GASTROINTESTINAL DISORDERS IN PREGNANCY PART 1

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REPRODUCTIVE ENDOCRINOLOGY AND INFERTILITY

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Gynecology schedule (customized program) 2018-2019 Gynecology schedule (local) 2018-2019

REFERENCE

- Cunningham FG, Leveno KJ, Bloom SL, Spong CY, Dashe JS, Hoffman BL, Casey BM, Sheffield JS (eds). William's Obstetrics 25th edition; 2018; chapter 54 Gastrointestinal disorders

OUTLINE

1. Diagnostic techniques
2. Nutritional support
3. Upper GI tract disorders
4. Small bowel and colon disorders

DIAGNOSTIC TECHNIQUES

Endoscopy

- Fiberoptic endoscopic instruments are well-suited for pregnancy → the esophagus, stomach, duodenum, and colon can be inspected
- Endoscopy in pregnancy is associated with a slightly increased risk for preterm birth, but this is likely due to the disease itself
- Upper gastrointestinal endoscopy is used for management as well as diagnosis of several problems.
- For visualization of the large bowel, flexible sigmoidoscopy can be used safely in pregnant women
  - Bowel preparation is completed using polyethylene glycol electrolyte or sodium phosphate solutions.
  - With these, serious maternal dehydration that may cause diminished uteroplacental perfusion should be avoided.

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DIAGNOSTIC TECHNIQUES

Noninvasive Imaging Techniques

- abdominal sonography
- magnetic resonance (MR) imaging
- computed tomography (CT) use is limited in pregnancy due to radiation exposure

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DIAGNOSTIC TECHNIQUES

Laparoscopy

- Laparoscopic procedures have replaced traditional surgical techniques for many abdominal disorders during pregnancy.
- Specific guidelines for diagnosis, treatment, and use of laparoscopy for surgical problems during pregnancy have been provided by the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES)

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NUTRITIONAL SUPPORT

- Specialized nutritional support can be delivered enterally, usually via nasogastric tube feedings, or parenterally with nutrition given by venous catheter access, either peripherally or centrally.
- When possible, enteral alimentation is preferable because it has fewer serious complications
  - For extreme cases, such as recalcitrant hyperemesis gravidarum, percutaneous endoscopic gastrostomy with a jejunal port (PEG-J tube) may be used.
- The purpose of parenteral feeding, or hyperalimentation, is to *provide nutrition when the intestinal tract must be quiescent*.
  - Central venous access is necessary for total parenteral nutrition because its hyperosmolarity requires rapid dilution in a high-flow vascular system.
  - These solutions provide 24 to 40 kcal/kg/d, principally as a hypertonic glucose solution.

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Various conditions may prompt total parenteral nutrition during pregnancy

TABLE 54-1. Some Conditions Treated with Enteral or Parenteral Nutrition During Pregnancy[a]

Achalasia	Ostomy obstruction
Anorexia nervosa	Pancreatitis
Appendiceal rupture	Preeclampsia syndrome
Bowel obstruction	Short gut syndrome
Burns	Stroke
Cholecystitis	Ulcerative colitis
Crohn disease	
Diabetic gastropathy	
Esophageal injury	
Hyperemesis gravidarum	
Jejunoileal bypass	
Malignancies	

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UPPER GASTROINTESTINAL TRACT DISORDERS

1. HYPEREMESIS GRAVIDARUM

- Severe unrelenting nausea and vomiting during pregnancy.
  - sufficiently severe to produce weight loss, dehydration, ketosis, alkalosis from loss of hydrochloric acid, and hypokalemia.
  - Acidosis develops from partial starvation.
  - In some women, transient hepatic dysfunction develops, and biliary sludge accumulates
- related to high or rapidly rising serum levels of pregnancy-related hormones.
  - include human chorionic gonadotropin (hCG), estrogen, progesterone, leptin, placental growth hormone, prolactin, thyroxine, adrenocortical hormones, ghrelins, leptin, nesfatin-1, and peptide YY.

