Non-operative treatment of abscesses-are there limits or limitations

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Introduction

- The management of abscesses is to gain source control in order to reduce the production of endotoxins.
- Standard
  - Antibiotics
  - Drainage

- Some abscesses have been successfully treated non-operatively
  - Antibiotics only
  - antibiotics and needle aspiration
  - antibiotics and Percutaneous catheter drainage (PCD)

- PCD prevents the morbidity of an operation.
- Successful PCD:
  - decrease of >90% of the original abscess size
  - if septic patients recover from the sepsis[2].
- There are certain limiting factors that will not allow the manage abscesses non-operatively.

Type and Site of abscesses

- PCD is not always suitable
  - abscesses lying in difficult locations e.g. intra-abdominally
- Diverticular abscesses when amenable to PCD has a reported failure rate of 15 to 30 percent[4].
- PCD of renal abscesses
  - Pyopneumothorax
  - Bacteraemia
  - Fistula in the gastrointestinal tract[5]

Type and Site of abscesses

- In a retrospective review of 114 patients with intra-abdominal abscesses.
- Antimicrobial therapy without drainage was successful in 86 percent of cases.
- Pelvic abscesses
  - usually associated with a worse prognosis
  - often require surgery
- *In this study, the management of pelvic abscesses were no different than abscesses in the other locations[6].

Type and Site of abscesses

- Muscle abscesses can usually be treated conservatively,
- The presence of concurrent bone involvement limits the success rate.
- A retrospective study of 94 patients showed the **success** of PCD for muscle abscesses
- The presence of skeletal infection was associated with drainage failure[2].
  - Osteomyelitis
  - Diskitis
  - Epidural abscess
- Musculoskeletal infection was statistically significantly more likely to undergo surgery (p =0.0001).

Type and Site of abscesses

- Amoebic liver abscesses- antibiotics>aspiration>surgery[16]
- Skin abscesses are **not** usually treated successfully with non-operative intervention.
- A prospective study of 101 patients with skin abscesses
- All patients had a sonar at initial presentation
- 54 were randomized for I&D and 47 U/S guided needle aspiration
- 60% of needle aspirations yielded little or no purulence, despite:
  - U/S visualization of an abscess cavity
  - U/S guidance during the procedure.
- Success of U/S guided needle aspiration: 26%
- Success in patients with I&D: 80%.[7]

Type and Site of abscesses

- In endoscopic pancreatic abscess drainage, access to the abscess cavity is gained through an incision made in the stomach wall or duodenum.
- With or without endoscopic ultrasound (EUS) guidance.
- In non-EUS-guided drainage:
  - the abscess cavity must be in close apposition to the gastrointestinal wall (1 cm)
  - there must be a bulge either in the stomach or duodenum marking the location of the abscess.
- The advantage of using EUS:
  - does not rely on bulging to locate the site of the abscess
  - excludes the presence of interposed blood vessels and reduces the risk of procedure-related bleeding.[21]

Size of the Abscess: Intra-abdominal

- Intra-abdominal abscesses >5cm has a less favourable outcome with antibiotic treatment alone.
- According to the retrospective study by Kumar, high failure rate with:
  - large intra-abdominal abscesses (>6.5 cm)
  - temperature >38.4 degrees [6].

Table 1[6]

Factors Associated With Failure of Conservative Management of Intra-abdominal Abscesses

	Clinical Improvement With Antibiotic Management	Failed Conservative Management	*P* Value
No. of patients	61	50	
Age (yr)	39 (25–48)	39 (29–50)	0.5694
Tmax-Admission (F)	100.8 (99.3–101.5)	101.2 (100.6–101.9)	0.0067
Admission WBC ($\times 10^3/\mu l$)	13.7 (10.7–16.8)	15.2 (13.1–18.5)	0.0622
Maximum abscess diameter (cm)	4 (3–6)	6.5 (5–10)	<0.0001

WBC = white blood cell.

Size of the Abscess: Pyogenic Liver abscesses

- A retrospective study of 58 patients with pyogenic hepatic abscess
- Antibiotics alone for the smaller abscesses (<3.5cm in diameter)
- Percutaneous drainage for abscesses >3,5cm [19]

Size of the Abscess: Crohn's disease

- Carvalhoa:
  - >4 cm
  - usually would not respond to medical treatment alone
  - require drainage
- The American College of Radiology recommends imaging-guided PCD for Crohn's disease related abdominal fluid collections greater than 4cm. [3]

Size of the Abscess: Breast

- Studies have shown the **success** of sonar guided needle aspiration of lactating breast abscesses.
- Abscesses >3cm to 5cm, needle aspiration is unlikely to be successful and will require PCD under sonar guidance[8, 14,15].
- A larger than average **volume** of pus is a risk for failure to treat with needle aspiration.
- Eryilmaza reported from a prospective study that the mean volume of pus from successful needle aspiration was 44.3ml and in the unsuccessful aspiration was 70.55ml[9].

Size of the Abscess: Renal

- 3cm to 5cm is the maximum diameter between treating with antibiotics only or a drainage procedure (percutaneous or surgical).
- <3cm: antibiotics only
- 3cm to 5cm: antibiotics only or antibiotics with drainage
- >5cm :antibiotics and drainage[5].

