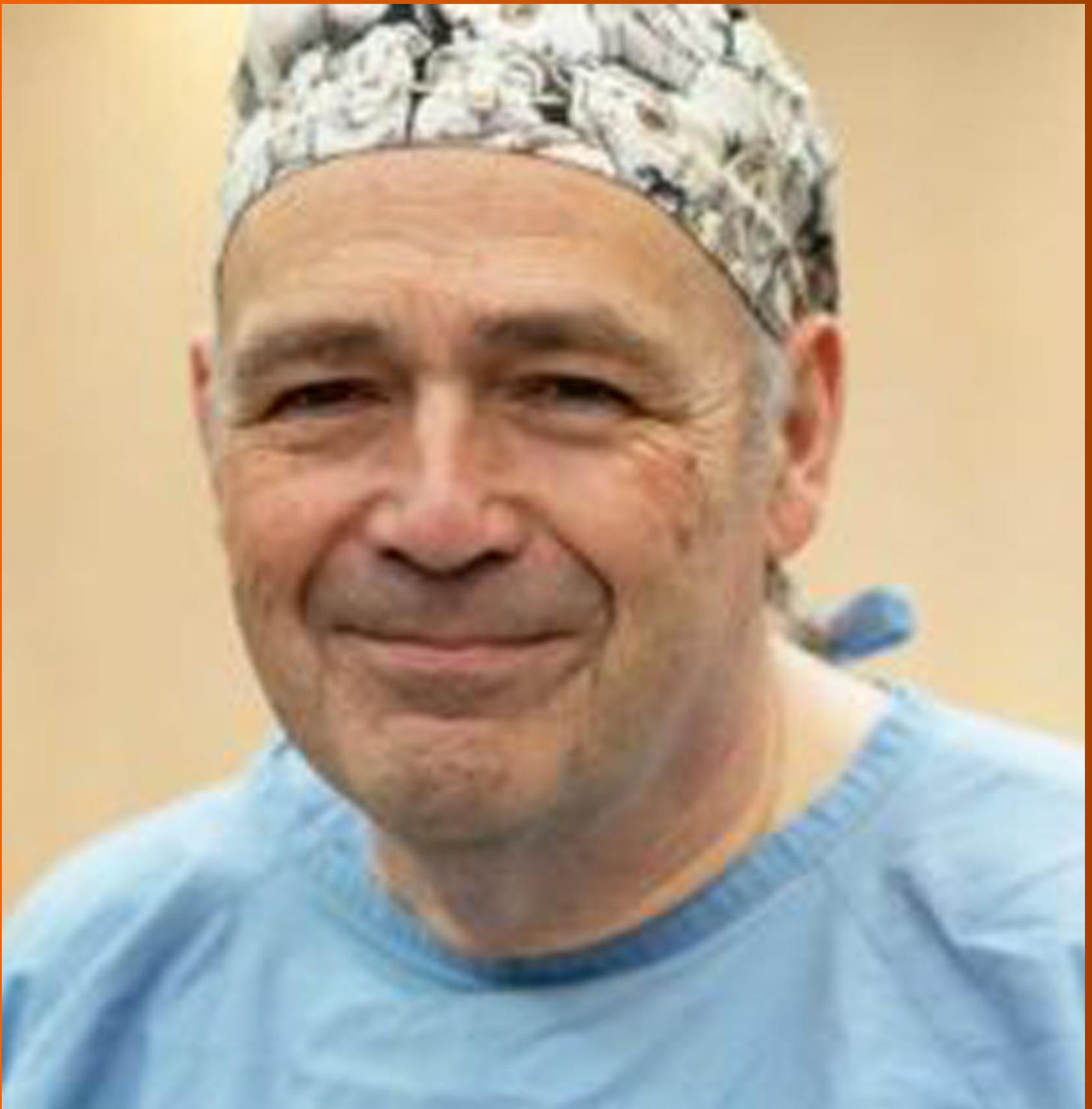


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World J Gastroenterol 2024 March 21; 30(11): 1470-1643



