**Inclusion Criteria**
- All ages
- Confirmed pancreatitis (2 out of 3 criteria)
- Amylase or lipase elevated (>3x normal)
- Any imaging showing pancreatic inflammation
- Abdominal pain or clinical symptoms of pancreatitis (vomiting, feeding refusal)

**Exclusion Criteria**
- Signs and symptoms of shock (use Septic Shock pathway)
- Complicated pancreatic fluid collection
- Other diagnosis - DKA
- TPN dependent

**Signs of Dehydration**
- Urine output (<1 mL/kg/hr)
- Capillary refill (>2 seconds)
- Skin turgor (tenting)
- BUN/Cr (elevated)
- Hematocrit (elevated)
- Heart Rate (elevated)
- Mean Arterial Pressure (for SCH only)

**Fluid Resuscitation**
- NPO during initial fluid resuscitation
- IVF bolus (20 mL/kg) x1 with LR
- Assess and consider re-bolus as needed until dehydration improves
- Once dehydration improves, begin 1.5-2.0x maintenance with D5 NS until enteral feeds initiated
- Vital signs minimum Q2hrs

**Pain Management**
- **Mild** (Pain score 0-3)
  - Distraction, warm packs
  - PO acetaminophen +/- ibuprofen
- **Mod – Severe** (Pain score 4-10)
  - IV opioids (Morphine preferred)
  - If severe pain persists >4 hours, consult pain service

**Disposition**
- Admit to GI service unless patient has established primary team
- PICU consult if ≥3 fluid boluses during initial resuscitation

Continue Phase I until signs of dehydration resolve (~12-24 hours).
Confirm readiness for phase change with GI.

**Medically complex/metabolic disorders:**
Use caution – may have alternate reason for increased lipase and pain

**Antibiotics not routinely recommended unless evidence of infection**

**Consul GI**
Emergent surgical consultation not required for gallstones
**Inclusion Criteria**
- All ages
- Confirmed pancreatitis (2 out of 3 criteria)
- Amylase or lipase elevated (>3x normal)
- Any imaging showing pancreatic inflammation
- Abdominal pain or clinical symptoms of pancreatitis (vomiting, feeding refusal)

**Exclusion Criteria**
- Signs and symptoms of shock (use Septic Shock pathway)
- Complicated pancreatic fluid collection
- Other diagnosis
  - DKA
  - TPN dependent

**Nutrition**
- Nutrition consult, Strict I+O. Daily weights
- If hemodynamically stable and no contraindications, including upcoming procedures, begin enteral nutrition within 48 hrs
- Feeding route in order of preference:
  1. PO regular diet
  2. NG tube feeds
  3. NJ tube feeds
  4. TPN
- Place feeding tube after 24 hours if patient starts PO feeds but takes <50% of caloric goal

**Specific populations**
- If triglycerides > 500
  - consult endocrinology
  - low fat enteral feeds:
    - PO: <15% calories from fat, fat free PO supplements (Boost Breeze, Ensure Clear)
    - NG/NJ: infant-13yr: Monogen, >13yr: Vivonex TEN (monitor essential fatty acids)
- Gallstone pancreatitis
  - consult surgery
  - due to high recurrence rates, surgery is generally recommended prior to discharge

**Pain Management**

**Mild** *(Pain score 0-3)*
For mild pain continue acetaminophen +/- ibuprofen

**Mod – Severe** *(Pain score 4-10)*
- If ongoing, consider multi-modal therapy:
  - PO vs IV Acetaminophen, if tolerated
  - IV Ketorolac, if adequate UOP and surgery not anticipated
- Pain medicine consult if:
  - Difficult to manage pain
  - Chronic pain
  - Chronic opioid use
- Start bowel regimen for those on opioids
- When tolerating enteral nutrition, consider transition to PO meds.
  - PO Acetaminophen
  - Oxycodone

**Contraindications to feeding:**
- TPN dependent
- Ileus, bowel obstruction
- Hemodynamic instability

**Discharge Criteria**
- Tolerating full enteral feeds
- PO pain meds
- For patients with recurrent/chronic pancreatitis, consider follow up in pancreatitis clinic

