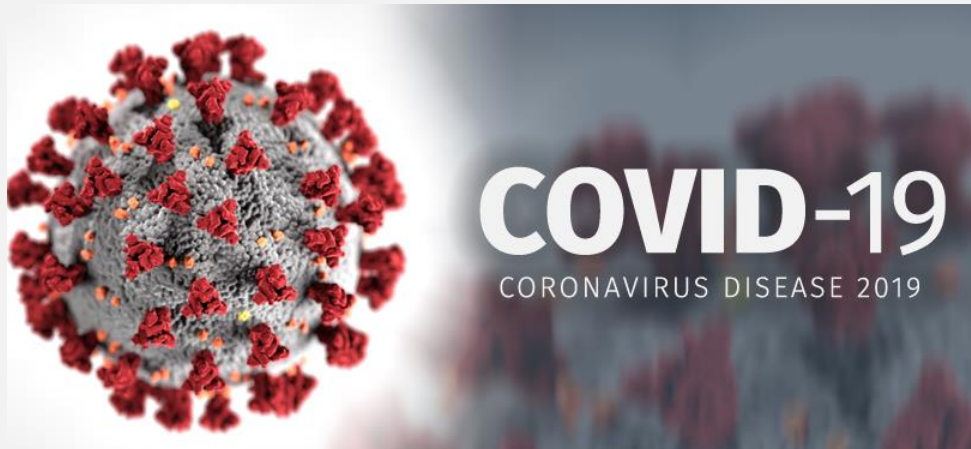




Acute Care Surgery Regional Management for COVID19 Alaska Native Tribal Health Consortium

Department of General Surgery ANMC

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Disclosures

- No Relevant Disclosures



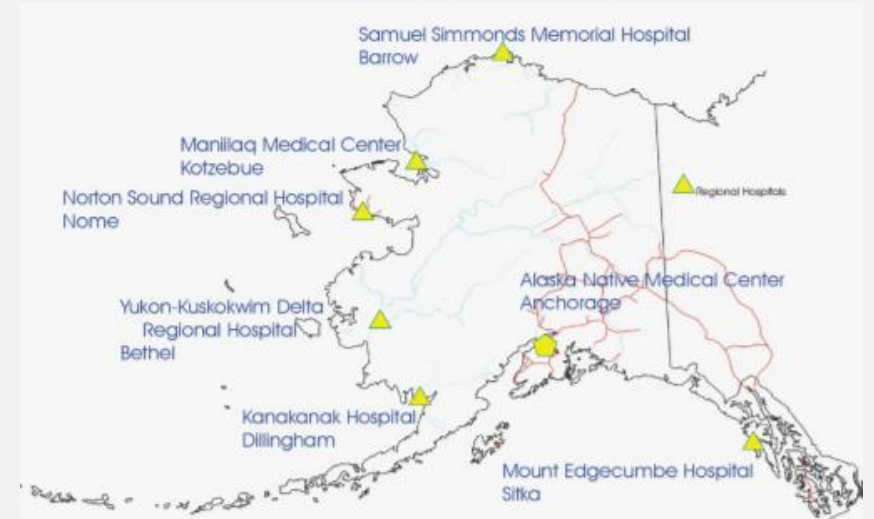
Alaska Native Health Network Unique Challenges