EDITORIAL

- 1470 MicroRNAs in hepatocellular carcinoma treatment: Charting the path forward
Lin HT, Castaneda AFA, Krishna SG, Mumtaz K
- 1475 Innovative pathways allow safe discharge of mild acute pancreatitis from the emergency room
Kothari DJ, Sheth SG
- 1480 Current remarks and future directions on the interactions between metabolic dysfunction-associated fatty liver disease and COVID-19
Brilakis L, Theofilogiannakou E, Lykoudis PM
- 1488 Routine utilization of machine perfusion in liver transplantation: Ready for prime time?
Parente A, Sun K, Dutkowski P, Shapiro AJ, Schlegel A
- 1494 Advancements in Barrett's esophagus detection: The role of artificial intelligence and its implications
Massironi S

REVIEW

- 1497 MicroRNAs: A novel signature in the metastasis of esophageal squamous cell carcinoma
Wei QY, Jin F, Wang ZY, Li BJ, Cao WB, Sun ZY, Mo SJ

MINIREVIEWS

- 1524 Morphological and biochemical characteristics associated with autophagy in gastrointestinal diseases
Chang YF, Li JJ, Liu T, Wei CQ, Ma LW, Nikolenko VN, Chang WL

ORIGINAL ARTICLE**Retrospective Study**

- 1533 Efficacy of radiofrequency ablation combined with sorafenib for treating liver cancer complicated with portal hypertension and prognostic factors
Yang LM, Wang HJ, Li SL, Gan GH, Deng WW, Chang YS, Zhang LF

Clinical Trials Study

- 1545 Effect of *Aspergillus niger* prolyl endopeptidase in patients with celiac disease on a long-term gluten-free diet
Stefanolo JP, Segura V, Grizzuti M, Heredia A, Comino I, Costa AF, Puebla R, Temprano MP, Niveloni SI, de Diego G, Oregui ME, Smecuol EG, de Marzi MC, Verdú EF, Sousa C, Bai JC
- 1556 Effects of *Lactobacillus paracasei* N1115 on gut microbial imbalance and liver function in patients with hepatitis B-related cirrhosis
Hu YC, Ding XC, Liu HJ, Ma WL, Feng XY, Ma LN

Prospective Study

- 1572 Washed microbiota transplantation for Crohn's disease: A metagenomic, metatranscriptomic, and metabolomic-based study
Chen SJ, Zhang DY, Wu X, Zhang FM, Cui BT, Huang YH, Zhang ZL, Wang R, Bai FH

Basic Study

- 1588 Silent information regulator sirtuin 1 ameliorates acute liver failure *via* the p53/glutathione peroxidase 4/gasdermin D axis
Zhou XN, Zhang Q, Peng H, Qin YJ, Liu YH, Wang L, Cheng ML, Luo XH, Li H
- 1609 Identification of an immune-related gene signature for predicting prognosis and immunotherapy efficacy in liver cancer *via* cell-cell communication
Li JT, Zhang HM, Wang W, Wei DQ

META-ANALYSIS

- 1621 Effects of neoadjuvant chemotherapy *vs* chemoradiotherapy in the treatment of esophageal adenocarcinoma: A systematic review and meta-analysis
Csontos A, Fazekas A, Szakó L, Farkas N, Papp C, Ferenczi S, Bellyei S, Hegyi P, Papp A

CASE REPORT

- 1636 Myocardial metastasis from ZEB1- and TWIST-positive spindle cell carcinoma of the esophagus: A case report
Shibata Y, Ohmura H, Komatsu K, Sagara K, Matsuyama A, Nakano R, Baba E

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Innovative pathways allow safe discharge of mild acute pancreatitis from the emergency room

