Noninvasive imaging of pediatric pancreatitis: joint recommendations from the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition and the Society for Pediatric Radiology

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In a recent article in *Journal of Pediatric Gastroenterology and Nutrition*, members of the Society for Pediatric Radiology (SPR) Abdominal Imaging Committee and the Pancreas Committee under the umbrella of the North American Society for Pediatric Gastroenterology, Hepatology & Nutrition (NASPGHAN) published joint recommendations for noninvasive imaging of pancreatitis in children [1]. The project, titled “NASPGHAN and the Society for Pediatric Radiology Joint Position Paper on Non-Invasive Imaging of Pediatric Pancreatitis: Literature Summary and Recommendations,”

grew out of a perceived need for current guidance for pediatric gastroenterologists on imaging of pancreatitis and capitalized on collaboration between the two societies.

The incidence of pancreatitis is increasing in children and is now approximately 1:10,000 for acute pancreatitis and 2:100,000 for chronic pancreatitis [2–4]. Imaging plays a substantial role in the evaluation, classification of severity and management of both acute and chronic pancreatitis [5]. In this work, the authors reviewed the existing pediatric literature and drew from the adult literature when necessary to describe the current state of noninvasive imaging for pediatric pancreatitis and to generate consensus recommendations (Table 1) [6]. A modified GRADE (grades of recommendation assessment, development and evaluation) procedure that weighs the quality of available evidence and the clarity of risk/benefit was used to classify the recommendations put forth.

Specific diagnostic criteria exist for both acute and chronic pancreatitis, and both include imaging findings [7]. Imaging contributes not only to making or confirming a diagnosis (when needed), but also to identifying and characterizing complications, identifying potential causes, and planning and guiding interventions [5]. Ultrasonography (US) CT and MRI all play roles in the noninvasive imaging of pediatric pancreatitis and the authors discussed the strengths, weaknesses and diagnostic performance of each, providing protocol and technique recommendations.

Specific imaging findings of acute and chronic pancreatitis are reviewed with emphasis on the performance of various imaging modalities to detect and characterize those findings. For example, in acute pancreatitis, CT might underestimate the complexity of fluid collections compared to US or MRI. Further, the authors emphasized the use of currently accepted terminology when describing findings of pancreatitis. For example, in the context of acute pancreatitis, accurately

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Table 1 Summary statements and recommendations

Statement number	Statement/recommendation	Grade [6]	Agreement ^a	Average score
General imaging				
1	CT should be performed with intravenous contrast material as a single portal venous phase exam unless specific arterial detail is needed	1C	100% (11/11)	4.5
2	When imaging with MRI, intravenous contrast material is not always needed but contributes to the diagnosis and definition of necrosis, assessment of the vasculature and the diagnosis of autoimmune pancreatitis	2C	100% (11/11)	4.3
Acute pancreatitis				
3	Transabdominal ultrasound is recommended as a first-line noninvasive imaging modality for suspected acute pancreatitis	1B	91% (10/11)	4.7
4	If ultrasound is negative for acute pancreatitis and an imaging diagnosis of acute pancreatitis is needed, either CT or MRI is recommended	1B	100% (11/11)	4.6
5	CT or MRI is recommended for identification and assessment of known or suspected complications of acute pancreatitis	1C	91% (10/11)	4.5
6	Ultrasound can be used to follow known acute pancreatitis fluid collections for resolution or progression (changes in size)	2C	82% (9/11)	4.3
7	CT or MRI should be used to characterize the degree of organization of collections prior to intervention	1C	100% (11/11)	4.5
Acute recurrent pancreatitis				
8	MRI is recommended to identify structural or obstructive causes for acute recurrent pancreatitis	1B	100% (11/11)	4.8
9	When clinically indicated, MRI is recommended to follow children with acute recurrent pancreatitis and to assess for progression to chronic pancreatitis	1C	100% (11/11)	4.6
10	In a child who requires sedation for imaging, it is reasonable to alternate MRI with ultrasound or CT for serial monitoring of acute recurrent pancreatitis	2C	82% (9/11)	4.0
Chronic pancreatitis				
11	MRI is the recommended modality for imaging of suspected chronic pancreatitis	1C	91% (10/11)	4.6
12	When imaging is needed to assess a suspected or known episode of acute pancreatitis in a child with chronic pancreatitis, transabdominal ultrasound is the preferred first-line imaging modality	1B	91% (10/11)	4.5
13	If ultrasound is negative for acute pancreatitis in a child with chronic pancreatitis and an imaging diagnosis of acute pancreatitis is needed, either CT or MRI is recommended	1B	100% (11/11)	4.5
14	CT or MRI is recommended for planning of endoscopic or surgical interventions in a child with known chronic pancreatitis	2C	100% (11/11)	4.5
15	MRI is recommended for clinically indicated serial imaging of chronic pancreatitis	1B	100% (11/11)	4.8

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^a Agreement denotes frequency of strongly agree and agree votes

describing findings of necrosis or acute fluid or necrotic collections impacts classification of disease severity and sometimes has management implications.

Emerging techniques such as MRI T1 mapping, elastography and secretin-enhanced magnetic resonance cholangiopancreatography are discussed, particularly

with regard to the growing emphasis on quantitative measures of disease.

The authors also called out areas of necessary future research, highlighting significant gaps in the pediatric literature. Specifically, the authors called out the need to define the optimal imaging strategy (and modalities) for all forms of

pediatric pancreatitis. They also expressed the need for research to identify imaging that can prognosticate and predict pancreatitis severity and progression, contributing to clinical care and acting as outcome and stratification measures for clinical trials. Finally, they called out the significant need for research to identify modalities that can diagnose minimal change disease, the very earliest form of chronic pancreatitis, which might reflect an opportunity to intervene and prevent disease progression or reduce patient morbidity.

The published position paper and its recommendations have been endorsed by both the SPR and NASPGHAN. The target audience of this document is primarily pediatric gastroenterologists, but pediatric radiologists should also find the content informative, particularly the discussion of diagnostic criteria and protocol recommendations. There are significant opportunities for the pediatric radiology community to contribute to future research related to pediatric pancreatitis.

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Compliance with ethical standards

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