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**2022**  
**ACG'S ENDOSCOPY SCHOOL  
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POSTGRADUATE COURSE**

**DECEMBER 2-4, 2022** | GRAND HYATT  
NASHVILLE, TENNESSEE

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**2023** **ACG HEPATOLOGY SCHOOL & WESTERN**  
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All attendees will be muted and will remain in Listen Only Mode.

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**LIVE VIRTUAL GRAND ROUNDS WEBINAR**  
ACG will send a link to a CME & MOC evaluation to all attendees on the live webinar.

**ABIM Board Certified physicians need to complete their MOC activities by December 31, 2022 in order for the MOC points to count toward any MOC requirements that are due by the end of the year. No MOC credit may be awarded after March 1, 2023 for this activity.**

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## ACG Virtual Grand Rounds

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Week 46 – Thursday, November 17, 2022  
**COVID-19 Vaccine Update**  
 Faculty: Freddy Caldera, DO  
 Moderator: Daniel J. Pambianco, MD, FACP  
 At Noon Eastern and **NEW!** 8pm Eastern!

**There will be no ACG Virtual Grand Rounds November 24<sup>th</sup>**




Week 48 – Thursday, December 1, 2022  
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 Faculty: Michael Camilleri MD, MACG  
 Moderator: Linda Anh Nguyen, MD  
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# 2022



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## Disclosures





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*\*All of the relevant financial relationships listed for these individuals have been mitigated*


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**AJG** The American Journal of GASTROENTEROLOGY

## ACG Monograph on GI Diseases and Endoscopy in Pregnancy and Postpartum Period


Read the ACG Pregnancy Monograph:  
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# ACG Monograph on GI Diseases and Endoscopy in Pregnancy and Postpartum Period



Moderator: Shivangi T. Kothari, MD, FACG  
 Faculty: Vivek Kaul, MD; Shivangi T. Kothari MD, FACG;  
 and Sunanda V. Kane, MD, MSPH, FACG

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## American College of Gastroenterology Monograph on GI Diseases and Endoscopy in Pregnancy and Postpartum Period

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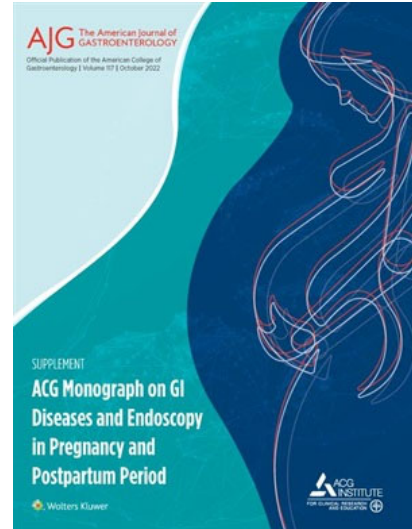
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## Introduction

- Gastroenterology consultation & endoscopic practice in the pregnant patient is highly nuanced
  - specific recommendations are in place
- First monograph: 1994
  - Update in 2007
- Significant advances since 2007 warranted an update
- 2022 Update: Multidisciplinary effort
  - GI, Hepatology, Ob-Gyn, Nutrition, Pharmacy, Maternal-Fetal Medicine
- High quality, state of the art, evidence & consensus based recommendations in each sub-specialty of GI/Liver disease



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## Hyperemesis Gravidarum and Nutritional Support

- Hyperemesis gravidarum (HG) may start early in pregnancy
  - May persist through pregnancy, extend into postpartum state
- Past HG history, increases likelihood of HG with future pregnancies.
- Physical examination: focus on assessing hydration status, features of malnutrition, electrolyte disturbances, and adequacy of fetal growth.
- Non-HG etiologies need to be ruled out, especially later in pregnancy
- Treatment should focus on symptom control + prevention of maternal/fetal complications

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## Hyperemesis Gravidarum: Treatment

- Treatment options based on symptom severity
  - Always start with nonpharmacologic approaches.
  - Pharmacotherapy for patients with moderate-to-severe symptoms
  - Enteral nutrition (EN) via gastric or jejunal route
  - Parenteral nutrition (PN) support should be last option
  - PN may be necessary in severely malnourished as a bridge to EN.
  - In those at risk for refeeding syndrome,
    - 100 mg of thiamin should be given before dextrose containing intravenous fluids, EN, and/or PN and supplemented daily for 5–7 days