Darshan J Kothari, Sunil G Sheth

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Abstract

Acute pancreatitis (AP) is a leading cause of gastrointestinal-related hospitalizations in the United States, resulting in 300000 admissions per year with an estimated cost of over \$2.6 billion annually. The severity of AP is determined by the presence of pancreatic complications and end-organ damage. While moderate/severe pancreatitis can be associated with significant morbidity and mortality, the majority of patients have a mild presentation with an uncomplicated course and mortality rate of less than 2%. Despite favorable outcomes, the majority of mild AP patients are admitted, contributing to healthcare cost and burden. In this Editorial we review the performance of an emergency department (ED) pathway for patients with mild AP at a tertiary care center with the goal of reducing hospitalizations, resource utilization, and costs after several years of implementation of the pathway. We discuss the clinical course and outcomes of mild AP patients enrolled in the pathway who were successfully discharged from the ED compared to those who were admitted to the hospital, and identify predictors of successful ED discharge to select patients who can potentially be triaged to the pathway. We conclude that by implementing innovative clinical pathways which are established and reproducible, selected AP patients can be safely discharged from the ED, reducing hospitalizations and healthcare costs, without compromising clinical outcomes. We also identify a subset of patients most likely to succeed in this pathway.

Key Words: Emergency department; Mild pancreatitis; Pathways; Hospitalization; Predictors

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Core Tip: In this editorial we review the outcomes of an emergency department (ED) pathway for patients with mild acute pancreatitis. The goal of the pathway is to reduce hospitalizations, prevent iatrogenic complications and reduce costs, without affecting readmission rates or mortality. We discuss the clinical course and outcomes of mild acute pancreatitis patients enrolled in the pathway who were successfully discharged from the ED compared to those who were admitted to the hospital, and identify predictors of successful ED discharge to select patients who can potentially be triaged to the pathway.

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INTRODUCTION

Acute pancreatitis (AP) is an inflammatory condition of the pancreas caused by the activation of pancreatic enzymes resulting in digestion of the pancreatic parenchyma. Patients typically present with acute onset epigastric abdominal pain with nausea and vomiting[1]. Diagnosis of AP requires two of the following three criteria: (1) Classic abdominal pain; (2) serum amylase or lipase that is greater than three times the upper limit of normal; and/or (3) radiographic evidence of pancreatic inflammation. Further, severity of AP is determined by the presence of peripancreatic complications and/or end-organ damage (*i.e.*, renal failure, respiratory failure or altered mental status)[2,3]. Studies report that patients with severe AP can have a mortality of nearly 30% during the hospitalization however account for less than 25% of all AP. Conversely, the majority of patients with AP have mild presentations and generally have a low mortality rate[1].

MAIN TEXT

In the United States, the most common cause of AP is gallstones followed by alcohol use and contributes to nearly 300000 hospital admissions per year amounting to approximately \$2.6 billion in aggregate costs per year[4]. Over the past two decades, the incidence of AP has increased amongst hospitalized patients with an estimated annual incidence ranging from 68 to 81 per 100000 persons[5]. Furthermore, despite the low mortality rate for patients with mild AP, traditionally, patients with mild AP are hospitalized with length of stay (LOS) of up to 3 d to 7 d[6-8]. Thus, patients with AP contribute to significant health care costs per year and opportunity exists to streamline care for patients with mild AP.

In an effort to reduce healthcare costs, Emergency Departments (ED) implement clinical pathways for common chief complaints and clinical conditions to streamline care. The goal of these pathways is to provide high-level care and identify those patients who need admission *vs* those who can be stabilized and safely discharged with outpatient management. Examples include chest pain with acute coronary syndromes, asthma, atrial fibrillation, seizures, congestive heart failure, hyperglycemia including diabetic ketoacidosis, and chronic obstructive pulmonary disease. In these scenarios, pathways include specialists that help direct care but also a direct transition to outpatient follow up. These pathways became the mainstay of therapy during the coronavirus disease 2019 pandemic when EDs were overcrowded and hospital beds were scarce. In these times, other conditions that were typically managed with admission were managed with ED stabilization and close outpatient follow up[9-16].