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HYPEREMESIS GRAVIDARUM

TABLE 54-2. Some Serious and Life-Threatening Complications of Recalcitrant Hyperemesis Gravidarum

Acute kidney injury—may require dialysis
Depression—cause versus effect?
Diaphragmatic rupture
Esophageal rupture—Boerhaave syndrome
Hypoprothrombinemia—vitamin K deficiency
Hyperalimentation complications
Mallory-Weiss tears—bleeding, pneumothorax, pneumomediastinum, pneumopericardium
Rhabdomyolysis
Wernicke encephalopathy—thiamine deficiency

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HYPEREMESIS GRAVIDARUM

- At least two serious vitamin deficiencies have been reported with hyperemesis in pregnancy:
  1. **Wernicke encephalopathy** from thiamine deficiency: ocular signs, confusion, and ataxia
  2. **vitamin K deficiency** can cause maternal coagulopathy, fetal intracranial hemorrhage, and vitamin K embryopathy

Management

- Most women with mild to moderate symptoms respond as outpatients to any of several first-line antiemetic agents
  - **Diclegis**—a combination of doxylamine (10 mg) plus pyridoxine (10 mg) has been proven safe and effective.
    - The usual dose is two tablets orally at bedtime.

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Management (cont'd)…

- **Ondansetron (Zofran)**: drawbacks include potential maternal effects from prolonged QT-interval and serotonin syndrome
- When simple measures fail, **intravenous crystalloid solutions** are given to correct dehydration, ketonemia, electrolyte deficits, acid-base imbalances, and hypokalemia.
  - *Thiamine, 100 mg is given to prevent Wernicke encephalopathy* → This is usually diluted in 1 L of the selected crystalloid and infused at the maintenance rate desired for patient hydration.
- If vomiting persists after rehydration and failed outpatient management, hospitalization is recommended.
  - Intravenous hydration is continued and antiemetics such as promethazine, prochlorperazine, chlorpromazine, or metoclopramide are given parenterally
  - For women who continue to have recalcitrant vomiting after intensive therapy, consideration is given for enteral nutrition
- With persistent vomiting after hospitalization, **exclude possible underlying diseases as a cause of hyperemesis.**
  - gastroenteritis, cholecystitis, pancreatitis, hepatitis, peptic ulcer, pyelonephritis, severe preeclampsia, fatty liver, clinical thyrotoxicosis

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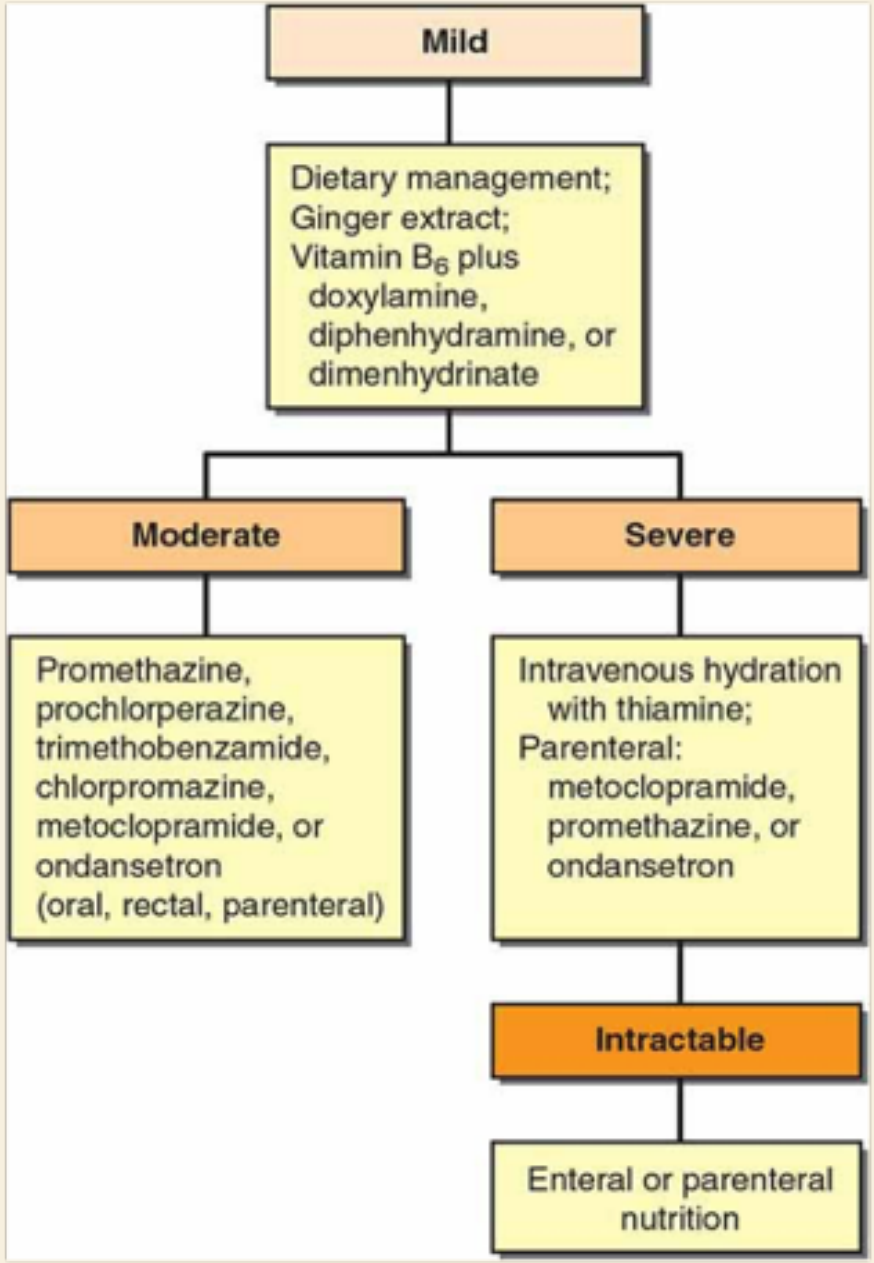

