MOH Pocket Manual in General Surgery

Table of Contents

UPPER GIT

Perforated Peptic Ulcer

Overview

- Epidemiology
  - The 15% death rate correlates with increased age, female sex, and gastric perforations
  - Severity of illness and occurrence of death are directly related to the interval between perforation and surgical closure

Clinical Presentation

- Symptoms
  - Sudden, severe upper abdominal pain which typically occurs several hours after the last meal
  - There may be a history of previous dyspepsia, previous or current Treatment and Management for peptic ulcer or ingestion of NSAID
  - Rarely is heralded by nausea or vomiting
  - Shoulder pain. Back pain is uncommon

- Signs
  - The patient appears severely distressed, lying quietly with the knees drawn up and breathing shallowly to minimize abdominal motion
  - Fever and hypotension (late sign)
  - The Epigastric tenderness may not be as marked as expected because the board-like rigidity
  - Tympanitic percussion over the liver and ileus

Differential Diagnosis

- Hepatobiliary: hepatitis, cholecystitis, pancreatitis, cholangitis
- Intestine: appendicitis, colitis, bowel perforation, ischemia
- Extraabdominal: inferior myocardial infarction, basal pneumonia

Work Up

- Laboratory
  - CBC: leukocytosis
  - Serum amylase mildly elevated
  - ABG: metabolic acidosis
- Imaging
  - Erect chest x-ray: air under diaphragm in 85%
  - CT scan abdomen with IV and PO contrast in doubtful cases

Treatment and Management

(See Flowchart 1)

- Medical therapy (See Table 1)
  - Non-operative management is appropriate only if there is clear evidence that the leak has sealed (by contrast study) in the absence of peritonitis
  - IV antibiotic and proton pump inhibitor

- Surgical therapy
  - Laparotomy and omental patch for perforated duodenal ulcer and prepyloric gastric ulcer
  - Resection for gastric ulcer (most likely cancerous)

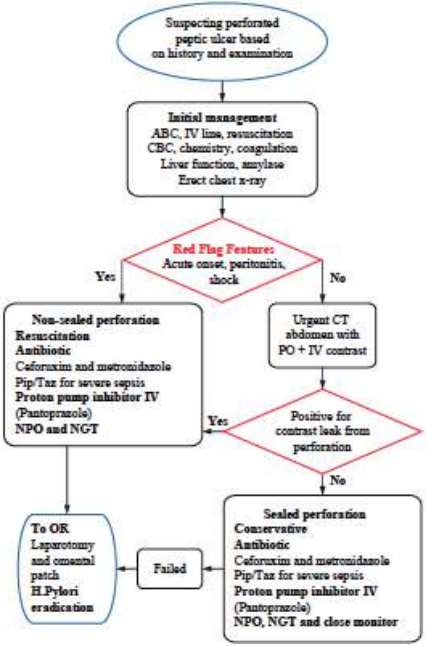
Red Flag

- Acute onset or chronic symptoms
- Shock and peritonitis
- Air under diaphragm but minimal symptoms and signs (sealed perforation)

Reference

1-Hassan Bukhari. Puzzles in General Surgery. 1st ed. Minneapolis: Tow Harbors Press 2013.

Flowchart 1: Perforated Peptic Ulcer



Hassan Bukhari. *Puzzles in General Surgery*. 1st ed. Minneapolis: Tow Harbors Press 2013

Gastric Outlet Obstruction

Overview

- Epidemiology
  - Occurs in 2% of patients with ulcer disease causing obstruction of pylorus or duodenum by scarring and inflammation
  - Cancer must be ruled out because most patients who present with symptoms of gastric outlet obstruction will have a pancreatic, gastric, or duodenal malignancy

Clinical Presentation

- Symptoms
  - Nausea, nonbilious vomiting contains undigested food particles, early satiety, bloating, anorexia, epigastric pain and weight loss

- Signs
  - Chronic dehydration and malnutrition
  - Tympanitic mass (dilated stomach in the epigastric area and/or left upper quadrant
  - Succussion splash in the epigastrium

Differential Diagnosis

- Hepatobiliary: Pancreatitis, pancreatic cancer

- Stomach: volvulus, obstructed hiatus hernia, foreign body

Work Up

- Laboratory: CBC, electrolyte panel, Liver function tests
- Imaging
  - Plain abdominal radiograph
  - Contrast upper GI studies (Gastrografin or barium)
  - CT scans with oral contrast
- Upper endoscopy with biopsy

Treatment and Management

(See flowchart 2)

- Medical therapy (See Table 1)
  - Resuscitation and correction of electrolyte imbalance
  - IV proton pump inhibitor
  - NPO and NG tube
  - H.pylori eradication
- Surgical therapy
  - Antrectomy vs. vagotomy vs. dilatation / stenting

Red Flags

- Weight loss and anorexia
- Unexplained anemia
- Palpable mass

References

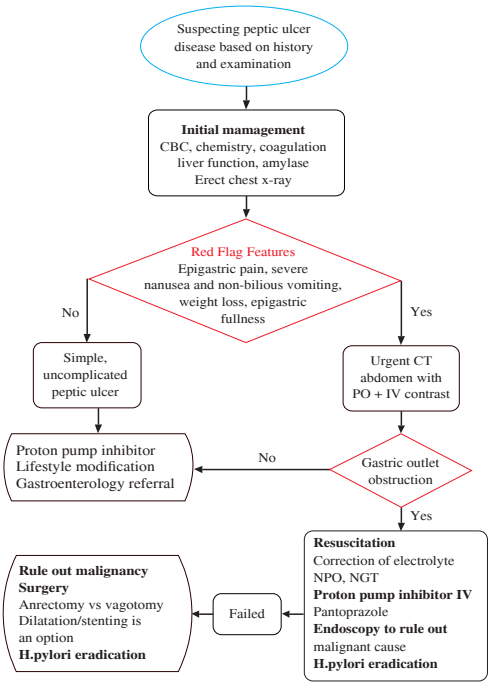
1-Andres E Castellanos, MD; Chief Editor: John Geibel, MD, DSc, MA : Gastric Outlet Obstruction . eMedicine of Medscape

2- Daniel T. Dempsey : Chapter 26. Stomach . Schwartz's Principles of Surgery, 9e , 2010

3-Gerard M. Doherty, MD, Lawrence W. Way, MD. CURRENT Work Up and Treatment and Management: Surgery, 13e , 2010

4-Maxine A. Papadakis, MD , Stephen J. McPhee, MD. Quick Medical Work Up and Treatment and Management , 2013

Flowchart 2: Peptic Ulcer and Gastric Outlet Obstruction



Upper GI Bleeding

Overview

- Definition: bleeding proximal to the ligament of Treitz, which accounts for 75% of GI bleeding

- Etiology
  - Above the GE junction: epistaxis, esophageal varices (10-30%), esophagitis, esophageal cancer, Mallory-Weiss tear (10%)
  - Stomach: gastric ulcer (20%), gastritis (e.g. from alcohol or post-surgery) (20%), gastric cancer
  - Duodenum: ulcer in cap/bulb (25%), aortoenteric fistula post aortic graft
  - Coagulopathy: drugs, renal disease, liver disease
  - Vascular malformation: Dieulafoy's lesion, AVM

Clinical Presentation

- In order of decreasing severity of the bleed: hematochezia followed by hematemesis, coffee ground emesis, melena and then occult blood in stool

Treatment and Management

(See flowchart 3)

- Initial management (See Table 2)
  - Resuscitation and monitoring (2 large bore IV lines, fluid, urinary catheter)
  - Send blood for CBC, cross and type, coagulation profile, electrolytes, liver and kidney functions
  - Keep NPO and insert NGT.

- IV Proton pump inhibitors.
  - It decreases risk of rebleeding if endoscopic predictors of rebleeding are seen
  - It is given to stabilize clot, not to accelerate ulcer healing
  - If it is given before endoscopy, it decreases the need for endoscopic intervention
- In case of esophageal varices: IV octreotide (50 mcg loading dose followed by constant infusion of 50 mcg/hr and IV antibiotic (ciprofloxacin)
- Consider IV erythromycin (or metoclopramide) to accelerate gastric emptying prior to gastroscopy to improve visualization

o Localization of the bleeder: esophagogastroduodenoscopy (EGD)

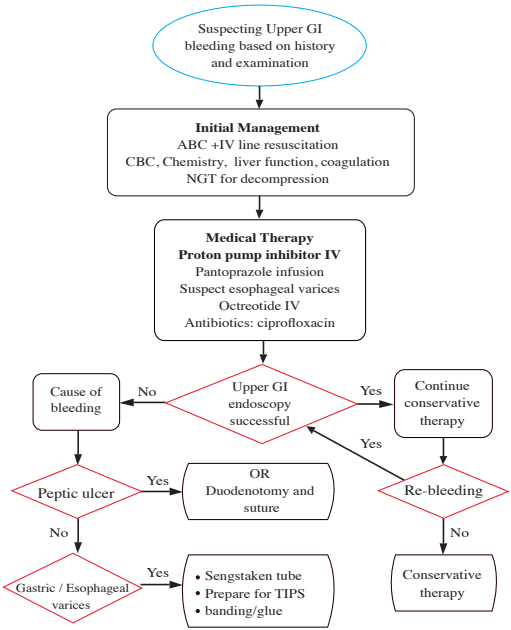
o Definitive management
- EGD: establish bleeding site+ treat lesion
- Bleeding peptic ulcer: injection of epinephrine around bleeding point, thermal hemostasis (bipolar electrocoagulation or heater probe) and endoclips
- Variceal bleeding: banding or glue injection, the medical therapy +/ - TIPS.

Reference

1-Hassan Bukhari. Puzzles in General Surgery. 1st ed. Minneapolis: Tow Harbors Press 2013.

2- Jesse Klostranec, Toronto Notes 2012: Comprehensive Medical Reference, 28th edition. Toronto: Toronto notes 2012

Flowchart 3: Upper GI Bleeding



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LOWER GIT

Bowel Obstruction

Overview

- Definition: partial or complete blockage of the bowel resulting in failure of intestinal contents to pass through lumen

- Pathogenesis
  - Disruption of the normal flow of intestinal contents ~ proximal dilation + distal decompression
  - May take 12-24 h to decompress, therefore passage of feces and flatus may occur after the onset of obstruction
  - Bowel ischemia may occur if blood supply is strangulated or bowel wall tension lesion leads to venous congestion
  - Bowel wall edema and disruption of normal bowel absorptive function ~ increased intraluminal fluid ~ transudative fluid loss into peritoneal cavity, electrolyte disturbances

- Etiology
  - Small bowel obstruction (SBO)
    - Extramural: Adhesions (most common), hernia
    - Intraluminal: Intussusception, gallstones ileus, bezoar.
    - Intramural: Crohn's disease, radiation stricture and tumors
  - Large bowel obstruction (LBO)
    - Intramural: Cancers (most common), diverticulitis, crohn's stricture
    - Extramural: Volvulus and adhesions
  - Pseudo-obstruction (functional): paralytic ileus, electrolyte disturbance, drugs

Clinical Presentation

- Must differentiate between obstruction and ileus, and characterize obstruction as acute vs. chronic, partial vs. complete (constipation vs. obstipation), small vs. large bowel, strangulating vs. non-strangulating, and with vs. without perforation / ischemia.

