failed maximal medical management, typically with xanthine oxidase inhibitors (XOI). Studies have shown a complete responder rate of 42% when defined as repeat serum uric acid (sUA) levels <6.0 mg/dL for >80% of the time during months 3 and 6 of treatment. Patients that do not maintain a low uric acid while on pegloticase therapy are presumed to have developed anti-drug antibodies (ADA) which rapidly clear the pegloticase molecule. As is routinely utilized in the treatment of other rheumatologic diseases, coadministration of immunomodulatory medications, such as methotrexate, could potentially temper the development of these ADAs (as defined by maintenance of sUA response) in patients treated with pegloticase for refractory gouty arthropathy.

Objectives: The aim of the current case series was to identify and clinically evaluate patients in a real-world practice setting in order to investigate the utility of adding methotrexate to a pegloticase regimen to increase the durability of response.

Methods: In this prospective, proof-of-concept, observational case series, 10 sequential patients with refractory tophaceous gouty arthropathy being started on treatment with pegloticase 8 mg every two weeks (as per the label) were identified from 3 separate infusion centers. No inclusion/exclusion criteria were implemented or prescreening performed. Methotrexate (MTX) 15 mg orally once weekly and folic acid 1 mg orally once daily was started one month prior to the initial administration of pegloticase and continued throughout pegloticase treatment. Any infusion premedications, which were consistent with standard practices, were administered per the individual physician's discretion as well as management of any gout flares which occurred during the treatment course. As per standard of care, sUA was measured every two weeks, prior to each subsequent infusion. At the completion of pegloticase treatment for all patients, the number and percentage of patients able to maintain an sUA at goal <6.0 mg/dL was recorded.

Results: Ten patients ranging in age from 35-80 were identified, from 3 separate infusion centers. There were 143 total pegloticase infusions performed within the observation period. All 10 patients received at least 10 infusions (5 months), 9 patients at least 12 infusions (6 months), 5 patients at least 16 infusions (8 months), 2 patients at least 18 infusions (9 months), and 1 patient received 19 infusions. All 10 patients completed a full course of pegloticase treatment. All patients stayed on MTX 15 mg/week. There were no dose adjustments. 100% of patients were responders as defined by >80% of sUA levels being maintained at goal <6.0 mg/dL during the observation period. None of the 10 patients stopped pegloticase therapy due to increased sUA or loss of response and there were no infusion reactions in any of the 143 infusions or safety concerns identified. Gout flares did occur, primarily following the initial infusion, with less severity/prevalence with subsequent infusions. No patients discontinued treatment because of flares.

Conclusion: In this proof-of-concept case series of 10 sequential patients, pretreatment and co-administration of methotrexate 15 mg orally once weekly and folic acid 1 mg orally once daily with pegloticase resulted in a 100% maintenance of pegloticase sUA response with no infusion reactions. Although additional studies would be needed to corroborate these results, these data support a potential paradigm shift in treatment of refractory gout with pegloticase.

REFERENCE

- [1] Sundy JS, et al. JAMA. 2011;306:711

Acknowledgement: Research sponsored by the Alaska Rheumatology Alliance.

Disclosure of Interests: John Botson Shareholder of: Publicly traded stock: Horizon, Johnson and Johnson, Pfizer, Rigel, Consultant for: Celgene, Eli Lilly, Genentech, Horizon, Mallinckrodt, Novartis, Pfizer, Speakers bureau: Celgene, Eli Lilly, Horizon, Mallinckrodt, Novartis, Pfizer, Jeff Peterson Consultant for: Celgene, Genentech, Horizon, Lilly, Novartis, Regeneron (2017-2018), Speakers bureau: Abbvie, Horizon, Lilly, Novartis (2017-2018)

DOI: 10.1136/annrheumdis-2019-eular.3475

SAT0405 GOUT AND HYPERURICEMIA IN THE US: PREVALENCE AND TRENDS

Gurkirpal Singh¹, Bharathi Lingala², Alka Mithal¹. ¹ICORE, Woodside, United States of America; ²Stanford, Stanford, United States of America

Background: While the prevalence of gout and hyperuricemia is believed to be increasing worldwide, there is little population-based data in the US

after 2008. We evaluated the prevalence of gout and hyperuricemia in the US National Health and Nutrition Examination survey (NHANES) from 2007-08 to 2015-16, and compared these to previously published estimates to study whether the time-trends continue to show an increase in these rates.