- Geography
- Concentration of Surgical Care
- Travel Limitations



Goals of Regional Management

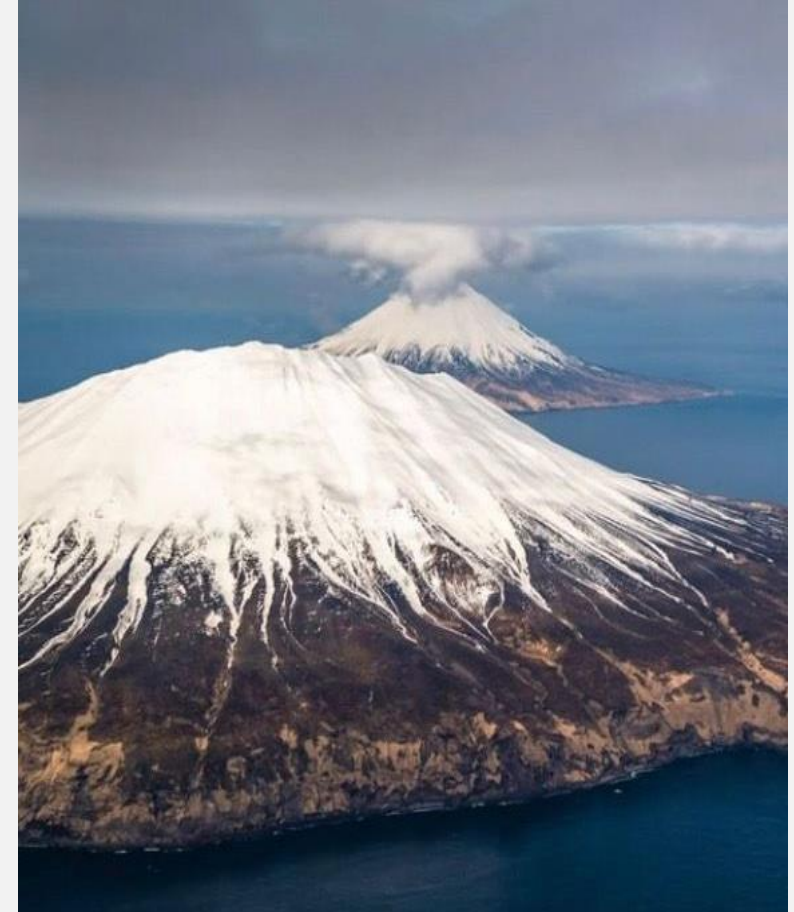
Prevent Unnecessary COVID19 Exposures



- Increase *Regional* care for common non-operative surgical problems
- Avoid *Unnecessary* patient transports
- Continue to identify patients that require transfer to ANMC
- Continue to provide surgical care at ANMC for acute surgical disease

Conditions Covered in This Lecture

- Adhesive Small Bowel Obstruction
- Simple Pneumothorax
- Simple Cutaneous Abscess
- Appendicitis
- Benign Gallstone Disease
- Diverticulitis



Small Bowel Obstruction

Most frequent surgical disorder of the small intestine

Classified by the etiology of the obstruction:

Intraluminal: foreign body, gallstone, meconium (peds)

Intramural: tumors, inflammatory bowel disease

Extrinsic: *adhesions*, hernias, carcinomatosis



-75% of small obstructions are caused by intrabdominal adhesions related to prior abdominal surgery

-Most cases of *adhesive* small bowel obstruction will resolve w/ non-operative management

Adhesive Small Bowel Disease, Presentation

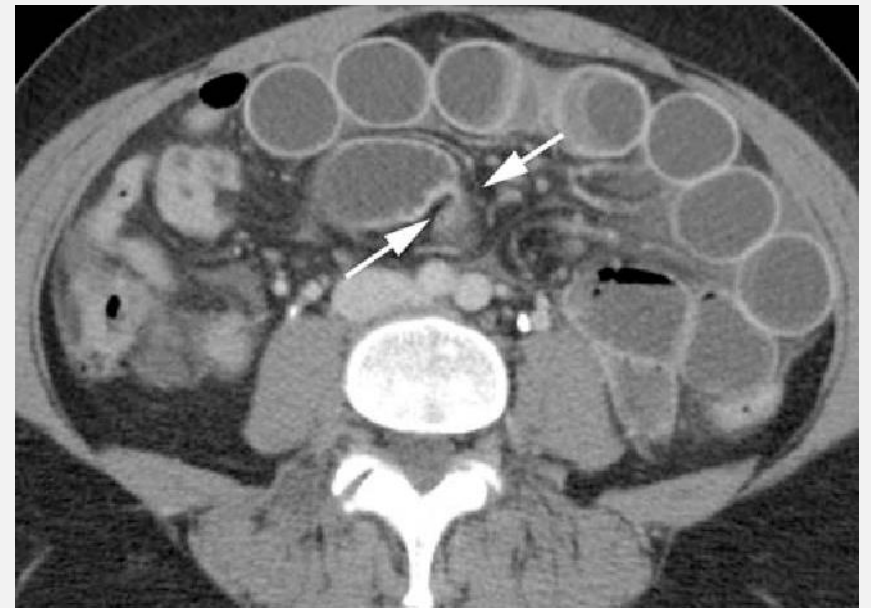
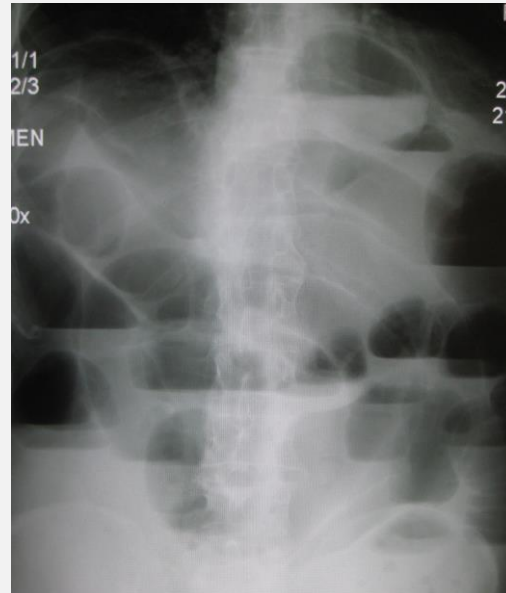
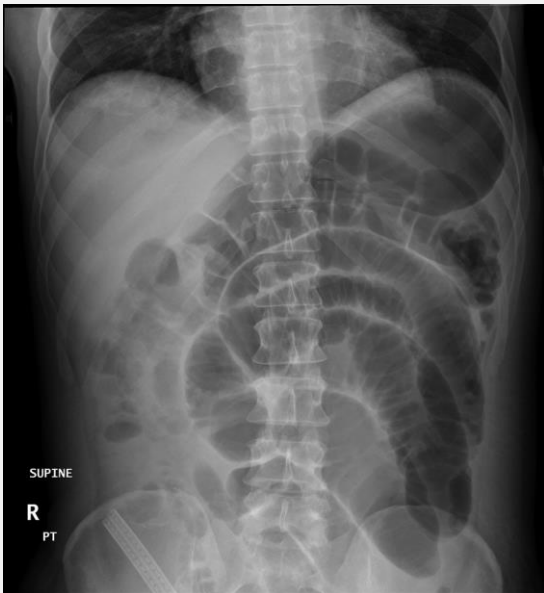
History: *past abdominal surgery*, colicky abdominal pain, nausea, emesis, decreased or absent bowel function