- Nausea, vomiting, abdominal pain, abdominal Distention and constipation

- Complications (of total obstruction)
  - Hypovolemia (due to third spacing) and bacterial translocation
  - Strangulation (10% of bowel obstructions): a surgical emergency
    - Cramping pain turns to continuous ache, hematemesis and melena (if infarction)
    - Fever, tachycardia, peritoneal signs and early shock
    - Leukocytosis and metabolic acidosis
  - Perforation: secondary to ischemia and luminal distention

Differential Diagnosis

- Small bowel: mesenteric ischemia, bowel perforation, Crohn's disease

- Large bowel: diverticulitis, colitis, appendicitis

- Hepatobiliary: cholecystitis, pancreatitis

- Peptic ulcer disease (perforation)
- Aortic aneurysem

Work Up

- Laboratory
  - May be normal early in disease course
  - CBC: hematocrit (hemoconcentration)
  - Electrolytes: to assess degree of dehydration
  - Amylase elevated
  - Metabolic alkalosis due to frequent emesis
  - In case strangulation: leukocytosis with left shift, lactic acidosis and elevated LDH (late signs)

- Radiological
  - Upright CXR or left lateral decubitus (LLD) to rule out free air, usually seen under the right hemidiaphragm
  - Abdominal x-rays to determine SBO vs. LBO vs. ileus
    - Erect (air fluid levels), Supine (dilated bowel).
    - In case of ischemic bowel: look for free air, pneumatosis, thickened bowel wall, air in portal vein, dilated small and large bowels, thickened or hose-like haustra (normally thin finger-like projections)
  - CT scan
    - It provides information on level of obstruction, severity and cause
    - Important to r/o closed loop obstruction, especially in the elderly

- Upper GI series/small bowel series for SBO (if no cause apparent, i.e. no hernias, no previous surgeries) can be used
- MRI in pregnant patients

Treatment and Management

(See flowchart 4)

- Initial management (See Table 1)
  - Resuscitation and electrolyte correction (with normal saline/ Ringer's first, then add potassium after fluid deficits are corrected)
  - NG tube to relieve vomiting, prevent aspiration and decompress small bowel by prevention of further distention with swallowed air
  - Foley catheter to monitor in/outs
  - Antibiotic in case of strangulation or perforation

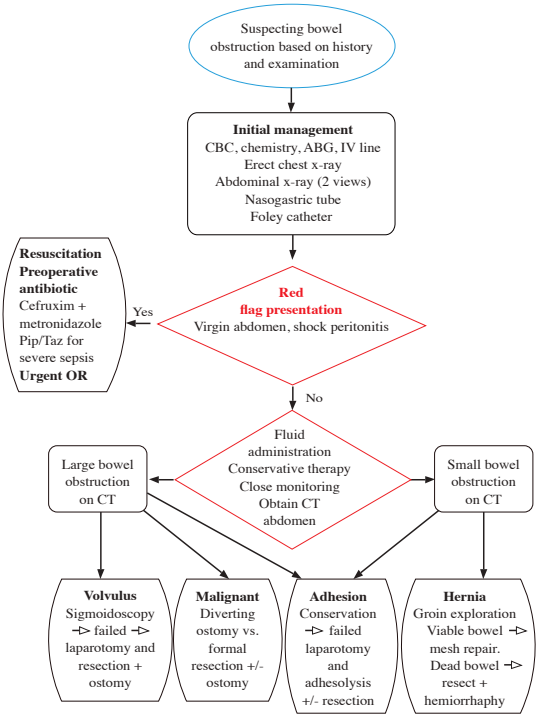
- Definitive management
  - Conservative therapy Especially if adhesions are the cause
  - Indication for surgery: virgin abdomen, peritonitis, perforation and septic shock

Reference

1-Hassan Bukhari. Puzzles in General Surgery. 1st ed. Minneapolis: Tow Harbors Press 2013.

2- Jesse Klostranec, Toronto Notes 2012: Comprehensive Medical Reference, 28th edition. Toronto: Toronto notes 2012

Flowchart 4: Bowel Obstruction



Hassan Bukhari. Puzzles in General Surgery. 1st ed. Minneapolis: Tow Harbors Press 2013.

Acute Appendicitis

Overview

- Pathophysiology
  - Obstruction of appendiceal lumen from lymphoid hyperplasia in wall of appendix (children) or fecalith (adult)

Clinical Presentation

- Symptoms
  - Vague, often colicky, periumbilical or epigastric pain that shifts to right lower quadrant, with steady ache worsened by walking or coughing
  - In >95% of patients with acute appendicitis, anorexia is the first symptom, followed by abdominal pain, which is followed in turn by vomiting
  - Constipation

- Signs
  - Low-grade fever (<37.8 °C) in the absence of perforation
  - Localized tenderness with guarding in the right lower quadrant and rebound tenderness
  - Psoas sign (pain on passive extension of the right hip)
  - Obturator sign (pain with passive flexion and internal rotation of the right hip)
  - Atypical presentations due to anatomic variations in the position of the inflamed appendix
    - Tenderness may be most marked in the flank
    - Pain in the lower abdomen, often on the left; urge to urinate or defecate

- Abdominal tenderness absent, but tenderness on pelvic or rectal examination

- Complications
  - Perforation, appendicular abscess or phlegmon (mass) and pylephlebitis (suppurative thrombophlebitis of the portal venous system)

Differential Diagnosis

- Mesenteric lymphadenitis, Gastroenteritis, Crohn's disease
- Renal: ureteric stone
- In female: ruptured ovarian cyst, ovarian torsion, ectopic pregnancy
- Beware of "crossover" diseases like
  - Sigmoid colon flopped into RLQ mimicking appendicitis

Work Up

- Laboratory
  - CBC: Mild leukocytosis, (12,000 to 18,000 cells/mm^3)
  - Urinalysis can be useful to rule out UTI
  - Pregnancy test if applicable

- Imaging
  - Ultrasound scan (pelvic) is indicated in young women of childbearing age if ovarian pathology is suspected
  - CT scan is indicated: suspecting appendix mass or abscess, unclear Work Up and in elderly
  - MRI in pregnant patient

- Invasive
  - Laparoscopy is a useful tool in case all above investigations failed

- Elderly patients with appendicitis often pose a more difficult diagnostic problem because of the atypical presentation

Treatment and Management

(See flowchart 5)

- Preoperative antibiotics (See Table 1)
  - All what is needed in case of appendicular mass phlegmon (followed by interval appendectomy)
  - Antibiotic coverage is limited to 24 to 48 hours in cases of non-perforated appendicitis. and 7 to 10 days for perforated appendix

- Percutaneous drainage for appendicular abscess

- Appendectomy open or laparoscopic.

Red Flags

- Females patient with missed menses or vaginal bleed
- Elderly patient with atypical, recurrent symptoms and weight loss
- Palpable mass on examination

Reference

1- Gerard M. Doherty, MD: Chapter 28. Appendix.Current Work up and Treatment: Surgery, 13e, 2010

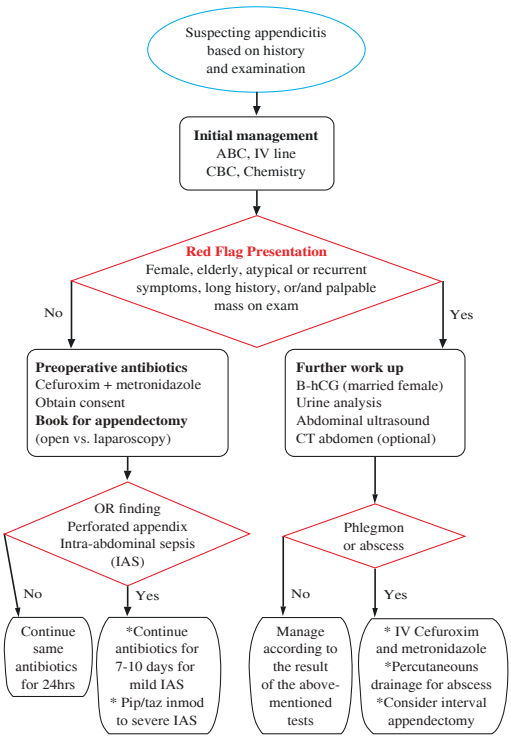
2- Bernard M. Jaffe and David H. Berger : Chapter 30. The Appendix . Schwartz's Principles of Surgery, 9e , 2010

3- Maxine A. Papadakis, MD , Stephen J. McPhee, MD : Appendicitis. QUICK MEDICAL WORK UP & TREATMENT AND MANAGEMENT , 2013

4- McLatchie, Greg; Borley, Neil; Chikwe, Joanna. Upper Gastrointestinal Surgery . Oxford Handbook of Clinical Surgery, 3rd Edition , 2007

5-Hassan Bukhari. Puzzles in General Surgery. 1st ed. Minneapolis: Tow Harbors Press 2013.

Flowchart 5: Acute Appendicitis



Anal Fissure

Overview

- Definition: is a tear in the anoderm distal to the dentate line
- Incidence: Most commonly occur in the posterior midline; 10% occur anteriorly
- Etiology
  - It is related to trauma from either the passage of hard stool or prolonged diarrhea
  - A lateral location of a chronic anal fissure suggests: Crohn's disease, Syphilis, Tuberculosis, HIV/AIDS or anal carcinoma

Clinical Presentation

- Symptoms
  - Severe, tearing pain during defecation
  - Sensation of intense and painful anal spasm lasting for several hours after a bowel movement
  - Constipation and hematochezia (less common). Fissures may present as painless non-healing wounds that bleed intermittently
- Signs
  - Acute fissure is a superficial tear of the distal anoderm
  - Chronic fissures: an ulcer with heaped-up edges. The white fibers of the internal anal sphincter visible at the base of the ulcer and associated external skin tag and/or a hypertrophied anal papilla internally

Differential Diagnosis

- Thrombosed hemorrhoid
- Perianal fistula or abscess

Work Up

- Work Up is confirmed by visual inspection of the anal verge while gently separating the buttocks
- Digital (by touching the anal sphincter, anal spasm will be appreciated) and anoscopic examinations may cause severe pain and may not be possible
- Examination under anesthesia (EUA) if in doubt or there is suspicion of another cause for the perianal pain

Treatment and Management

(See flowchart 6)

- Medical therapy (See Table 4)
  - Life-style modification, stool softener and sitz bath
  - Local analgesia
  - Local nitroglycerin or calcium channel blocker (nifedipine - less side effects).
- Surgical therapy
  - Partial Lateral internal sphincterotomy for refractory and chronic fissure

Red Flags

- New onset in an elderly patient
- Unexplained anaemia, tenesmus or weight loss
- Family history of bowel cancer or inflammatory bowel disease
- Associated anal mass or enlarged groin mass
- Positive faecal occult blood test

Reference

1-Lisa Susan Poritz, MD; Chief Editor: John Geibel, MD, DSc. eMedicine of Medscape

2-Kelli M. Bullard Dunn and David A. Rothenberger. Schwartz's Principles of Surgery, 9e , 2010

3-Mark L. Welton, MD, Carlos E. Pineda, MD, George J. Chang, MD, Andrew A. Shelton, MD. CURRENT Work Up & Treatment and Management: Surgery, 13e , 2010.

4-Maxine A. Papadakis, MD , Stephen J. McPhee, MD. Quick Medical Work Up & Treatment and Management , 2013

5-Hassan Bukhari. Puzzles in General Surgery. 1st ed. Minneapolis: Tow Harbors Press 2013.

Fistula in Ano

Overview

- Definition: an abnormal tract or cavity with an external opening in the perianal skin which is communicating with the rectum or anal canal by an identifiable internal opening.

- Pathophysiology
  - History of previous anorectal abscess, which was drained spontaneously or surgically

Clinical Presentation

- Symptoms: perianal discharge, pain, swelling and/or bleeding

- Signs
  - Perianal exam: an external opening that appears as an open sinus or elevation of granulation tissue. Spontaneous discharge of pus or blood via the external opening may be apparent or expressible on digital rectal examination.
  - Digital rectal examination may reveal a fibrous tract or cord beneath the skin. It also helps to delineate any further acute inflammation that is not yet drained. Lateral or posterior induration suggests deep postanal or ischiorectal extension.
  - The sphincter tone and voluntary squeeze pressures should be assessed before any surgical therapy.

