Conclusions: These preliminary results suggest that an increased value of IMT may be observed in patients with very high or high risk of CV disease. However, the IMT value was higher than the reference cut-off only in a limited number of the studied arteries.

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SAT0662 SCREENING RESEARCH OF ULTRASONOGRAPHIC PERIPHERAL ARTHRITIS AND ENTHESITIS IN PATIENTS WITH INFLAMMATORY BOWEL DISEASE

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Background: Some patients with inflammatory bowel diseases (IBD) such as ulcerative colitis (UC) and Crohn's disease (CD) develop spondyloarthritis (SpA). Conventionally, the assessment of affected joint count in patients with SpA was relied for the detection of swelling and tenderness in the joints and enthesitis by clinical physical examination. To date, high quality ultrasonography (US) can detect inflammatory condition in the joint and enthesitis more sensitively than clinical assessment.

Objectives: The aim of this study was to research the utility of US screening for detection of peripheral arthritis in patients with IBD.

Methods: Total 42 patients including 27 patients with UC and 15 patients with CD were consecutively included. HI VISION Ascendus (HitachiAloka Medical, Tokyo, Japan) was used with an 18 MHz linear array transducer. US examination was performed in MCP, PIP, DIP and wrist joints in both hand. Greyscale (GS) and power Doppler (PD) US were scored on a 0–3 semiquantitative scale for each joint. Moreover, the US assessment of enthesitis was performed. Lateral epicondyle, triceps enthesitis, the proximal and distal patella tendon enthesitis, Achilles tendon and fascia plantaris tendon enthesitis was scanned in both GS and PD assessment. Abnormal findings of enthesitis was defined structure, thickness, bur-sitis, erosion, calcification in GS and power Doppler signal.

Results: In the joint clinical assessment, 12 patients with UC and 7 patients with CD had joint symptoms. US active synovitis (GS Grade $\geq$ 2 · PD Grade $\geq$ 1) was found in 8 patients with UC and 6 patients with CD. The concordance rate between clinical findings and US findings was relatively low in UC and high in CD patients. In the enthesitis clinical assessment, 9 patients with UC and 7 patients with CD had tenderness in any enthesitis. Active enthesitis in US was found in 16 patients with UC and 8 patients with CD. The concordance rate between clinical findings and US findings was relatively high and subclinical enthesitis was also found in many patients.

	UC (n=27)	CD (n=15)
Male (%)	9 (33.3%)	7 (46.7%)
Age (years)	46.1 $\pm$ 14.2	39.4 $\pm$ 11.6
Height (cm)	161.2 $\pm$ 8.4	163.1 $\pm$ 5.8
Weight (kg)	56.4 $\pm$ 17.4	56.0 $\pm$ 9.16
BMI	21.3 $\pm$ 4.9	21.0 $\pm$ 3.0
Duration of IBD (years)	13.3 $\pm$ 12.5	12.3 $\pm$ 9.7
Clinical peripheral joint symptom	12 (44.4%)	7 (46.7%)
Active US synovitis (GS $\geq$ 2, PD $\geq$ 1)	8 (29.6%)	6 (40.0%)
Clinical enthesitis symptom	9 (33.3%)	7 (46.7%)
US enthesitis (any pathological findings)	16 (59.3%)	8 (53.3%)
Inflammatory back pain	12 (44.4%)	9 (60.0%)

Conclusions: The peripheral arthritis and enthesitis findings in patients with IBD was compared between clinical and US examination. The prevalence rate of sub-clinical synovitis was not high, thus US screening might not be useful in patients with IBD without arthritis symptom. However, the subclinical enthesitis was found in patients without any enthesitis symptoms. US screening might be useful to detect subclinical enthesitis than clinical examination in patients with IBD.

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SAT0663 A NEW OPERATOR INDEPENDENT AUTOMATIC TOOL FOR ACCURATE IDENTIFICATION OF VERTEBRAL FRAGILITY FRACTURES

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Background: Osteoporosis is a systemic skeletal disease characterised by a compromised bone resistance that predisposes a subject to an increased risk of fracture. In particular, vertebral fractures are the most common of all osteoporotic fractures. A common clinically-used method for vertebral fracture detection is vertebral morphometry, which is based on measurements of front (Ha), middle (Hm), and rear (Hp) heights of vertebral bodies in radiographic images. This method is quantitative and does not require specific operator skills, but its actual accuracy is affected by errors made during the time-consuming manual measurements.

Objectives: In this work we propose a fully automatic algorithm for morphometric measurement, whose final goal is to reduce errors due to manual and semi-automatic processes. Our automatic method identifies the vertebrae and their edges. Then, the algorithm measures the characteristic vertebra heights (Ha, Hm, Hp) and determines possible vertebral deformities.

Methods: The vertebral morphometry uses lateral X-ray images and it is based on height measurements of vertebral bodies:

$$Hp = ||P1 - P2||_2,$$

$$Ha = ||A1 - A2||_2,$$

$$Hm = ||M1 - M2||_2.$$

Where: Pi: rear vertebral corners;

Mi: middle vertebral points;

Ai: front vertebral corners.

The vertebral deformities can be determined as follows:

biconcave deformity: $Hm/Hp < 0.80$, crushing deformity: $Hp/Hp(\pm 1) < 0.80$, wedge deformity: $Ha/Hp < 0.80$.

The main problem in implementing our fully automatic algorithm was the correct placement of the six reference points for each detected vertebra. Our approach first combined literature-reported methods for the identification of vertebrae in X-Ray images, subsequent emphasise the vertebral borders. The four corners of the vertebra (Pi and Ai) were localised on the borders detected vertebra. While, the middle points Mi were positioned at equal distance from Pi and Ai.

Results: The performance tests were based on the comparison between the results coming from our automatic approach and those obtained from the manual measurements by an experienced radiologist. We analysed 100 conventional lateral radiographs. The following metrics were used: sensitivity and specificity in vertebra detection; errors in the localization of characteristic points and in the measurement of diagnostic parameters; correlation between manual and automatic measurements. The results of our method showed a sensitivity of 90.8% and a specificity of 99.0%. Average errors in the localisation of vertebral characteristic points were always smaller than 3 mm. Bland-Altman analysis documented a mean error in automatic measurements of diagnostic ratios of 0.01 ± 0.15 (bias ± 2 SDs), while Pearson's correlation coefficient resulted $r = 0.71$ ($p < 0.001$).

Conclusions: Obtained results of our method compared to the results obtained by a trained radiologist showed an acceptable low error rate, a very good performance in vertebra detection and the same diagnosis (normal, biconcave deformity, crushing deformity, and wedge deformity). Overall, the adopted method has a strong potential for an effective employment in clinical routine for fast and accurate diagnosis of vertebral fractures.

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