FIGURE 54-1 Algorithm for outpatient and inpatient management of hyperemesis gravidarum.

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TABLE 54-3. Medications for Gastric Disorders in Pregnancy

Medication (Brand Name)	Usual Dosing	Route(s)
Options for Nausea and Vomiting		
Antihistamine		
Doxylamine + pyridoxine (Diclegis)[a]	At bedtime; up to 4 times daily	PO
Phenothiazines	**Every 6 hr**	
Promethazine (Phenergan)[c]	12.5–25 mg	IM, IV, PO, PR
Prochlorperazine (Compazine)[c]	5–10 (25 PR) mg	IM, IV, PO, PR
Serotonin antagonist	**Every 8 hr**	
Ondansetron (Zofran)[b]	8 mg	IV, PO
Benzamides	**Every 6 hr**	
Metoclopramide (Reglan)[b]	5–15 mg	IM, IV, PO
Oral Options for Gastroesophageal Reflux (GERD)		
H2 receptor antagonists		
Ranitidine (Zantac)[b]	150 mg twice daily	
Cimetidine (Tagamet)[b]	400 mg 4 times daily for up to 12 wks	
	800 mg twice daily for up to 12 wks	
Nizatidine (Axid)[b]	150 mg twice daily	
Famotidine (Pepcid)[b]	20 mg twice daily up to 6 wks	
Proton-pump inhibitors		
Pantoprazole (Protonix)[b]	40 mg daily for up to 8 wks	
Lansoprazole (Prevacid)[b]	15 mg daily for up to 8 wks	
Omeprazole (Prilosec, Zegerid)[c]	20 mg daily for 4–8 wks	
Dexlansoprazole (Dexilant)[c]	30 mg daily for up to 4 wks	

[a]Food and Drug Administration category A.
[b]Food and Drug Administration category B.
[c]Food and Drug Administration category C.

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2. GASTROESOPHAGEAL REFLUX DISEASE

- The main symptom of reflux is **heartburn, or pyrosis**
- **Retrosternal burning sensation** stems from esophagitis caused by gastroesophageal reflux related to relaxation of the lower esophageal sphincter.
- Usually respond to tobacco and alcohol abstinence, small meals, head of the bed elevation, and avoidance of postprandial recumbency.
- So called "trigger" foods are also avoided (fatty foods, tomato-based foods, and coffee)
- Oral antacids are first-line therapy.
- If severe symptoms persist, sucralfate (Carafate) + proton-pump inhibitor or an H2- receptor antagonist can be given. Both classes are generally safe for use in pregnancy
  - 1-g sucralfate tablet is taken orally 1 hour before each of the three meals and at bedtime for up to 8 wks.
  - Antacids are not used within 1/2 hour before or after sucralfate doses.
  - If relief is not attained, then endoscopy should be considered.
- The spectrum of sequelae includes *esophagitis, stricture, Barrett esophagus, and adenocarcinoma*

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3. DIAPHRAGMATIC HERNIA

- These are caused by herniations of abdominal contents through either the **foramen of Bochdalek or Morgagni.**
- rarely complicate pregnancy.
- Because the maternal mortality rate is approx 45%, it is *recommended that repair be done during pregnancy* even if a woman is asymptomatic.
- Several case reports have described *spontaneous diaphragmatic rupture* from increased intraabdominal pressure during delivery.

