

Assessment Points				
System	Effect	Assessment by Hx	PE	Test
HEENT	Bleeding		Bleeding from minor sites of trauma	
CV	Sepsis Hypovolemic shock Microthrombi		Hypotension Signs of decreased organ perfusion	ECG PAC ECHO
RESP	Bleeding Microthrombi	Dyspnea Hemoptysis	Tachypnea	CXR ABGs
GI	Bleeding Microthrombi	Hematemesis		NG suctioning Stool sample, LFTs, clotting studies
GU	Bleeding Microthrombi	Hematuria PU/PV bleeding		Urine output, BUN, Cr
HEME	Bleeding Consumption of factors and platelets	Hemorrhage		Hb, Plt count, clotting studies, TEG, fibrinogen, D-dimer, ATIII, protein C, blood film
CNS	Bleeding Microthrombi		Neurologic deficits	CT
MS	Bleeding Microthrombi		Extremity infarcts	

Key References: Hunt BJ: Bleeding and coagulopathies in critical care, *N Engl J Med* 370(9):847–859, 2014; Levi M: Diagnosis and treatment of disseminated intravascular coagulation, *Int J Lab Hematol* 36(3):228–236, 2014.

Perioperative Implications

Preoperative Preparation

- Optimize the management of the precipitating cause.
- Correct coagulopathy.
- Liaise with laboratory to ensure blood product availability.

Monitoring

- Routine
- Invasive where indicated by severity
- Serial CBC, coagulation studies, and TEG

Airway

- Careful intubation to avoid trauma

Induction

- Be prepared for CV instability in sick pts.

Maintenance

- Use invasive monitoring and laboratory tests to guide interventions.

Extubation

- Organ dysfunction and/or failure may necessitate a protracted period of mechanical ventilation in an ICU.

Adjuvants

- Hepatic and/or renal failure increases the duration of action of most muscle relaxants.

Anticipated Problems/Concerns

- Periop management is best conducted in a critical care environment.
- Hemorrhage may continue into the postop period.
- Organ support may be prolonged.

Diverticulosis

Nancy C. Wilkes

Risk

- More prevalent in developed countries; common in the UK and other parts of northern Europe, North America, Australia, and New Zealand, but uncommon in southern Africa, the Middle East, the Far East, and the Pacific Islands.
- Prevalence in developing countries between 5–45%, depending on age of population and method of diagnosis; African and Asian countries with prevalence approximately 0.2%.
- Prevalence increases with age. In USA, seen in less than 5% of pts younger than 40 y; Approximately 30% by age 60 y and 65% by age 85 y.
- Low-fiber diet is the highest risk factor. High-fat and/or meat diets are high risk.
- Under age 50 y more common in men; over 50 y more common in women.
- Colonic motility disorders contribute.

Perioperative Risks

- Pts who present with diffuse peritonitis or fail non-operative management of acute diverticulitis may require emergency surgery.

- Risks may include full stomach, obstruction, sepsis, and bleeding.

Worry About

- 15–25% of pts with diverticulosis will develop diverticulitis.
- Acute diverticulitis may be complicated by abscess, fistula, obstruction, or perforation.
- 15% of individuals with diverticular disease will develop acute GI bleeding. Of those, one-third will develop massive bleeding.
- Mortality rates of 22–39% reported for perforation and resultant fecal peritonitis.

Overview

- Multiple saclike herniations through weak points in the intestinal wall. Typically does not contain all layers of the wall but is a herniation of the mucosa and submucosa through the muscle layer.
- Vast majority (>90%) found in the sigmoid colon. Limited to the sigmoid in 65%, approximately 25% involving sigmoid and other segments.
- Of pts with significant diverticulosis, 70% remain asymptomatic and without related complications.

Etiology

- Not completely understood but thought to be related to low-residue diet with long transit time, as opposed to diets with high-fiber content with shorter transit time.
- Abnormalities of peristalsis and intestinal dyskinesia may contribute.
- With long transit times, intraluminal pressure increases, colon becomes distended, followed by acute and then chronic inflammation of diverticula.

Usual Treatment

- Dietary modification, high-fiber emphasis long term for diverticulosis.
- With the development of simple diverticulitis, 75% of cases are not associated with complications. Most are initially treated conservatively with medical therapy (low-residue diet and antibiotics); 85% respond quickly; 15% will require surgery.
- Severe abdominal pain, fever, and clinical signs of peritonitis and/or pelvic abscess require initial resuscitation, parenteral antibiotics, and operative intervention.