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## Heartburn, Nausea and Vomiting During Pregnancy

- GERD, nausea, and vomiting during pregnancy (GNVP) significantly affect quality of life (QOL)
  - GNVP should be treated proactively
  - Numerous safe and well-established options for medical therapy are available
- GERD Management Principles
  - A step-up approach is generally encouraged
  - Diet and lifestyle modification initial approach
  - When necessary, pharmacotherapy should be invoked
    - Proton pump inhibitors are generally considered safe to use during pregnancy
  - NVP ideally should be treated early
    - May be managed with diet and lifestyle optimization
    - Vitamin B6 or ginger supplementation
- Most cases of GNVP DO NOT require testing
  - Late onset, persistent, and/or severe NVP: laboratory testing + additional evaluation may be warranted.

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## Constipation, Hemorrhoids and Anorectal Disorders in Pregnancy

- Constipation affects 25%–40% of women during pregnancy // postpartum
  - Significant negative impact on QOL
- Constipation during pregnancy involves both infrequent stools and difficulty with defecation.
- A prospective stool diary or stool app could improve diagnosis and help with intervention strategies.
- Diagnostic tests are best undertaken postpartum
- Treatment options include dietary fiber education and medication
  - Senna, lactulose, and PEG.
  - Paucity of RCTs in pregnancy (none with newer prescription agents)
- Bowel function mostly normalizes in puerperium

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## Constipation, Hemorrhoids and Anorectal Disorders in Pregnancy

- Hemorrhoids and anal fissures seen in two-thirds of women during pregnancy
  - Best managed conservatively: hydration, fiber supplementation, treat constipation, topical ointments
  - Persistent symptoms/plan for future pregnancy: More aggressive treatment is recommended
- Symptomatic thrombosed hemorrhoids should be incised and decompressed.
- Anal fissures can be safely treated with intra-anal topical 0.125% nitroglycerin, 0.5% nifedipine, or 2% diltiazem ointment.

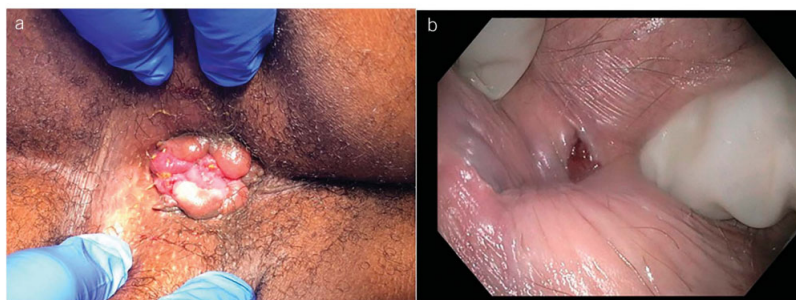


Figure 3. (a) Grade 3 hemorrhoids. (b) Posterior anal fissure.

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## Fecal Incontinence and Diarrhea During Pregnancy

- Diarrhea should be assessed and managed in a timely manner
  - Dehydration (and electrolyte imbalance) can lead to serious risks to the pregnancy
- Provide adequate rehydration with an oral rehydration solution
  - Use loperamide for severe diarrhea
- Most acute diarrheal illness due to self-limited viral infections
  - However, a high index of suspicion should be maintained for *C. difficile* and listeriosis infections
    - Both are associated with high morbidity of the pregnant patient and fetus
- Ask pregnant persons about fecal incontinence (in setting of diarrhea)
  - Treatment: dietary modification, fiber supplements and pelvic floor muscle therapy

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## Endoscopy and Sedation

- Patients undergo anesthesia and endoscopy during pregnancy and lactation periods for non-obstetric conditions.
- Fetal risks associated with procedures:
  - Spontaneous abortion, preterm labor, growth restriction, and low birth weight
- Clinical studies suggest anesthesia and procedures during pregnancy do not increase risk of congenital abnormalities.
- Elective procedures should be postponed until after delivery.
- Emergent procedures to be performed as per maternal disease process.
- Nonemergent procedures ideally performed in 2nd trimester with attn to:
  - Aspiration prophylaxis, thromboprophylaxis, left uterine displacement, and fetal monitoring.
- Anesthetic management focused to avoid:
  - Hypoxemia, hypotension, acidosis, and hyperventilation.
- Position preferably left lateral to relieve aortocaval compression
- Close communication between Ob, anesthesia and GI.

