NON OBSTETRIC SURGERY FOR THE PREGNANT PATIENT

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Objective

Understand the basics of the perinatal patient and fetus.

Explain the care of the non-obstetric pregnant patient.

The peri-anesthesia nurses role in managing these patients.
Background

0.3% to 2.2% women will have non-obstetric surgery unrelated to pregnancy
1 in 500 pregnancies will need non-obstetric surgery
Two patients in one body

(Chestnut, et al., 2014)
"I Don't Know Nothin Bout Birthing No Babies"
Can facility provide appropriate intra-operative and post-operative care to mother and fetus?
Resources to manage emergencies?

(Bing.com, 2014).
Maternal Safety:
Altered Maternal Physiology

Growing fetus
Greater metabolic demand
Hemodynamic consequences of the low-pressure placental circulation
Increased concentrations of various hormones
Hormonal changes are likely responsible for most of the changes that occur during the first trimester.

https://www.youtube.com/watch?v=eVuiitFyM34
Balance of Systems

Hormones = homeostasis
Placenta
Cytokines
Progesterone
Relaxin
Rectus Abdominis muscle
Fetal and Placental Physiology

PLACENTA

- prevents rejection of the fetus
- enables respiratory gas exchange
- transports nutrients
- eliminates fetal waste products, and
- secretes peptide and steroid hormones

fetal and neonatal use

FETUS

~ 500-600 mL/min.

Contributes to the amniotic fluid volume by urinating approximately 800 mL/day or 5 mL/hour.

Amniotic fluid reabsorbed by fetal swallowing and the mechanism of in utero breathing.

(Roberts, V. and Myatt, L. 2013).
Hematologic System

Red blood cell concentration
Physiologic anemia of pregnancy

Nursing assessment:
- Anemic?
- Hematologic disorders?
- Physiological leukocytosis?
Total blood volume, plasma volume and red cell volume in normal pregnancy

DVT

Pressure of gravid uterus on iliac veins

Hyper-coagulable state

- SCDs
- Ambulation
Childbirth Through Time
Compression of the vena cava by the gravid uterus can result in a 30% decrease in cardiac output by the end of the third trimester. Place pt. in left lateral decubitus position with a 30-degree incline during the late second and third trimester of pregnancy.

@ 18 to 20 weeks' gestation, transport patient on her left side.

For the OR, displace uterus to the left.

Progesterone acts as both a veno- and arterial dilator.
Maternal Respiratory System

Antepartum pulmonary changes ~4th week of gestation.
Mucosal capillary engorgement
Diaphragm elevates 4cm rise
Subcostal angle widens as the transverse thoracic diameter increases by 2 cm.
Compensated respiratory alkalosis
Increased respiratory effort and concomitant reduction of PCO$_2$

(Bing, 2014).
Renal System

Increase in renal blood flow and glomerular filtration rate.

Ureteral dilation due to progesterone and compression of fetus.

Increased risk for both urolithiasis and pyelonephritis.

http://adam.about.net/encyclopedia/infectiousdiseases/Kidney-infection-pyelonephritis.htm
<table>
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<th>System</th>
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<th>Anesthetic Considerations</th>
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<td>Upper airway edema</td>
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<td>Upper airway friability</td>
<td>Bleeding with nasal tubes</td>
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<td>Rapid induction/emergence</td>
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<td>Rapid desaturation</td>
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<td>Aortocaval compression (&gt;20 wk)</td>
<td>Slows induction for inhaled agents</td>
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<td>Hematologic reserve for hemorrhage</td>
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<td>Low mean blood pressure</td>
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<td>Left lateral tilt</td>
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<td>Neurologic</td>
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<td>Musculoskeletal</td>
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<td>Gastrointestinal</td>
<td>Gastrosophageal junction integrity</td>
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<td>Slowed gastric emptying during active labor</td>
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(Belden, M., 2010).
Timing of Surgery

- **Elective Surgery**: Delay until postpartum.
- **Essential Surgery**: If no or minimal increased risk to mother, consider delaying until mid-gestation; if greater than minimal increased risk to mother, proceed with surgery.
- **Emergency Surgery**: Proceed with optimal anesthetic for mother, modified by considerations for maternal physiologic changes and fetal well being. Consider consulting a perinatologist or an obstetrician. Intraoperative and postoperative fetal and uterine monitoring may be useful.