Assessment Points

System	Effect	Assessment by Hx	PE	Test
CV	Hypotension Tachycardia Hemodynamic instability	Fatigue Weakness Angina	Auscultation	ECG BP Pulm artery cath
RESP	Hypoxemia	Tachypnea Dyspnea	Auscultation	SpO ₂ ABGs CXR
GI	Perforation Obstruction Abscess Fistula Hemorrhage	Abdominal pain N/V Fever Abdominal rigidity Rectal bleeding	Diffuse abdominal tenderness Rebound Absent bowel sounds Abdominal rigidity	Free air under diaphragm if perforation CT scan Ultrasonography
HEME	Anemia, leukocytosis, DIC with sepsis			CBC with differential PT/ PTT, FSP, plt count, fibrinogen
RENAL	Colovesicular fistula	May pass air with urine if perforation into urinary bladder		Urinalysis Urine output
CNS	Disorientation with sepsis			

Key References: Young-Fadok TM, Sarr MJ: Diverticular disease of the colon. In Yamada T, Alpers DH, Kaplowitz N, et al., editors: *Textbook of gastroenterology*, ed 4, Philadelphia, PA, 2003, Lippincott Williams and Wilkins, pp 1843–1863; Tantawy H, Myslajek T: Diseases of the gastrointestinal system. In Hines R, Marschall K, editors: *Stoelting's anesthesia and co-existing disease*, ed 6, Philadelphia, PA, 2012, Saunders, pp. 301–304.

Perioperative Implications

Monitoring

- Routine, including urine output.
- With sepsis, monitor arterial pressure; consider PAC monitoring.

Maintenance

- Optimize intravascular volume and high O₂ content.

Postoperative Period

- Maintain intravascular volume.
- Continued monitoring of CV variables and urine volume.

Adjuvants

- Antibiotics
- Volume expanders
- Component therapy if DIC develops
- Vasopressor support if required; no interactions

Anticipated Problems/Concerns

- Condition is chronic so flare-ups may occur. Diverticulosis may progress to uncomplicated diverticulitis and evolve to the complicated form (abscess, perforation, obstruction, bleeding, fistula).
- Any surgical intervention and bowel resection would therefore have the anticipated side effects and complications expected from that procedure.

Do Not Resuscitate Orders

Alanna E. Goodman

Risk

- Violation of pt autonomy and self-determination if DNR orders are not reconsidered and honored for the periop period.
- Increasing numbers of pts have some form of advance directive.
- Approximately 15% of surgical pts have DNR orders.

Perioperative Considerations

- Resuscitation preferences can change based on pt status and prognosis.
- DNR orders do not become automatically suspended or continued when a pt goes to surgery.
- Intraop arrests tend to have better outcomes because they are witnessed, acted upon quickly, and are often due to reversible causes.
- Pts with DNR orders often undergo vascular access procedures, gastrostomy tube placement,

tracheostomy, palliative procedures, repair of pathologic fractures, and surgery for emergent conditions (e.g., bowel obstruction, appendicitis).

Worry About

- Ethical and legal obligation to honor and follow pt's wishes and provide optimal medical care
- Appropriateness of the DNR order
- Delineation of anesthesia care and resuscitation
- Iatrogenic events
- Intraop deaths
- Liability

Overview

- The Patient Self-Determination Act (1990) was established to allow pts to avoid undesired medical interventions. It requires federally funded healthcare institutions to ask pts about advance directives when admitted and provide information about their right to have one (Medicare and Medicaid are federally funded).

- The 1983 Report of the President's Commission for the Study of Ethical Problems in Medicine justified the "favoring of resuscitation of hospitalized pts with unexpected cardiac arrest"—which conveys implicit pt consent for CPR.
- CPR is the only medical intervention that requires a MD order to be withheld.
- A DNR order is a limited advance directive that prevents resuscitative intervention in the event of a cardiopulmonary arrest.
- Many pts with DNR orders are terminally ill or have advanced disease.
- Policies should be set in place for reevaluation of DNR orders for pts requiring surgery. These policies should be institutional, written, unambiguous, and flexible to individual pt needs.
- Anesthesiologists should be familiar with their institution's policies, as well as state and federal laws.

Assessment Points

- What are the pt's wishes?
- When was the DNR order written/last updated?
- Why was the DNR order initiated?
- Did the pt have a terminal condition?
- Did the pt have correct prognostic information?
- Who discussed/wrote the DNR order with the pt?
- Did the physician influence the decision to have the DNR order?

Key References: *Ethical guidelines for the anesthesia care of patients with do not resuscitate orders or other directives that limit care*, Park Ridge, IL, 1993, American Society of Anesthesiologists; amended 1998; Waisel D, Burns JP, Johnson J, et al.: Guidelines for perioperative do-not-resuscitate policies, *J Clin Anesth* 14(6):467–473, 2002.