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# Advanced Endoscopic Procedures in Pregnancy

- Advanced endoscopic procedures that might be required during pregnancy:
  - EUS, ERCP, enteroscopy, EMR, ablation, and enteral stenting
- Elective diagnostic and therapeutic advanced procedures should be avoided during pregnancy.
- Nonionizing radiation imaging, such as US, should be optimized during pregnancy.
- MRI can safely be performed during pregnancy. Noncontrast studies preferred.
- Despite low intrauterine doses, the CT scan can be used in pregnancy if deemed necessary.
- EUS can safely be used as a diagnostic tool.
- Indication for performing ERCP in pregnancy should be limited to:
  - Urgent and emergent disease states like symptomatic choledocholithiasis, cholangitis, and biliary pancreatitis.
  - Left

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# Advanced Endoscopic Procedures in Pregnancy

- Optimal time during the second trimester; however, if consequences of a delayed procedure can cause harm to patient or fetus, then proceed with use of multidisciplinary team.
- Multidisciplinary team effort, including perinatologist, radiation safety officer, Ob anesthesiologist, and experienced endoscopist.
- ERCP during 2<sup>nd</sup> or 3<sup>rd</sup> trimester:
  - Left lateral position, and electrocautery grounding pads placed away from the fetus.
- Minimize radiation
- Consider nonfluoroscopic ERCP techniques, such as cholangioscopy.

**Table 1. Techniques to reduce radiation exposure**

Multidisciplinary care: perinatologist, radiation safety officer, obstetrical anesthesiologist, and experienced endoscopist
Use modern, collimated radiation unit
Use short taps of fluoroscopy
Avoid the use of magnification and spot films
Patient should be placed far from the radiation source
Low-dose radiation protocol for kilovoltage peak (kvp), field size, and frame rate
Use sphincterotome for cannulation to avoid catheter exchanges
Dosimeter above the expected uterine location for time and radiation dose recording
Use bile aspiration technique, cholangioscopy, or EUS to reduce radiation for cannulation and clearance during ERCP
ERCP, endoscopic retrograde cholangiopancreatography; EUS, endoscopic ultrasound.

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## Liver Disease During Pregnancy

- Normal physiology during pregnancy:
- Blood volume increases by activation of the renin-angiotensin system, sodium and water retention
- Cardiac output increases by 30%–40%
- Preexisting portal hypertension, exaggerated during pregnancy.
- Serum aminotransferases and bilirubin remain normal during pregnancy
- Albumin typically decreases.
- Alkaline phosphatase is elevated; placental origin

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## Liver Disease During Pregnancy

Pre-pregnancy	First	Second	Third
Chronic viral hepatitis, AIH, PBC, genetic/metabolic liver disease, cirrhosis...			
Acute viral hepatitis, DILI, Vascular, Gall stones, liver masses			
Hyperemesis Gravidarum			
Intra-hepatic cholestasis of pregnancy			
Pre/eclampsia & HELLP			
Acute Fatty Liver of Pregnancy			

- Multidisciplinary comanagement by hepatology, maternal fetal medicine, and pediatrics is recommended for any pregnant patient with liver disease.
- Any abnormalities in transaminases or bilirubin during pregnancy require further evaluation

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## Liver Disease During Pregnancy

- **Preeclampsia:** HTN, edema & proteinuria in late 2nd, or 3<sup>rd</sup> trimester
- **Eclampsia:** preeclampsia + neurologic symptoms like headaches, visual disturbances, and seizures or coma.
- **Evaluation:**
  - Labs and imaging
- **Management:**
  - If no severe features, delivery is recommended at 37 weeks. Delivery considered the only intervention to resolve acute symptoms
- **HELLP:** hemolytic anemia, platelets <100,000/mm<sup>3</sup>, and elevated ALT/AST levels twice the upper limit of normal
- Arterial hypertension and proteinuria are observed in up to 80% of cases
- **Management:**
  - Consists of the use of glucocorticoids and magnesium sulfate and control of the systolic blood pressure

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## Liver Disease During Pregnancy