The traditional dogma for AP management includes hospital admission for fluid resuscitation, bowel rest, symptom management, and risk mitigation for recurrence (*i.e.*, cholecystectomy for biliary pancreatitis and alcohol cessation resources for alcoholic pancreatitis)[1,2]. Over the decades, studies and guidelines advance this management to improve care and reduce hospital LOS. Specifically, the American Gastroenterological Association (AGA) guidelines for early management of AP published in 2018 specifically advocate for goal directed fluid resuscitation and oral solid diet within 24 h of presentation[17]. Streamlined protocols in AP are aimed at reducing LOS and health care costs[18-21]. Some studies have explored the effect of such pathways on patient outcomes including mortality, sepsis, and LOS[22-25]. One study using a combined paging alert and web-based clinical decision-making tool and demonstrated a reduction in LOS and included all patients with AP regardless of severity and local complications[25]. Finally, with greater support for judicious use of fluids, as published in Waterfall trial in 2022, there is greater evidence to support streamlined care[26].

Furthermore, a 2014 Turkish study demonstrated that patients with mild AP could be safely discharged from the ED with intensive in-home therapy without a difference in readmission rates and with lower charges[27]. Although a novel approach, most health systems are not able to provide intensive home care and thus these results are not generalizable to most. Further, this study eliminated alcoholic pancreatitis, an important etiology to consider for United States patients. Given the low mortality rates for mild AP and accurate prediction scoring systems to identify patients with mild AP, patients with low-risk AP could potentially be managed safely within the confines of the ED with close outpatient follow up.

In a study published in 2018, we developed a clinical pathway for patients with mild AP with the aim to determine the feasibility of managing these patients in the ED with discharge after stabilization rather than admission[28]. The clinical pathway isolated patients with the mildest form of AP by excluding those with confirmed moderately-severe or severe AP, patients with persistent systemic inflammatory response, severe hyperglycemia, evidence of cholangitis or

