

Clinical Guideline Highlights for the Hospitalist: Management of Acute Pancreatitis in the Pediatric Population

Jillian M Wall, MD, MPH*

Division of Hospital Medicine, Phoenix Children's Hospital, Phoenix, Arizona.

TITLE: Management of Acute Pancreatitis in the Pediatric Population: A Clinical Report from the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition Pancreas Committee

DEVELOPER: Review developed by the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN) Pancreas Committee

RELEASE DATE: January 1, 2018

FUNDING SOURCE: NASPGHAN and the National Institutes of Diabetes and Digestive and Kidney Diseases

PRIOR VERSIONS: N/A

TARGET POPULATION: Children with acute pancreatitis

Pediatric acute pancreatitis is being diagnosed more commonly, affecting approximately one per 10,000 children annually with an estimated inpatient cost burden of \$200 million per year.^{1,2} Common causes of pediatric acute pancreatitis include systemic illness, biliary disease, trauma, and medications; 13%-34% of cases are idiopathic.¹ Currently, substantial variation exists in the clinical management of this condition.^{3,4} Hospitalists should familiarize themselves with the current literature, including the recent practice guideline by the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN).²

KEY RECOMMENDATIONS FOR THE HOSPITALIST

(Evidence quality: not graded, recommendation by expert consensus)

Recommendation 1. Diagnosis of acute pancreatitis in pediatric patients requires at least two of the following symptoms: abdominal pain compatible with acute pancreatitis, serum amylase and/or lipase values >3 times the upper limits of normal, and imaging findings consistent with acute pancreatitis.

The most common symptoms of acute pancreatitis in children are epigastric or diffuse abdominal pain, vomiting, and irritability. Presentation varies by age, and diagnosis requires a high index of suspicion. Significant elevations in amylase and lipase levels are typically detected early in the disease course. The guideline does not specify a preferred serum biomarker in the diagnosis of pancreatitis but notes that lipase is more sensitive and specific than amylase, rises within 6 hours of symp-

toms, and stays elevated longer. Amylase levels rise faster but often normalize by 24 hours of symptom onset. Amylase and lipase can originate from extrapancreatic sources and may be elevated during acute illness in the absence of pancreatitis.

Laboratory testing to investigate the etiology of acute pancreatitis should include hepatic enzymes, bilirubin, triglyceride, and calcium levels. Although not typically necessary for diagnosis, imaging may demonstrate pancreatic edema or peripancreatic fluid, confirm disease complications, and identify obstructive causes. Transabdominal ultrasonography is indicated if biliary pancreatitis is suspected. Contrast-enhanced computed tomography should be considered for patients with severe presentation or deteriorating condition. Magnetic resonance cholangiopancreatography is useful in detecting pancreaticobiliary abnormalities.

Recommendation 2. Children with acute pancreatitis should be initially resuscitated with crystalloids, either with lactated Ringer's or normal saline in the acute setting. These children should be provided 1.5-2 times maintenance intravenous fluids with monitoring of urine output over the next 24-48 hours.

Fluid resuscitation and maintenance are the current mainstays of therapy for pancreatitis. Prompt fluid administration corrects hypovolemia and may prevent potential complications. Early, aggressive fluid replacement in adults reduces the incidence of systemic inflammatory response syndrome and organ failure. Limited pediatric studies support correction of hypovolemia and/or circulatory compromise using 10-20 ml/kg boluses of isotonic crystalloid fluid. Although the literature is sparse regarding the rate of continued fluid replacement, the committee recommends patients receive 1.5-2 times maintenance intravenous fluid (IVF) with normal saline plus 5% dextrose for the first 24-48 hours. The rate of IVF administration should be adjusted based on volume status and urine output. IVF should be discontinued once the patient is able to maintain adequate hydration enterally. Cardiac, renal, and pulmonary complications of pancreatitis often present within the first 48 hours of illness and should prompt close monitoring with assessment of vital signs every

*Corresponding Author: Jillian M. Wall, MD, MPH; E-mail: jwall2@phoenixchildrens.com; Telephone: 602-933-0777.

Published online first August 21, 2019.

Received: April 16, 2019; Revised: July 3, 2019; Accepted: July 8, 2019

© 2019 Society of Hospital Medicine DOI 10.12788/jhm.3285

four hours. The committee recommends monitoring serum electrolytes and renal function in the first 48 hours but does not offer guidance regarding the frequency of laboratory testing or the value of trending serum biomarkers.

Recommendation 3. Except in the presence of direct contraindications to use the gut, children with mild acute pancreatitis may benefit from early (within 48-72 hours of presentation) oral and enteral nutrition to decrease the length of stay (LOS) and the risk of organ dysfunction.

Adult studies suggest early enteral nutrition decreases complications and reduces LOS. Initiating enteral nutrition within 48 hours in children may have similar benefits. Several small pediatric studies have demonstrated a reduced LOS with early enteral feeds without an increase in complications. In a retrospective single-center study, children who were fed within the first 48 hours and received 1.5-2 times maintenance IVF had shorter LOS, less frequent intensive care admissions, and reduced severity of illness compared with those who were kept nil per os for the first 48 hours.⁵ Nasogastric or nasojejunal feeds may be initiated if a patient is unable to tolerate oral feeding. Parenteral nutrition should be reserved for children in whom enteral nutrition cannot be initiated within five to seven days.