PE: abdominal distention, hypo/hyperactive bowel sounds, tenderness

Labs: elevated Cr, electrolyte abnormalities, +/-leukocytosis, +/- elevated lactate

Abd X-ray: dilated loops small bowel, air fluid levels, paucity of colonic gas

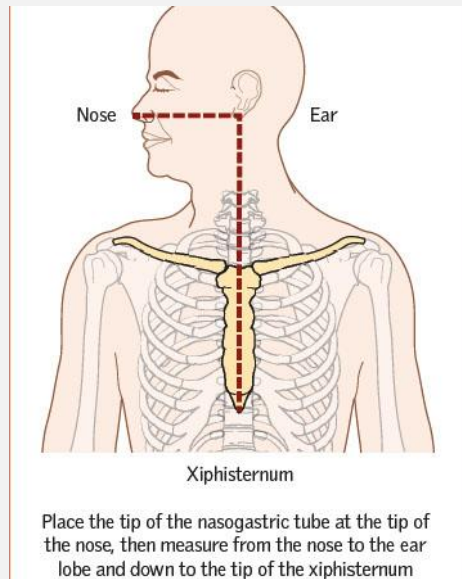
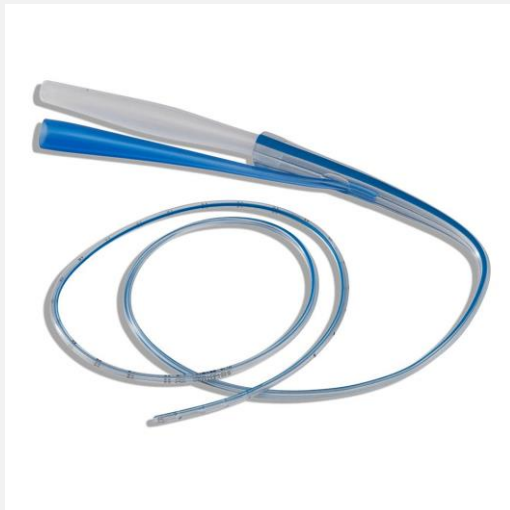
CT imaging: discrete transition from dilated to decompressed SB, decompressed colon



Adhesive Small Bowel Disease, Management

- Work-Up: CBC, BMP, Lactate, Abd X-rays, CT Abd/Pelvis
- Resuscitation: fluid bolus, continuous IVF, follow UOP, replete electrolytes
- NG tube decompression: check NG position, low intermittent suction, monitoring NG output
- Follow Bowel Function: Discontinue NG tube after decreased NG output & return of bowel function

Recommend: telemedicine consult & daily review with ANMC surgical team



Adhesive Small Bowel Obstruction, Indications for Transfer

High Risk Features: -free air -free fluid -closed loop obstruction
-pneumatosis intestinalis -portal venous gas
-hemodynamic instability -persistently elevated lactic acid



Closed Loop
Small Bowel
Obstruction

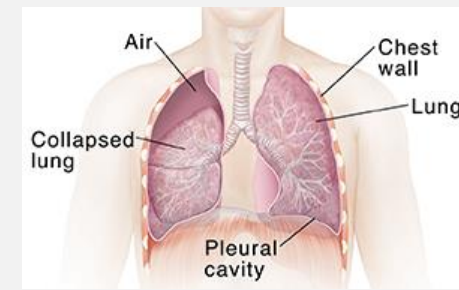


Pneumatosis Intestinalis



Portal Venous Gas

Simple Pneumothorax



- Occurs when air enters the space between visceral and parietal pleura
- Can happen spontaneously or from trauma (blunt or penetrating)