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4. ACHALASIA

- This is a rare motility disorder in which the *lower esophageal sphincter does not relax properly with swallowing.*
- There is also nonperistaltic contraction activity of the esophageal muscularis to cause symptoms
- defect is caused by *inflammatory destruction of the myenteric (Auerbach) plexus* within smooth muscle of the lower esophagus and its sphincter.
- Symptoms: dysphagia, chest pain, and regurgitation.
- Barium swallow radiography demonstrates *bird beak or ace of spades narrowing* at the distal esophagus.
- Endoscopy is performed to exclude gastric carcinoma, and manometry is confirmatory.
- If dilatation of the esophagus and medical therapy does not provide relief, myotomy is considered

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ACHALASIA

- in most women, pregnancy does not seem to worsen achalasia.
- Management of achalasia includes *soft diet and anticholinergic drugs*.
  - With persistent symptoms, other options include *nitrates, calcium-channel antagonists, and botulinum toxin A injected locally*
  - Balloon dilatation of the sphincter may be necessary, and 85 percent of nonpregnant patients respond to this.
  - One caveat is that esophageal perforation is a serious complication of dilatation.

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5. PEPTIC ULCER DISEASE

- Erosive ulcer disease involving the *stomach and duodenum*.
- Gastroduodenal ulcers may be caused by chronic gastritis from *H pylori*, or they develop from *nonsteroidal antiinflammatory drug (NSAID) use*.
- Neither is common in pregnancy
- Gastroprotection during pregnancy probably originates from physiological changes that include reduced gastric acid secretion, decreased motility, and considerably increased mucus secretion
  - Despite this, ulcer disease may be underdiagnosed because of frequent treatment for reflux esophagitis

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PEPTIC ULCER DISEASE

- The mainstay of management is *eradication of H pylori and prevention of NSAID-induced disease*.
- **First-line therapy is with H2-receptor blockers or proton-pump inhibitors**
- Sucralfate is the aluminum salt of sulfated sucrose that inhibits pepsin.
  - It provides a protective coating at the ulcer base.
  - Approximately 10 percent of the aluminum salt is absorbed, and it is considered safe for pregnant women
- With active ulcers, a search for H pylori is undertaken.
  - Diagnostic aids include the *urea breath test, serological testing, or endoscopic biopsy.*
  - If any of these yield positive results, combination *antimicrobial and proton-pump inhibitor therapy* is indicated.
  - *14-day regimens include amoxicillin, 1000 mg twice daily plus clarithromycin, 250 to 500 mg twice daily, plus metronidazole, 500 mg twice daily given along with the proton-pump inhibitor omeprazole*

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6. UPPER GASTROINTESTINAL BLEEDING

- In some women, persistent vomiting is accompanied by worrisome upper gastrointestinal bleeding.
  - Occasionally, a peptic ulceration is the source.
- Most of these women have small linear mucosal tears near the gastroesophageal junction —***Mallory-Weiss tears.***
- Bleeding usually responds promptly to conservative measures, including *iced-saline irrigations, topical antacids, and intravenously administered H2-blockers or proton-pump inhibitors.*
- if bleeding persists, then endoscopy is usually indicated
- With sustained retching, the less common, but more serious, esophageal rupture—**Boerhaave syndrome**—may develop from greatly increased esophageal pressure.

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SMALL BOWEL AND COLON DISORDERS

1. ACUTE DIARRHEA

- Diarrhea can be classified as **acute (<2 weeks), persistent (2 to 4 weeks), and chronic (>4 weeks).**
- Most cases of acute diarrhea are caused by infectious agents, and a third result from foodborne pathogens.
- Evaluation of acute diarrhea depends on its severity and duration.
  - Some indications for evaluation include profuse watery diarrhea with dehydration, grossly bloody stools, fever >38°C, duration >48 hours without improvement, recent antimicrobial use, and diarrhea in the immunocompromised patient
  - Cases of moderately severe diarrhea with fecal leukocytes or gross blood may best be treated with empirical antibiotics rather than evaluation.

