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High prevalence of ultrasound detected monosodium urate deposits among children with asymptomatic hyperuricemia.

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Background:
Gout is the most common type of inflammatory arthritis in adults and rare in pediatric population. Both gout and asymptomatic hyperuricemia (AH) are associated with chronic deposition of uric acid (UA) crystals that may be detected by ultrasound (US). There is only limited knowledge about frequency of joint changes in children with primary AH in the literature.

Objectives:
The aim of the study was to assess the frequency of US changes in population with pediatric onset of AH.

Methods:
15 patients of age 2-19 years with pediatric onset of AH were recruited. All of them were clinically asymptomatic, mean duration of AH at time point of US investigation was 2,6 years (SD 1,1). The cohort was previsously characterised in detail, included sequencing analysis of main urate transporter ABCG2, showed that ABCG2 dysfunction is a strong risk factor for pediatric-onset hyperuricemia/gout[1,2].
Patients were selected from the Department of Pediatrics and Inherited Metabolic Disorders in Prague and had no history or signs of renal diseases. In terms of serum UA levels, the definition of hyperuricemia was as follows: men 15-18 years > 420 µmol/L, and women and children under 15 years > 360 µmol/L both on two repeated measurements taken at least 4 weeks apart. Every patient underwent US assessment of 34 joints and 6 tendons of both hands and feet (joints: metacarpophalangeal 1-5, proximal interphalangeal 2-5, metatarsophalangeal 1-5), knees, talocrural joints. Achilles, peroneal and wrist extensors tendons were assessed for inflammatory signs and tophi. Typical US changes were assessed according the OMERACT scoring system[3] (double contour (DC), aggregates (AG), tophi). Synovitis and tenosynovitis were assessed in Gray Scale (GS) and Power Doppler (PD) setting (0-3 severity score). Both kidneys were examined to exclude nephrolithiasis.
US assessments were made by 2 experienced sonographers with high inter-reader agreement of 0,89%, the same high-end US machine with 18-24 MHz probe was used in all investigations.

Results:
510 joints and 90 groups of tendons were examined. AG were found in 4 patients (26,6%, SD 0,43), DC in 2 patients (13,3%, SD 0,3), tophus in 1 patient in MTP1 (6,6%, SD 0,2). Mild synovitis was found in 7 patients (46,6%, SD 0,5) but no PD activity was identified. No other US features were identifyed (tenosynovitis, erosion, extraarticular tophus or nephrolithiasis).
Synovitis associated with the presence of AG was found in 3 patients, with DC in 2 patients, and in 2 patients, the finding was isolated bilateral mild synovitis in MTP1. Most changes were found in young adolescents 15-19 years old with known hyperuricemia duration of at least 2 years; mean UA level in this age group was 439 µmol/L (SD 90).

Conclusion:
This is the first report on US changes in the pediatric population with AH. A surprisingly high frequency of US-detected deposits was observed. According to previously published data from the Japanese population[3], most

changes were found in young adolescents, with a possible association with a longer duration of AH before diagnosis. Due to the limited number of patients, further studies are needed to confirm our findings.

References:

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