**Laboratory** *(daily until goal enteral feeds established)*
- BUN/Cr
- Lytes
- Hct
- CRP
- LFTs if initially abnormal
- Do not need to trend Lipase

**Additional Testing**
- MRI, exocrine function testing and genetic testing not routinely indicated during initial hospitalization

**Antibiotics not routinely recommended unless evidence of infection**

**Follow up imaging not routinely recommended unless worsening clinical status**

**Infection**
- Antibiotics not routinely recommended unless evidence of infection

**For questions concerning this pathway, contact:** pancreatitis@seattlechildrens.org

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Last Updated: March 2018
Next Expected Review: July 2022
Lactated Ringers

Isotonic fluid type for fluid resuscitation:

Lactated ringers (LR) is recommended as the initial infusion solution for AP based on 2 randomized controlled trials (pediatrics not specified) favoring reduction of inflammation versus normal saline (NS). [LOE: ☹☹☹☹ Low quality] (#45 Yokoe 2015) (#152 Working Group IAP/APA 2013)

Conditional recommendation made in favor of LR vs NS given in large volumes may lead to non-anion gap, hyperchloremic metabolic acidosis. (# 157 Tenner 2013) A Spanish multidisciplinary society guideline commented on benefit of LR over NS for control of inflammatory states, but did not make a recommendation. (#178 Poma 2013)

Retrospective pediatric cohort study was not willing to recommend best type of fluid due to lack of evidence in children. (#62 Szabo 2015).
Nutrition

**Recommendations:**
A nutrition consult should be placed for all patients admitted with pancreatitis. Enteral nutrition is preferred in patients with pancreatitis and should begin within 48 hours of hospital admission when the patient is hemodynamically stable unless there are contraindications such as ileus or bowel obstruction. Feeding route (in order of preference):

- **Oral Diet:** Advance diet to goal of regular
- **Nasogastric feeds (NG):** If unable to take PO due to pain, poor appetite, other underlying cause impairing ability to eat, first line treatment should be NG tube placement with initiation of continuous polymeric formula unless contraindicated by protein allergy. Conversion to bolus feeds should be attempted when clinical status allows.
- **Nasojejunal (NJ):** If NG-feeds are poorly tolerated due to vomiting, diarrhea, post-pyloric tube placement and trial of NJ continuous polymeric feedings is recommended.
- **Parenteral nutrition:** IV nutrition should be considered if there are contraindications to enteral feeds or if severe feeding intolerance persists despite attempts at enteral feeds.
Empiric Antibiotics for Patients with Pancreatitis

Multiple guidelines now support NOT using prophylactic antibiotics routinely for acute pancreatitis (Yokoe 2015, Hoffmeister 2015, Tenner 2013, LOE: 🟢🟠🟠 Low quality). Multiple guidelines suggest that there is evidence to support treating infected necrotic pancreatitis, however we did not look at this question specifically. Where evidence is less conclusive is in the case of severe necrotizing pancreatitis. Subgroup analysis of RCTs where antibiotics are given within 72 hours of onset show some benefit in infectious complications and mortality (Yokoe 2015 meta-analysis of relevant RCTs). Some studies also seem to indicate benefit in using pancreas penetrating choices such as beta-lactams or fluoroquinolones. At this time no RCTs have been done assessing the use of antifungal therapy and all guidelines do not recommend their use routinely [LOE: 🟠🟠🟠 Very low quality] (Hoffmeister 2015, Yokoe 2015).

The vast majority of evidence for this question is in guidelines and RCTs and M/A of adult patients. Only one review of pediatric patients with acute pancreatitis addresses this question and supports the adult data in suggesting that antibiotic prophylaxis not be routinely used [LOE: 🟠🟠🟠 Very low quality] (Filho 2012).
Use age appropriate pain scale. See pain policy (for SCH only) for more details.

**0-10 SCALE for children over age 7**

On a scale of 0 to 10, with ‘0’ being no pain and ‘10’ being the worst pain you can imagine, what number are you feeling right now?