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ETIOLOGY, CLINICAL FEATURES, AND TREATMENT OF COMMON ACUTE DIARRHEAL SYNDROMES

Agents	Incubation	Emesis	Pain	Fever	Diarrhea	Treatment
Toxin producers	1–72 hr	3–4+	1–2+	0–1+	3–4+, watery	
1. *Staphylococcus*						1. None
2. *C perfringens*						2. None
3. *E coli (enterotoxin)*						3. Ciprofloxacin
4. *B cereus*						4. None
Enteroadherent	1–8 days	0–1+	1–3+	0–2+	1–2+, watery, mushy	
1. *E coli*						1. Ciprofloxacin
2. *Giardia*						2. Tinidazole
3. Helminths						3. As detected
Cytotoxin producers	1–3 days	0–1+	3–4+	1–2+	1–3+, watery, then bloody	
1. *C difficile*						1. Metronidazole
2. *E coli* (hemorrhagic)						2. None
Inflammatory						
Minimal	1–3 days	1–3+	2–3+	3–4+	1–3+, watery	
1. *Rotavirus*						1. None
2. *Norovirus*						2. None
Variable	1–11 days	0–3+	2–4+	3–4+	1–4+ watery or bloody	
3. *Salmonella*						3. Ciprofloxacin
4. *Campylobacter*						4. Azithromycin
5. *Vibrio*						5. Doxycycline
Severe	1–8 days	0–1+	3–4+	3–4+	1–2+, bloody	
6. *Shigella*						6. Ciprofloxacin
7. *E coli*						7. Ciprofloxacin
8. *Entamoeba histolytica*						8. Metronidazole

B cereus = Bacillus cereus; C difficile = Clostridium difficile; C perfringens = Clostridium perfringens; E coli = Escherichia coli.
Data from Camilleri, 2015; DuPont, 2014.

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ACUTE DIARRHEA

- **The mainstay of treatment is intravenous hydration using normal saline or Ringer lactate with potassium supplementation**
  - to restore maternal blood volume and to ensure uteroplacental perfusion.
- Vital signs and urine output are monitored for signs of sepsis syndrome.
- For *moderately severe nonfebrile illness* without bloody diarrhea, *antimobility agents* such as loperamide (Imodium) may be useful.
  - Bismuth subsalicylate (Pepto-Bismol) may also alleviate symptoms.
- For *moderate to severely ill women*, some recommend *empirical treatment with ciprofloxacin*, 500 mg twice daily for 3 to 5 days.
- Severe illness caused by:
  - Salmonella spp is treated with ciprofloxacin or trimethoprim-sulfamethoxazole;
  - Campylobacter spp with azithromycin;
  - Clostridium difficile with oral metronidazole or vancomycin;
  - Giardia spp and Entamoeba histolytica with metronidazole

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ACUTE DIARRHEA

Clostridium Difficile Infection

- This anaerobic gram-positive bacillus is transmitted by the *fecal-oral route*.
- The *most important risk factor is antibiotic use*, and the highest risk is with *aminopenicillins, clindamycin, cephalosporins, and fluoroquinolones*.
- Other risk factors include inflammatory bowel disease, immunosuppression, advanced age, and gastrointestinal surgery.
- Diagnosis is by enzyme immunoassay for toxins in the stool, or by DNA-based tests that identify toxin genes.
- Only patients with diarrhea should be tested, and posttreatment testing is not recommended.
- Prevention is by soap-and-water hand washing, and infected individuals are isolated.
- Treatment is **oral vancomycin or metronidazole**.