Classification

- Four main types
  - Intersphincteric: the track is in the intersphincteric plane. The external opening is usually in the perianal skin close to the anal verge
  - Transsphincteric: The fistula starts in the intersphincteric plane or in the deep postanal space. The track traverses the external sphincter, with the external opening at the ischioanal fossa. Horseshoe fistula is also in this category
  - Suprasphincteric: The fistula starts in the intersphincteric plane in the midanal canal and then passes upward to a point above the puborectal muscle. The fistula passes laterally over this muscle and downward between the puborectal muscle and the levator ani into the ischioanal fossa
  - Extrasphincteric: The fistula passes from the perineal skin through the ischioanal fossa and the levator ani and finally penetrates the rectal wall

Differential Diagnosis

- Perianal abscess
- Hemorrhoid

Work Up

- History and Physical Examinatio
- Anoscopy is usually required to identify the internal opening.
- MRI and Fistulogram in complex or recurrent types
- Proctoscopy or flexible sigmoidoscopy is performed to rule out other lesions and inflammatory bowel disease

Treatment and Management

(See flowchart 6)

- Abscess: incision and drainage (See Table 3)
- Simple, superficial: fistulotomy
- Crohn's disease, anterior fistula in female, complex or high: seton, referral to colorectal surgeon for other options.

Red Flags

- History of Crohn's disease or HIV
- Anterior location or multiple fistulae
- Complex, recurrent or high location

References

1-Juan L Poggio, MD, MS, FACS, FASCRS; Chief Editor: John Geibel, MD, DSc, MA : Fistula-in-Ano . eMedicine of Medscape

2-Kelli M. Bullard Dunn and David A. Rothenberger: Chapter 29. Colon, Rectum, and Anus . Schwartz's Principles of Surgery, 9e , 2010

3-Mark L. Welton, MD, Carlos E. Pineda, MD, George J. Chang, MD, Andrew A. Shelton, MD. CURRENT Work Up & Treatment and Management: Surgery, 13e , 2010

4-Hassan Bukhari. Puzzles in General Surgery. 1st ed. Minneapolis: Tow Harbors Press 2013.

Hemorrhoids

Overview

- Definition: Hemorrhoids are cushions of submucosal tissue containing venules, arterioles and smooth-muscle fibers that are located in the anal canal

- Types
  - External hemorrhoids are located distal to the dentate line and are covered with anoderm
  - Internal hemorrhoids are located proximal to the dentate line and covered by insensate anorectal mucosa
  - Combined internal and external hemorrhoids

Clinical Presentation

- Symptoms
  - Bright red bleeding per rectum and mucus discharge
  - When very large, a sense of rectal fullness or discomfort
  - Pain during bowel movements (when thrombosed)
  - Anal Itching
  - Thrombosed external hemorrhoid
    - Acute severe perianal pain
    - The pain usually peaks within 48–72 hours
    - It is a purple-black, edematous, tense subcutaneous perianal mass that is quite tender.
    - Ischemia and necrosis of the overlying skin, resulting in bleeding
- Signs: purple-colored swelling protruding through anus
- Complications
  - Incarceration, thrombosis and necrosis
  - Severe bleeding
  - Painful lumps in the anal area

Classification

- Internal hemorrhoids are graded according to the extent of prolapse
  - First-degree: bulge into the anal canal and may prolapse beyond the dentate line on straining
  - Second-degree: prolapse through the anus but reduce spontaneously
  - Third-degree: prolapse through the anal canal and require

manual reduction
- Fourth-degree hemorrhoids: prolapse but cannot be reduce.

Differential Diagnosis

- Perianal hematoma
- Perianal abscess
- Rectal prolapse
- Anal papilla

Work Up

- Rectal Examination: visual and digital
- Anaoscopy, proctoscopy
- Colonscopy: to rule out colonic pathology especially > 40 years.

Treatment and Management

(See flowchart 6)

- 1st to 3rd degree (See Table 4)
  - Medical therapy: diet/lifestyle modification, flavonoid, sitz bath and stool softener
  - Surgical therapy: banding or sclerotherapy and hemorrhoidectomy
  - 4th degree: hemorrhoidectomy

- Thrombosed exernal hemorrhoid
  - Medical therapy and analgesia
  - Incision and evacuation of clot

Red Flags

- Weight loss, change in stool size and bowel habit
- Abdominal pain, anorexia or unexplained anemia
- Family History of bowel cancer or inflammatory bowel disease
- Elderly, HIV patients

References

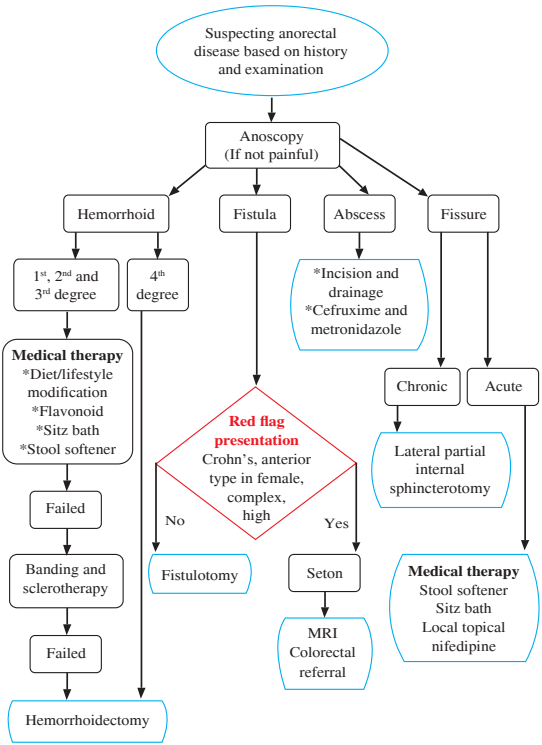
1-Kelli M. Bullard Dunn and David A. Rothenberger: Chapter 29. Colon, Rectum, and Anus . Schwartz's Principles of Surgery, 9e , 2010

2-Mark L. Welton, MD, Carlos E. Pineda, MD, George J. Chang, MD, Andrew A. Shelton, MD. CURRENT Work Up & Treatment and Management: Surgery, 13e , 2010

3-Maxine A. Papadakis, MD , Stephen J. McPhee, MD. Quick Medical Work Up & Treatment and Management , 2013

4-Hassan Bukhari. Puzzles in General Surgery. 1st ed. Minneapolis: Tow Harbors Press 2013.

Flowchart 6: Anorectal Diseases



Pilonidal Disease

Overview

- Definition
  - Acute/chronic recurring abscess or chronic draining sinus over the sacrococcygeal or perianal region
- Incidence: most commonly in people aged 15-30 years
- Etiology
  - Unknown. It is speculated that the cleft creates a suction that draws hair into the midline pits when a patients sits

Clinical Presentation

- Symptoms
  - A painful, fluctuant mass in the sacrococcygeal region with purulent discharge
- Signs
  - Abscess: red, warm, local tenderness and fluctuation with or without induration
  - Sinus: Midline natal cleft pit sinus
    - Chronic draining sinuses with multiple mature tracts with hairs protruding from the pitlike openings

Work Up

- It is a clinical Work Up best elicited by history and physical examination findings

Treatment and Management

- Abscess: incision and drainage with antibiotic therapy
- Sinus: excision (without closure or with modified closure of skin).

References

1-Kelli M. Bullard Dunn and David A. Rothenberger: Chapter 29. Colon, Rectum, and Anus . Schwartz's Principles of Surgery, 9e , 2010

2-Maxine A. Papadakis, MD , Stephen J. McPhee, MD. Quick Medical Work Up & Treatment and Management , 2013

3-Mark L. Welton, MD, Carlos E. Pineda, MD, George J. Chang, MD, Andrew A. Shelton, MD. CURRENT Work Up & Treatment and Management: Surgery, 13e , 2010

4-Hassan Bukhari. Puzzles in General Surgery. 1st ed. Minneapolis: Tow Harbors Press 2013.

Lower GI Bleeding

Overview

- Definition: bleeding distal to ligament of Treitz
- Etiology
  - Upper GI source
  - Anorectal disease: fissure and hemorrhoid
  - Diverticular disease
  - Vascular: angiodysplasia
  - Neoplasm: benign (polyp) or malignant
  - Inflammation: ulcerative colitis, infectious, radiation, ischemic

Clinical Presentation

- Hematochezia, anemia, occult blood in stool and rarely melena

Treatment and Management

(See flowchart 7)

- Initial management
  - Resuscitation and monitoring (2 large bore IV line, fluid, urinary catheter)
  - Send blood for CBC, cross and type, coagulation profile, electrolytes, liver and kidney function
- Localization
  - Insert NGT to rule out upper GI source if suspected.

- Proctoscopy
- Colonoscopy for mild to moderate bleed
- RBC scan for stable patient with massive bleeding
- Angiogram for unstable patient with massive bleeding

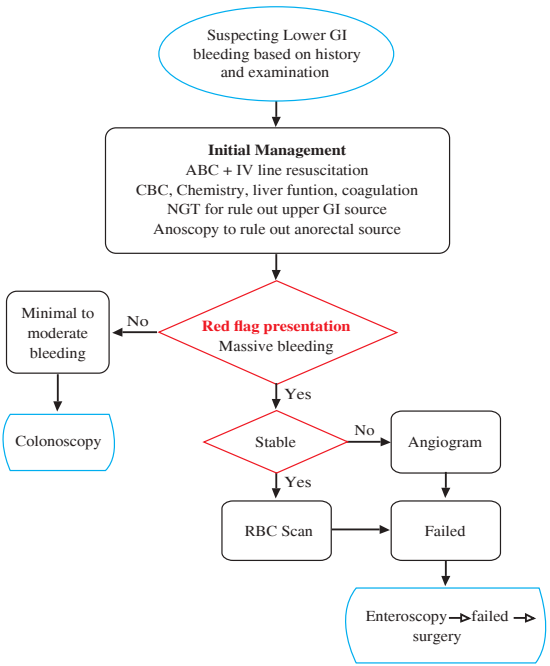
o Definitive management
- Colonoscopy and angiogram
- Surgery rarely indicated if conservative treatment fails.

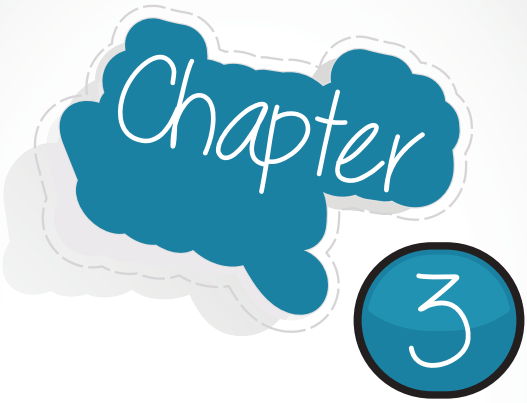
Reference

1-Hassan Bukhari. Puzzles in General Surgery. 1st ed. Minneapolis: Tow Harbors Press 2013.

2- Jesse Klostranec, Toronto Notes 2012: Comprehensive Medical Reference, 28th edition. Toronto: Toronto notes 2012

Flowchart 7: Lower GI Bleeding





HEPATOBILIARY

Gall Stones

Overview

- Risk Factors
  - Cholesterol stones
    - Obesity, age <40
    - Estrogens: female, multiparity, oral contraceptive pills
    - Ethnicity: Caucasian more prevelant.
    - Terminal ileal resection or disease (e.g. Crohn's disease)
    - Impaired gallbladder emptying: starvation, TPN, DM
    - Rapid weight loss: rapid cholesterol mobilization and biliary stasis
  - Pigment stones (contain calcium bilirubinate)
    - Cirrhosis
    - Chronic hemolysis
    - Biliary stasis (strictures, dilation, biliary infection)
    - Protective factors: statins, vitamin C, coffee

Clinical Presentation

- Asymptomatic (80%), biliary colic (10-25%), cholecystitis, choledocholithiasis (8-15%), cholangitis, gallstone pancreatitis and gallstone ileus

Work Up

- Ultrasound: diagnostic procedure of choice
- Other modalities of investigations in special cases e.g. CT, MRCP, ERCP, HIDA scan

Treatment and Management

- No need for Treatment and Management in most of the cases
- Indication of cholecystectomy if: increased risk of malignancy (choledochal cysts, Caroli's disease, porcelain (calcified) gallbladder), sickle cell disease, pediatric patient, bariatric surgery, diabetes, immunosuppression

Reference

1-Hassan Bukhari. Puzzles in General Surgery. 1st ed. Minneapolis: Tow Harbors Press 2013.