Objectives: To study the prevalence of gout and hyperuricemia in the US population from 2007-08 to 2015-16.

Methods: We studied adults 20 years and older from the National Health and Nutrition Examination Survey (NHANES), beginning with the continuous NHANES 2-year survey cycles from 2007-08 to 2015-2016. The samples in each cycle were selected using a stratified, multistage, clustered probability sampling design. Persons with gout were identified from the home interview question "Has a doctor or other health professional ever told you that you had gout?" Hyperuricemia was defined as a serum urate level of greater than 6.8 mg/dl (supersaturation levels at physiological temperatures and pH), with alternate definitions of greater than 6.0 mg/dl (defined as the treat-to-target level in some treatment guidelines)(1). All statistical analyses were performed with appropriate survey procedures in SAS v9.4 (SAS Institute Inc., Cary, NC). Survey design variables and weight variables were used to account for the complexity of the NHANES survey design with stratification and clustering. Age-adjusted rates were calculated using 2010 US population numbers (direct standardization).

Results: In 2015-16, the overall prevalence of gout among US adults was 3.9%, corresponding to a total affected population of 9.2 million US adults. Gout was significantly more prevalent in men (5.2%) compared to women (2.7%), and the prevalence increased with age. Hyperuricemia (above 6.8 mg/dl) was seen in 14.6% of US population (estimated 32.5 million individuals), and was much more common in men (24.7%) compared to women (5.2%). The alternative definition of hyperuricemia (more than 6.0 mg/dl) was seen in 29.9% of individuals (estimated 66.6 million adults). Both hyperuricemia and gout were less prevalent in Mexican-Americans compared to Whites and African-Americans. No significant trends were identified in the age-adjusted prevalence of gout and hyperuricemia. Statistical comparisons between 2007-08 and 2015-16 age-adjusted rates were not significant.

Conclusion: While the age-adjusted prevalence of gout and hyperuricemia has remained unchanged in the most recent decade from 2007-08 to 2015-16, the estimated total number of persons with self-reported gout has gone up from 8.3 million to 9.2 million, reflecting the growth and increased aging of the US population. The age-adjusted prevalence of hyperuricemia has declined slightly but the total number of affected individuals is virtually identical (32.5 million in 2015-16 compared to 32.1 million in 2007-08). While the stabilization of gout and hyperuricemia prevalence rates is encouraging, our study highlights the still considerable burden of gout and hyperuricemia in the increasingly aging US population.

REFERENCE

- [1] Ruoff G, Edwards NL. Overview of Serum Uric Acid Treatment Targets in Gout: Why Less Than 6 mg/dL? Postgraduate medicine. Sep 2016;128(7):706-715.

Disclosure of Interests: Gurkirpal Singh Shareholder of: Merck, Pfizer, Grant/research support from: Horizon, Acorda, UCB, Consultant for: Horizon, Acorda, Sancier, Unipharm, Bharathi Lingala: None declared, Alka Mithal: None declared

DOI: 10.1136/annrheumdis-2019-eular.4438

SAT0406 COMPUTED TOMOGRAPHIC MAPPING OF SPINAL AND VASCULAR URATE DEPOSITION IN THE ABDOMEN WITH CORRELATION TO URIC ACID LEVEL

Juvel Lee¹, Waleed Abdellatif², Sunghan Jung¹, Ahmed Negida³, Bo Gong⁴, Savvas Nicolaou⁵. ¹Faculty of Medicine, University of British Columbia, Vancouver, Canada; ²University of British Columbia/Vancouver General Hospital, Radiology, Vancouver, Canada; ³Faculty of Medicine, Zagazig University, Zagazig, Egypt; ⁴Vancouver General Hospital, Vancouver, Canada; ⁵University of British Columbia/Vancouver General Hospital, Vancouver, Canada

Background: Gout is characterized by accumulation of monosodium urate (MSU) in joints and soft tissues. Gout prevalence is about 1-5% in the western world, predominantly in elderly men. Accurate diagnosis of gout is paramount in managing disease progression and guiding treatment. A meta-analysis in 2018 showed that Dual-Energy CT (DECT) has high sensitivity, specificity and diagnostic accuracy in MSU detection. MSU

deposition outside 'classic' extremities has been scarcely investigated yet may be a potential indicator of tophus burden and impending clinical deterioration.

Objectives: 1. Anatomical mapping of gout deposition in the abdomen (vessels, solid organs and lumbosacral spine).