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2. INFLAMMATORY BOWEL DISEASE

- Two presumably noninfectious forms of intestinal inflammation are **ulcerative colitis** and **Crohn disease**.
- Differentiation between these is important because treatment differs.
- both share common features, and sometimes are indistinguishable if Crohn disease involves the colon.
- Inflammation is thought to result from dysregulated mucosal immune function in response to commensal microbiota, with or without an autoimmune component

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INFLAMMATORY BOWEL DISEASE

TABLE 54-5. Some Shared and Differentiating Characteristics of Inflammatory Bowel Disease

	Ulcerative Colitis	Crohn Disease
Shared Characteristics		
Hereditary	More than 100 disease-associated genetic loci–a third shared; Jewish predominance; familial in 5–10% of cases; Turner syndrome; immune dysregulation	
Other	Chronic and intermittent with exacerbations and remissions; extraintestinal manifestations: arthritis, erythema nodosum, uveitis	
Differentiating Characteristics		
Major symptoms	Diarrhea, tenesmus, rectal bleeding, cramping pain; chronic, intermittent	Fibrostenotic–recurrent RLQ colicky pain; fever Fistulizing–cutaneous, bladder, interenteric
Bowel involvement	Mucosa and submucosa of large bowel; usually begins at rectum (40% proctitis only); continuous disease	Deep layers small and large bowel; commonly transmural; discontinuous involvement; strictures and fistulas
Endoscopy	Granular and friable erythematous mucosa; rectal involvement	Patchy; rectum spared; perianal involvement
Serum antibodies	Antineutrophil cytoplasmic (pANCA) ~70%	Anti-*S cerevisiae* ~50%
Complications	Toxic megacolon; strictures; arthritis; cancer (3–5%)	Fistulas; arthritis; toxic megacolon
Management	Medical; proctocolectomy curative	Medical; segmental and fistula resection

RLQ = right lower quadrant; *S cerevisiae* = *Saccharomyces cerevisiae*.
Data from Friedman, 2015; Lichtenstein, 2009; Podolsky, 2002.

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INFLAMMATORY BOWEL DISEASE

Ulcerative Colitis

- This is a mucosal disorder with inflammation **confined to the superficial luminal layers of the colon.**
- In approximately 40 percent of cases, disease is confined to the *rectum and rectosigmoid*, but 20 percent have pancolitis.
- Endoscopic findings include *mucosal granularity and friability* that is interspersed with mucosal ulcerations and a *mucopurulent exudate*
- Major symptoms include diarrhea, rectal bleeding, tenesmus, and abdominal cramps.
- Toxic megacolon and catastrophic hemorrhage are dangerous complications that may necessitate colectomy.
- Extraintestinal manifestations include arthritis, uveitis, and erythema nodosum.
- the risk of colon cancer approaches 1% per year.
- With either ulcerative colitis or Crohn disease, there is also possible increased risks for venous thromboembolism

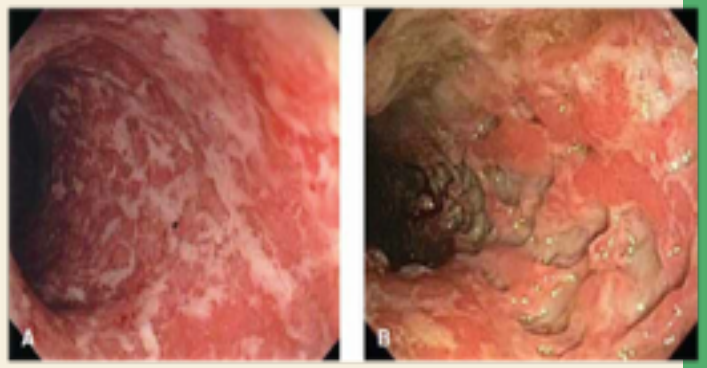

FIGURE 54-2 Causes of colitis. **A.** Chronic ulcerative colitis with diffuse ulcerations and exudates. **B.** Crohn colitis with deep ulcers. (Reproduced with permission from Song LM, Topazian M: Gastointestinal endoscopy. Kasper DL, Fauci AS, Hauser SL, et al (eds): Harrison's Principles of Internal Medicine, 19th ed. New York: McGraw-Hill Education; 2015.)

