Proposed Non-operative Management (NOM) of Appendicitis during Covid-19 epidemic

**Rationale:** To limit potential transmission of Covid-19 and preserve resources, it is necessary to deflect admission of certain conditions, such as appendicitis, which are traditionally managed in house but in fact could be safely managed in the field hospitals or in outpatient setting. NOM of appendicitis is increasingly adopted throughout the world, including the US. Its use in one study over time increasing from 4-24% of cases. At ANMC we have not adopted routine NOM for appendicitis but concerns for added risk of Covid-19 transmission and/or infection to these pts may tip the scale. These concerns should be discussed with pts and family members, especially if pt transfer to ANMC is deemed necessary.

**Pros**
- 90% respond well to NOM
- Decreased or same pain score
- Decreased narcotic requirement
- Quicker return to work
- No increased perf rate
- Decreased overall complication rate (6.5 vs. 24%)

**Cons**
- 10% fail NOM
- Failure not predictable
- 30% eventually require appy within 4-7 mo.
- At 5 yr f/u 39% require appy
- Many studies compare to open appendectomy
- Many trials exclude high risk pt (immunocompromised, co-morbidities, pregnant, elderly)

**Note on inclusion/exclusion criteria:** The literature is highly variable regarding this and while criteria for inclusion are expanding so is the incidence of failure of NOM.

**Inclusion criteria**

Uncomplicated appendicitis: non-perf, no phlegmon, no free air, appendix diam <11 mm.

No fecolith (not absolute but probably increased rate of failure)

Adult or child > 6 yr

+/- Non-pregnant pts (many studies exclude pregnant pts)

+/- Sx <48 hrs

+/- phlegmon or small abscess <3cm (these pts may respond but usually take 3 days for sx resolution, i.e. expanded criteria for tx failure, and planned interval appendectomy at 8 weeks should be considered)
+/- high risk pts (immunocompromised, co-morbidities, hx abx resistant bacteria, age >70. Most studies exclude these patients but in the setting of Covid-19 we would consider including them.)

Exclusion criteria

Hemodynamically unstable

Diffuse peritonitis

Abscess > 3 cm (literature actually says 5 cm but support for this is sparse and in our practice >3 cm would be IR drained, i.e admitted to ANMC)

+/- phlegmon or small abscess

+/- pregnant pts

+/- high risk pts

Non-operative Abx Regimen for appendicitis

See flow chart last page.

Supportive care:

IV fluids as needed until tolerating po.

Anti-emetics as needed.

Multimodal pain management with scheduled acetaminophen, NSAIDs, limited narcotics.

(Restrict Toradol to 2 doses in case appendectomy is required.)

Hospital admission is generally done for 24-48 hrs but outpatient management and discharge from the ED is possible if Q24h dosing regimen is selected and pt responds quickly.

Failure of Abx therapy definition:

Lack of improvement over 24 -48 hr. This should be expanded to 72 hrs if abscess or phlegmon present.

Persistent elevation of inflammatory markers.

Development of peritoneal signs or hemodynamic instability.
Failure of Abx therapy would indicate the need for urgent appendectomy.

Successful treatment with Abx should be followed closely by phone and if recurrent sx occur, considered for subsequent lap appy.

If pt is at risk for infection with resistant organisms or has multiple allergies we suggest consultation with Infection Disease Service.

Telephone consultation with the General Surgery Service at ANMC is welcomed and encouraged during non-operative management of appendicitis.

References:


continues: A meta-analysis. *Journal of Trauma and Acute Care Surgery, 82*(6), 1129–1137. 
[https://doi.org/10.1097/TA.0000000000001450](https://doi.org/10.1097/TA.0000000000001450)


UptoDate: Acute appendicitis in children: Management. Apr. 4 2019

UptoDate: Management of acute appendicitis in adults. Apr. 4 2019
Non-operative Management of Appendicitis during Covid 19

**Low risk patients:** age > 6 or < 70, no fecolith, no phlegmon, no abscess, non-pregnant, no co-morbidities

*High risk patients may be considered for NOM but need longer duration IV abx, repeat imaging, longer hospitalization, closer f/u and planned interval appendectomy later*

1\textsuperscript{st} line: Ceftriaxone 2 g IV q day + Metronidazole 500 mg IV q8h
2\textsuperscript{nd} line: Piperacillin tazobactam 4.5 g IV q8h
3\textsuperscript{rd} line: Levofloxacin 750mg IV q24h and Metronidazole 500mg IV q8h

Resolution, PO tolerance

**Increased pain, fever, increased WBC, hemodynamic instability**

Discharge on PO Abx for total of 10 days Abx
1\textsuperscript{st} line: Amoxicillin clavulanate 875 mg BID
2\textsuperscript{nd} line: Cephalexin 1 g TID and Metronidazole 500 mg TID
3\textsuperscript{rd} line: Levofloxacin 750 mg q day and Metronidazole 500 mg TID
F/u Clinic or ED in 1-2 days with CBC

**Urgent Appendectomy**

Increased pain, fever, increased WBC

Continued improvement

F/u Clinic 4-8 weeks: If normal exam and asymptomatic, may be referred to ANMC for routine interval appendectomy after Covid-19 epidemic has ended.