

Use of Ultrasonography in Patients with Inflammatory Bowel Disease and Spondyloarthritis: An Update

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Abstract

Intestinal Bowel Diseases (IBDs) are inflammatory diseases of the gastrointestinal tract that are often associated with extra-intestinal manifestations, the most frequent of which are musculoskeletal symptoms. These are experienced by 6-46% of IBD patients, and include articular, peri-articular and muscular involvement, osteoporosis and the related fractures, and fibromyalgia. IBD-related SpondyloArthritis (SpA) is mainly characterised by axial involvement, but may also be associated with synovitis, dactylitis or signs of enthesopathy such as Achilles tendinitis, plantar fasciitis and chest wall pain. SpA-associated enthesitis is generally assessed by eliciting tenderness at the entheses. UltraSonography (US) is a non-invasive and easily reproducible means of diagnosing and following up SpA patients, but there are only a few published studies of its use in IBD patients with articular involvement. This review analysed all of the data available in the literature and our new findings.

Keywords: Intestinal bowel diseases; Enthesopathy; Articular involvement; Instrumental examinations; Ultrasonography

Introduction

Crohn's Disease (CD) and Ulcerative Colitis (UC) are chronic relapsing inflammatory bowel diseases (IBDs) of unknown etiology that affect up to 1/250 of adults, with up to 25% of the patients being diagnosed during childhood or adolescence [1]. The key features of UC include diffuse mucosal inflammation extending proximally from the rectum, whereas any site in the gastrointestinal tract may be affected by typically patchy and segmental transmural inflammation in the case of CD [2]. IBDs are often associated with extra-intestinal manifestations, the most frequent of which are musculoskeletal symptoms. These are experienced by 6-46% of IBD patients [3,4], and include articular, peri-articular and muscular involvement, osteoporosis and the related fractures, and fibromyalgia [3]. IBD-related arthropathy is classified in the group of inflammatory arthritides called seronegative spondyloarthropathies, which include idiopathic Ankylosing Spondylitis (AS), Reactive Arthritis (ReA), Psoriatic Arthritis (PsA), and undifferentiated spondylarthropathy (SpA), and is sub-divided on the basis of the type of articular involvement and the number of joints affected by axial and peripheral arthritis [4].

IBD-Related Spondyloarthropathy

The clinical association of SpA and IBD is well-established. As many as 10-15% of the cases of IBD are complicated by AS or other forms of SpA [5], and ileal inflammation resembling IBD has been found in up to two-thirds of the cases of SpA; it has also been suggested that the presence of ileitis is associated with the chronicity of articular complications. Moreover, evidence of the familial clustering of IBD and AS, the co-existence of both conditions in patients, an increased risk ratio among first- and second-degree relatives of AS or IBD patients, and an increased cross-risk ratio between AS and IBD confirms the existence of a shared genetic predisposition, although IL23R is the only shared susceptibility gene that has so far been identified [6].

IBD-related SpA is mainly characterised by axial involvement, but may also be associated with synovitis, dactylitis, or signs of enthesopathy such as Achilles tendinitis, plantar fasciitis and chest wall pain [7]. It can also simulate idiopathic SA. The diagnosis of SpA is often missed or delayed because years may elapse from the onset of inflammatory back pain to the development of radiographic sacroiliitis in many patients with AS.

Entheses in SpA and IBDs

Entheses are the points at which tendons, fasciae or joint capsules insert into bones, and are typically affected by Inflammatory Rheumatic Diseases (IRDs) such as SpA [7]. Histopathological studies have demonstrated that enthesitis is the key alteration that causes the typical erosions and bone proliferation, and so its early detection is essential for preventing disease progression and disability [7].

SpA-associated enthesitis is generally assessed by eliciting tenderness at the entheses. However, although an enthesitis index of tenderness assessed at 66 enthesal insertions correlates with SpA pain and stiffness scores, it is time-consuming to use and its inter-observer reliability is poor. Enteseal histology is a potential "gold standard" for evaluating enthesitis, but is rarely used because of its ethical and practical constraints. Plain radiography, ultrasonography (US) and Magnetic Resonance Imaging (MRI) reveal soft tissue thickening, cortical bone breakage, new bone proliferation, and bone structure alterations at inflamed entheses that allow the quantification of enthesitis [8]. The radiological scoring of SpA-associated enthesitis progression is mainly based on plain radiography of the spine [9]. The MRI evaluation of enthesitis is useful, but limited by its availability and expense [6]. Furthermore, its resolution of superficial structures is no better than that of US, which has a 200-450 µm in-plane resolution at an insonation frequency of 10 MHz. Although MRI remains the gold standard for assessing enteseal involvement, the most recent US techniques can detect early pathological changes [7-13], thus making it a useful, non-invasive and easily reproducible means of diagnosing and following up SpA patients [10-13].

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Ultrasonography and IBD-Associated Enthesitis

Balint et al. [14] found that a non-clinical examination showed that 22% of the enthesal insertions were inflamed, a finding that is similar to that of a previous study of calcaneal entheses [13]. Lehtinen et al. [15] noted less clinical enthesitis in the lower limbs of SpA patients (56/372, 15%), which may reflect differences between the two patient groups. The presence of tenderness was more sensitive than swelling in detecting enthesitis, as they were respectively present at 14-28% and 0-14% of enthesal sites. US detected enthesitis at 51.4-63.8% of enthesal sites, and was more sensitive than a clinical examination of tenderness and swelling together or separately. Taking US as the gold standard, neither tenderness nor swelling was specific in detecting enthesitis as only 44/75 clinically inflamed entheses were confirmed by US [15].

Only Bandinelli et al. [16] has evaluated US enthesal abnormalities in IBD patients. Using the GUESS score, they found that patients with no signs or symptoms of SpA showed a large number of pathological enthesal alterations [16]. De Miguel et al. [17] demonstrated that the Madrid Sonographic Enthesis Index (MASEI) is highly sensitive and accurate in diagnosing early SpA, and D'Agostino et al. [18] found that 81% of subjects with a positive Power Doppler (PD) signal in at least one enthesis developed a defined SpA.

We used US (an ESAOTE MyLAB 70 10-18 MHz linear array transducer) to evaluate 15 consecutive IBD patients (nine with CD and six with UC; eight females and seven males with a mean age of 42 years; range 26-72) with a low level of disease activity or in clinical remission, and compared the results with those obtained in 16 patients with a previous diagnosis of enteropathic spondyloarthritis (11 with CD and five with UC; four females and 12 males with a mean age of 46.5 years, range 26-71) [19]. The median MASEI score of the patients with a positive score (>18) were significantly lower in the patients with IBD alone than in those with IBD+SpA (14 vs 27; $p=0.004$), but the percentage of patients with at least one PD-positive enthesis (47% vs 69%; $p=0.0285$) or enthesophytes (93% vs 100%) was not statistically different. There was a significant between-group difference in the number of patients with at least one erosion (13.3% vs 69%; $p=0.003$). The MASEI scores of both groups correlated directly with the clinical MASES variables ($r=0.028$), and inversely with the Schöber test values ($r=0.029$) [19]. In conclusion, 33.3% of the IBD patients had a US score suggesting spondyloarthritis. There were no differences in the clinimetric and clinical variables of the IBD patients with a MASEI score of <18, and the percentage of patients with US enthesal abnormalities, a positive PD signal and enthesophytes was similar in the two groups [19].

In conclusion, US is a useful means of evaluating enthesopathies in asymptomatic IBD patients, although further studies are necessary to clarify the published findings.

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