PERCUTANEOUS DRAINAGE OF INTRA-ABDOMINAL ABSCESSES IN THE SETTING OF INFLAMMATORY BOWEL DISEASE

General

A. Abscess- collection of pus (bacteria, PMNs, necrotic tissue) or an infected fluid collection
B. Simple abscess- unilocular cavity
C. Complex abscess- multiloculated cavity or evidence of fistulous connection (e.g. between bowel or other hollow viscus and abscess cavity)
D. 45-100% mortality in undrained intra-abdominal abscesses

Intra-abdominal abscesses (IAA)- pathophysiology

A. IAA result from a host response to intra-abdominal bacterial contamination
B. Occurs secondary to perforated hollow viscera in 60% to 80% of cases (Feldman)
    1. appendicitis
    2. diverticulitis
    3. blunt abdominal trauma
    4. duodenal or gastric ulcer
    5. neoplastic disease
    6. cholecystectomy
    7. complications of acute pancreatitis
    8. surgical complications
    9. inflammatory bowel disease
C. Factors that play a role in abscess formation- when bacterial burden >> host defense mechanisms, bacterial contamination ► abscess formation
    1. Of note, compensatory mechanisms driven by the host defense system to bacteremia may do more harm than good
        a. inflammation ► decreased plasminogen levels ► increased fibrin deposition ► wall off infection (good and bad)
        b. inflammation (PMN recruitment) ► rapid exudation of protein and fluid into peritoneal cavity, increased splancnic flow ► dilution of opsonins and decreased effective circulating volume

Bacterial factors (pathogenicity)	Adjuvant factors	Host defense
Adherence	Fibrin	Lymphatic clearance
Invasiveness	Necrotic tissue	Peritoneal macrophages
Synergy	Foreign material (e.g. barium)	Neutrophil influx
Antimicrobial resistance	Blood	Fibrin sequestration
Metabolism (e.g. obligate anaerobic metabolism)	Feces	Lymphocyte response (omentum)

Adapted from Farthmann EH, Schoffel U: Epidemiology and pathophysiology of intraabdominal infections (IAI). Infection 26:329, 1998; and McClean KL, Sheehan GJ, Harding GK: Intraabdominal infection: A review. Clin Infect Dis 19:100, 1994.

D. Typical antimicrobial species isolated from IAA
    1. Common aerobes: *E.coli*, *Enterococcus* spp.
    2. Common anaerobes: *B. fragilis, Peptostreptococcus* spp.
    3. Less common: Other bacteroides spp., *Clostridium*
    4. Most IAA contain polymicrobial flora

    *Note: bacterial species present depends upon etiology of the IAA (perforated viscera due to underlying disease demonstrates distinct species from those seen in surgical trauma, etc.)

Intra-abdominal abscesses or masses in IBD

A. Represents one of at least four acute surgical emergencies seen in IBD (toxic colitis, perforation, hemorrhage, intestinal obstruction)
B. Etiology of intra-abdominal abscesses- transmural ulceration of the diseased bowel ► adhesions ► walled-off collections.
C. Location of abscesses depends upon site of disease process
    1. intraperitoneal
    2. retroperitoneal
    3. intramesenteric (rarely)
D. Berg, et. al. cite a 25% incidence of intra-abdominal abscess or mass in patients undergoing surgery for Crohn's Disease
    1. 40% of these have associated fistulas

Clinical findings seen with IAA (nonspecific)

A. Abdominal exam: tenderness +/- rebound, guarding; +/- palpable mass, +/- distension
B. Fever
C. Leukocytosis

General management

A. Removal of the source of peritoneal contamination
B. Drainage of established collections
C. Antibiotics to remove residual contaminant
D. Supportive

Diagnostic studies- imaging studies remain the diagnostic cornerstone for evaluating IAA

A. Computed tomography with IV and oral contrast
    1. gold standard imaging technique
    2. oral contrast 2 hours prior to test can distinguish between unopacified fluid filled bowel loop and abscess
    3. features:
        a. fluid collection not attributed to bowel, other solid organs, structures
        b. enhancing wall
        c. fluid density (vs. phlegmonous changes)
        d. +/- gas within abscess

B. Ultrasound
    1. suboptimal when compared to CT
    2. main use is in diagnosing abscesses in liver, spleen, pelvis based on superior visualization of these areas
    3. poor sensitivity in midabdomen due to blockage of sound waves by bowel gas
    4. consider portability aspect- utility in ICU/trauma/unstable patients
    5. features:
        a. decreased echogenicity
        b. debris
        c. thickened and irregular wall
        d. gas within abscess may be represented by increased echogenic focus
        e. difficult to distinguish between infected and sterile fluid collections

C. Abdominal plain films
    1. low sensitivity
    2. features
        a. may see a nonspecific mass effect
        b. extraluminal air
        c. ileus

D. Nuclear studies
    1. potential use as second line diagnostic modality to clarify equivocal CT results
    2. Gallium 67- nonspecific for infections (can light up in tumors, normal tissue)
    3. Indium 111- labeled leukocytes are more specific but can cause a delay in results on up to 72 hours.