Risks

Preterm labor
Possible teratogenicity of anesthetic agents
Anatomic and physiologic changes of pregnancy (e.g., difficult intubation, aspiration) and with the underlying maternal disease.
Intraoperative changes of uteroplacental perfusion and/or fetal oxygenation

https://www.youtube.com/watch?v=Qbnv6eHKjCQ

AWHONN, 2011.
Recommendations

Neonatal and pediatric services available
OB with cesarean delivery privileges readily available
Qualified individual readily available to interpret the fetal heart rate patterns.
EFM- fetal heart rate check pre and post procedure:
Viable fetus - simultaneous electronic fetal heart rate and contraction monitoring pre and post procedure to assess fetal well-being and the absence of contractions.
Most Common Non Obstetric Indications

- Appendicitis
- Biliary disease
- Ovarian disorders
- Trauma
- Breast or cervical disease
- Bowel obstruction
Things To Consider

Regional versus General
Risk of PTL
Increased work of breathing
Increased O2 consumption
Swollen mucosa
Risk of aspiration
Peri-operative Assessment & Interventions

- OB Consult
- Height
- Weight
- Antibiotics
- Bicitra
  - Prenatal Care
  - Communication
  - Prevent Hypothermia
Fetal Heart Rate Monitoring

Assess FHR depends on patient
- >24 weeks continuous EFM ~ 10 mins
- <24 weeks prior to and immediate after the procedure
- Sterile external transducer, Doppler, or transvaginal US probe for abdominal procedures

Intraoperative EFM:
- Viable fetus
- A health care provider with obstetric surgery privileges is available and willing to intervene during the surgical procedure for fetal indications.
- Plan for possible c/s delivery

Assess for uterine contractions
Position >18 weeks left lateral tilt
- Prevent hypotension and uterine hypo-perfusion

Boisseau, 2012.
LABs

CBC
PT/PTT/INR
Fibrinogen/D-dimer
Type and screen
ECG
CXR
Considerations

Laparoscopy is performed during pregnancy for both diagnostic and therapeutic indications with increasing frequency.

Laparotomy continues to be performed for many abdominal conditions that occur during the later stages of pregnancy.
Suggested Guidelines for Laparoscopic Surgery during Pregnancy

Indications for laparoscopic treatment of acute abdominal processes are the same as for non-pregnant patients.
Safely performed during any trimester of pregnancy.
Preoperative obstetric consultation should be obtained.
SCDs for VTE prevention.
EFM and uterine tone should be monitored both preoperatively and postoperatively.
End-tidal CO$_2$ should be monitored during surgery.
Suggested Guidelines for Laparoscopic Surgery during Pregnancy

Left uterine displacement should be maintained to avoid aortocaval compression. An open (Hassan) technique, a Veress needle, or an optical trocar technique may be used to enter the abdomen.

Low pneumo-peritoneum pressures (between 10 and 15 mm Hg) should be used.

Tocolytic agents should not be used prophylactically but should be considered when evidence of preterm labor is present.
Acute Appendicitis

Most common non-obstetric surgical problem
1 per 1500 pregnancies
Usually 2\textsuperscript{nd} trimester
Difficult to confirm - abdominal pain, nausea and vomiting, rupture
Right-sided abdominal pain, depends on gestational age
Leukocytosis
Ultrasound - sensitivity and specificity are 86\% and 81\%
Avoid ionizing radiation
MRI - sensitivity and specificity are 100\% and 93\%, respectively.
CT scan - sensitivity of 97\% and specificity of 100\%
FIGURE 1. The growing uterus progressively displaces the appendix in a counterclockwise rotation out of the pelvis into the right upper quadrant.
Case Study #1

34 yo, presents to ER with right lower quadrant pain
point not tender
Nausea and vomiting
12 weeks pregnant
BP 100s/60s, P 82-102, Temp 98.3
OB and Surgical consults
Case Study #1

- Labs drawn, IV started
- US confirms acute appendicitis
- Zofran 4mg, Morphine 5mg, and Zosyn administered
- WBCs 12.1
- Prepped for laparoscopic appendectomy
Case Study #1

Avoidance of the uterus
Trocars placed and EnSeal and Endocatch used
EBL 5ml
Pt sent to recovery and extubated
FHTS 153
Sent to floor and discharged that pm without complications
F/U with OB
Case Study #2

30 year old, 2 week PP
ER admission with c/o of 24 hour pain
Hx of uterine inversion and 2U PRBCs
WBCs 11.9
CT Scan of acute appendicitis
Case Study #2

General endotracheal anesthesia
Foley cath
Large umbilical hernia left subcostal access
Left lower quadrant 5mm port placed and 12mm suprapubic port
Inflamed appendix removed with Ligasure device
Gallbladder Disease

Cholecystectomy second most common nonobstetric surgical procedure

Ultrasound to confirm

Complications from non-operative management are higher than uncomplicated surgical intervention

- Conservative management for asymptomatic cholelithiasis.
- Surgical intervention should not be reserved for the sequelae of cholelithiasis, such as cholecystitis, choledocholithiasis, and gallstone pancreatitis.
- Nonoperative management leads to increased length of hospital stay, multiple readmissions, and higher incidence of preterm deliveries.

Laparoscopic cholecystectomy can be performed during each of the trimesters

Try to avoid contrast

An open technique is advocated for peritoneal access to prevent iatrogenic uterine injury.
Summary

A multidisciplinary approach
If possible, surgery should be delayed until the second trimester
Elective surgery should not be performed at all
Avoid (unwanted) drug effects on the fetus
Avoid oxytocic effects to preserve pregnancy
Avoid tocolytic effects postpartum
References

Perioperative Care of the Pregnant Woman, Evidence Based Clinical Practice Guideline, Washington DC.

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