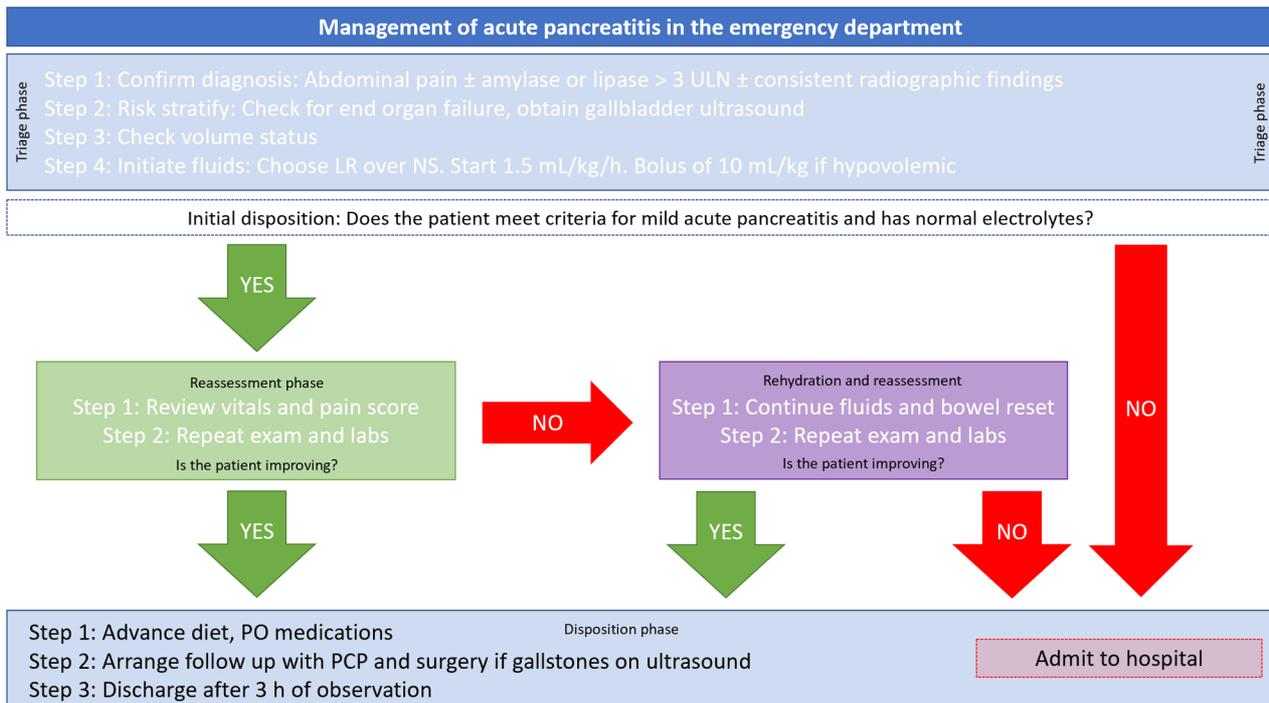


Figure 1 Example decision support tool for acute pancreatitis management in the emergency department. ULN: Upper limit of normal; NS: Normal saline; LR: Lactated ringers; PCP: Pseudotumoral chronic pancreatitis.

choledocholithiasis, or with patients with severe comorbidities (such as heart failure with reduced ejection fraction or end-stage renal failure on hemodialysis or peritoneal dialysis). Patients enrolled in the ED observation pathway, received structured hydration and reassessment in 8 h increments. Improvement was defined as lower pain scores, nausea controlled by medications, presence of hunger, and stable vital signs. When improved, patients would receive a solid fat diet and with continued improvement would be discharged with primary care or gastroenterology (GI) follow up. Patients with biliary pancreatitis in the absence of cholangitis or choledocholithiasis would have surgical follow up within 7 d of discharge to ensure close interval cholecystectomy. Patients who failed to improve would be admitted and follow standard of care.

In comparison to those admitted, we found that patients were typically younger, had lower prediction scores, and were more likely to have an idiopathic etiology for their pancreatitis. Patients in the observation pathway had a significantly lower LOS (22 h *vs* 87 h). In this study we also compared those patients in the observation pathway to a historical cohort of patients with similar presentations who would have met criteria for observation. In this comparison, patients' LOS were significantly longer in the historical cohort (72 h *vs* 23 h) and significantly greater patient charges in the historical cohort. Importantly, there was no difference in 30 d readmission rates and there were no deaths in either cohort. These findings suggested that a robust ED-based clinical pathway could be safe for the mildest form of AP.

In follow-up, we published longer-term data using the same ED-based clinical pathway in 2021[29]. In this study, the patients enrolled in the observation pathway continued to have a lower LOS and significantly fewer patient charges than those admitted and compared to those of a historical cohort without differences in readmission and without any related deaths. Compared to the initial study that had direct oversight by the GI team, the follow up study demonstrated that the ED providers could use the clinical pathway autonomously suggesting the ease of implementation and generalizability to institutions without GI providers. Using the availability data, we found that older age, greater medical comorbidity, and biliary pancreatitis were predictors for admission rather than observation whereas patients with idiopathic pancreatitis were nearly eight times more likely to be observed[30].

These studies demonstrate both the feasibility and durability of ED-based clinical observation pathways to support patients with mild AP using guideline based care while also providing safe discharge and avoiding unnecessary admission. In using such pathways, healthcare systems could reduce costs without compromising patient care or safety. In **Figure 1**, we provide a sample clinical decision tool as an example of a type of ED-based clinical pathway. In implementing such a pathway, we suggest assembling a group of stakeholders to include ED providers (physicians, midlevel providers, and nursing leadership), GI providers, hospital administrators and surgeons to sure that this pathway has support. Implicit in instituting such a pathway requires clear communication between the stakeholders to reduce risk of error and patient harm. In the studies we presented, we created a specific alert system to ensure that patients discharged from the ED on the pancreatitis pathway had adequate follow up with appropriated providers.

CONCLUSION

AP is an important contributor to healthcare burden in the United States and although some presentations are associated with a high mortality rate, the majority of patients have mild AP and thus a low mortality rate. As demonstrated by other clinical pathways for similarly morbid conditions such as asthma and atrial fibrillation, the mildest form of AP can safely manage in the ED with the implementation of guideline based clinical pathway.

FOOTNOTES

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