- **AFLP:**
- 3rd trimester
- Associated with a high risk of progression to acute liver failure.
- Nonspecific symptoms
- Marked elevation of ALT/AST and hyperammonemia. Can have high bili and low glucose
- Challenging to differentiate from HELLP
- **Management:**
  - Prompt diagnosis, early delivery, and symptomatic care, including ICU care as necessary

**Table 1.** Swansea criteria

Six or more criteria required in the absence of another cause	
Vomiting	
Abdominal pain	
Polydipsia/polyuria	
Encephalopathy	
Elevated bilirubin	>14 μmol/L
Hypoglycemia	<4 mmol/L
Elevated urea	>340 μmol/L
Leukocytosis	>11 × 10 <sup>6</sup> cells/L
Ascited or bright liver on ultrasound scan	
Elevated transaminases (AST or ALT)	>42 IU/L
Elevated ammonia	>47 μmol/L
Renal impairment: creatinine	>150 μmol/L
Coagulopathy; prothrombin time	>14 s or APPT >34 s
Microvesicular steatosis on liver biopsy	
ALT, alanine transaminase; APPT, activated partial thromboplastin time; AST, aspartate transaminase.	

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## Liver Disease During Pregnancy

- IHCP:
- Commonest, onset of pruritus in 2<sup>nd</sup>/3<sup>rd</sup> trimester, marked in palms and soles, no bil dil
- Elevated alk phos, ALT/AST normal or moderately elevated
- Elevated serum total bile acids, levels greater than 100  $\mu\text{mol/L}$  = high risk of IUFD
- Management:
  - Ursodiol (10–15 mg/kg/d) for symptomatic relief and to improve serum bile acids and liver biochemistries.
  - Cholestyramine for severe pruritus, refractory to ursodiol.
  - Dexamethasone if delivery planned before 37 weeks gestation for fetal lung maturity. Planned fetal delivery at 36 weeks recommended for patients with bile acids greater than 100  $\mu\text{mol/L}$

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## Liver Disease During Pregnancy

- Transplant:
  - Mycophenolate mofetil contraindicated during pregnancy
  - Complicated by need for C-section and higher incidence of preterm delivery
  - Not associated with increased congenital malformations or worse neonatal outcomes
  - Calcineurin inhibitors like cyclosporine or tacrolimus considered safe for developing fetus but associated with an increased incidence of HTN, preeclampsia, and eclampsia.

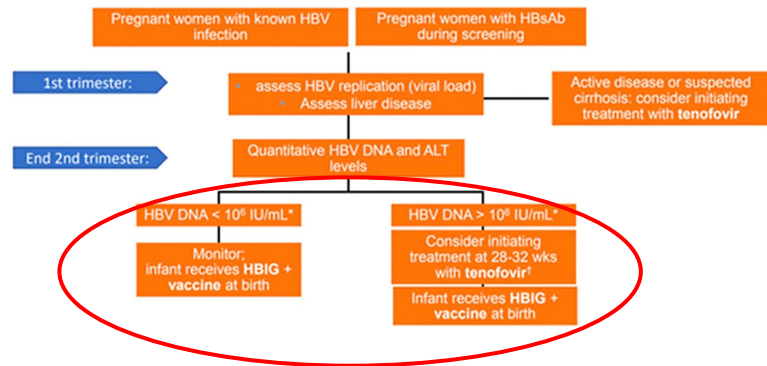
**Table 2.** Safety of medications commonly used in patients with cirrhosis during pregnancy and postpartum

Medication	Category for use in pregnancy	Safety during lactation
Avatrombopag	Not assigned	Unknown
Calcineurin inhibitors	C	Unknown
Carvedilol	C	Unknown
Cefotaxime	B	Probably yes
Ciprofloxacin	C	Probably yes
Eltrombopag	C	Unknown
Furosemide	C	Unknown
Lactulose	B	Unknown
mTOR inhibitors	C	Unknown
Mycophenolate mofetil	D	Unknown
Nadolol	C	Possibly unsafe
Neomycin	D	Unknown
Octreotide	B	Unknown
Propranolol	C	Probably yes
Rifaximin	C	Unknown
Spirolactone	C	Probably yes

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## Liver Disease During Pregnancy

- **Viral Hepatitis:**
- HBsAg, HBsAb, and HCV-Ab tested during the 1<sup>st</sup> first trimester.
- Viral load (HBV DNA or HCV RNA) performed in any patient positive for HCV-Ab or HBsAg.
- HCV during pregnancy associated with higher rates of ICP.
- Invasive procedures should be deferred if possible, and mode of delivery should not be affected by viral hepatitis.
- Neither HBV nor HCV contraindicated during lactation.