Symptoms: dyspnea, pleuritic chest pain, increased O₂ requirements

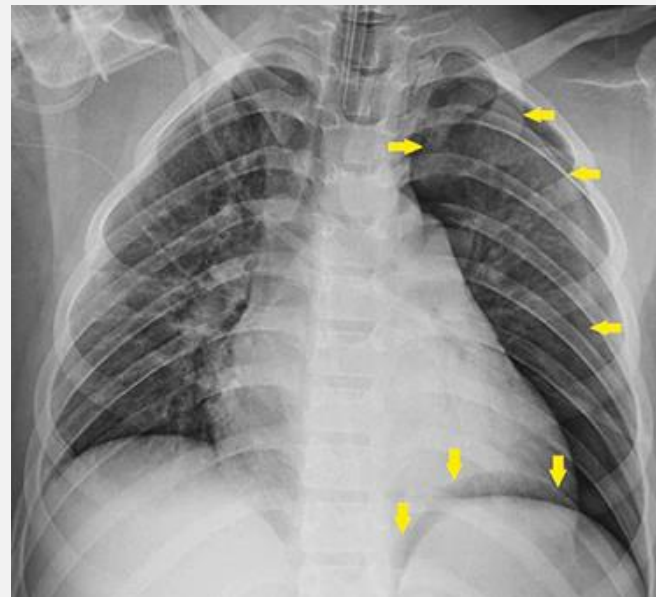
Signs: decreased breath sounds, hyperresonance, unequal chest rise

CXR: -absent lung markings
(look at apex & periphery of lung)

-visible pleural edge

-deep sulcus sign

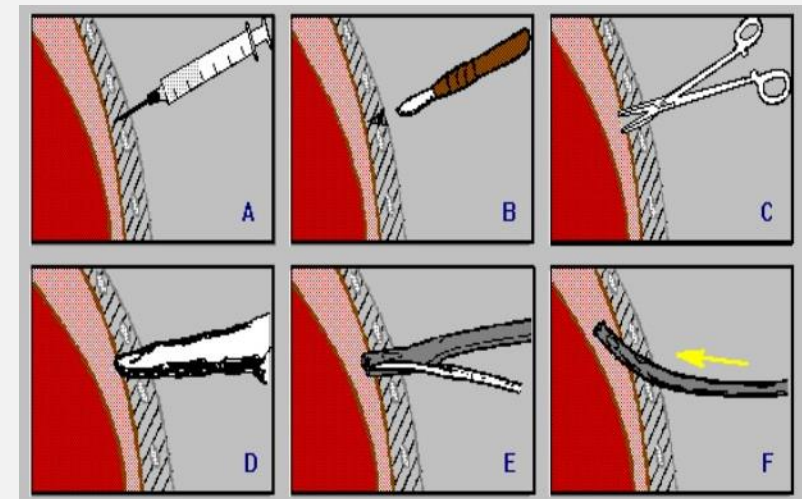
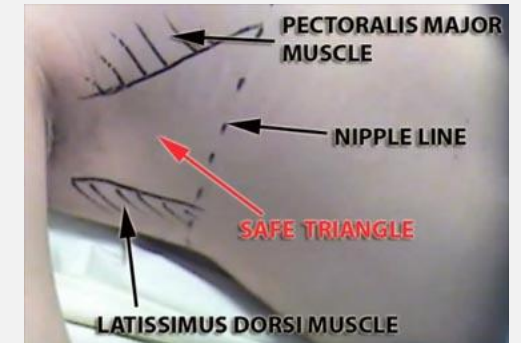
(deep dark costophrenic angle)



Chest Tube Placement

Chest tube placement is definitive treatment for most pneumothoraxes

- Place patient supine w/ arm of effected side above head
- Prep and drape the chest, don PPE
- Apply local anesthetic to skin, subq tissue & periosteum of rib
- 2-3cm transverse incision just anterior midaxillary line at 5th intercostal space
- Use Kelly clamp to puncture into parietal pleura, palpate cavity w/ finger
- Direct chest tube posteriorly along chest wall
- Connect chest tube to Chest Drainage Unit
- Suture tube in place
- Apply occlusive dressing



