

The Dynamics of Acute Necrotic Collections Quantified with Texture Analysis

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ABSTRACT

Background. Pancreatic fluid collections are seen in up to 50% of cases of acute pancreatitis. Acute necrotic collections consist of inhomogeneous mixture of liquefied, necrotic fatty tissue along with solid pancreatic and extra-pancreatic debris. They may gradually resolve or persist as walled-off necrosis – a homogeneous well-demarcated fluid collection. However, quantification of changes in these collections has never been performed. We propose a texture analysis of these collections as a quantitative description of changes in acute necrotic collections.

Methods. In our retrospective study, we included all patients with acute necrotizing pancreatitis that were hospitalized at the Department of Abdominal Surgery, University Medical Centre Ljubljana from January 2016 until October 2017. All patients with two or more successive CT examinations and acute necrotic collections present on CT examinations were included. The analysis of CT images was performed at the Institute of Radiology, University Medical Centre Ljubljana. Two blinded radiologists analyzed all the images and determined heterogeneity of peripancreatic collections with LIFEx software sys-

tem. Periodic change of heterogeneity of peripancreatic fluid was determined with paired samples t-test.

Results. There were 19 patients in our group, 13 men (68%) and six women (32%). Fifty CT examinations were performed (mean 2.6 per patient, range 2–4 per patient). The median difference between the first and the last examination was 22 days (range 3–190 days). A texture analysis of one collection per examination was performed; altogether 19 fluid collections were analyzed (one per patient). The mean change in entropy was 7% (3.90 versus 3.62, $p < 0,001$). The intraobserver agreement was calculated and will be reported in the final version.

Conclusions. Texture analysis of acute pancreatic necrotic collections is a feasible method capable of quantitative description of an evolution of acute necrotic collections with a decrease in entropy and increase in homogeneity. This finding has a potential role to help clinicians decide about further treatment options and finding the right timing for interventional or surgical procedure. Further studies with bigger sample size are needed to confirm this data.

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