2. Determine correlation between uric acid level and vascular, solid organ and spinal MSU deposition.

Methods: Retrospective analysis of all DECT abdomen and pelvis scans done in our institution (from January 2007 to July 2018). The inclusion criteria were: males > 50 years with high or normal uric acid level. All cases were then assessed by 2 radiologists with extensive experience in

DECT for MSU deposits. Validated dual-energy gout analysis software was used.

Results: 235 DECT cases met the inclusion criteria. Medical Record document review showed no diagnosis of gout in any patient in the sample. By the time this abstract was submitted, 166 cases were reviewed. The analyzed sample ($n = 166$), showed MSU deposits (1 or more deposits) in the abdominal aorta ($n = 48/166$; 28.92%), abdominal vessels other than aorta ($n = 57/166$; 34.34%) and lumbosacral spine ($n = 15/166$; 9.04%). No deposits were detected in the solid abdominal organs ($n = 0/166$; 0%). There was a statistically significant positive correlation between uric acid level and spinal deposits ($r = 0.22$, $P = 0.004$). No significant correlation between uric acid level and aortic ($P = 0.86$) or vascular deposits ($P = 0.19$). Regression analysis showed uric acid levels can't significantly predict the presence of aortic, vascular or spinal deposits.

Conclusion: Computed tomographic mapping of MSU deposits was positive in the abdominal aorta, other abdominal vessels and lumbosacral spine in patients with normal or high uric acid levels who were asymptomatic for gout. Uric acid level was positively correlated with spinal gout, but not with aortic or vascular gout. Interestingly, uric acid levels can't significantly predict the presence of aortic, vascular or spinal gout. Larger sample size, wider variation in uric acid levels are still needed.

REFERENCES

- [1] Yu, Z., Mao, T., Xu, Y., Li, T., Wang, Y., Gao, F., & Sun, W. (2018). Diagnostic accuracy of dual-energy CT in gout: a systematic review and meta-analysis. *Skeletal radiology*, 1-7.
- [2] Barazani, S. H., Chi, W., Pyzik, R., Jacobi, A., O'Donnell, T., Fayad, Z., ... & Ali, Y. (2018). Detection of Uric Acid Crystals in the Vasculature of Patients With Gout Using Dual-Energy Computed Tomography. *Circulation*, 138(Suppl_1), A11821-A11821.
- [3] Gamala, M., Linn-Rasker, S. P., Nix, M., Heggelman, B. G. F., van Laar, J. M., Pasker-de Jong, P. C. M., ... & Klaasen, R. (2018). Gouty arthritis: decision-making following dual-energy CT scan in clinical practice, a retrospective analysis. *Clinical rheumatology*, 1-6.
- [4] Chew, N., & Cho, J. (2018). Dual-energy CT for the diagnosis of sacroiliac and spinal gout. *Joint Bone Spine*.

Table 1. correlation Analysis.

	Uric Acid Levels	
	Correlation coefficient	P value
Aortic Deposits	-0.013	0.86
Vascular Deposits	0.101	0.198
Spine	0.223	0.004

Table 2. Regression analysis

	Uric Acid Levels	
	Regression coefficient	P value
Aortic Deposits	0.00	0.86
Vascular Deposits	0.001	0.226
Spine	0.003	0.053

Disclosure of Interests: Juvel Lee: None declared, Waleed Abdellatif: None declared, Sunghan Jung: None declared, Ahmed Negida: None declared, Bo Gong: None declared, Savvas Nicolaou Grant/research support from: The Department of Radiology, Vancouver General Hospital has a Master Research Agreement with Siemens Healthcare, Forchheim, Germany (non-pharmaceutical company).

DOI: 10.1136/annrhumdis-2019-eular.5217

SAT0407

GOUT PATIENTS ARE GETTING MORE POSITIVE ABOUT THEIR MEDICINES WHILE TREATED TO TARGET: DATA FROM THE NOR-GOUT STUDY

Jon Anders Grønvald, Sebastian James Hekneby, Lars Fridtjof Karoliussen, Espen A. Haavardsholm, Tore K. Kvien, Hilde Berner Hammer, Till Uhlig. *Diakonhjemmet Sykehus, Oslo, Norway*

Background: Low adherence to medication is a concern in gout where urate lowering therapy (ULT) is indicated to prevent disease severity and

comorbidities. Not believing in medication may impact on the success of achieving these treatment goals.