2- Jesse Klostranec, Toronto Notes 2012: Comprehensive Medical Reference, 28th edition. Toronto: Toronto notes 2012

Acute Cholecystitis

Overview

- Pathogenesis
  - Inflammation of gallbladder resulting from sustained gallstone impaction in cystic duct or Hartmann's pouch
  - No cholelithiasis in 5-10%

Clinical Presentation

- Symptoms
  - Often have history of biliary colic
  - Severe constant (hours to days) epigastric or RUQ pain, anorexia, nausea and vomiting,

- Signs
  - Fever: usually <38.5°C but it goes higher in the presence of complication
  - Focal peritoneal findings: Murphy's sign, palpable, tender gallbladder (in 33%)

- Complications
  - Mucocele: long term cystic duct obstruction results in mucous accumulation in gallbladder.
  - Gangrene (20%) and perforation (2%): result in abscess formation or peritonitis
  - Empyema of gallbladder: suppurative cholecystitis, (pus inside gallbladder)
  - Cholecystoenteric fistula, from repeated attacks of

cholecystitis. It can lead to gallstone ileus

- Emphysematous cholecystitis: bacteria produce gas inside gallbladder lumen, wall or pericholecystic space (more in diabetic patient)
- Mirizzi syndrome: extra-luminal compression of CBD/CHD due to large stone in cystic duct, which can create a fistula between gallbladder and common bile duct.

Differential Diagnosis

- Hepatobiliary: hepatitis, cholangitis, pancreatitis
- Peptic ulcer disease
- Basal pneumonia
- Renal: pylonephritis
- Cardiac: angina or myocardial infarction.

Work Up

- Laboratory: leukocytosis and left shift, mildly elevated bilirubin, AST, ALT and ALP
- Abdominal ultrasound: 98% sensitive, consider HIDA scan if U/S equivocal

Treatment and Management

(See flowchart 8)

- Admission: hydrate, NPO, NG tube (if persistent vomiting from associated ileus) and analgesics
- Antibiotics: to cover E. coli, Klebsiella, Enterococcus and Clostridium (See Table 5)
- Cholecystectomy
  - Laparoscopic is standard of care.
  - Percutaneous cholecystostomy tube: for critically ill or inoperable patients.

Red Flags

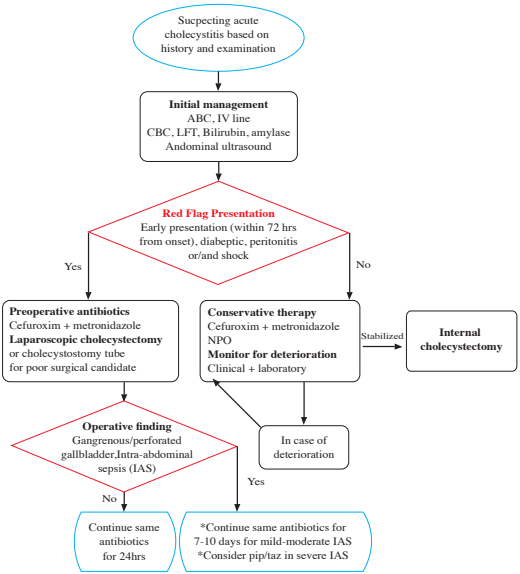
- Asymmetric thichening of gall bladder wall on u/s (suspect malignancy).
- Diabetic or immunocompromized patient
- Male with chronic recurrent attackes
- Peritonitis or shock

Reference

1-Hassan Bukhari. Puzzles in General Surgery. 1st ed. Minneapolis: Tow Harbors Press 2013.

2- Jesse Klostranec, Toronto Notes 2012: Comprehensive Medical Reference, 28th edition. Toronto: Toronto notes 2012

Flowchart 8: Acute Cholecystitis



Hassan Bukhari. Puzzles in General Surgery. 1st ed. Minneapolis: Tow Harbors Press 2013.

Choledocholithiasis

Overview

- Definition: stones in common bile duct (CBD)
- Etiology: Primary vs. secondary stones
  - Primary: formed in bile duct, indicates bile duct pathology (e.g. benign biliary stricture,sclerosing cholangitis, choledochal cyst, cystic fibrosis)
  - Secondary: formed in gallbladder (most common)

Clinical Presentation

- Symptoms
  - 50% are asymptomatic. Often has history of biliary colic
- Signs
  - Tenderness in RUQ or epigastrium
  - Pale stool, dark urine and fluctuating jaundice
- Complications
  - Cholangitis (pain, jaundice and fever), pancreatitis, biliary stricture and biliary cirrhosis

Work Up

- Laboratory
  - CBC: usually normal; leukocytosis suggests cholangitis
  - LFT: increased AST, ALT early in disease. Increased bilirubin (direct > 50% of the total bilirubin, more sensitive),

ALP and GGT
- Amylase/lipase: to rule out biliary pancreatitis

- Imaging
  - Ultrasound: intra/extra-hepatic duct dilatation
  - MRCP (90% sensitive, almost 100% specific, not therapeutic)
  - ERCP or PTC: diagnostic and therapeutic

Treatment and Management

(See Flowchart 9)

- Antibiotics (See Table 5)

- ERCP for CBD stone extraction followed by laparoscopic cholecystectomy

Red Flags

- Jaundice with RUQ pain and fever

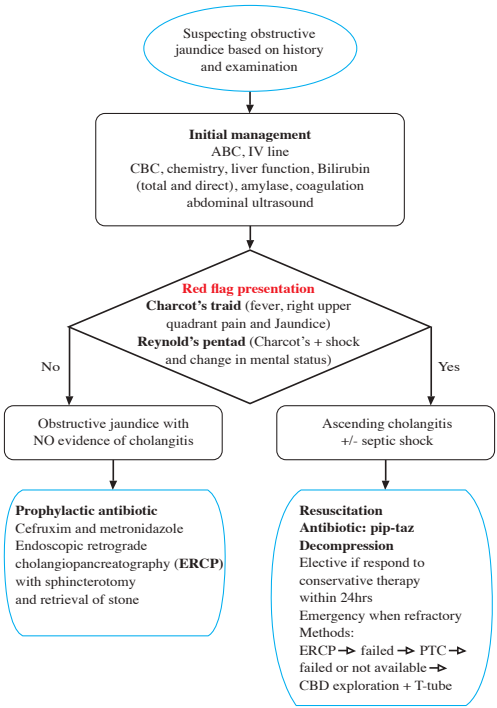
- Altered mental status or shock

Reference

1-Hassan Bukhari. Puzzles in General Surgery. 1st ed. Minneapolis: Tow Harbors Press 2013.

2- Jesse Klostranec, Toronto Notes 2012: Comprehensive Medical Reference, 28th edition. Toronto: Toronto notes 2012

Flowchart 9: Obstructive Jaundice



Acute Pancreatitis

Overview

- Definition
  - Acute inflammatory non-infectious process. ranging from mild parenchymal edema to severe hemorrhagic pancreatitis, leading to necrosis

- Etiology
  - Gallsone (40-60%), alcohol (20-30%), idiopathic, trauma, medication, and iatrogenic (ERCP)

- Pathophysiology
  - Intracellular activation of trypsinogen to trypsin leads to activation of other proenzymes and cellular auto-digestion causing a systemic inflammatory response.

Clinical Presentation

- Symptoms
  - Pain (epigastric pain radiating to back), nausea and vomiting, ileus,
  - Pain worse when supine, better when sitting forward
  - Rarely may have coexistent cholangitis or pancreatic necrosis

- Signs
  - Fever, signs of shock, may present with jaundice
  - Upper abdomen is tender, most often without guarding, rigidity, or rebound
  - There may be distention and absent bowel sounds from

paralytic ileus

- Complications
  - Local
    - Pseudocyst: collection of pancreatic secretions >4 wks old surrounded by a defined wall of granulation tissue
    - Abscess/infection, necrosis
    - Splenic, mesenteric and portal vessel thrombosis or rupture
    - Pancreatic ascites and pancreatic pleural effusion
    - Diabetes mellitus
  - Systemic
    - ARDS, sepsis and multi-organ failure
    - Coagulopathy, DIC and hypocalcemia

Differential Diagnosis

- Hepatobiliary: hepatitis, cholecystitis, cholangitis
- Peptic ulcer disease
- Aortic dissection
- Beware of "crossover" diseases like
  - Inferior myocardial infarction (MI) causing epigastric pain
  - Rght lower lobe pneumonia presenting with RUQ pain

Work Up

- Laboratory
  - CBC: Leukocytosis

- High amylase/lipase
- Elevated ALT (> 150 IU /L) and AST strongly suggest gallstone etiology of pancreatitis

- Imaging
  - Abnormal x-ray: sentinel loop (dilated jejunum), colon cutoff
  - Ultrasound may show multiple stones (may have passed spontaneously), edematous pancreas
  - CT scan: peri-pancreatic inflammation, pseudocyst, phlegmon, abscess and pancreatic necrosis (non beneficial if done after initial symptoms 64,24-48 hours).

Treatment and Management

(See flowchart 10)

- Ranson's criteria for determining prognosis of acute pancreatitis

- Simple pancreatitis: fluid resuscitation and supportive measures

- Complicated pancreatitis: antibiotics (See Table 5) and drainage / debridement

- Surgical debridement must be avoided early in the course of severe pancreatitis as it entails high mortality.

Red Flags

- Associated jaundice (may need urgent ERCP) ascites or shock
- Palpable abdominal mass (abscess or pseudocyst)

Reference

1- Gerard M. Doherty, MD, Lawrence W. Way, MD. CURRENT Work Up & Treatment and Management: Surgery, 13e , 2010

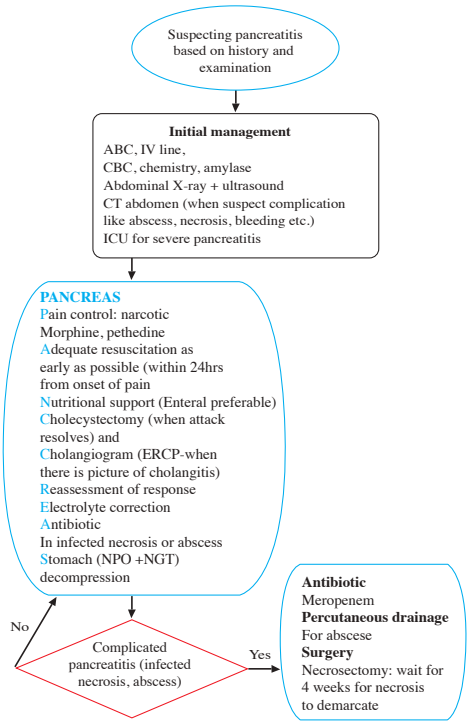
2- William E. Fisher, Dana K. Andersen, Richard H. Bell Jr., Ashok K. Saluja, and F. Charles Brunic ardi. Schwartz's Principles of Surgery, 9e , 2010

3- Maxine A. Papadakis, MD , Stephen J. McPhee, MD. Quick Medical Work Up & Treatment and Management , 2013

4- McLatchie, Greg; Borley, Neil; Chikwe, Joanna. Oxford Handbook of Clinical Surgery, 3rd Edition.2007

5-Hassan Bukhari. Puzzles in General Surgery. 1st ed. Minneapolis: Tow Harbors Press 2013.