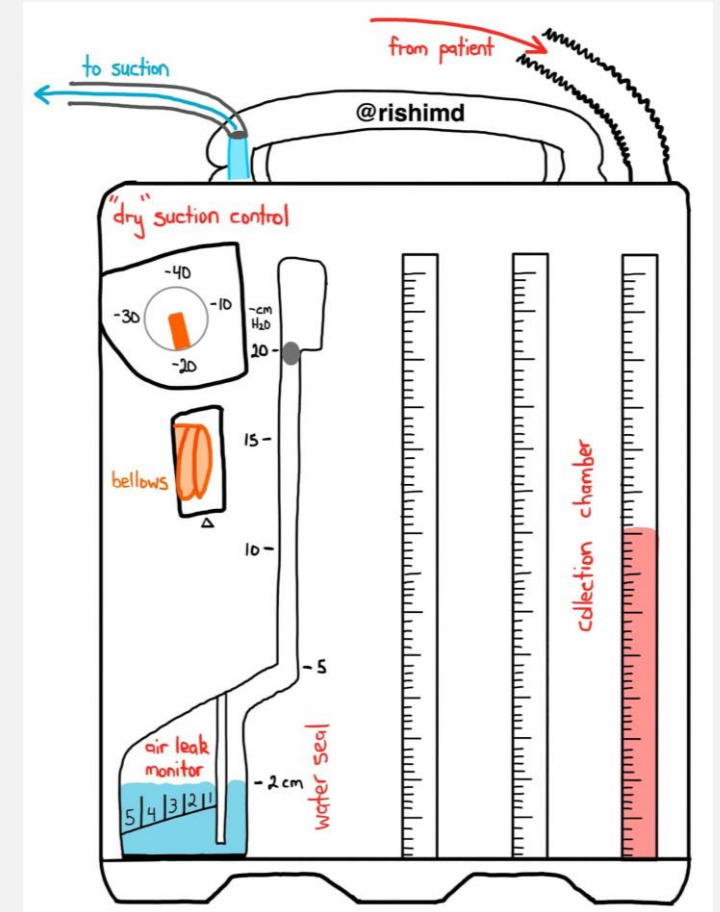
After Chest Tube Placement

- Obtain CXR, confirm re-expansion of lung
- Continue chest tube to *suction*, -20mmHg
- Check Chest Drainage Unit daily & monitor for *air leak*
- If no air leak, place chest tube to *water seal*
- After additional 12-24 hour repeat CXR, confirm lung expansion → remove chest tube

Pathology that requires transfer to ANMC:

- Hemothorax (300ml+) -Flail Chest
- Open Pneumothorax -Pulmonary Contusion
- Residual Pneumothorax after CT -Unresolving Air leak

Recommend: telemedicine consult & daily review with ANMC surgical team



Chest Drainage Unit

Simple Cutaneous Abscess Care

Cutaneous Abscess: collection of pus within dermis or subcutaneous space

- Caused by infection of skin, hair follicle or underlying gland

Symptoms: -redness, pain, warmth & swelling of skin

-with or without systemic symptoms

Signs: erythema, induration, fluctuance, purulent drainage



Treatment: *Incision and Drainage*

-Antibiotic: associated cellulitis, DM, immunocompromised pts

-Bedside I&D procedures can avoid transfers to ANMC g

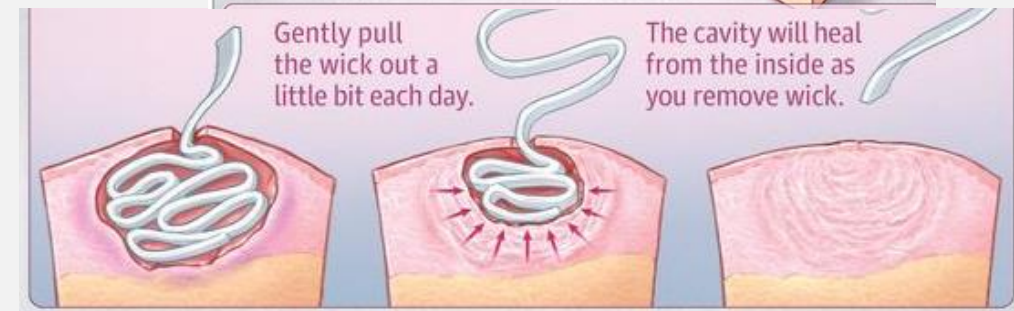
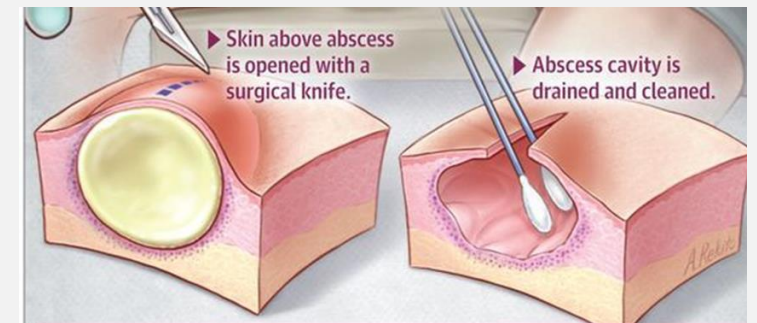
-IV analgesics, anxiolytics, local anesthetic field blocks facilitate bedside procedures

Incision & Drainage & Wound Care

- Apply skin prep, drape field, don PPE
- Infiltrate local anesthetic around & under tissue surrounding abscess
- Cruciate incision over point of maximum fluctuance (15 or 11 blade)
- Gently probe cavity to break up loculations
- Apply pressure circumferentially to drain purulence, send culture
- Pack cavity, dress wound with sterile gauze & tape

Aftercare:

- Provide wound care teaching
- pt to continue daily dressing changes
- Transition to simple dressing as wound heals

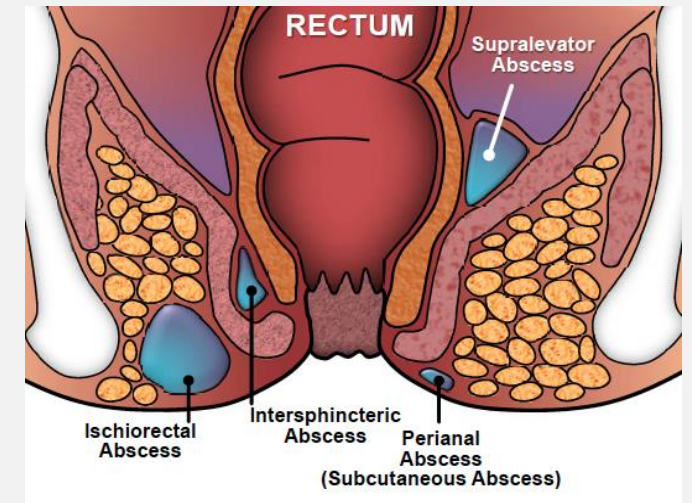


Abscesses, Special Circumstances

Breast Abscess: -Consider needle aspiration & antibiotics 1st
-Patient may require image guided drain
-Surgical I&D, reserved for treatment failures after above measures