No pain | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Worst pain

**Faces PAIN SCALE – REVISED (FPS-R) for children over age 3**

Point to the face that shows how much you hurt.

These faces show how much something can hurt. The left-most face shows no pain. The faces show more and more pain up to the right-most face - it shows very much pain.
Approved by the CSW Pancreatitis team for July 26, 2017 go live.

CSW Pancreatitis Team:

<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
<th>Position</th>
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<tbody>
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Executive Approval:

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Please cite as:
This pathway was developed through local consensus based on published evidence and expert opinion as part of Clinical Standard Work at Seattle Children’s. Pathway teams include representatives from Medical, Subspecialty, and/or Surgical Services, Nursing, Pharmacy, Clinical Effectiveness, and other services as appropriate.

When possible, we used the GRADE method of rating evidence quality. Evidence is first assessed as to whether it is from randomized trial or cohort studies. The rating is then adjusted in the following manner (from: Guyatt G et al. J Clin Epidemiol. 2011;4:383-94.):

- **Quality ratings are downgraded** if studies:
  - Have serious limitations
  - Have inconsistent results
  - If evidence does not directly address clinical questions
  - If estimates are imprecise OR
  - If it is felt that there is substantial publication bias

- **Quality ratings are upgraded** if it is felt that:
  - The effect size is large
  - If studies are designed in a way that confounding would likely underreport the magnitude of the effect OR
  - If a dose-response gradient is evident

Guideline – Recommendation is from a published guideline that used methodology deemed acceptable by the team.

Expert Opinion – Our expert opinion is based on available evidence that does not meet GRADE criteria (for example, case-control studies).

**Quality of Evidence:**
- 💫💫💫💫 High quality
- 💫💫💫💫 Moderate quality
- 💫💫💫 Low quality
- 💫💫 Very low quality

Guideline
Expert Opinion
Summary of Version Changes

- Version 1.0 (7/26/2017): Go live
- Version 2.0 (3/16/2018): Added feeding tube parameters to algorithm
Medical Disclaimer

Medicine is an ever-changing science. As new research and clinical experience broaden our knowledge, changes in treatment and drug therapy are required.

The authors have checked with sources believed to be reliable in their efforts to provide information that is complete and generally in accord with the standards accepted at the time of publication.

However, in view of the possibility of human error or changes in medical sciences, neither the authors nor Seattle Children’s Healthcare System nor any other party who has been involved in the preparation or publication of this work warrants that the information contained herein is in every respect accurate or complete, and they are not responsible for any errors or omissions or for the results obtained from the use of such information.

Readers should confirm the information contained herein with other sources and are encouraged to consult with their health care provider before making any health care decision.
Search Methods, Pancreatitis, Clinical Standard Work

Studies were identified by searching electronic databases using search strategies developed and executed by a medical librarian, Susan Groshong. Searches were performed in December, 2016. The first search for the concept pancreatitis was completed in the following databases – on the Ovid platform: Medline and Cochrane Database of Systematic Reviews; elsewhere: Embase, National Guideline Clearinghouse, TRIP and Cincinnati Children’s Evidence-Based Recommendations. A second search was completed for the concepts pancreatitis, hypertriglyceridemia, dyslipidemias, chylomicronemia, lipodystrophy and nutrition therapy in Medline and Cochrane Central Register of Controlled Trials on the Ovid platform, plus Embase. In Medline and Embase, appropriate Medical Subject Headings (MeSH) and Emtree headings were used respectively, along with text words, and the search strategy was adapted for other databases using text words. Retrieval was limited to humans, English or French language, 2007 to current and further limited to certain evidence categories, such as relevant publication types, index terms for study types and other similar limits.

Susan Groshong, MLIS
June 29, 2017

Identification

713 records identified through database searching

0 additional records identified through other sources

Screening

672 records after duplicates removed

672 records screened

470 records excluded

Eligibility

202 records assessed for eligibility

181 full-text articles excluded, 155 did not answer clinical question 23 did not meet quality threshold 3 outdated relative to other included study

Included

21 studies included in pathway

Flow diagram adapted from Moher D et al. BMJ 2009;339:bmj.b2535


