Annals of Gastroenterology (2015) **28,** 299-300

Investigating the predictive role of computed tomography in patients with acute pancreatitis: let's not give up

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Acute pancreatitis (AP) is the leading gastrointestinal-related discharge diagnosis in the United States [1]. The clinical outcome of AP varies broadly with mortality rates reaching 30% in severe cases [2]. An accurate and early prediction of disease severity would be beneficial in directing the patient to the most appropriate management, and ultimately in improving outcome. Although multiple clinical scoring systems have been developed, they show modest accuracy in predicting persistent organ failure in AP [3,4]. Among the available clinical scoring systems Systemic Inflammatory Response Syndrome (SIRS) and Bedside Index for Severity in AP (BISAP) scores have been extensively studied in recent years and are easily applicable in daily practice [3-5]. Computed tomography (CT) is the imaging modality of choice for the diagnosis of AP and for the assessment of local complications [2,6]. In the past 30 years, several radiological scoring systems have been proposed to predict severity of AP [7]. Among the most commonly used scoring systems is CT Severity Index (CTSI), based on the assessment of pancreatic/peri-pancreatic inflammation and fluid collections, and on the presence and extent of pancreatic necrosis [8]. In 2004, Mortele *et al* introduced the "modified CTSI" (mCTSI) scoring system which combines the evaluation of pancreatic and peri-pancreatic inflammatory findings with extra-pancreatic complications [9]. Few other scoring systems rely only on extra-pancreatic findings [10-13]. Among them, the ExtraPancreatic Inflammation on CT (EPIC) score, introduced by de Waele *et al* in 2007, is based on presence and extent of pleural effusion, ascites, and retroperitoneal /mesenteric inflammation [12]. There has been limited validation of the prognostic role of the imaging scoring systems based only on extra-pancreatic findings.

In the current issue of the *Annals of Gastroenterology*, Sharma *et al* compared two CT scoring systems relying only on extra-pancreatic findings (i.e. EPIC score and renal rim sign) with clinical (i.e. BISAP and SIRS) and conventional CT scores (CTSI and mCTSI) for prediction of persistent organ failure, need for pancreatic drainage/debridement, and mortality [14]. The study was conducted retrospectively in a cohort of 105 patients with AP who underwent contrast-enhanced CT 3-10 days after onset of symptoms. The authors showed comparable predictive accuracy of these scoring systems, although the BISAP score had the highest performance in predicting persistent organ failure and mortality. In this study, the CT-based scores did not provide any additional prognostic value to the clinically-based score. In a recent, large prospective study, Bollen *et al* found no statistically significant difference in predicting severity of AP between CT-based and clinical scoring systems obtained within 24 h of hospitalization [15].

The available literature does not show any additional value of CT for assessment of patient prognosis in the early phase of AP. At this point the question for a researcher interested in identifying predictive imaging biomarkers of AP is: *Should we stop looking for such biomarkers?*

We believe that the answer is *no* and that more work can be done. Extra-pancreatic imaging findings, although included in multiple CT-based scoring systems, have been assessed in qualitative or semi-quantitative way. Research on full quantification of these findings has been scant. In their recent study Meyrignac *et al* showed significant correlation between volumetric measurement of extra-pancreatic necrosis and clinical outcome [16]. We believe that a full quantification of inflammatory imaging findings of AP could provide new insights into the predictive role of CT. The required imaging analysis can be facilitated by the utilization of dedicated software. In addition, the terminology introduced with the revised Atlanta classification allows uniform standardization of the findings to be analyzed, such as peri-pancreatic necrosis and fluid collections [2].

CT images offer a vast amount of data perhaps as yet not used to its full extent in patients with AP. More work can be done - *let's not give up*.

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Conflict of Interest: None

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Received 28 February 2015; accepted 03 March 2015

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