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## Liver Disease During Pregnancy

- **Wilson's:**
  - Chelation therapy for WD should be reduced during pregnancy; however, there is no adjustment needed for zinc.
- **AIH:**
  - Flares associated with a higher risk for maternal/fetal complications. Disease flares less common in patients in remission on stable immune suppression for a year before conceptions.
  - Immune suppression should be continued during pregnancy with the exception of mycophenolate mofetil, which is contraindicated.
- **Cirrhosis:**
  - Increased risk of liver decompensation and portal HTN complications, especially variceal bleeding
  - Management of liver-related complications in pregnancy follow typical societal guidelines for nonpregnant patients with cirrhosis.
  - Screen for varices in year before the pregnancy or during 2nd trimester
  - Beta blockers are safe to use
  - Decision on mode of delivery in a pregnant patient with cirrhosis based on obstetrical determinants

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## Surgery During Pregnancy

- A pregnant patient should never be denied medically necessary surgery or have necessary and urgent surgery delayed, regardless of trimester.
- Elective nonobstetric surgery should be postponed until after delivery.
- The treatment of choice for acute appendicitis during pregnancy is surgical intervention. Surgery should not be delayed because of the increased morbidity associated with perforated appendix in pregnancy.
- A laparoscopic cholecystectomy is superior to nonoperative management for pregnant patients presenting in the first or second trimester with biliary tract disease and ideally performed in the second trimester.

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## Surgery During Pregnancy

- Most cases of acute pancreatitis during pregnancy can be managed non-operatively.
- For critically ill patients, early Cesarean section should be considered if delivery with improved maternal status or delivery will improve fetal outcomes without worsening the maternal status.
- Intestinal obstruction is most often due to adhesive disease. After an MRI, a trial of conservative management may be appropriate, but surgical intervention, when indicated, should not be delayed because of pregnancy.

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## Surgery During Pregnancy

- Hepatic adenomas may rupture during pregnancy and should be carefully monitored with consideration of resection when > 5 cm.
- Surgery for hemorrhoids should be reserved only for those with severe complications such as incarceration of prolapsed internal hemorrhoids.
- Indications for surgery for pregnant patients with IBD are obstruction, perforation, hemorrhage and toxic colitis.
- Colorectal cancer diagnosed in pregnancy is usually late stage and requires a multidisciplinary discussion to prioritize the oncologic outcome for the patient while exposing the fetus to the lowest possible risk.
- Pregnancy should be delayed until at least 1 year after liver or kidney transplant, provided there is stable graft function without evidence of rejection.

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## Pregnancy and IBD

- All patients with IBD capable of pregnancy should receive pre-conception counseling, which ideally would involve a patient-centered, multidisciplinary approach between the GI and the Ob/MFM physician.
- To improve pregnancy outcomes, clinical and endoscopic remission should be achieved before conception
- Fecal calprotectin should be checked at preconception, every trimester, and postpartum to screen for active colonic disease
- Most of the IBD medications compatible in pregnancy are compatible with lactation

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## Pregnancy and IBD

- Biologics should be continued throughout pregnancy, and if possible, a schedule adjustment should be made so that the biologic is given soon after delivery
- Methotrexate and ozanimod must be stopped at least 3 months before conception
- Until more human data are obtained, JAK inhibitors should be avoided in pregnancy and lactation
- Most patients can safely undergo a vaginal delivery unless there is active perianal disease
- Maintain medications after delivery to minimize postpartum disease flare

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## Conclusion


- The field of GI, hepatology and endoscopy, have evolved significantly over the past few decades. Similarly, maternal fetal medicine and the care of the pregnant person have become increasingly sophisticated.
- Gastroenterologists are frequently called on to provide consultative input and/or perform endoscopy during pregnancy
- We wanted to highlight the importance of recognizing the need to have patient focused, interdisciplinary collaboration between GI, Ob/Gyn, MFM, anesthesia, surgery, radiology for a true multidisciplinary patient care and optimal outcomes for the pregnant patients with various GI issues.

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## Questions?



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