Perirectal Abscesses: Arise from infections of anal glands
-categorized by the space involved:
 perianal, ischiorectal, intersphincteric, supralelevator
-superficial perianal & small Ischiorectal abscesses → bedside I&D
-incision close to anus, avoid aggressive probing & packing



Hands, Feet & Digit Abscesses: -May require specialized surgical drainage
-Consider early orthopedic involvement

Signs of Necrotizing Infection: blistering, bulla, skin streaking,
pain out of proportion to exam, gas formation imaging
→ → *Urgent Surgical Involvement*



Appendicitis

- Blockage of appendiceal lumen → inflammation of appendiceal wall
 - increased intraluminal pressure → bacterial overgrowth & decreased blood flow to wall of appendix
 - If left untreated: necrosis of appendix → appendicular wall perforation → sepsis
- One of the most common reasons for hospitalization among children & young adults worldwide

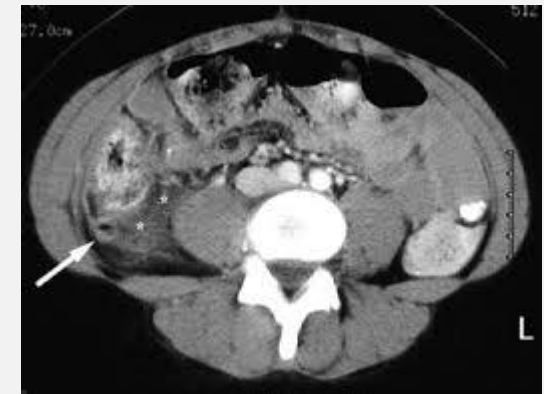


Risk Factors: age 5 to 40, male sex, rural living

Symptoms: abdominal pain (periumbilical → RLQ), nausea, vomiting, fever

Signs: Tenderness to palpation at McBurney's Point, Dunphys' sign, Rovsing's sign, Psoas sign etc.

Dx: elevated WBC, elevated CRP, *CT Abd/Pelvis*, MRI, Abd Ultrasound



Surgical removal of the appendix is standard treatment for acute appendicitis in the United States

Non-operative treatment with antibiotics is safe and effective for many patients with uncomplicated appendicitis, commonly done outside of the United States

Non-operative regional treatment should be considered for select patients in our network during COVID epidemic

Appendicitis, Non-operative Management

Benefits: quicker return to normal activity, decreased pain & narcotic requirements, *avoidance of transfer to surgical hospital*, lower morbidity

Risks: 10% failure rate, only effective for uncomplicated appendicitis, 30% of patients require appendectomy within 4-7 months

Inclusion: uncomplicated appendicitis, age 6+, no fecalith, appendiceal diameter $\leq 11\text{mm}$

-no perforation -no phlegmon -no free air

-non-pregnant -symptoms less than 48 hours duration

Exclusion Criteria: hemodynamic instability, diffuse peritonitis, abscess 3cm+

High Risk patients: immunocompromised, age > 70 yrs, medical comorbidities

Appendicitis, Antibiotic Treatment Regimen

Low Risk Patients: Pip-tazo 3.375g q6 h or Ertapenem 1g q day for 24 to 48 hrs →
PO Levaquin & Flagyl or Keflex & Flagyl or Augmentin for total of 10 days

High Risk Patients: Pip-tazo 4.5g IV q 8 h or Meropenem 1g q 8 h for 24 to 48 hrs →
PO Levaquin & Flagyl or Keflex & Flagyl or Augmentin for a total of 10 days

Supportive Care: IV fluids PRN, Anti-emetics PRN, Pain medications PRN

Recommend hospital admission for 24-48 hrs w/ IV Abx, monitoring & serial labs

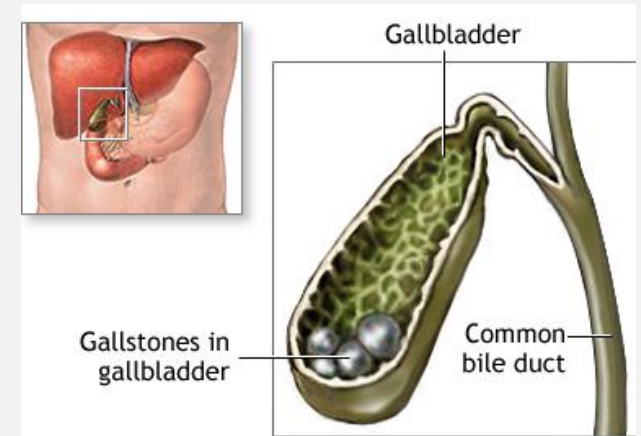
Inflammatory marks improve, tolerating PO → transitioned to PO antibiotics for 10-day total course

