Letter to the Editor Re: Serum Calprotectin in Adolescents With Inflammatory Bowel Disease

To the Editor: We were interested to read the article by Carlsen et al (1) describing their evaluation of serum calprotectin (SC) in children with inflammatory bowel disease (IBD). Initially SC correlated with serum C-reactive protein (CRP) and endoscopic severity but not with fecal calprotectin (FC) in 19 adolescents with ulcerative colitis (UC). SC was then measured in longitudinally collected samples: SC correlated with FC in the children with UC in this cohort, but not those with Crohn disease.

Previous work demonstrated higher levels of SC in 31 children with IBD than in children without IBD (2). FC was not measured. SC correlated with CRP. On reanalysis of the previous data, however, SC did not correlate with mucosal calprotectin (MC) (Spearman $r = 0.27$, $P = 0.14$).

Although FC has high sensitivity and specificity in identifying IBD in children presenting with gastrointestinal symptoms (3), it may not always reflect mucosal healing (4) or the extent of ileal disease (5). Furthermore, some patients prefer a blood test over collecting a stool sample. Consequently, a serum marker would certainly have a role in IBD. Standard markers provide variable indications of disease activity (6,7). SC has high test utility in conditions such as juvenile arthritis (8), but does not appear to have the same benefits in IBD.

Overall, these evaluations show that SC was raised in children with IBD, but correlated inconsistently with FC or MC (1,2). Although SC correlated closely with CRP, it may not offer advantages over CRP. The role of SC in children with IBD remains unclear.

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A Unified Treatment Algorithm and Admission Order Set for Pediatric Acute Pancreatitis

To the Editor: Pediatric acute pancreatitis (AP) has increased over the last 2 decades (1) with the most recent incidence being 12.3/100,000 persons per year (2) and inpatient costs alone exceeds $100 million/year (2–5). Data on best practices in children are limited and practice varies widely across the United States and even within the same pediatric institution (6). To bring uniformity to the diagnosis and treatment of pediatric AP, the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition (NASPGHAN) and European Pancreas Club/Hungarian Pancreatic Study Group (EPC/HPSG) published pediatric AP management recommendations (7,8). Given the effectiveness of evidence-based clinical guidelines to improve clinical care (9), several pediatric hospitals have independently developed center-specific pediatric AP-focused treatment algorithms and admission order sets.

We analyzed the AP treatment algorithms and admission order sets at 4 tertiary/quaternary care children's hospitals in the United States (Cincinnati Children's Hospital Medical Center, Lucile Packard Children's Hospital at Stanford, Seattle Children's Hospital, University of Iowa Stead Family Children's Hospital) to reach a consensus for delivering consistent and evidence-based care in pediatric AP. Each institution had previously developed their own products, with Cincinnati being the first in 2013 (10). All institutions had admission order sets, while Seattle and Stanford also developed treatment algorithms. Treatment algorithms provide practical guidance to physicians on how to implement clinical guidelines in a user-friendly manner (11). All protocols focused on initial diagnosis and assessment of clinical status, frequency of vitals checks, ''early aggressive'' intravenous fluids, early nutrition (enteral vs intravenous), and pain (nonopioid and opioid) management. Overall, there were minor differences between protocols, for example, types of fluids chosen, presence or absence of fluid bolus as standard management (vs as needed), and specific opiates used for pain. Most products included teaching points for provider education. Admission order sets and treatment algorithms from the 4 institutions were harmonized with current NASPGHAN and EPC/HPSG recommendations (7,8), and where applicable, the American Gastroenterological Association AP guidelines (12). For broader consensus these were sent to all authors of the NASPGHAN Clinical Report on management of pediatric AP (7). There was broad excitement and consensus with the major tenets of the algorithm and order set, with no objections or major concerns from any of the authors. Minor comments were incorporated, as appropriate.

In summary, we generated a standardized and unified pediatric AP admission order set (Supplemental Digital Content, *http://links.lww.com/MPG/B626*) and treatment algorithm (Fig. 1)