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INFLAMMATORY BOWEL DISEASE

Crohn Disease

- Also known as **regional enteritis, Crohn ileitis, and granulomatous colitis**.
- It involves not only the bowel mucosa but also the **deeper layers**, and sometimes involvement is transmural
- Lesions can be seen **throughout the entire gastrointestinal tract**, from the mouth to the anus, but it typically is segmental
- Perianal fistulas and abscesses develop in a third of those with colonic involvement.
- Symptoms depend on which bowel segment(s) is involved.
  - Thus, complaints may include lower-right-sided cramping abdominal pain, diarrhea, weight loss, low-grade fever, and obstructive symptoms.
  - The disease is chronic with exacerbations and remissions, and importantly, it cannot be cured medically or surgically.
  - Reactive arthritis is common, and the gastrointestinal cancer risk, although not as great as with ulcerative colitis, is increased substantially.

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ULCERATIVE COLITIS AND PREGNANCY

- *Ulcerative colitis does not significantly alter the course of pregnancy/pregnancy outcomes in affected women*.
  - in women with active disease at the time of conception, approximately 45 percent worsened, 25 percent remained unchanged, and only 25 percent improved.
- *Osteoporosis* is a significant complication:
  - *vitamin D—800 IU daily—and calcium—1200 mg daily—are given.*
  - *Folic acid, 4 mg orally daily*, is recommended preconceptionally and during the first trimester for neural-tube defect prevention (counteracts the antifolate actions of sulfasalazine.)

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ULCERATIVE COLITIS AND PREGNANCY

- Treatment of active colitis and maintenance therapy incorporate drugs that deliver **5-aminosalicyclic acid (5-ASA) or mesalamine.**
  - **Sulfasalazine (Azulfidine)** is the prototype, and its 5-ASA moiety inhibits prostaglandin synthase in colonic mucosa.
  - Others include olsalazine (Dipentum), balsalazide (Colazal), and delayed- release 5-ASA derivatives (Apriso, Asacol, Pentasa, Lialda).
  - Glucocorticoids are given orally, parenterally, or by enema for moderate or severe disease that does not respond to 5-ASA.
  - Recalcitrant disease is managed with immunomodulating drugs, including **azathioprine, 6-mercaptopurine, or cyclosporine**, which are relatively safe in pregnancy
- *antibodies against tumor necrosis factor-alpha (TNF-alpha) may be given for treatment of ulcerative colitis and include infliximab (Remicade), adalimumab (Humira), and golinumab (Simponi).*
  - administered intravenously or subcutaneously.
  - Several studies showed these are safe for use in pregnancy
  - may cause immunosuppression in the neonate

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CROHN DISEASE AND PREGNANCY.

- In general, Crohn disease activity during pregnancy is related to its status around the time of conception.
- Calcium, vitamin D, and folic acid supplementation mirror that for ulcerative colitis.
- For maintenance during asymptomatic periods, no regimen is universally effective.
  - Sulfasalazine is effective for some, but the newer 5-ASA formulations are better tolerated.
  - Prednisone therapy may control moderate to severe flares but is less effective for small-bowel involvement.
  - Immunomodulators such as azathioprine, 6-mercaptopurine, and cyclosporine are used for active disease and for maintenance.
  - As with ulcerative colitis, treatment with antitumor necrosis factor monoclonal antibodies is often used initially for active Crohn disease and maintenance. Their discontinuance may be followed by a relapse
- Endoscopy or conservative surgery is indicated for complications.
- the likelihood is greater that Crohn disease is associated with adverse pregnancy outcomes compared with ulcerative colitis

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3. INTESTINAL OBSTRUCTION

- The incidence of bowel obstruction is not increased during pregnancy, although it generally is more difficult to diagnose.
- Most cases of intestinal obstruction during pregnancy result from *pressure of the growing uterus on intestinal adhesions.*
  - this more likely occurs around midpregnancy when the uterus becomes an abdominal organ; in the third trimester when the fetal head descends; or immediately postpartum when uterine size acutely shrinks.
- During pregnancy, mortality rates with obstruction can be excessive because of difficult and thus delayed diagnosis, reluctance to operate during pregnancy, and the need for emergency surgery

- Cunningham FG, Leveno KJ, Bloom SL, Spong CY, Dashe JS, Hoffman BL, Casey BM, Sheffield JS (eds). William's Obstetrics 25th edition; 2018; chapter 54 Gastrointestinal disorders