Flowchart 10: Acute Pancreatitis



Hassan Bukhari. Puzzles in General Surgery. 1st ed. Minneapolis: Tow Harbors Press 2013.

HERNIA

Overview

- Definition: protrusion of a an abdominal content through an abnormal fascial defect into an area in which it is not normally contained

- Epidemiology
  - More common in male than female for groin hernias.
  - Lifetime risk of developing a hernia: males 20-25%, females 2%
  - 50% are indirect inguinal hernia, 25% are direct inguinal hernia and 5% are femoral

- Risk Factors
  - Activities which increase intra-abdominal pressure like obesity, chronic cough, pregnancy, constipation, straining on urination or defecation, ascites and heavy lifting
  - Congenital abnormality (e.g. patent processus vaginalis)
  - Previous hernia repair

- Classification
  - Complete vs. incomplete: complete vs. partial protrusion through the defect
  - Reducible vs. irreducible (incarcerated)
  - Richter's hernia
    - Only part of circumference of bowel (usually anti-mesenteric border) is incarcerated or strangulated so may not be obstructed
    - A strangulated Richter's hernia may self-reduce and thus be overlooked, leaving a gangrenous segment. This segment is at risk of perforation

- Sliding hernia
  - Part of wall of hernia is formed by protruding viscus (usually cecum, sigmoid colon or bladder)
- Anatomical classification
  - Groin
- Indirect and direct inguinal, and femoral
- Pantaloon: combined direct and indirect hernias, peritoneum draped over inferior epigastric vessels
  - Epigastric: defect in linea alba above umbilicus
  - Incisional: ventral hernia at site of wound closure, may be secondary to wound infection
  - Other: Littre's (involving Meckel's diverticulum), Amyand's (containing ruptured appendix), lumbar and obturator hernia
  - Parastomal, umbilical and Spigelian (ventral hernia through linea semilunaris)
  -

Clinical Presentation

- Symptoms
  - Mass of variable size, which gets worse at the end of the day and relieved with supine position or with reduction
- Signs
  - Reducible mass with positive cough impulse
- Complications:
  - Incarceration (irreducible)
  - Obstruction
  - Strangulation

Differential Diagnosis

- Inguinal hernia
  - Lymph node: lymphadenitis, lymphoma, metastatic cancer
  - Hydrocele, undescended testes
  - Vascular: pseudoaneurysem, saphena varix
  - Infection: psoas abscess, infected hematoma
  - Femoral hernia
- Umbilical hernia
  - Urachal cyst
  - Pilonidal disease.
  - Epigastric hernia
  - Primary of secondary abdominal wall neoplasm
- Incisional hernia
  - Diastasis recti, wound hematoma or seroma

Work Up

- Physical examination usually sufficient
- Ultrasound to confirm Work Up and rule out other causes
- CT scan: CT required for obturator hernias, internal abdominal hernias, Spigelian and femoral hernias in obese patients)

Treatment and Management

(See Flowchart 11)

- Prophylactic antibiotics (See Table 6)
- Elective repair: Simple, reducible
- Emergency: Incarcerated, obstructed and strangulated hernias.
- Open vs. laparoscopy

Red Flags

- Very painful, irreducible, bowel obstruction or sepsis
- History of previous cancer
- Pulsatile swelling,
- Very tender, negative cough impulse, overlying skin changes, abdominal distention

Reference

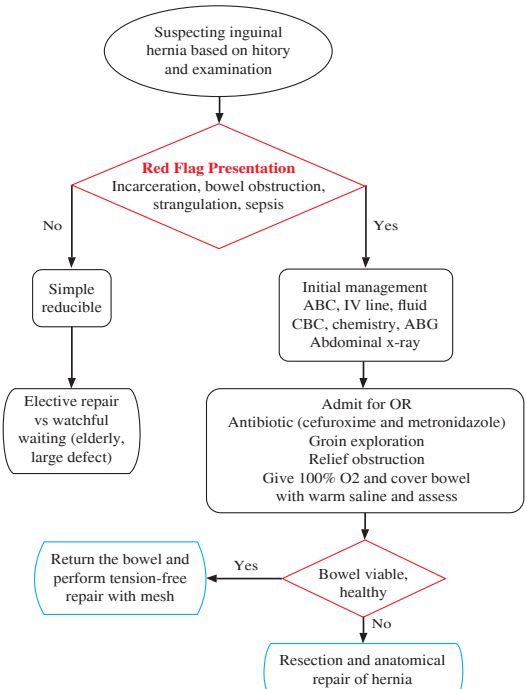
1-Amid PK et al. Open "tension-free" repair of inguinal hernias: the Lichtenstein technique.
Eur J Surg. 1996;162:447.

2-Kark AE et al. 3175 primary inguinal hernia repairs: advantages of ambulatory open mesh
repair using local anesthesia. J Am Coll Surg. 1998;186:447.

3-Liem MSL et al. Comparison of conventional anterior surgery and laparoscopic surgery for inguinal hernia repair. N Engl J Med. 1997;336:1541.

4-Hassan Bukhari. Puzzles in General Surgery. 1st ed. Minneapolis: Tow Harbors Press 2013.

Flowchart 11 : Hernia



SKIN AND SOFT TISSUS

Cellulitis and Erysipelas

Overview

- Definition
  - Skin infections that develop as a result of bacterial entry though break in the skin barrier
  - Erysipelas involves the upper dermis and superficial lymphatics
  - Cellulitis involves the deeper dermis and subcutaneous fat
- Incidence: about 200 cases per 100,000 patient-years
- Etiology
  - Most common pathogens are beta-hemolytic streptococci, then Staphylococcus aureus
  - Gram negative bacilli and anaerobes in a minority of cases, especially in diabetic patients

Clinical Presentation

- Symptoms: pain, swelling and fever
- Signs
  - May present with fever
  - Areas of skin erythema, edema, and warmth with pain.
  - Erysipelas lesions are raised above the level of surrounding skin, and there is a clear line of demarcation between involved and uninvolved tissue.
  - While the edges in cellulitis are diffuse and vague
  - The lower extremities are the most common site of infection

for both erysipelas and cellulitis

- May present with lymphangitis and inflammation of regional lymph nodes

Treatment and Management

(See flowchart 12)

- Overview therapy
  - Elevation of the affected area facilitates gravity drainage of edema and inflammatory substances
  - Treatment and Management of underlying conditions (diabetes, any dermatological disease)
  - The skin should be sufficiently hydrated to avoid dryness
  - Analgesia and antipyretic: paracetamol 1 g PO q8h

- Antibiotics (See Table 7)
  - Cellulitis without associated purulent drainage or abscess
    - If mild and no need for hospital admission, Outpatient Treatment andManagement recommendations:
    - Amoxicillin-clavulanate (augmentin) 625 mg PO BID for 10 days
    - If patient needs admission, Inpatient Treatment and Management recommendations:
  - Crystalline Penecillin 4 millions units q6h or Cefuroxime
    - Broad-spectrum antibiotic in diabetic patient
    - Cellulitis with purulent drainage and/or abscess
    - Admission to hospital
    - If an abscess is present, drainage will be required for Treatment

and Management

- Send swab for culture and sensitivity
- Augmentin 1.2 g IV q8h or cefuroxime and metronidazole , then shift to oral on discharge
- In severe or resistant cases: start Tazocin (Piperacillin-tazobactam) 4.5 g IV q8h for 1-3d; then change according to the result of the culture and sensitivity

Red Flags

- Diabetic patient, shock.
- Severe pain out of proportion to exam.
- Bruises, nercotic area and subcutaneous air

Reference

1-F. Charles Brunicardi, Dana K. Andersen, Timothy R. Billiar, David L. Dunn, John G. Hunter, Jeffrey B. Matthews, Raphael E. Pollock, Schwartz's Principles of Surgery, 9th edition, McGraw Hill, 2010

2-Larry M Baddour, Daniel J Sexton, MD, Sheldon L Kaplan, uptodate Literature review, 2013

3-Hassan Bukhari. Puzzles in General Surgery. 1st ed. Minneapolis: Tow Harbors Press 2013.

Diabetic Septic Foot

Overview

- Diabetic foot infections are associated with significant morbidity and mortality
- Risk factors: neuropathy, angiopathy (peripheral vascular disease), and poor blood sugar control.
- Forms: Cellulitis, Deep-skin and soft-tissue infections, Acute osteomyelitis or Chronic osteomyelitis
- Etiology
  - Most diabetic foot infections are polymicrobial
  - The microbiology of diabetic foot wounds is variable depending on the extent of involvement
  - Superficial diabetic foot infections: due to aerobic gram-positive cocci (including S. aureus, S. pyogenes)
  - Ulcers that are deep, chronically infected are more likely to be polymicrobial. Such wounds may involve the above organisms in addition to enterococci, enterobacteriaceae, pseudomonas aeruginosa, and anaerobes
  - Wounds with extensive inflammation, necrosis, pus drainage, or gangrene with signs of systemic toxicity should be presumed to have anaerobic organisms in addition to the above pathogens. Potential pathogens include anaerobic streptococci, bacteroides species, and clostridium species

Work Up

- Laboratory
  - CBC: leukocytosis
  - Chemistry: renal function may impaired due to sepsis

- Foot x-rays: osteomyelitis, destructed bone, atherosclerotic vessels, gas in subcutaneous tissue in cases of gas gangrene

Treatment and Management

(See Flowchart 12)

Overview

- Careful wound management
- Nutrition support, blood sugar control
- Fluid and electrolyte management
- Appropriate antibiotic
- Surgical debridement

- Antibiotics therapy (See Table 7)
  - Empiric antibiotic should be started then modified according to culture
  - Mild to moderate infection
    - One of the following antibiotics for 10-14 days: Augmentin (monotherapy).
    - Cefuroxime or Ciprofloxacin or ceftriaxone with metronidazole is an alternative
    - Vancomycin for MRSA
  - Moderate to severe infection: Tazocin or meropenem

- Surgery
  - Surgical debridement is necessary for eradication and control of infections
  - Revascularization (via angioplasty or bypass grafting) and/or amputation may be necessary

- Wound management
  - Debridement of callus and necrotic tissue
  - Frequent dressing with gauze and other materials include gels, hydrocolloids, honey and antiseptics containing iodine or silver salts.
  - Wound swab for culture and sensitivity

Red Flags

- Surgery
- Pain out of propotion to physical examination
- Sepsis and shock
- Very high WBC or leucopenia

Reference

1-F. Charles Brunicardi, Dana K. Andersen, Timothy R. Billiar, David L. Dunn, John G. Hunter, Jeffrey B. Matthews, Raphael E. Pollock, Schwartz's Principles of Surgery, 9th edition, McGraw Hill, 2010

2-Amy C Weintrob, Daniel J Sexton, uptodate Literature review, 2013

Surgical Site Infection

Overview

- Epidemiology
  - Surgical site infection (SSI) is the common cause of nosocomial infection in surgical patients
  - SSI is associated with significant morbidity and mortality, prolonged hospital stay, and increased cost

Definition

- Infection related to an operative procedure that occurs at or near the surgical incision within 30 days of the procedure, or within one year if prosthetic material is implanted at surgery

- Classification of SSI
  - Incisional: divided into
    - Superficial: involve only the skin or subcutaneous tissue outer to the fascia
    - Deep: involve deep soft tissue of an incision inner to the fascia
  - Organ or space infection: may involve any part of the operative field (other than the incision) that was manipulated during the operative procedure

- Overview classification of wound
  - Clean, clean-contaminated, contaminated and dirty wounds
  - SSI rates according to wound class were
    - Clean is 1 to 2 %, clean-contaminated is 2 to 7 %, contaminated is 6 to 15 % and dirty wound can reach up to 40 %

Clinical Presentation

- Symptoms
  - Pain, swelling and fever. It can present with discharge
- Signs
  - Fever and signs of infection (warm, red, tender, swollen area)

Differential Diagnosis

- Wound dehiscence, enterocutanous fistula, seroma, hematoma

Work Up

- Clinically and by imaging (ultrasound and/or CT scan)