E. MRI
    1. nonspecific findings
    2. fluid-filled bowel has similar appearance to IAA
    3. $$$

F. Diagnostic aspiration- gold standard

Management: The Role of Percutaneous Abscess Drainage (PAD)

A. PAD vs. surgical drainage
    1. Series by Garcia, et. al. 56% of patients undergoing either medical therapy or PAD experienced abscess recurrence (vs. 12% with operative management, p=0.016). 50% of patients treated nonoperatively required surgery (vs. 12% of those treated surgically, p=0.010).
    2. considerations
        a. simple vs. complex abscess
        b. location/accessibility

B. PAD: best initial therapeutic modality

1. efficacy
    a. 80-90% success rate of draining simple, uniloculated, well-circumscribed, accessible abscesses (Cinat, et. al. reported 70% success rate with 1st drainage, 82% on 2nd drainage in large, multicenter trial)
    b. vanSonnenberg reports nearly uniform cure rates among simple abscesses, 65-90% cure rates for complicated abscesses (enteric fistulas, diverticular abscesses)
    c. Marano, et. al. reports a 73% success rates of PAD in the post-operative setting

2. benefits
    a. diagnosis and therapy may be achieved simultaneously
    b. minimally invasive approach

3. indications
    a. simple, unilocular, well-circumscribed, accessible IAA

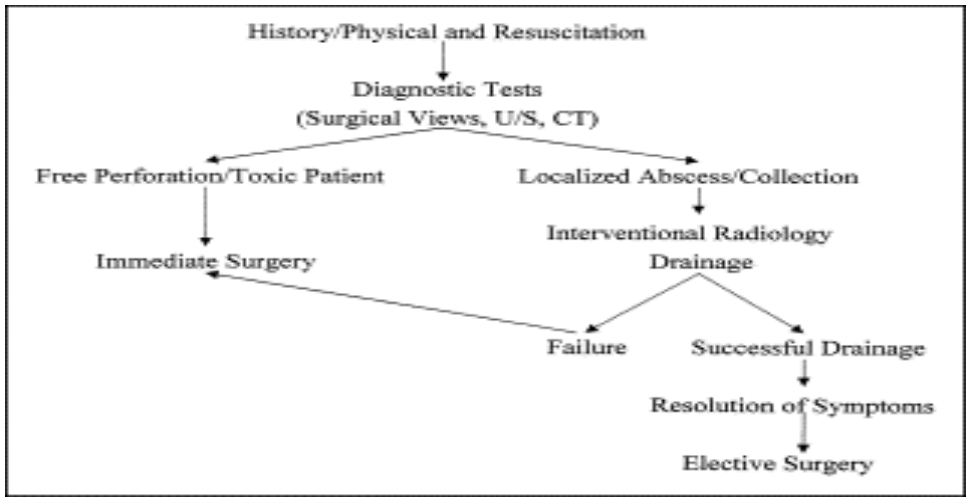
4. selection criteria
    a. safe percutaneous route to the abscess, avoiding bowel, organs, vascular structures
    b. absence of coagulopathy
    c. ideally, uniloculated abscesses, although multiloculated abscesses can potentially be managed using multiple catheters and possible adjunct use of urokinase (reported by Lahorra, et. al.)
    d. small collections (<3cc) amenable to percutaneous aspiration (60-90% success rate)
    e. patients with fistulas- 57% success rate of PAD along with intensive nutritional support
    f. phlegmon- not treatable by PAD

C. PAD in IBD

5. pre-operatively
6. following elective colorectal surgery
    a. Khurrum, et. al.- retrospective study examining 40 patients with post-op IAA. (most common operation- proctocolectomy, ileoanal anastamosis, J-pouch)
        i. first PAD attempt: 65% success rate (35% initial recurrence rate)
        ii. second attempt: 80% success rate

Addendum: Technique

identify safe percutaneous route ► trocar or guidewire method ► dilate tract to diameter of the proposed catheter ► catheter placed (sump-type, double lumen, 12-14 Fr)



*Simple Algorithm for Management of IAA due to IBD (Berg, et. al.)

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August 21, 2003