Objectives: To study which factors were associated to and predictive of beliefs about medicines during one year in patients with a recent gout attack and a need for ULT.

Methods: Baseline data from a prospective observational study were used in patients with crystal-proven gout after a recent gout flare and insufficiently treated serum urate (sUA) level ($>360 \mu\text{mol/L}$ / $>6 \text{ mg/dl}$). In these patients a treat-to-target approach was planned to meet the treatment target (sUA $<360 \mu\text{mol/L}$, or $<300 \mu\text{mol/L}$ if clinical tophi). Assessments included demographic and clinical data, baseline serum urate levels, medication, comorbidities, physical function (HAQ), and SF-36 mental (MCS) and physical component summary scores.

The Beliefs in Medicines Questionnaire (BMQ)(1) queries patient beliefs about medicines on four subscales (necessity and concerns specific for the patient, generally on overuse and harm). Respondents indicated their degree of agreement with each individual statement about medicines on a 5-point Likert scale, (1=strongly disagree to 5=strongly agree). Scores within the four subscales were summed (ranges 5-25 for necessity and concern, 4-20 for overuse and harm). Calculation of the difference between necessity and concern shows the relative importance of patients' view on taking medication, and was grouped as high and low relative to the median.

Using multivariate analysis with logistic regression, baseline variables were explored as predictors of high beliefs in the relative importance of medication after 12 months.

Results: 202 patients were included at baseline, 94.1% men, 90.3% Caucasian, mean (SD) age 56.6 (14.2) years, disease duration 8.0 (7.7) years. Mean sUA level was 494 (SD 86.8) $\mu\text{mol/L}$ at baseline, body mass index 28.9 (4.6) kg/m^2 , and physical function (HAQ) 0.36 (0.57). 18.8% (n=28) had tophi, and 30.4% (n=55) were previous users of allopurinol.

During the first year the beliefs in necessity of medication and the perceived importance of medication increased, while the concerns decreased (Table).

Table: Beliefs in Medicines questionnaire (BMQ) subscales. * $p<0.05$, ** $p<0.01$ vs. baseline

Month (n)	0 (195)	3 (158)	6 (144)	12 (126)
Necessity (SD)	17.1 (4.5)	18.2 (3.4)*	18.4 (3.4)**	18.5 (3.3)**
Concern (SD)	13.7 (4.8)	13.3 (4.5)	13.3 (4.6)*	13.1 (4.6)**
Nec – Conc (SD)	3.4 (6.2)	4.9 (5.4)*	5.1 (5.5)**	5.4 (5.5)**
Overuse (SD)	10.6 (2.8)	10.8 (2.5)	10.6 (2.8)	10.6 (2.7)
Harmful (SD)	9.4 (2.4)	9.5 (2.5)	9.6 (2.5)	9.2 (2.7)

Bivariate comparisons studying demographic, medication and clinical variables did not show consistent cross-sectional associations with beliefs in the importance of medication. However, after 12 months, bivariate comparisons revealed statistically significant differences in mental health (SF36 MCS), physical function (HAQ) and self-efficacy for symptom control.

In logistic regression analyses, adjusting for age, gender, BMI and comorbidities, prediction of high beliefs in the relative importance of medication after 12 months were independently associated with baseline self-efficacy for symptom control (OR 1.04 per unit, 95% CI 1.01-1.06).

Conclusion: During one year of treat-to-target strategy in patients with gout, perceived necessity of medication and higher importance of medication increases. Self-efficacy for symptom control at baseline was an independent predictor of high beliefs in importance of medication after 12 months. These findings support that patients increase their perception of the necessity of beliefs in medication during a treat-to-target approach with ULT.

REFERENCE

- [1] Horne R, et al. *Psychology & Health*. 1999. 14(1): 1–24.