Treatment and Management

(See Flowchart 12)

- Antibiotics (See Table 7)
- Open the wound and drain the pus for incisional SSI
- Percutaneous drainage for deep space infection

Reference

1. F. Charles Brunicardi, Dana K. Andersen, Timothy R. Billiar, David L. Dunn, John G. Hunter, Jeffrey B. Matthews, Raphael E. Pollock, Schwartz's Principles of Surgery, 9th edition, McGraw Hill, 2010

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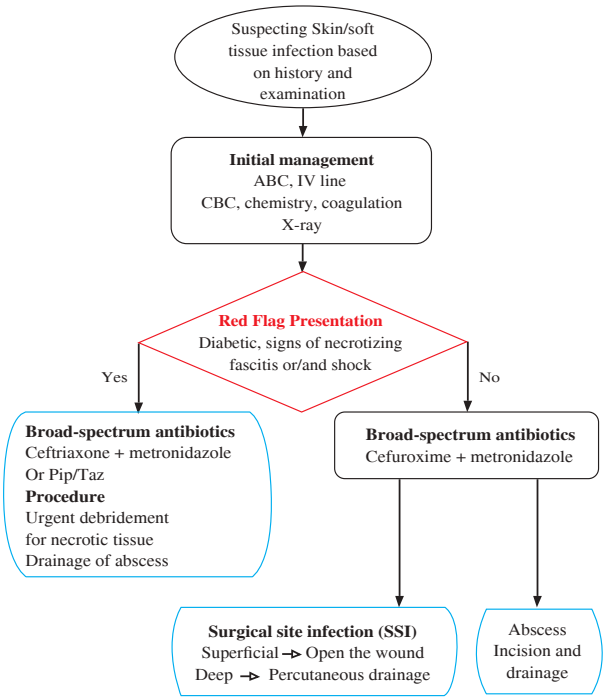
Flowchart 12 : Skin and Soft Tissue Infection



POLYTRAUMA

Overview

- Epidemiology
  - Fifth leading cause of death overall; leading cause of death for ages 1–44 years
  - 3 peaks of death
    - 1st peak (within minutes)
  - Account for 50% of trauma-related deaths. It is due to great vessels/heart laceration or brain stem/spinal cord injury
    - 2nd peak (within hours)
  - Account for 30% of deaths. It is due to bleeding and CNS injury
  - There hours are called the "GOLDEN HOURS" because they from a window for the trauma team to save the patient
    - 3rd peak (from 1 day to weeks)
  - Account for 20% of deaths, which is due to Infection and multi-organ failure

Assessment of Trauma Patient

- Primary survey
  - **ABCDE**
    - Airway and alignment of C-spine
  - Indication for intubation (summarized in **ABCDE**)
- **A**irway protection
- **B**reathing insufficiency
- **C**ontrol PaO_2 and $PaCO_2$

- **D**isaster prevention (for anticipated airway obstruction)
- **E**vent (for transportation to another hospital)
  - Breathing
  - Look, listen and measure O_2 saturation
  - Circulation (Pulse, blood pressure) and control the bleeding
  - Source of bleeding is summarized in "**FAST**"
- Floor (external bleed)
- Abdomen and pelvis
- Skeleton or Soft tissue
- Thorax
  - Disability
  - Includes: Glascow Coma Scale (GCS: 3-15), pupil reflex, AVPU and lateralization

* Hassan Bukhari. Puzzles in General Surgery. 1st ed. Minneapolis: Tow Harbors Press 2013

  - Exposure
  - Do not forget the back (Log rolling), avoid hypothermia
  - Adjuncts to primary survey
    - 2 large bore IV line
    - Tube in each orifice: gastric tube and Foley's catheter
    - Labs: CBC, chemistry, ABG and coagulation (not always needed)

- Chest and pelvic x-ray
- Focused Assessment with Sonography for Trauma (FAST)
- Cardiac monitor and ECG

- Resuscitation
  - Resuscitation with fluid (1 liter of ringer lactate) followed by blood as soon it become available
  - Correct 4 Hs
- **H**ypotension
- **H**ypothermia
- **H**ypocoagulation (coagulopathy)
- **H**ydrogen excess (acidosis)
  - Monitor response: vital signs, urine output (0.5 ml/Kg/hr) and may need invasive monitoring

- Secondary survey and adjuncts
  - AMPLE history
    - **A**llergy
    - **M**edication
    - **P**ast history
    - **L**ast meal
    - **E**vent
  - Head to toe examination
  - Specific imaging
    - Specific x-ray
    - Whole-body CT scan
  - It is the imaging of choice in trauma
    - Angiogram

- Indicated when there is leak of contrast (blush) on CT angiogram
- It has no rule in stopping venous bleed

o Reassessment
- Always reassess
- Monitor response: vital signs, urine output (0.5 ml/Kg/hr) and may need invasive monitoring

o Definitive Care: e.g. angiogram, surgery, transfer, etc.

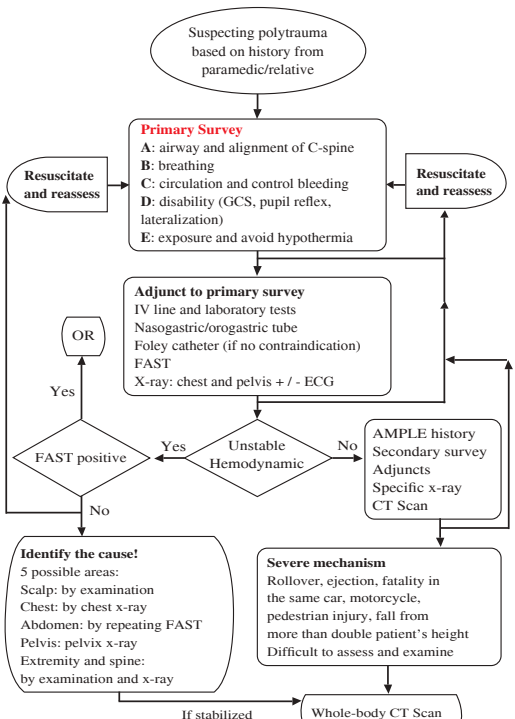
o Tertiary survey (after 24hrs from admission)
- Review all studies, repeat head-to-foot examination, review all laboratory test results for any missed injuries

References

1. Advanced trauma life support for doctors: Student course manual, 9th ed. American College of Surgeons, 2012.

2.Hassan Bukhari. Puzzles in General Surgery. 1st ed. Minneapolis: Tow Harbors Press 2013.

Flowchart 13 : Polytrauma-Blunt



PEPTIC ULCER AND G.I BLEEDING DRUG

Mediction	Parenteral therapy and dose	Hepatic impairment
Proton pump inhibitors		
Omeprazole	40mg every 24 hours	Not more than 20mg daily
Esomeprazole	(major peptic ulcer bleeding (unlicensed indication),initial intravenous infusion of 80mg intravenous over 40-60 minutes, then by continuous infusion,8mg/hour for 72 hours)	Sever peptic ulcer bleeding in sever hepatic impairment ,initial intravenous infusion of 80mg ,then by continuous intravenous infusion ,4mg/hour for 72 hours
Lansoprazole	30mg every 12 -24 hours	Use half normal dose in moderate to severe liver disease
Pantoprazole	40mg every 12 -24 hours or 80 IV,then 8mg/hr infusion	Max. 20mg daily in sever impairment and cirrhosis
Histamine H2 receptors		
Ranitidine	50mg every 6 -8hours	Use half normal dose if eGFR less than 50ml/minute/1.73m2

Notes :
Clopidogrel : Omeprazole and Esomeprazole reduce antiplatelet effect of Clopidogrel , Lansoprazole and Pantoprazole possibly reduce antiplatelet effect of Clopidogrel

Table 3


Diagnosis
Microorganism (most)
Suggested regimens
Primary
Alternative
Comments
Anorectal diseases
perirectal abscess
Escherichia coli, anaerobes
Cefuroxime 750mg I.V. Every 6-8h
metronidazole 0.5gm every 8h
✓ Treatment duration 14 days

Diagnosis	Microorganism (usual)	Suggested regimens		Comments
		Primary	Alternative	
Hepatobiliary				
Cholecystitis	eaecairetcaboretnE 68 %	Cefuroxim 750mg I.V. Every 6-8h plus metronidazole 500gm every 8h Piperacilin-tazobactam 4.5gm I.V. every 8h in severe Meropenem 0.5-1gm I.V. every 8h in life threatening condition	Ciprofloxacin 400 mg IV q12h or ceftriaxone 1g IV daily plus Metronidazole 500mg IV every 8h	Management includes in (sever) : ✓ Resuscitation ✓ Hemodynamic support ✓ Broad-spectrum parenteral antibiotics ✓ Relief of biliary obstruction Duration :5days but may require longer
Cholangitis	eaecairetcaboretnE 68 %	Piperacilin-tazobactam 4.5gm I.V. every 8h Meropenem 0.5-1gm I.V. every 8h in life threatening condition		
Jaundice		Cefuroxim 750 mg I.V. Every 6-8h Plus metronidazole 500 gm every 8h		✓ Treatment duration : 5 days
Pancreatitis Infected necrosis or abscess	eaecairetcaboretnE Eucocoretne S.aureus, anaerobic	Meropenem 0.5-1gm I.V. every 8h in case of infected nercosis or absess		✓ Perform a CT scan with IV contrast at days4-7 and begin Meropenem IV 1g tds if >30% necrosis present ✓ Treatment duration :2 week

Northumbria Healthcare NHS Stanford Guide to Antimicrobial Therapy 2010

Diagnosis	Microorganism (usual)	Suggested regimens		Comments
		Primary	Alternative	
Hernia				
Hernia repair with or without mesh, open or laparoscopic	Escherichia coli, MRSA S aerginosa s epidermidis	Not routinely recommended but in Immunocompromised or taking immunosuppresant drugs : Cefuroxime 1.5gm I.V plus metronidazole 0.5gm	Gentamicin 1.5mg/kg plus metronidazole 0.5gm	✓ Prophylaxis duration : 1dose only

Cardiff and vale UHB micro guide Dec 12,2013

Table 7

	Diagnosis	Microorganism (usual)	Suggested regimens		Comments
			Primary	Alternative	
Skin and soft tissue					
Cellulitis , erysipelas	Limb , non-diabetic	Streptococcus group(A B C&G) S aureus including MRSA reported	Flucloxacillin 1g iv qds plus Benzylpenicillin 1.2g iv qds	Vancomycin 1g I.V. Every 12h	✓ Swab any open wounds before starting treatment ✓ Treatment duration 7-10 days ✓ Check for previous MRSA result only in sever use Vancomycin if penicillin allergic/MRSA colonized then switch to oral ✓ If exposure to fresh water at site skin break add ciprofloxacin 750mg po bid ✓ On mild case (no signs of systemic toxicity) use Flucloxacillin 500mg po qds if allergic use Clarithromycin 500mg po ✓ Treatment duration in mild 7 days
	facial, adult (superficial or ondontogenic and deep soft tissue infection and (pre-ocular)(or pre-septal)(around the eye)	Streptococcus group(A B C&G) S aureus including MRSA , S. pneumo	Superficial Flucloxacillin 1g iv qds plus Benzylpenicillin 1.2g iv qds Deep: Augmentin 1.2 iv tds	Superficial clarithromycin 500mg iv bid Deep Cefuroxime 1.5g iv tds Plus Metronidazole 500 iv tds	✓ IV Clarithromycin risk of phlebitis, switch to oral ✓ Treatment duration in mild 7 days ✓ in sever pre-septal use same regimen deep and discuss with ophthalmology ✓ in pre-septal mild use Augmentin 625mg po tds if allergy use Clarithromycin 500mg po bid ✓ Treatment duration in sever 7-14 days ✓ Choice of empiric therapy must have activity vs. S.aureus. Erysipelas of face can mimic streptococcal. Erysipelas of an extremity. Forced to treat empirically for MRSA until in vitro susceptibilities available
	Erysipelas in Diabetes mellitus	Streptococcus group(A B C&G) S aureus, enterobacteriaceae, Clostridia	Early mild: Augmentin 625mg po tid plus cephalexin 500mg po qid Sever disease Meropenem 0.5-1gm I.V. every 8h plus Vancomycin 1g I.V. Every 12h		✓ Tissue biopsy required to determine pathogen in deep infection ✓ Other regimen (mild) [illegible] Flucloxacillin 500mg po qds (sever) Flucloxacillin [illegible] po qds then switch to oral if clinically improving if allergy clindamycin 450mg po qds ✓ Treatment duration 7-10 days