Failure: Lack of improvement after 24-48 hrs IV Abx, persistently elevated inflammatory markers, hemodynamic instability → transfer to ANMC for surgical intervention

Recommend: telemedicine consult & daily review with ANMC surgical team

Symptomatic Gallstones & Gallstone Related Disease

- Gallstone and benign biliary disease, very common
- Prevalence of gallstones 11 to 36%, general US population
- Most patients are asymptomatic from gallstones
- Some patients will develop symptoms & complication from gallstones: symptomatic cholelithiasis, cholecystitis, choledocholithiasis, cholangitis, gallstone pancreatitis etc.
- Treatment for these conditions are highly variable but most gallstone disease can be treated acutely without surgery



For cases of symptomatic cholelithiasis and mild to moderate cholecystitis nonoperative management at regional centers should be considered while travel is limited from the COVID Pandemic

Symptomatic Cholelithiasis / Cholecystitis

Symptomatic Cholelithiasis: intermittent obstruction of the cystic duct → gallbladder irritation

Episodic / intermittent RUQ pain, associated w/ fatty foods, lasts 1-5 hrs. No fever. No WBC count.

US/CT: stones in the gallbladder w/o wall thickening

TX: -Initial treatment involves supportive measures, pain control, antiemetics, avoid aggravating foods

-Surgery performed on elective basis, may be delayed unless pt has debilitating & recurrent symptoms

Acute Cholecystitis: obstruction of cystic duct → gallbladder inflammation & bacterial overgrowth

Unremitting RUQ pain, lasts 6hrs+. Decreased appetite. Fever. Elevated WBC count

PE- acutely tender to palpation RUQ. + Murphy's sign.

US/CT: Thickening of the Gallbladder wall, pericholecystic fluid

Initial TX: -IVF, analgesia, Antibiotics: Pip-tazo 1st line, alternatives: Ertapenem, Ciprofloxacin, Levaquin

-Consider Regional Treatment with antibiotics for 24-48 hrs, mild to moderate disease

Transfer: hemodynamic instability, end organ dysfunction, Symptoms > 72 hrs, failure to improve after 48 hrs

Recommend: telemedicine consult & daily review with ANMC surgical team

Cholecystitis, Grading Criteria & Treatment

Mild & Moderate Disease: Consider Regional Treatment w/ IV antibiotics for 48 hrs

Severe Disease or Failure to Improve after 48 hrs of IV antibiotics → Transfer to ANMC

IV Antibiotics: Pip-tazo 1st line Alternatives: Ertapenem, Ciprofloxacin, Levaquin

Table 4 TG13 severity grading for acute cholecystitis

Grade III (severe) acute cholecystitis

Associated with dysfunction of any one of the following organs/systems:

- | | |
|-------------------------------|---|
| 1. Cardiovascular dysfunction | Hypotension requiring treatment with dopamine ≥ 5 $\mu\text{g}/\text{kg}$ per min, or any dose of norepinephrine |
| 2. Neurological dysfunction | Decreased level of consciousness |
| 3. Respiratory dysfunction | $\text{PaO}_2/\text{FiO}_2$ ratio < 300 |
| 4. Renal dysfunction | Oliguria, creatinine > 2.0 mg/dl |
| 5. Hepatic dysfunction | PT-INR > 1.5 |
| 6. Hematological dysfunction | Platelet count $< 100,000/\text{mm}^3$ |

Grade II (moderate) acute cholecystitis

Associated with any one of the following conditions:

1. Elevated white blood cell count ($> 18,000/\text{mm}^3$)
2. Palpable tender mass in the right upper abdominal quadrant
3. Duration of complaints > 72 h
4. Marked local inflammation (gangrenous cholecystitis, pericholecystic abscess, hepatic abscess, biliary peritonitis, emphysematous cholecystitis)

Grade I (mild) acute cholecystitis

Does not meet the criteria of "Grade III" or "Grade II" acute cholecystitis. Grade I can also be defined as acute cholecystitis in a healthy patient with no organ dysfunction and mild inflammatory changes in the gallbladder, making cholecystectomy a safe and low-risk operative procedure

High Risk Gallstone Disease

Choledocholithiasis: presence of stones common bile duct

-most commonly from stones that have migrated from gallbladder

RUQ pain, nausea, jaundice. Elevated LFTs

US: stones in gallbladder, dilated CBD (8mm+)

Tx: requires clearance of CBD & cholecystectomy → Transfer to ANMC

Cholangitis: ascending bacterial infection from obstructed bile duct

-most commonly from gallstone obstructing the CBD

Fever, RUQ/epigastric pain, jaundice. Elevated LFTs. Elevated WBC.