Disclosure of Interests: Jon Anders Grønvold: None declared, Sebastian James Hekneby: None declared, Lars Fridtjof Karoliussen: None declared,

Espen A Haavardsholm Grant/research support from: research funding from Pfizer, UCB, Roche, MSD, and AbbVie., Tore K. Kvien Grant/research support from: AbbVie, BMS, MSD, Pfizer, Roche and UCB., Consultant for: AbbVie, Biogen, BMS, Boehringer Ingelheim, Celgene, Celltrion, Eli Lilly, Hospira, Merck-Serono, MSD, Novartis, Oktal, Orion Pharma, Pfizer, Roche, Sandoz, Sanofi, Mylan and UCB, Speakers bureau: AbbVie, Biogen, BMS, Boehringer Ingelheim, Celgene, Celltrion, Eli Lilly, Hospira, Merck-Serono, MSD, Novartis, Oktal, Orion Pharma, Pfizer, Roche, Sandoz, Sanofi and UCB, Hilde Berner Hammer Speakers bureau: speakers fee from AbbVie, Bristol-Myers

Squibb, Roche, UCB Pharma and Pfizer, Till Uhlig Consultant for: Grünenthal, Novartis, Speakers bureau: Grünenthal, Novartis

DOI: 10.1136/annrheumdis-2019-eular.4019

SAT0408

BODY FAT MEDIATES THE CORRELATION BETWEEN FRUCTOSE-CONTAINING BEVERAGES CONSUMPTION AND SERUM URIC ACID IN MALE GOUT PATIENTS

LI Qianhua, Lijuan Yang, Yan-Hui Xu, Chao Deng, Jinjian Liang, Jianzi Lin, Lefeng Chen, [Lie Dai](#). *Sun Yat-sen Memorial Hospital, Sun Yat-sen University, Department of Rheumatology, Guangzhou, China*

Background: Fructose-containing beverages (FCB) consumption has been recognized as a promoter of hyperuricemia and gout in recent years. FCB consumption also contributes to the development of obesity which is an important risk factor of gout. However, data about the associations among FCB consumption, obesity and the level of serum uric acid (sUA) is limited.

Objectives: To investigate the associations among FCB consumption, obesity and sUA level in gout patients.

Methods: Consecutive gout patients who fulfilled the 2016 ACR/EULAR classification criteria were recruited. Demographic information, clinical characteristics and comorbidities of gout were collected. A 10-items food frequency questionnaire was developed which included alcohol, red meat, animal offal, seafood, hotpot, slow-cooking soup, FCB, tea, coffee and milk/milk products. Patients were asked to report the average consumption frequency over the one year prior to the first gout attack. Body composition was assessed by bioelectric impedance analysis and overfat was defined by body fat percentage (BF%) as $\geq 25\%$ for men and $\geq 35\%$ for women.

Results: 1) Among 331 recruited gout patients, 96.1% were male, so only male patients were further analyzed. The median age of male patients was 37.5 (30, 49) years and median sUA was 9.5 (7.8, 10.5) mg/dl with 18.9% presented tophi. The mean BF% was $25.6 \pm 6.2\%$ and 54.7% male patients were overfat. The prevalence of hypertension, diabetes, dyslipidemia, metabolic syndrome and fatty liver were 34.6%, 8.5%, 62.9%, 44.3% and 46.9% respectively. 2) There were no significant difference of food intake frequency between overfat patients and normal fat patients. Spearman correlation analysis results showed that FCB consumption was positively correlated with BF% ($r=0.176$, $P=0.002$), while milk/milk products consumption was negatively correlated with BF% ($r=-0.117$, $P=0.038$). After adjusted by age, duration, family history, eGFR, hypertension, diabetes mellitus, dyslipidemia, metabolic syndrome, fatty liver and the other nine dietary factors, multivariable linear regression showed that FCB consumption was positively correlated with BF% (compared with $<1 \text{ time/w}$, 3-4 times/w: coefficient $\beta=2.4619$, 95%CI 0.3580~4.5657, $P=0.022$; 4 times/w: coefficient $\beta=2.6696$, 95%CI 0.8266~4.5726, $P=0.0049$), and BF% was positively correlated with sUA (coefficient $\beta=0.0784$, 95%CI 0.0328~0.1239, $P<0.001$). However, FCB consumption was not correlated with sUA after adjusted by above confounders and BF% ($P=0.079$). 3) Further mediation analysis were performed to evaluate whether BF% mediated the correlation between FCB consumption and sUA. After adjusted by the confounding factors mentioned above, the total effect of FCB consumption on sUA was significant (compared with $<1 \text{ time/w}$, $>4 \text{ times/w}$: coefficient $\beta=0.8813$, 95%CI 0.1457~1.6169, $P=0.019$). BF% produced indirect effect on the correlation between FCB consumption and sUA (compared with $<1 \text{ time/w}$, $>4 \text{ times/w}$: indirect effect coefficient $\beta=0.2115$, 95%CI 0.0453~0.4032).