Abstract / Povzetek predavanja

Imaging in Crohn's disease and ulcerative colitis: intestinal ultrasound – "a new kid on the block"

Silvija Čuković-Čavka[1,2]
[1]*School of Medicine University of Zagreb, Zagreb, Croatia*
[2]*Department for Gastroenterology and Hepatology, University Hospital Center Zagreb, Zagreb, Croatia*
Correspondence: silvija.cavka@gmail.com
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Imaging of the gut in inflammatory bowel disease (IBD) patients is crucial in the process of establishing diagnosis. Ileocolonoscopy is the gold standard in initial part of diagnostic process but endoscopy is invasive procedure which can visualize only mucosal part of the bowel wall. Imaging techniques traditionally used for the assessment of IBD patients include magnetic resonance enterography (MRE) and computed tomography enterography (CTE). In spite of the fact that MRE is radiation-free, it is not practical for the regular monitoring of IBD patients because of the long waiting time for an appointment and high cost. At the other hand, CTE is widely available but limited due to its high radiation exposure. In spite of the fact that first record on the idea about the measuring bowel thickness by ultrasound machine dates back to fifties of the last century, only in the last decade, intestinal ultrasound IUS) is becoming a popular diagnostic tool in the area of IBD diagnostics and treatment. The main advantage of intestinal ultrasonography over the other imaging methods is that is available without any preparation of the patient or cleansing of the bowel. It is transabdominal, non-invasive, radiation-free, real-time, and inexpensive method. Also, this method can be conducted by specialist during the regular outpatient appointment which allows assessment of peristalsis and differentiation of fixed intestinal stenosis from functional changes. Intestinal ultrasound has to be performed with a high-frequency (usually linear) probe and low-frequency sector array transducer to gain a better visualization and not overlook any deeper-lying structures and collections. The position of the patient should be supine. A systematic approach should be used by scanning the bowel both longitudinally and cross-sectionally.

The colon and the small intestine may be distinguished by ultrasound from each other based on the presence of haustration and the Kerckring's folds. There are frequently visible and useful as landmarks. Terminal ileum and colon are easier to assess than lesions in the proximal small-bowel where assessment can be very challenging. Also, the rectum is not routinely assessed using a high-frequency probe but sometimes can be reached by convex probe. There is no need for routine application of oral contrast during the classic protocol of IUS but if it is applied polyethylene glycol solution as the contrast agent it can enhance small-bowel visualization and measure the accurate diameter of the lumen in the stenotic part of the gut and additionally confirm prestenotic dilatation above the gut stricture. If oral contrast is used, the method is referred to as Small Intestinal Contrast Ultrasound (SICUS) and has a long tradition in Italy. The most important ultrasound features in IBD patients are bowel wall thickness (BWT), bowel wall stratification (BWS) and Colour Doppler Signal (CDS). The measurement of wall thickness it crucial. Thickness of the normal intestinal wall does not exceed 3

mm with slight probe compression. The typical layers are: hypoechoic mucosa, hyperechoic submucosa, hypoechoic muscularis propria and hyperechoic serosa. In the non-inflamed bowel wall, stratification is preserved, intramural vascularization is weak and peristalsis is normal. IUS parameters, especially BWT and CDS, has a potential for close monitoring of treatment, especially for the assessment of early response on therapy in UC and CD patients. Mesenteric proliferation, lymph nodes and free fluid are also important parts of bowel ultrasonography report.

Imaging of the bowel by ultrasound became very useful for the early diagnosis, monitoring and assessment of complications of Crohn's disease and ulcerative colitis because IUS has high sensitivity and specificity. The technical advances of ultrasound machines and modern probes allow an accurate imaging of the gut.

Patient during the IUS procedure can be educated by attending physician which ultimately influence better patient' understanding of the disease, compliance and motivation for therapy.

Some cons of IUS include limitations of the scan quality due to intestinal gas which can make visualization difficult. Quality of the scan depends also on the examiner's skill which ultimately depends directly on specialized training and the experience of performer. The method can be challenging and demanding in obese patients and in patients with previous multiple surgeries, especially in the case of small bowel resections.

However, as with other methods, a dedicated training is required to learn how to perform adequately bowel ultrasonography. IUS has been traditional part of gastroenterology training curriculum in Germany and Italy. A lot of efforts were made recently to popularize IUS worldwide, especially with initiative done by International Bowel Ultrasound (IBUS) Group established in 2016. Theoretical knowledge is the basis of the learning process of IUS but there is no skill acquisition without long practice, patience and passion for learning which are prerequisites for effective learning. One of the options to achieve bowel ultrasonography education nowadays it to participate in the IBUS 3-step training curriculum, details of the education programme could be reached wisiting the website of the IBUS Group (https://www.ibus-group.org).

CONCLUSION

Current data confirm that IUS has important role in the non-invasive assessment of patients with Crohn's disease and ulcerative colitis. It is a fascinating, simple, no-prep, no-radiation and fast technique which deserves the implementation as a standard tool for IBD patients in everyday clinical practice focused on "treat-to-target" approach but also as an objective non-invasive measure of transmural inflammation and treatment response in clinical studies.

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