyperuricosuria**: due to increased net excretion of uric acid.
- **Increased urinary pH**: favors infective stones.

Symptoms
- **Low back pain.** The most common symptom (95%).
- **Hematuria.** The second most common symptom (90%), 1/3 of cases are macrohematuria.
- **Frequency.** Due to irritative symptoms. Overlaps the usual frequency typical in pregnancy.
- **Urinary infections and pyuria**, especially with struvite stones.

Diagnosis
- **Problems of ionizing radiation**: has dose-related teratogenic effects on the fetus, especially in the first two months. Although 50 mSv is considered to be a relatively safe dose, increases in the incidence of leukemia have been reported in fetuses receiving 10-20 mSv. The fetal dose depends on the type of study being performed.

<table>
<thead>
<tr>
<th>Radiologic examination</th>
<th>Fetal doses (mSv)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KUB</td>
<td>0.5</td>
</tr>
<tr>
<td>Standard IVP</td>
<td>4-5</td>
</tr>
<tr>
<td>IVP limited to 2-3 radiographies</td>
<td>1-2</td>
</tr>
<tr>
<td>Radioscopy (per minute)</td>
<td>15-20</td>
</tr>
<tr>
<td>Abdominal CT scan</td>
<td>20-25</td>
</tr>
</tbody>
</table>

- **Ultrasounds**: the method of choice due to its lack of ionizing radiation.
  - **Doppler ultrasound**: studies report that it can differentiate the physiological dilation associated with pregnancy from that due to lithiasis (intrarenal resistance index >0.7).
  - The transvaginal approach allows ultrasound visualization of distal ureteral lithiasis.
- **KUB x-ray**: the risk-benefit ratio must be calculated. With a reduced ionizing dose, x-rays provide information about the location, size, and radiopacity of stones.
- **IVP**: though not a method of choice, it can be useful in selected cases.
  - To minimize fetal exposure, collimation and maximum protection are recommended; the procedure should be carried out with the mother in prone decubitus position.
  - **Limited IVP** consists of a plain x-ray and another taken 30 m after injecting contrast medium. If the information provided is insufficient, another x-ray is taken 60 m later.
  - Since iodinated contrast crosses the placenta, postnatal thyroid testing is recommended.
• **Helical CT scan without contrast**: provides ample information but with greater radiation. The calculated maximum fetal dose is 35 mSv, although the latest low-dose equipment can reduce radiation to 12 mSv.

• **MRI**: although it detects the presence and location of ectasia without ionizing radiation, it is not the best method for visualizing stones due to the lack of image sharpness.

**Conservative treatment**

- **Indications**: in 80-90% of cases, this is the first treatment phase.

- **Expectant**: a sensible approach for mild symptoms given that 2/3 of stones are expelled spontaneously. For those that are not expelled during pregnancy, half are eliminated post-partum. Requires only fluid therapy, analgesia, and *Antimicrobials* (if there is infection).

<table>
<thead>
<tr>
<th>Generic name</th>
<th>Brand name®</th>
<th>Dose</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paracetamol</td>
<td>PERFALGAN, TYLENOL</td>
<td>1 inj of 1 g/8 h iv</td>
<td>1-2 d</td>
</tr>
<tr>
<td>Pethidine</td>
<td>MEPERIDINE, DEMEROL</td>
<td>1 inj of 100 mg/12 h iv</td>
<td>1-2 d</td>
</tr>
<tr>
<td>Paracetamol</td>
<td>PERFALGAN, TYLENOL</td>
<td>1 tab of 1 g/8 h</td>
<td>7 d</td>
</tr>
<tr>
<td>Amox-clavulanate</td>
<td>AUGMENTIN</td>
<td>1 inj of 500 mg/8 h</td>
<td>3-5 d</td>
</tr>
<tr>
<td>Cefonicid</td>
<td>MONOCID</td>
<td>1 tab of 1 g/d parenteral</td>
<td>1-2 d</td>
</tr>
<tr>
<td>Amox-clavulanate</td>
<td>AUGMENTINE</td>
<td>1 tab of 500 mg/8 h</td>
<td>10-14 d</td>
</tr>
<tr>
<td>Cefaclor</td>
<td>CECLOR</td>
<td>1 tab of 750 mg/12 h</td>
<td>10-14 d</td>
</tr>
<tr>
<td>Cefuroxime axetil</td>
<td>ZINNAT</td>
<td>1 tab of 500 mg/12 h</td>
<td>10-14 d</td>
</tr>
</tbody>
</table>

- **Expulsive**: with *Alpha-blockers* (to decrease muscle tone and spasms). *Corticoids* reduce the associated edema; however, because their safety and efficacy during pregnancy have not yet been demonstrated, they are not generally recommended.

**Active treatment**

- **Indications**: in cases of febrile UTIs, obstructed single kidney, or intractable symptoms.

- **Placement of double J catheter**: prevents obstruction and can be monitored through ultrasounds. To avoid encrustation, the catheter should be changed every 6-8 weeks. Associated with a greater index of UTIs and encrustation.

- **Percutaneous nephrostomy**: more aggressive, but allows easy rear access to percutaneous nephrolithotomy and is associated with lower indices of UTI.

- **Ureteroscopy**: if performed in clinics with ample endourological experience, this is a safe, effective technique with results/complications similar to those for non-pregnant women. With flexible or semirigid instruments and a *holmium* laser, high stone-free rates are achieved (90%). Riskier in the 3rd trimester due to anatomical changes in the ureterovesical junction. As always, the risk-benefit ratio must be taken into account. Contraindications:
  - Sepsis.
  - Lack of adequate instruments or endourological experience.
  - Large stones.

- **Percutaneous nephrolithotomy**: extremely risky due to the possibility of complications and the need for fluoroscopic monitoring. Should be delayed until after delivery.

- **Extracorporeal shock-wave lithotripsy**: contraindicated. The teratogenic effects of shock waves on the fetus have been demonstrated. However, a small series of women who received lithotripsy without knowing they were pregnant gave birth to healthy babies, a fact which should be taken into account in order to reassure patients in similar circumstances.
Lithiasis in pregnancy

Renoureretal ultrasounds

In selected cases:
KUB Limited IVP

Asymptomatic
- Observation

Minimal symptoms
- Last month of pregnancy
- Conservative treatment
  - Intravenous fluids
  - Oral rehydration
  - Analgesia:
    - Paracetamol 1 g iv/8 h
    - Pethidine 100 mg iv/12 h
    - Paracetamol 500 mg/8 h oral

Obstructed single kidney
- Progressive obstruction
- Obstetric complications
- Persistent symptoms
- Active treatment
  - Double J stenting
  - Not possible
  - Analgesia:
    - Paracetamol 1 g iv/8 h
    - Pethidine 100 mg iv/12 h
    - Paracetamol 500 mg/8 h oral

Antimicrobial treatment:
- Amoxicillin 1 g iv/8 h
- Cefonicid 1 g iv/24 h
- Amoxicillin 500 mg/8 h oral
- Cefuroxime 500 mg/12 h oral
- Cefixime 400 mg/24 h oral

Nephrostomy tube placement

Ureteroscopy