Tx: fluid resuscitation, IV antibiotics, biliary drainage → Transfer to ANMC

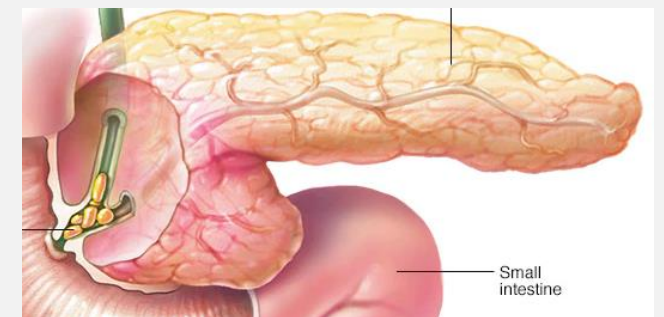
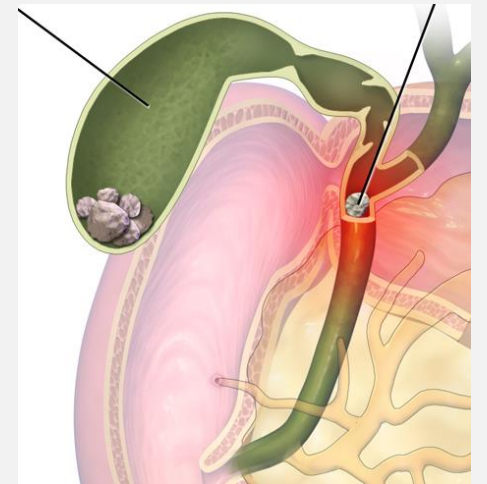
Gallstone Pancreatitis: pancreatitis caused by biliary stones

Epigastric/back pain, nausea, emesis. Elevated LFTs, amylase, lipase

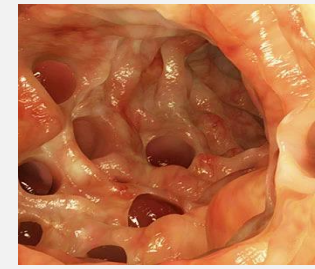
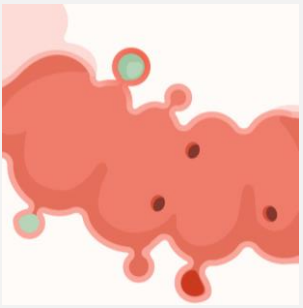
US/CT: biliary stones, pancreatitis

TX: conservative medical management for pancreatitis, interval cholecystectomy

→ Semi urgent transfer to ANMC for definitive biliary clearance & cholecystectomy



Diverticular Disease



Diverticulosis: Mucosa & Muscularis Mucosa herniate through colonic wall

-herniations occur where vessels penetrate colonic wall

-caused by chronic lack colonic distention from diets low in fiber

-increasingly common w/ advanced age, present in 50% of pts > 50yrs

- Sigmoid Colon is most common site of diverticulosis
- Most people with Diverticulosis are asymptomatic

Diverticulitis: Inflammation of the Colon associated with diverticulosis

-Results from perforation of diverticulum

Presentation: LLQ pain, fevers, stool changes (diarrhea / constipation)

Work-Up: depends of severity, CT - imaging study of choice



Treatment of Diverticulitis

Uncomplicated Diverticulitis: local colonic inflammation w/ colonic wall thickening or phlegmon

Tx: Low residue diet & antibiotics, *Consider Regional Management*

Complicated Diverticulitis: Abscess, Obstruction, Perforation or Fistula

Hinchey Staging System

- Stage I: Diverticulitis w/ Pericolonic Abscess
- Stage II: Diverticulitis w/ Retroperitoneal or Pelvic Abscess
- Stage III/IV: Diverticulitis w/ Peritonitis

TX: Diverticulitis w/ small abscesses < 3cm → *Consider Regional Management w/ IV antibiotics*

Diverticulitis w/ large abscess > 3cm → Transfer to ANMC for percutaneous drainage

Diverticulitis w/ peritonitis or free air on CT imaging → Transfer to ANMC for Urgent Surgical Management

Special Cases:

Colovesicle Fistula, mildly symptomatic not requiring suppressive Abx → Regional Management → Elective Surgery

Colovesicle Fistula, symptomatic requiring suppressive Abx → Consultation with ANMC Surgical Team

Colonic Obstruction from Diverticular Stricture → Transfer to ANMC for Urgent Surgical Management

For patients with new diagnosis of diverticulitis

-Colonoscopy should be performed in 6-12 weeks elective basis, after COVID travel restrictions have been lifted



Conclusions

- Unique challenges in Alaska Native Healthcare Network during the COVID19 pandemic: Geography, Travel, Surgical Access
- Focus on providing appropriate care, *limiting unnecessary travel*
- Some common surgical diseases can be safely treated at regional centers: Simple Adhesive SBO, Simple Abscesses, Uncomplicated Appendicitis, Symptomatic Cholelithiasis, Cholecystitis, Uncomplicated Diverticulitis
- For Regional Management of SBO, Appendicitis & Cholecystitis we recommend daily consultation with surgical team at ANMC
- Always feel free to discuss any cases w/ General Surgery team at ANMC to help guide management

Thank You!

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