Surrey&Sussex healthcare NHS trust Dec 13 2013 Stanford Guide to Antimicrobial therapy 2010

Necrotizing fasciitis (flesh-eating bacteria) post-surgery . trauma streptococcal skin infection	Type1: *Streptococcus group (A.C.G)* Type2:Clostridia Type3:plymicrobic:aerobic plus anaerobic Type4:community-associated MRSA	Type1and2:Clindamicin 900mg IVq8h plus Benzylpenicillin 24million units/day divided q4-6h IV Type3: Meropenum 0.5-1gm I.V. every 8h add Vancomycin 1.0-2.0g I.V. Every 24h if MRSA suspected	Type1and2: ceftriaxone 2g IVq12h or Erythromycin 1gm q6h IV	✓ All require prompt surgical determine and need gram stain/culture to determine if etiology is strep , Clostridia, plymicrobic or S.aureus ✓ Treatment duration 7 days
Surgical site infection(SSI) IN. Gastro-intestinal: upper Gastrointestinal tract	Gram-positive cocci enteric gram-negative bacilli	Cefuroxime750mg I.V. Every 6-8h	Gentamicin1.5mg/kg metronidazole 0.5gm every 8h OR Augmentin 1.2 iv every 8h	✓ The goal of antibiotics prophylaxis is to prevent surgical site infection (SSI) by decreasing the numbers of microorganisms at the surgical site during the operation. ✓ Choosing the prophylactic antibiotics according to the anticipated organism ✓ Best to administer prophylactic antibiotics : within 30 minutes to two hours before the initial incision ✓ Can be add Augmentin with Gentamicin or metronidazole ✓ Treatment duration 1-2days in some case need to 7-10 days
Biliary	S.aureus , gram negative bacilli(enterococcus anaerobic)	Cefuroxime750mg I.V. Every 6-8h		
Colorectal	S.aureus , gram negative bacilli, anaerobic	Cefuroxime750mg I.V. Every 6-8h, plus metronidazole 0.5gm every 8h		
Appndicectomy	S.aureus , gram negative bacilli, anaerobic	Cefuroxime750mg I.V. Every 6-8h, plus metronidazole 0.5gm every 8h		

Stanford Guide to Antimicrobial Therapy 2010 clinical pharmacy and therapeutics by roger walker and cate whittlesea

Standard guide to Antimicrobial Therapy 2010

Deep-vein-thrombosis (DVT)

Deep-vein-thrombosis prophylaxis (surgery patient)	
Heparin 5000 unite	**Low molecular weight heparins** **Enoxaparin (clexane)**
Loading dose : 5000 units given subcutaneously This should be started within two hours of operation Then: every 8 or 12 hours	moderate risk : 20mg (2000 units) subcutaneous injection 2hours before surgery then 20mg (2000unite) subcutaneous injection every 24 hours High risk :40mg (4000unite) 12 hours before surgery then 40mg(4000 unite)every 24 hours

Note:

- Pharmacological prophylaxis in general surgery should usually continue for 5-7 days or until sufficient mobility has been re-established .
- INR is 2-3 for at least 24hours
- Heparin should be stopped and an alternative anticoagulant such as argatroban ,Ensure platelet count return to normal range in those who require warfarin
- Continuous infusion of unfractionated heparin is as effective as the subcutaneous route but has an increased risk of major bleeding and also requires hematologic monitoring

Guyatt,2012 British national formulary 65e Tarascon Pocket Pharmacopoeia 2013 Deluxe Lab-Coat Edition By FAAEM, FACMT, Editor in Chief, Richard J. Hamilton

وزارة الصحة
Ministry of Health

M . O . H
DRUG LIST

ALPHAPITICAL
DRUG INDEX

(A)	atracurium besylate
abacvir sulfate + lamivudine + zid-ovudine	atropine sulphate
acetazolam ide	azathioprine
acetylcholine chloride	azelaic acid
(acetyl salicylic acid (asprine	azithromycin
acitren	**(B)**
acyclovir	bacillus calmette-gue rin
adalimumab	bacitrin zinc + polymixin b sulphate
adefovir dipivoxil	baclofen
adenosine	basiliximab
adrenaline hcl	bcg vaccine (bacillus calmette – Guer-(in
(adrenaline (epinephrine	beclomethasone
albendazole	bnzhexol hcl
albumen human	benzoyl peroxide
alemtuzumab	benztropine mesylate
alendronate sodium	beractant,phospholipid
alfacalcidol	betahistine dihydrochloride
allopurinol	betamethasone
alprazolam	betaxolol hcl
alprostadil (prostaglandin e1) pediatric dose	bevacizumab
alteplase	bicalutamide
aluminum hydroxide + magnesium hydroxide	bimatoprost

amantadine hcl	bisacodyl
amethocain	bisoprolol fumarate
amikacin sulfate	bleomycin
amiloride hcl + hydrochloridethiazide	bortezomib
aminoacids for adult	bosentan
aminocaproic acid	botulinum toxin type a
aminoglutethimide	bretulium tosylate
aminophyline	brimonidine tartrate
amiodarone hcl	brinzolamide
amlodipine besilate or felodephne	bromocriptine
ammonium chlorhde	b-sitosterol
amobarbitol	budesonide
amoxicilline trihydrate	budesonide 3mg capsules
amoxicilline trihydrate + clavulanate potassium	budesonide turbuhaler
amphotericin b liposomal	Bulk-forming laxative
mpicilline sodium	bupivacaine hcl
anagrelide	buprenorphine
anastrozole	bupropion
antihemorroidal / without steroids	busulfan
(anti rabies serum (horse origin	**(C)**
anti-rho(d) immunogloblin	cabergoline
(antithymocyte globulin(atg	calcipotriol
apracloidine hcl	calcipotriol + betamethasone dipropionate
aripiprazole	(calcitonin (salmon)-(salcatonin

artemether + lumefantrine	calcitriol
artemisinin	calcium carbonate
artesunate	calcium chloride
artesunate + sulfadoxine + pyrimethamine	calcium gluconate
artificial tears eye dropper	calcium lactate
(ascorbic acid (vitamin c	capecitabine
(sparaginase (crisantaspase	capreomycine
atazanavir	captopril
atenolol	carbamazepine
atorvastatin	carbimazole

carboplatin	cyclophosphamide
carboprost tromethamine	cycloserine
carboxymethyl-cellulose	cyclosporine
carmustine	cyprotone acetate + ethinyl estradiol
carteolol hcl	cytarabine for injection
carvedilol	**(D)**
caspofungin acetate	dabigatran
cafaclor	dacarbazine
cefepime hydrochloride	dactinomycin
cefixime	dalteparin
cefixime sodium	danazol
ceftazidime pentahydrate	dantrolene sodium
ceftriaxone sodium	dapsone

cefuroxime	darunavir
celecoxib	dasatinib monohydrate
cephalexin monohydrate	daunorubicin hcl
cephradine	desmopressin acetate
cetuximab	dexamethasone
chloral hydrate	Dextran (dextran40) + sodium chlorid
chlorambcil	dextromethorphan
chloramphenicol	dextrose
chlordiazepoxide hcl	diazepam
chlorhexidine gluconate	diazoxide
chloroquine	diclofenac
chlorpheniramine maleate	didanosine
chlorpromazine hcl	diethylcarbamazine citrate
chlorthalidone	digoxin
chlorzoxazone	dihydralazine mesilate or hydralazine hcl
(cholecalciferol (vitamine d3	diloxanide furoate
cholestyramine	(diltiazem hcl (sustainad release
cincalcet hydrochloride	dimenhydrinate
cinnararizine	dinoprostone
ciprofloxacin	diphenhydramine hcl
cispltin	(diphetheria,tetanus,pertussis (dpt
citalopam hydrobromide	diphetheria,tetanus vaccine for adult
clarithromycin	diphetheria,tetanus vaccine for children
clindamycin	diphetheria antitoxine

clindamycin or erythromycin for acne	dipyridamol
clindamycin phosphate	disodium pamidronate
clofazimin	disopyramide phosphate
clomiphene citrate	distigmine bromide
clomipramine hcl	dodutamine hcl
clonazepam	docetaxel
clonidine hcl	docusate sodium
clopidogral	domperidone
clotrimazole	dopamine hcl
cloxacillin or flucloxacillin sodium	dorzolamide&1
clozapine	doxorubicin
codeine phosphate	duloxetine
colchicine	dydrogesterone
colistin sulphomethate sodium	**(E)**
conjugated estrogen + norgestrel	econazole
corticorelin (corticotrophin-releasing (factor,crf	edrophonium chloride
cromoglycate sodium	efavirenz
(cyanocobalmin (vit b12	(electrolyte oral rehydration salt (ors
cyclopentolate hcl	emtricitabine

cyclophosphamide	carboplatin
cycloserine	carboprost tromethamine
cyclosporine	carboxymethyl-cellulose
cyprotone acetate + ethinyl estradiol	carmustine
cytarabine for injection	carteolol hcl

(D)	carvedilol
dabigatran	caspofungin acetate
dacarbazine	cafaclor
dactinomycin	cefepime hydrochloride
dalteparin	cefixime
danazol	cefixime sodium
dantrolene sodium	ceftazidime pentahydrate
dapsone	ceftriaxone sodium
darunavir	cefuroxime
dasatinib monohydrate	celecoxib
daunorubicin hcl	cephalexin monohydrate
desmopressin acetate	cephradine
dexamethasone	cetuximab
Dextran (dextran40) + sodium chlo-rid	chloral hydrate
dextromethorphan	chlorambcil
dextrose	chloramphenicol
diazepam	chlordiazepoxide hcl
diazoxide	chlorhexidine gluconate
diclofenac	chloroquine
didanosine	chlorpheniramine maleate
diethylcarbamazine citrate	chlorpromazine hcl
digoxin	chlorthalidone
dihydralazine mesilate or hydralazine hcl	chlorzoxazone

diloxanide furoate	cholecalciferol (vitamine d3)
diltiazem hcl (sustainad release)	cholestyramine
dimenhydrinate	cincalcet hydrochloride
dinoprostone	cinnararizine
diphenhydramine hcl	ciprofloxacin
diphetheria,tetanus,pertussis (dpt)	cispltin
diphetheria,tetanus vaccine for adult	citalopam hydrobromide
diphetheria,tetanus vaccine for children	clarithromycin
diphetheria antitoxine	clindamycin
dipyridamol	clindamycin or erythromycin for acne
disodium pamidronate	clindamycin phosphate
disopyramide phosphate	clofazimin
distigmine bromide	clomiphene citrate
dodutamine hcl	clomipramine hcl
docetaxel	clonazepam
docusate sodium	clonidine hcl
domperidone	clopidogral
dopamine hcl	clotrimazole
dorzolamide&1	cloxacillin or flucloxacillin sodium
doxorubicin	clozapine
duloxetine	codeine phosphate
dydrogesterone	colchicine
(E)	colistin sulphomethate sodium
econazole	conjugated estrogen + norgestrel

edrophonium chloride	corticorelin (corticotrophin-releasing factor,crf)
efavirenz	cromoglycate sodium
electrolyte oral rehydration salt (ors)	cyanocobalmin (vit b12)
emtricitabine	cyclopentolate hcl

