

## Pregnancy, Intra-Abdominal

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### Risk

- Incidence in USA: 11:100,000 live births and 9:1000 ectopic pregnancies.
- Higher incidence in African Americans, Asians, and immigrant populations from third-world countries.
- Risk factors include PID, tubal damage, intrauterine contraceptive devices, assisted reproductive techniques, previous ectopic, and previous pelvic surgery.
- Maternal mortality 100 times that of intrauterine pregnancy.
- Perinatal mortality ranges from 40–95%.

### Perioperative Risks

- Misdiagnosis prior to delivery is not uncommon, and a high index of suspicion is important for Dx. In one case series, only 6 of 10 pts were diagnosed preop.
- Massive hemorrhage may occur anytime in the periop setting.

### Worry About

- Severe hemorrhage depending on location of placental implantation in the abdomen.

### Assessment Points

System	Effect	Assessment by Hx	PE	Test
CV	Hemorrhage	Postural dizziness, shortness of breath	Hypovolemia, hypotension, tachycardia	Hgb, Hct
GI	Bowel obstruction GI bleed if bowel implantation	N/V, abdominal pain, distended rigid abdomen	GI bleed	Abdominal x-ray, CT, MRI, abdominal US
CNS			Decreased consciousness if massive hemorrhage	

**Key References:** Kunwar S, Khan T, Srivastava K: Abdominal pregnancy: methods of hemorrhage control, *Intractable Rare Dis Res* 4(2):105–107, 2015; Arendt KW: Problems of early pregnancy. In Chestnut DH, Wong CA, Tsen LC, et al., editors: *Chestnut's obstetric anesthesia: principles and practice*, 5th edition, Philadelphia, PA, 2014, Elsevier, pp 340–357.

### Perioperative Implications

#### Preoperative Preparation

- Assess volume status and optimize maternal cardiovascular status, usually with intravascular volume replacement.
- Obtain large bore IV access, draw blood to assess hematocrit, and type and crossmatch.

#### Monitoring

- Urethral cath to monitor urine output.
- Consider invasive monitoring (arterial cath and/or central venous cath).

- Decreased placental perfusion and oligohydramnios, leading fetal growth restriction, pulmonary hypoplasia, and anatomic deformities.

### Overview

- Defined as implantation in the peritoneal cavity, not including the fallopian tubes, ovaries, or ligaments.
- Early pregnancy may be normal and subsequently presenting with midtrimester abdominal pain, N/V, shock, partial bowel obstruction, and vaginal bleeding.
- Differential Dx includes abruptio placentae, placenta previa, uterine rupture, pelvic inflammatory disease, and bowel obstruction. MRI is better than US diagnosis. US may miss diagnosis in >50% of cases.
- Exsanguinating intraabdominal bleeding can occur at any time.
- No abnormal trend in serial hCG values compared to that seen in tubal pregnancies.

### Etiology

- Often results from a missed ruptured tubal ectopic pregnancy.

### Usual Treatment

- Emergency diagnostic laparoscopy or exploratory laparotomy with delivery of the fetus. However, expectant management has been successful in case reports with very close monitoring.
- Excision of placenta can result in life-threatening hemorrhage but, leaving it in situ, may yield higher infectious risk.
- Methotrexate or arterial embolization can be used to accelerate placental involution.
- Rare phenomena may occur where an unrecognized abdominal pregnancy dies and calcifies leading to formation of lithopedion or “stone baby.”

### Induction

- GA with rapid-sequence using ketamine or etomidate if there is concern for significant hypotension in response to propofol

### Maintenance

- Monitor for hemorrhage and resuscitate with crystalloid/blood products as needed.

### Extubation

- May need to delay extubation for postop care.
- Extubate awake.

### Postoperative Period

- May require multidisciplinary ICU for those who had massive transfusion or significant hypotension

### Anticipated Problems/Concerns

- Massive hemorrhage, DIC.
- If massive blood transfusion is needed, be aware of possible dilutional thrombocytopenia and need for coagulation factor replacement.

## Pregnancy, Maternal Physiology

Stephanie R. Goodman

### Risk

- Estimated 6.4 million pregnancies in USA, resulting in 4.1 million live births per year.
- Pregnancy rate is 102 pregnancies per 1000 women between the ages of 15–44 y.

### Perioperative Risks

- Maternal mortality rate is 28 deaths per 100,000 live births in USA, with 210 deaths per 100,000 live births in the world.
- Hemorrhage, hypertension, and embolic disorders are leading causes of maternal deaths.
- Risks of maternal mortality include advanced maternal age, obesity, multifetal pregnancies, C-section, and African American race.

### Worry About

- Difficult airway, including inability to intubate and ventilate due to maternal wt gain, breast enlargement,

and swelling of oropharyngeal tissues (incidence of failed intubation 1:280 vs. 1:2230 in nonpregnant pts).

- Hypoxemia occurs more quickly during periods of apnea due to decreasing FRC and increasing O<sub>2</sub> consumption.
- Aortocaval compression causing decreased uteroplacental perfusion and FHR late decelerations.
- Hypercoagulability causing DVT/PE.
- Obesity as an independent risk factor for adverse pregnancy outcomes.

### Overview

- Physiologic changes occur during pregnancy to allow maternal adaptation to the demands of the growing fetus and supporting placental unit and ultimately to facilitate labor and delivery.
- These changes affect almost every organ system and influence the anesthetic and periop management of the pregnant woman.

- Adjust drug doses and administration schedules to compensate for increased volume of distribution, decreased peak plasma drug concentration, increased elimination T<sub>1/2</sub>, and increased renal excretion.

### Etiology

- Profound increases in hormonal concentrations, especially progesterone
- Mechanical effects of an enlarging uterus
- Increased metabolic demand
- Presence of the low resistance placental circulation

### Usual Treatment

- Normal spontaneous vaginal delivery
- C-section