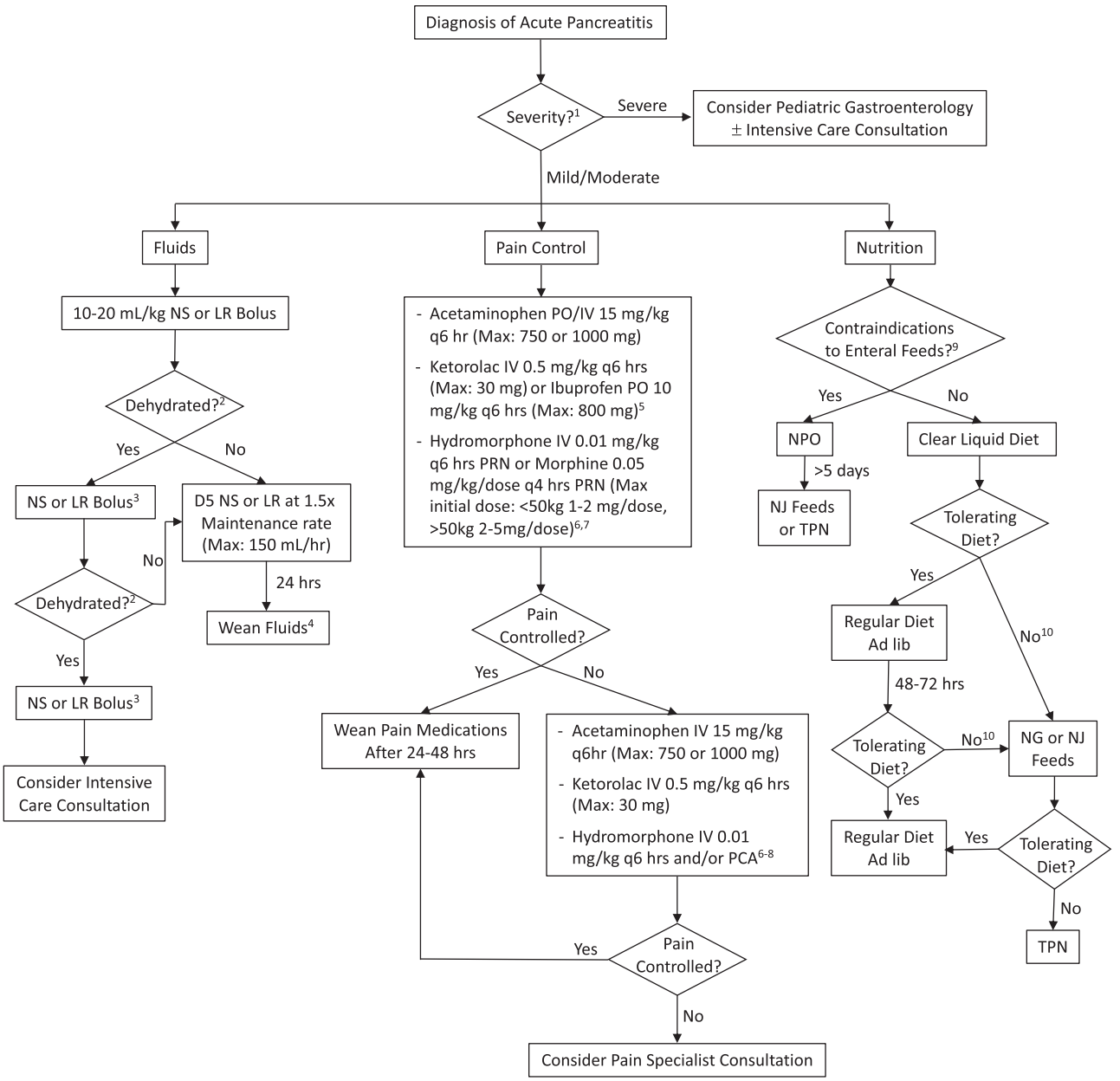

FIGURE 1. Treatment algorithm for pediatric AP. CT = computed tomography, D5 = 5% dextrose, IV = intravenous, LR = lactated Ringers, MRCP = magnetic resonance cholangiopancreatography, NG = nasogastric, NJ = nasojejunal, NPO = nil per os (nothing by mouth), NS = normal saline, PCA = patient-controlled analgesia, PO = per os, PRN = *pro re nata* (as needed), TPN = total parental nutrition. Footnotes: [1] To help guide management, determine severity of AP (13). [2] Need for continued boluses determined by: signs of dehydration: Urine output $<1\ cm^3 \cdot kg^{-1} \cdot h^{-1}$, tachycardia, hypotension, delayed capillary refill, and poor skin turgor. Avoiding aggressive fluids and use of goal-directed fluid therapy is essential to preventing complications such as pulmonary edema. [3] 10 to 20 mL/kg, based on clinical status. Monitor for signs of fluid overload or third-spacing. Consider LR over NS if metabolic acidosis is present. [4] Wean based on clinical status and enteral intake. [5] Use nonsteroidal anti-inflammatory drugs only if BUN and creatinine are normal. [6] Other opiates may be substituted based on patient needs and institutional preferences. [7] When using opioids, place patient on laxatives. Recommend: Polyethylene glycol 3350 $1\ g \cdot kg^{-1} \cdot day^{-1}$ (divided once or twice daily) if no stools in 24 to 48 h. May increase to achieve goal of at least 1 soft stool daily. [8] Consult pain service when on PCA, if service available. [9] Examples of contraindications to enteral feeding include, but are not limited to disrupted pancreatic duct, intestinal obstruction, and ileus. [10] If not tolerating adequate diet within 48 to 72 h, consider if pain and/or nausea adequately controlled. For antiemetics, recommend: IV or PO ondansetron 0.15 mg/kg/dose q6–8 h as needed for nausea and emesis. Maximum dose of 8 mg q8 h. Also consider imaging to evaluate for complications from pancreatitis (eg, pancreatic fluid collection/necrosis or pancreatic duct stricture/stones). Recommend: IV contrast enhanced CT or MRCP if biliary/pancreatic duct abnormalities are suspected (with IV secretin if available for pancreatic duct evaluation).

that are in-line with the current NASPGHAN, EPC/HPSG and American Gastroenterological Association AP guidelines. Although these products were reviewed and approved by other pediatric pancreatologists, it should be noted that these are based on minimal evidence and expert opinion, given the paucity of relevant pediatric-specific data. We recognize that there may be institution-specific variation and accommodations made based on patient-specific circumstances; however, we hope that these resources will further standardize the treatment of pediatric AP, which in turn will improve outcomes and generate pediatric-specific data on best clinical practices for AP.

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