Recommendation 4. Intravenous morphine or other opioids should be used for acute pancreatitis pain not responding to acetaminophen or nonsteroidal antiinflammatory drugs (NSAIDs).

Abdominal pain is the most common presenting symptom of pancreatitis, and pain control is an essential component of supportive care. There are no randomized trials identifying an optimal pain management regimen. The committee recommends the use of opioids for pain not controlled with acetaminophen and NSAIDs. Refractory pain may necessitate consultation with an acute pain specialist.

Recommendation 5. Routine use of prophylactic antibiotics, protease inhibitors, antioxidants, and probiotics is not recommended in acute pancreatitis.

Adult literature does not support routine use of antibiotics in acute pancreatitis, but their use may be beneficial in severe or recalcitrant cases. Pediatric literature neither confirms nor refutes this finding. The guideline does not recommend the use of antibiotics without signs of infection. Limited adult studies have shown protease inhibitors, antioxidants, and probiotics to be beneficial; however, no pediatric data support their use.

This guideline also discusses interventional and surgical procedures. Of note, biliary tract disease may necessitate endoscopic retrograde cholangiopancreatography or cholecystectomy. Such procedures should be considered in conjunction with subspecialty input.²

CRITIQUE

Methods in Preparing Guideline

The guideline development committee, funded by the NASPGHAN and the National Institutes of Diabetes and Digestive and Kidney Diseases, was composed of members of the NASPGHAN Pancreas Committee and included gastroenterologists from multiple sites.² Topics were selected via group discussion, and Medline searches included both adult and pediatric litera-

ture. Preliminary recommendations were presented at the 2016 World Congress of Pediatric Gastroenterology, Hepatology and Nutrition. Following revision, the 24 authors voted on each recommendation using a five-point Likert scale. A recommendation passed if 75% of the participants either agreed or strongly agreed with it. The authors reported no conflicts of interest.

Although the literature review was comprehensive, it lacked prospective pediatric studies and many of the recommendations were derived from adult research. The committee originally intended to grade the quality of evidence; however, the pediatric specific literature was underpowered and retrospective. Therefore, the committee opted to use consensus voting. The authors note that had the group used the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) system, it would have returned grades of "low" or "very low" quality evidence.² The Hungarian Pancreatic Study Group and the European Pancreatic Club published a consensus guideline on the management of pediatric acute pancreatitis shortly after the NASPGHAN guideline, which offers similar conclusions.^{2,6} The strength and generalizability of the NASPGHAN guideline are limited by its overreliance on adult literature, expert consensus, and small, retrospective pediatric studies to guide care.

AREAS OF FURTHER STUDY

This guideline highlights the need for pediatric research to guide the management of acute pancreatitis. The etiologies of pancreatitis in children are distinct from adults, where alcohol abuse and biliary disease are significant contributors.¹ Furthermore, age and environmental factors influence the presentation and clinical course.¹ Robust, prospective studies are needed to better understand the treatment outcomes of pediatric pancreatitis. Areas of further research include pediatric pancreatic severity scoring, ideal fluid composition and administration rate, enteral feed timing, optimal pain control, laboratory monitoring frequency, and adjuvant therapies.

Disclosures: Dr. Wall has nothing to disclose.

References

- Bai HX, Lowe ME, Husain SZ. What have we learned about acute pancreatitis in children? *J Pediatr Gastroenterol Nutr.* 2011;52(3):262-270. <https://doi.org/10.1097/MPG.0b013e3182061d75>.
- Abu-El-Hajja M, Kumar S, et al. The management of acute pancreatitis in the pediatric population: a clinical report from the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition pancreas committee. *J Pediatr Gastroenterol Nutr.* 2018;66(1):159-176. <https://doi.org/10.1097/MPG.0000000000001715>.
- Szabo FK, Palermo, J, et al. Comparison of length of hospital stay of children admitted with acute pancreatitis among hospital services at a single pediatric tertiary care center [AGA Abstract Tu1144]. *Gastroenterology.* 2014;146(5):S-765. [https://doi.org/10.1016/S0016-5085\(14\)62765-7](https://doi.org/10.1016/S0016-5085(14)62765-7).
- Abu-El-Hajja M, Lin TK, Palermo J. Update to the management of pediatric acute pancreatitis: highlighting areas in need of research. *J Pediatr Gastroenterol Nutr.* 2014;58:689-693. <https://doi.org/10.1097/MPG.0000000000000360>.
- Szabo FK, Fei L, Cruz LA, et al. Early enteral nutrition and aggressive fluid resuscitation are associated with improved clinical outcomes in acute pancreatitis. *J Pediatr.* 2015;167(2):397-402e1. <https://doi.org/10.1016/j.jpeds.2015.05.030>.
- Párniczky A, Abu-El-Hajja M, et al. EPC/HPSG evidence-based guidelines for the management of pediatric pancreatitis. *Pancreatol.* 2018;18(2):146-160. <https://doi.org/10.1016/j.pan.2018.01.001>.