4. COLONIC PSEUDO-OBSTRUCTION

- Also known as **Ogilvie syndrome**, pseudo-obstruction is caused by adynamic colonic ileus.
- It is characterized by *massive abdominal distention with cecal and right-hemicolon dilatation*.
- Approximately 10 percent of all cases are associated with pregnancy
- The syndrome usually develops postpartum—most commonly after cesarean delivery—but it has been reported antepartum
- Rarely, the large bowel may rupture
- Treatment with an *intravenous infusion of neostigmine, 2 mg,* usually results in prompt decompression
- In some cases, colonoscopic decompression is performed, and laparotomy is needed for perforation

- Cunningham FG, Leveno KJ, Bloom SL, Spong CY, Dashe JS, Hoffman BL, Casey BM, Sheffield JS (eds). William's Obstetrics 25th edition; 2018; chapter 54 Gastrointestinal disorders

5. APPENDICITIS

- *Pregnancy makes the diagnosis of appendicitis more difficult.*
  - Nausea and vomiting accompany normal pregnancy, but also, as the uterus enlarges, the appendix commonly moves upward and outward from the right lower quadrant
  - some degree of leukocytosis accompanies normal pregnancy.
- For these and other reasons, *pregnant women*— especially those late in gestation— frequently *do not have clinical findings "typical" for appendicitis.*
- Thus, it commonly is *confused with cholecystitis, labor, pyelonephritis, renal colic, placental abruption, or uterine leiomyoma degeneration.*
- as the appendix is progressively deflected upward by the growing uterus, omental containment of infection becomes increasingly unlikely.

- Cunningham FG, Leveno KJ, Bloom SL, Spong CY, Dashe JS, Hoffman BL, Casey BM, Sheffield JS (eds). William's Obstetrics 25th edition; 2018; chapter 54 Gastrointestinal disorders

APPENDICITIS

Diagnosis

- *Persistent abdominal pain and tenderness are the most reproducible findings*.
- Right-lower quadrant pain is the most frequent, although pain migrates upward with appendiceal displacement
- *sonographic abdominal imaging* is reasonable in suspected appendicitis, even if to exclude an obstetrical cause of pain
- when available, MR imaging is the preferred modality for evaluation of suspected appendicitis in pregnancy
  - MR imaging has high diagnostic yield and accuracy, and it also provides alternative diagnoses

• Cunningham FG, Leveno KJ, Bloom SL, Spong CY, Dashe JS, Hoffman BL, Casey BM, Sheffield JS (eds). William's Obstetrics 25th edition; 2018; chapter 54 Gastrointestinal disorders

APPENDICITIS

Management

- When appendicitis is suspected, **treatment is prompt surgical exploration.**
- Currently, **laparoscopy** is almost always used to treat suspected appendicitis during the first two trimesters.
- laparoscopic surgery in pregnancy after 26 weeks' gestation should be performed only by the most experienced endoscopic surgeons
- Before exploration, **intravenous antimicrobial therapy is begun**, usually with a second-generation cephalosporin or third-generation penicillin.
- Without generalized peritonitis, the prognosis is excellent.
- Uterine contractions are common, and some clinicians recommend tocolytic agents.
  - However, tocolytic use substantially increased the risk for pulmonary-permeability edema caused by sepsis syndrome

• Cunningham FG, Leveno KJ, Bloom SL, Spong CY, Dashe JS, Hoffman BL, Casey BM, Sheffield JS (eds). William's Obstetrics 25th edition; 2018; chapter 54 Gastrointestinal disorders

APPENDICITIS

Antimicrobial versus Surgical Treatment

- Because of European studies, some have advocated that many cases of appendicitis can be treated successfully with *intravenous antimicrobials alone*
  - *As of this time, this practice is still not recommended until appropriate studies have been done with pregnant women.*

Pregnancy Outcomes

- Appendicitis increases the likelihood of abortion or preterm labor, especially if peritonitis has developed.
- Long-term complications are not common.
- appendicitis during pregnancy does not appear to be associated with subsequent infertility

- Cunningham FG, Leveno KJ, Bloom SL, Spong CY, Dashe JS, Hoffman BL, Casey BM, Sheffield JS (eds). William's Obstetrics 25th edition; 2018; chapter 54 Gastrointestinal disorders

SUMMARY

1. Diagnostic techniques
2. Nutritional support
3. Upper GI tract disorders
4. Small bowel and colon disorders

Thank you!

youtube channel: Ina Irabon

www.wordpress.com: Doc Ina OB Gyne