OP0265   **VALIDATION OF A DEFINITION FOR ATTACK (FLARE) IN PATIENTS WITH ESTABLISHED GOUT**

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Background: A standardized validated definition for gout attacks (flares) is not available. Two provisional definitions published in 2012 were based on patient-reported elements (patient-defined attack, pain at rest greater than 3 in a 0–10 numeric rating scale, presence of at least one swollen joint, presence of at least one warm joint) (1). These definitions had acceptable sensitivity and specificity but lacked external validation which is necessary before they can be adopted in gout clinical studies.

Objectives: To perform external validation of previously published preliminary gout attack (flare) definitions in patients with gout.

Methods: We enrolled 509 participants with gout from 17 international sites in a cross-sectional study performed during routine clinical care. All patients met the 2015 ACR/EULAR classification criteria for gout (2). Criteria for the previously published gout attack definitions were collected by a site investigator and the final adjudication of a gout attack status was done by a local expert rheumatologist, through an evaluation independent from that of the site investigator. Logistic regression, Bayesian statistics, and receiver-operator curves were used to calculate the final diagnostic performance of the gout attack definitions.

Results: The mean age of participants was 57.5 years (standard deviation [SD] 13.9) and 89% were men. Mean disease duration was 12.3 (SD 10.3) years, 35% had tophi, and 75% were taking urate-lowering therapies. The previously published and favored definition requiring the presence of 3 or more out of 4 criteria ("number of criteria") was found, using the current study data, to be 85% sensitive and 95% specific in confirming the presence of an attack in patients with gout (Table). The concurrent logistic regression model had an area under the curve of 0.97. The previously published definition based on a classification and regression tree algorithm (entry point pain at rest >3 followed by patient-defined attack "yes") was 73% sensitive and 96% specific using the current study data (Table). The "number of criteria" approach with a cut-point at 3 or more out of 4 criteria had higher diagnostic accuracy using the current study data than in its initial 2012 description (92% versus 84%, table). (1) Finally, using current study data the "number of criteria" approach at 3 or more out of 4 criteria had higher accuracy to the classification and regression tree algorithm based approach (92% versus 89%) but with a much better sensitivity (85% versus 73%).

Table. Diagnostic performance of gout attack (flare) definitions: "number of criteria"* and classification and regression tree (CART)

	Sensitivity% (95% CI)	Specificity% (95% CI)	PPV% (95% CI)	NPV% (95% CI)	Accuracy% (95% CI)
Number of criteria (current study)					
1 or more	100 (100)	66 (61-715)	57 (51-63)	100 (100)	77
2 or more	97 (94-100)	88 (84-91)	78 (72-84)	98 (97-100)	91
3 or more	85 (80-91)	95 (93-97)	88 (83-93)	94 (91-96)	92
All 4	61 (54-69)	98 (97-100)	94 (90-99)	85 (82-88)	87
3 or more (2012 provisional definition)†	91 (80-97)	82 (75-88)	64 (52-74)	96 (91-99)	84
CART‡ (current study)	73 (66-80)	96 (94-98)	90 (84-95)	89 (86-92)	89
CART (2012 provisional definition)	83	90	85	91	

CI = confidence interval, PPV = positive predictive value, NPV = negative predictive value
CART = classification and regression tree
*Criteria include: patient-defined gout attack, pain at rest greater than 3 in an 0-10 numeric rating scale, Presence of at least one swollen joint, presence of at least one warm joint
†3 or more criteria was found to have the best performance in a receiver-operator curve analysis
‡CART rule: Pain at rest > 3 followed by patient-defined gout attack positive

Conclusions: The definition requiring the presence of 3 or more out of 4 patient-reported criteria is validated to be sensitive, specific, and accurate in identifying attacks (flares) in patients with gout using an independent large international sample. Having a validated gout attack definition will improve ascertainment of outcomes in gout clinical studies.

References:
[1] Gaffo AL et al. Arthritis Rheum. 2012;65:1508.
[2] Neogi T et al. Ann Rheum Dis 2016;75:473.