enalapril malate	Gemfibrozil
enfuvirtide	gentamicine
enoxaparin	glibenclamide
entecvir	gliclazide
ephedrine hydrochloride	glipizide
epirubicin hcl	glucagon
epoetin (recombinant human eryth- (ropoietins	glycrine
ergotamine tartarate	glycopyrrolate bromide
erlotinib hydrochloride	gonadorelin (gonadotrophine-releas- (ing hormone, lhrh
erythromycin	goserlin acetate
escitalopram	granisetron
esmolol hcl	griseofulvin micronized
esomeprazole magnesium trihydrate	(H)
estradiol valerate	haemophilus influenza vaccine
etanercept	haloperidol
ethambutol hcl	heparinecalcium for subcutaneous injection
ethanolamine oleate	(heparine sodium (bovine
ethinyl estradiol	(hepatitis b vaccine (child
ethionamide	homatropine

ethosuximide	human chorionic gonadotrophin
etomidate	human fibrinogen
etoposide	(human isophane insulin (nph
etravirine	human menopausal gonadotrophins,-follicle
(F)	stimulating hormone + luteinizing hormone
factor ix fraction for injection, which is sterile and free of hepatitis, hivand any other infectious disease agent	human normal immunoglobulin for i.m injection
factor viii (stable lyophilized con-(centrate	(human soluble insulin (regular
fat emulsion	hyaluronidase
(felodipine retard (modified release	hydralazine hcimesilate
fentanyl citrate	hydrochlorothiazide
ferrous salt	hydrocortisone
ferrous sulphate or fumarate + folic acid	hydroxurea
filgrastim g-csf	hydroxychloroquine sulphate
finasteride	ydroxyprogesterone hexanoate
fluconazole	hydroxypropyl methylcelulose
fludarabine phoaphate	hyocine butylbromide
fludrocortisones acetate	(I)
flumazenil	ibuprofen
fluorescein	ifosfamide
fluorometholone	iloprost
fluorouracil	imatinib mesilate

fluoxetine	imidazole derivative
flupenthixol	imipenem + cilastatin
fluphenazine decanoate	imipramine hcl
flutamide	(indapamide (sustaind release
fluticasone	indinavir
fluvoxamine malate	indomethacin
follitropin	infliximab
formoterol + budesonide turbuhaler	influenza virus vaccine
foscarnet	injectable polio vaccines (ipv) (salk (vaccine
fosinopril	insulin aspart
furosemide	nsulin detmir
fusidic acid	insulin glargine
(G)	insulin lispro
gabapentine	interferon alpha
ganciclovir	interferon beta 1a
gemcitabine	ipratropium bromide
medroxyprogesterone acetate	irbesartan
mefenemic acid	irintecan hydrochloride
melfloquine hcl	iron saccharate
megestrol acetate	isoniazid
meloxicam	isoprenaline hcl (isoproterenol hcl)
melphalan	isosorbide dinitrate
memantine hcl	isosorbide dinitrate

meningococcal polysaccharide sero group (a,c,y,w-135)	isotretinoin
mercaptopurine	itraconazole
meropenem	ivabradine
mesalazine	ivermectin
mesna	**(K)**
metformin hcl	kanamycin
methadone hcl	kaolin + pectin
methotrexate	ketamine hcl
methoxsalen + ammidine	ketoconazole
methoxy polyethylene glycol-epoetin beta	ketotifen
methyldopa	**(L)**
methylerrgonovine maleate	labetalol hcl
methylphenidate	lactulose
methylperdnisolone	lamivudine
metoclopramide hcl	lamotrigine
metolazone tartrate	lansoprazole
metolazone	latanoprost
metolazone tartrate	l-carnitine
etronidazole	leflunomide
mexiletine hcl	lenalidomide
micafungin sodium	letrozole
miconazole	Leucovorin calcium
midazolam	leuprolid depo acetate
miltefosine	levamizole

minocycline hcl	levetiracetam
mirtazapine	levofaoxacin
misoprostol	levothyroxine sodium
mitomycin	lidocaine + fluorescein sodium
mitoxantrone hydrochloride	Lidocaine hcl
mixed gas gangrene antitoxin	linezolid
moclopemide	liquid paraffin
mometasone furoate	lisinopril
montelukast sodium	lithium carbonate
orphine sulphate	lomustine
moxifloxacin hydrochloride	Loperamide hcl
ultienzyme (pancreatic enzymes:protease200-600u;lipse5,000-10,000u and amylase5,000-10,000u) /capsule or enteric coated tablet	lopinavir + ritonavir
multivitamins	lorazepam
mupirocin	losartan potassium
muromonab-cd3	lubricant
mycophenolate mofetil	(M)
(N)	magnesium oxide
nafarelin	mannitol
nalbuphine hcl	maprotilline hcl
naloxone hcl	measles vaccine
naphazoline	mebendazole
Naproxene	mebeverine hcl
natalizumab	mechlorethamine hcl
natamycin	meclozine + vitamine B6

phenylephrine hcl	nateglinide
phenytoin sodium	nelfinavir
phosphate enema	neomycin sulphate
phosphate salt	neostigmine methylsulpfate
phytomenadione	niclosamide
pilocarpine	nicotine(24-hour effect dose)
pioglitazone	nifedipine retard (modified release)
piperacillin + tazobactam	nilotinib
plasma protein solution	nimodipine
pneumococcal polyvalent (23 valent) vaccine	nitrazepam
poliomyelitis vaccine live oral: (sabin strain)	nitrofurantoin
polyacrylic acid	nitroglycerin
polyethylene glycol,3350-13.125g oral ppowder, sodium bicarbonate 178.5mg,sodium chloride350mg , potassium chloride 46.6mg/sachet	isosorbide dinitrate
polymyxin b sulphate + neomycin sulphate + hydrocortisone	non sedating antihistamine tablet (cetirizine or noratadine)
polystyrene sulphate resins (calcium)|	noradenalin acid tartrate
potassium salt	norethisterone
pramipexole	norfloxacin
pravastatin	nystatin
praziquantel	(O)
prazosin hcl	octreotide
prednisolone	ofloxacin

pregabalin	oily phenol injection
Prilocaine + felypressin	olanzapine
Primaquine phosphate	olopatadine hcl
Primidone	omeprazole sodium
Procainamide hcl	ondansetron
Procarbazine	orienograstim (g-csf)
Procyclidine hydrochloride	oxaliplatin
Progesterone	oxybuprocaine
Proguanil hcl	oxybutynin hcl xl
Promethazine hcl	oxymetazoline
proparacaine	oxytocin
propfol	(P)
propylthiouracil	paclitaxel
Propranolol hcl	paliperidone
Protamine sulfate	palivizumab
prothionmide	pancuronium bromide
Protirelin (thyrotrpphin-releasing hormone,trh)	pantoprazoole sodium sesquihydrate
Pseudoephedrine hcl 30mg + anti-histamine	papaverin
Pumactant phospholipid	para-amino salicylate sodium
Pura aluminum hydroxide	paracetamol
Pyrazinamide	pegaspargase
Pyrethrins	pegylated interferon alpha 2a
Pyridostigmine	pemetrexed
Pyridoxine hcl (vitamine b6)	penicillamine

Pyrimethamine	penicillin benzathine (penicillin g)
Prilocaine + felypressin	pentamidine isethionate
primaquine phosphate	pentavalent vacc.(hbv+hib+dtp)
(Q)	pentoxifylline
quetiapine	perindopril
quinidine sulfate	permethrin
quinine dihydrochloride	pethidine hcl
quinie sulphate	phenobarbital (phenobarbitone)
(R)	phenoxymethyl penicillin (penicillin v potassium)
rabies immunoglobulin for i.m injection	phentolamine mesylate
stibogluconate sodium (organic pentavalent antimony)	rabies virus vaccine
streptokinase	racemic epinphrine
streptomycin sulfate	raltegravir
strontium ranelate	ranitidine
succinylcholine choloride	rasburicase
sucralfate	recombinant factor via
sulfacetamide	repaglinide
sulfadiazine	reteplase
sulfadoxin500mg + pyrimetha-mine25mg	retinoin (vitamine a)
sulfasalazine,500mg/tablet	ribavirin
sulindac	rifabutine
sulpiride	rifampicin
sumatriptan succinate	riluzole

(T)	ringer's lactate solution
tacrolimus	risperidone
tamoxifen citrate	ritonavir
tamsulosin hcl (modified release)	rituximab
telmisartan	rivaroxaban
temazepam	rocuronium bromide
tenofovir disoproxil fumurate	ropivacaine hcl
terbinafine	rose bengal
teriparatide	rosuvastatin
terlipressin acetate	(S)
tetanus antitoxin	salbutamol
tetanus immunoglobulin for i.m injection	salmeterol + fluticasone propionate
tetanus vaccine	scorpion anti – venin
tetracosactrin (corticotrophin)	selegiline hcl
tetracycline hcl	senna
thalidomide	sevelamer
theophylline	sevoflurance
thiacetazone	sildenafil
thiamine (vitamine b1)	silver sulfadiazine (steril)
thioguanine	simethicone
thiopental sodium	simvastatin
tigecycline	sirolimus
timolol	sitagliptin phosphate
tinzaparin sodium	snake anti-venin

tiotropium	sodium acetate
tirofiban hydrochloride	sodium aurothiomalate
tobramycin + dexamethasone	sodium bicarbonate
tobramycin sulfate	sodium chloride
tolterodine tartrate	sodium cormoglycate
topiramate	sodium hyaluronate
trace elements additive (pediatric dose)	sodium hyaluronate intra-articular (mw over 3 sillion)
tramadol hcl	sodium nitropruprusside
tranexamic acid	sodium phosphate
trastuzumab	sodium valpproate
trazodone	somatropin (human growth hormone)
tretinoin	sorafenib
triamcinoloneacetonide	sotalol hydrochloride
triamterene + hydrochlorthiazide	spectinomycin hcl
trifluperazine hcl	spiramycin
trifluridine	spironolactone
trimetazidine dihydrochloride (modified release)	sterile balanced salt solution (bss)
trimethoprim + sulfamethoxazole	sterile water for injection
triple virus vaccine (measles-mumps-rubella)	verapamil hcl
triptorelin acetate	verapamil hcl (sustaind release)
tropicamide	vigabatrin
tuberculin ppd skin test	vinblastine sulfate

Authors

Khalid O. Dhafar, MD, MBA, FRCS, FACS
Consultant General Surgery
Health Affair, Ministry of Health
Jeddah, Saudi Arabia

Hassan Adnan Bukhari, MD, FRCSC
Assistant Professor, General Surgery, Umm Al-Qura University
Consultant General Surgery, Trauma Surgery and Critical Care, King Abdulaziz Hospital, Makkah, Saudi Arabia
Head of Accident and Emergency Department, Al-Noor Specialist Hospital
Makkah, Saudi Arabia

Abdullah Mosleh Alkhuzaie, MD, SBGS
Consultant General Surgery
King Abdulaziz Hospital
Ministry of Health
Makkah, Saudi Arabia

Saad A. Al Awwad, MD, SBGS, JBGS
Consultant General Surgery
King Fahad General Hospital, Ministry of Health
Jeddah, Saudi Arabia

Ali Abdullah S. Al-Zahrani, MD, SBGS
Consultant General Surgery
King Faisal Hospital, Ministry of Health
Taif, Saudi Arabia

Mohammed Abdulwahab Felimban, MD, ABFM, FFCM (KFU)
Director of healthcare quality and patient safety
Health affair, Ministry of Health
Makkah, Saudi Arabia

Faisal Ahmed Al-Wdani, BPharma (KFH)
Clinical Pharmacist
King Faisal Hospital, Ministry of Health
Makkah, Saudi Arabia

Illustration

Flowchart by Hassan Adnan Bukhari

Medication Table by Faisal Ahmed Al-Wdani

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