Table 2[5]
Reported Primary Treatment of Renal or Perinephric Abscesses by Size

Investigator	Country	Year	n	Mean abscess size			Mean hospital stay (days)
				< 3 cm	3 - 5 cm	> 5 cm	
Siegel, et al.[4]	United States	1984 - 1993	51	Antibiotics alone	PCD	PCD	20 - 21
Dalla Palma, et al.[5]	Italy	1984 - 1997	16	Antibiotics alone	Antibiotics	-	-
Shu, et al.[10]	United States	1991 - 2002	26	Antibiotics alone	PCD	PCD	11
Coelho, et al.[11]	Brazil	1992 - 2002	65	Antibiotics alone	PCD or SD	SD	-
Lin, et al.[9]	Taiwan	2001 - 2006	73	Antibiotics alone	Antibiotics alone	PCD or SD	21 - 24
Present study	Korea	2001 - 2008	41	Antibiotics alone	Antibiotics alone	PCD	15.3

PCD, percutaneous drainage; SD, surgical drainage.

Type of infections

- Antibiotics
  - penetrate abscesses poorly
  - have poor activity in this environment in which bacteria are not rapidly dividing[6]
  - No diagnostic drainage
  - Empirical regimens are used without knowledge of the infective organisms and their antimicrobial susceptibilities[5].
- A multivariate analysis showed that **MRSA** is an independent risk factor for failure of therapy regardless of the drainage procedure.
- Gaspari reported in a prospective study of superficial abscesses
  - U/S guided needle aspiration of abscesses with MRSA were less likely to be successful compared to I&D (8% versus 61%)[7].
- The growth of **yeast** in liver abscesses is an independent risk for failure of non-operative treatment [19]

Concurrent use of other medications

- Concurrent use of medications that may influence the immunological response
- Retrospective studies on patients with Crohn's disease associated abscesses have success rate of **60% using IVI antibiotics** alone.
- Unfortunately, over **50%** of those patients eventually required operative drainage.
- These patients were on corticosteroid treatment for their inflammatory bowel disease[3].
- Another study by Cronin on muscle abscesses also demonstrated a higher failure rate with PCD when the patients were on chemotherapy[2].
- Mezhir also showed failure with chemotherapy to treat liver abscesses non-operatively. [19]

Characteristics of abscesses: viscosity, loculations and capsule

- Thickened abscess contents, i.e. increased viscosity may obstruct abscess drainage[6].
- Washing out to decrease the viscosity of purulent discharge
  - normal saline
  - sterile water.
- Studies have compared normal saline and lytic agents
  - Urokinase
- There was no difference in the success or failure of the draining abscess[2].
- Small-caliber catheters
  - necrotic tissue
  - blood coagulates
  - thick purulent fluid[3].

Characteristics of abscesses: viscosity, loculations and capsule

- Loculations or septations, even with the use of U/S-guided needle aspiration, may fail[7, 10].
- In multi-septated abscesses PCD drainage may not access all of the individual compartments, thereby preventing a complete drainage[11]
- The capsule:
  - Too firm-resist penetration
  - Too soft-evade penetration
  - E.g. Endorectal ultrasound-guided aspiration and drainage of pelvic fluid collections.[22]
- Esther also demonstrated in patients with any breast abscess:
  - **Uncapsulated** abscesses are usually inadequately drained and requires the insertion of a PCD[11].

Hospital and patient factors

- The local expertise of the hospital influences management.
- Carvalhoa: intra-abdominal abscesses admitted to a teaching hospital were associated with an increased likelihood of PCD[3].
- Eryilmaza reported that **delayed access** to medical facilities is associated with a higher failure rate of needle aspiration for breast abscesses[9].
- Independent patient factors also influences outcome
  - age over 65 years
  - Thrombocytopenia
  - underlying comorbidity such as Diabetes Mellitus[5].
- Worsening of sepsis when treating conservatively indicates that management needs to progress to operative treatment.

Distorted anatomy

- PCD in patients with previous abdominal surgery has a high risk of complication
  - Bleeding
  - perforated viscus
  - solid organ injury.
- Minor complications occur more frequently[6]
  - catheter obstruction
  - migration

Complicated abscesses

- Complicated abscesses indicates surrounding tissue damage
- Highly unlikely to be treated successfully with non-operative measures.
- Crohn's disease associated abscesses + strictures + fistulae .>>> operative intervention.
- Conversely, small abscess without concurrent fistula >>> antibiotics alone.
- Pyogenic liver abscesses with fistula's with the biliary tree is an independent predictor of non-operative management failure.[19]
- The presence of strictures and abdominal fistulas >>> surgical treatment (since there might be already an irreversible structural damage in the bowel wall)[3].

Non-resolving

- clinical deterioration
- imaging that demonstrated failure of abscess resolution.[19]

Summary of limits/limitations

- Type and Site of abscesses
- Size of the Abscess
- Type of infections
- Concurrent use of other medications
- Characteristics of abscesses
- Hospital and patient factors
- Distorted anatomy
- Complicated abscesses
- Non-resolving

Conclusion

- There are many factors that influences the most appropriate management of abscesses.
- The treatment of one abscess is not always the same for another.
- Health professionals need to be aware of the non-operative options available to manage abscesses and the limits and limitations thereof; and when to progress to operative management.

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