OP0266   **PRESENCE OF MONOSODIUM URATE CRYSTALS BY DUAL-ENERGY COMPUTED TOMOGRAPHY IN GOUT PATIENTS TREATED WITH ALLOPURINOL**

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Background: Chronic hyperuricemia predisposes to deposition of monosodium urate (MSU) crystals in musculoskeletal and other tissues, causing chronic inflammation, acute gout flares, joint damage, and disfiguring tophi. Dual-energy computed tomography (DECT) is a useful imaging tool to detect and quantify MSU crystal deposits.

Objectives: This study assessed the evidence of MSU crystal deposition using DECT scanning among gout patients treated with allopurinol and the potential determinants associated with the observed deposits.

Methods: The multicenter DECT study recruited patients with gout from the USA and New Zealand who were taking allopurinol at ≥ 300 mg daily for at least 3 months. MSU crystal deposition was measured using DECT in hands/wrists, knees, and feet/ankles bilaterally. The presence of MSU crystals as well as the total volume of crystals were assessed according to gout characteristics and serum uric acid (sUA) levels.

Results: Patients (N=153) were predominately male (92.2%), with mean (SD) age 58.5 (11.4) years, and gout duration 14.9 (10.3) years. sUA was ≥ 6.0 mg/dL in 49.0% of patients. 81.7% of patients took allopurinol at a stable dose of 300 mg/day and the remainder at >300 mg/day. 69.1% of patients had MSU crystal deposits with a total median crystal volume of 0.16 cm^3 (range, 0.01 to 19.53 cm^3). Those with sUA ≥ 6.0 mg/dL and palpable tophi showed the highest prevalence of urate deposits (90%), and those with sUA <6.0 mg/dL and no palpable tophi showed the lowest prevalence (47%). Those who reported a gout flare within the prior 3 months (versus none), were prescribed allopurinol doses >300 mg (versus 300 mg), and had palpable tophi (versus none) had greater deposit volume.

Table. Summary of Urate Deposits on DECT Scan According to Palpable Tophus Status and sUA Level.

	Tophi		No tophi		Total
	sUA ≥6.0 mg/dL (n=20)	sUA <6.0 mg/dL (n=28)	sUA ≥6.0 mg/dL (n=55)	sUA <6.0 mg/dL (n=50)ª	(N=153) ª
Median volume (range) for nonmissing urate deposits	0.26 (0.00, 19.53)	0.16 (0.00, 4.63)	0.09 (0.00, 1.23)	0.00 (0.00, 0.89)	0.07 (0.00, 19.53)
Presence of urate deposits, n (%)	18/20 (90.0)	20/28 (71.4)	44/55 (80.0)	23/49 (46.9)	105/152 (69.1)
	P=0.16 ᵇ		P<0.001 ᵇ		
	P<0.001 ᶜ				
Median volume (range) for positive scans	0.37 (0.01, 19.53)	0.29 (0.05, 4.63)	0.12 (0.01, 1.23)	0.14 (0.01, 0.89)	0.16 (0.01, 19.53)

ª MSU crystal deposition data missing in 1 patient.
ᵇ Fisher's Exact test and Pearson's Chi-square test for pairwise comparisons.
ᶜ Pearson's Chi-square test across the 4 groups.

Conclusions: Despite a stable dose of allopurinol for more than 3 months, and even with sUA at the target level, a substantial proportion of patients with gout continue to have evidence of MSU crystal deposition by DECT scan. Patients with palpable tophi, sUA levels ≥ 6.0 mg/dL, and gout flares within the prior 3 months have a greater volume of MSU crystal deposition. These patients may need continuation and/or intensification of their urate-lowering therapy regimen.

OP0267   **SERUM URATE AS A SURROGATE ENDPOINT FOR GOUT FLARES: RESULTS OF A SYSTEMATIC REVIEW AND META-REGRESSION ANALYSIS OF RANDOMIZED TRIALS**

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Background: The primary outcome measure for efficacy in clinical trials of urate lowering therapy (ULT) is frequently serum urate (SU), effectively acting as a surrogate for patient-centred outcomes (e.g. gout flares). It has not been clearly demonstrated that the strength of the relationship between SU and patient-centred outcomes is strong enough for SU to be considered a surrogate.