

# 2023 EULAR recommendations on imaging in diagnosis and management of crystal-induced arthropathies in clinical practice

Gout (MSU)  
CPPD  
BCPD

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# 5 Overarching principles

Overarching principles	LoE	GoR	LoA
A. Crystal-induced arthropathies are typically characterised by intermittent, acute episodes of inflammation, but may also exhibit a persistent disease course with or without superimposed flares.	n.a.	n.a.	9.83 (0.48) 100% ≥8
B. Imaging in crystal-induced arthropathies provides useful information on crystal deposition, inflammation and structural damage.	n.a.	n.a.	9.83 (0.48) 100% ≥8
C. The presence of imaging abnormalities, in particular, those related to crystal deposition, may not always be related to clinical manifestations.	n.a.	n.a.	9.79 (0.51) 100% ≥8
D. Patient information (medical history, physical/laboratory examination, synovial fluid/tissue analysis, etc) should be taken into account when imaging is considered in crystal-induced arthropathies.	n.a.	n.a.	9.75 (0.74) 96% ≥8
E. Imaging in crystal-induced arthropathies should be performed and interpreted by trained healthcare professionals.	n.a.	n.a.	9.92 (0.41) 100% ≥8

A. Acute inflammation: Crystal deposition  
Chronic arthropathy of CPPD, Gout, calcific periarthritis (BCPD)

C. Asymptomatic crystal deposition (small)  
Asymptomatic calcific tendinitis

B. CR: structural damage  
DECT: structural damage, quantitative analysis of crystal deposition and bone marrow edema.  
Ultrasound : inflammation, early joint damage, semiquantitative assessment of crystal deposition.

D. Acute joint symptoms with clear, macroscopic evidence of tophaceous gout /pathognomonic crystals : imaging may not be necessary

# 10 Recommendations

Recommendations			
1. When performing imaging in crystal-induced arthropathies, both symptomatic areas and disease-specific target sites (ie, MTP1 joint in gout, knee and wrist in CPPD, shoulder in BCPD) should be considered.	1a*	A†	9.71 (0.55) 100% ≥8
2. In the diagnostic assessment of gout, ultrasound and DECT are both recommended imaging modalities.	1a	A	9.75 (0.61) 100% ≥8
3. When characteristic features of monosodium urate crystal deposition on ultrasound (ie, double contour sign or tophi) or on DECT are identified, synovial fluid analysis is not needed to confirm a diagnosis of gout.	1a	A	8.79 (1.82) 87% ≥8
4. In the diagnostic assessment of CPPD, conventional radiography and ultrasound (or CT if axial involvement is suspected) are recommended imaging modalities.	1a‡	A§	9.63 (0.92) 96% ≥8
5. In the diagnostic assessment of BCPD, imaging is necessary; conventional radiography or ultrasound is the recommended modality.	2b	C	9.08 (1.69) 87% ≥8
6. In gout, ultrasound and DECT can be used to monitor crystal deposition and in case of ultrasound, also inflammation. Both modalities provide additional information on top of clinical and biochemical assessment. In case ultrasound/DECT are not available, conventional radiography can be used to assess structural damage due to gout. The decision on when to repeat imaging depends on the clinical circumstances.	2b	B	9.33 (1.17) 96% ≥8
7. In CPPD and BCPD, serial imaging is not recommended, unless there is an unexpected change in clinical characteristics.	2a	B	9.42 (1.21) 96% ≥8
8. In gout, assessing the amount of monosodium urate crystal deposition by ultrasound or DECT may be used to predict future flares.	2b	B	8.46 (1.67) 79% ≥8
9. If synovial fluid analysis is required in the assessment of crystal-induced arthropathies, ultrasound guidance should be used in cases where aspiration based on anatomical landmarks is challenging.	5	D	9.71 (0.55) 100% ≥8
10. Showing and explaining imaging findings of crystal-induced arthropathies to people with such conditions may help them understand their condition and improve treatment adherence in gout.	2b	C	9.38 (0.92) 96% ≥8

1. When performing imaging in crystal-induced arthropathies, both symptomatic areas and disease-specific target sites (ie, MTP1 joint in gout, knee and wrist in CPPD, shoulder in BCPD) should be considered.	1a*	A†	9.71 (0.55) 100% ≥8
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Identify periarticular and other soft tissue involvement (tendons or ligaments) & MSU deposits in joints not showing clinical symptoms at examination.

2. In the diagnostic assessment of gout, ultrasound and DECT are both recommended imaging modalities.	1a	A	9.75 (0.61) 100% ≥8
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Early disease : USG to detect synovitis, inflammation.

DECT : crystal deposition.

Financial constraints: CR (Conventional Radiography) or CT

3. When characteristic features of monosodium urate crystal deposition on ultrasound (ie, double contour sign or tophi) or on DECT are identified, synovial fluid analysis is not needed to confirm a diagnosis of gout.	1a	A	8.79 (1.82) 87% ≥8
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Clinical decision. General rule is to attempt arthrocentesis whenever feasible (rule out septic arthritis, regardless of previous evidence for gout i.e. positive DECT and hyperuricemia)

4. In the diagnostic assessment of CPPD, conventional radiography and ultrasound (or CT if axial involvement is suspected) are recommended imaging modalities.	1a‡	A§	9.63 (0.92) 96% ≥8
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CR and USG: peripheral joints

CT: Axial involvement (crowned dens)

5. In the diagnostic assessment of BCPD, imaging is necessary; conventional radiography or ultrasound is the recommended modality.	2b	C	9.08 (1.69) 87% ≥8
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USG: BCP Deposits in joints & periarticular structures

6. In gout, ultrasound and DECT can be used to monitor crystal deposition and in case of ultrasound, also inflammation. Both modalities provide additional information on top of clinical and biochemical assessment. In case ultrasound/DECT are not available, conventional radiography can be used to assess structural damage due to gout. The decision on when to repeat imaging depends on the clinical circumstances.	2b	B	9.33 (1.17) 96% ≥8
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Monitoring is limited by cost and accessibility issues. Advised in flares despite adherence to treat- to- target urate- lowering therapy. Crystal deposition (tophi, aggregates ,double- contour signal) is sensitive to change over **1 year**.

CR: long standing disease

7. In CPPD and BCPD, serial imaging is not recommended, unless there is an unexpected change in clinical characteristics.	2a	B	9.42 (1.21) 96% ≥8
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Imaging advised in rapid progression of symptoms. Helps in assessing disease severity, identifying additional diagnoses, and understanding natural history of CPPD disease.

8. In gout, assessing the amount of monosodium urate crystal deposition by ultrasound or DECT may be used to predict future flares.	2b	B	8.46 (1.67) 79% ≥8
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Reduction of crystal deposition or tophi on ultrasound or DECT may be used to predict flares in gout. Decrease of >50% in tophus size on ultra sound 6 months following initiation of urate- lowering therapy correlated with a reduced risk of gout flare (USEFUL 2).

9. If synovial fluid analysis is required in the assessment of crystal-induced arthropathies, ultrasound guidance should be used in cases where aspiration based on anatomical landmarks is challenging.	5	D	9.71 (0.55) 100% ≥8
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10. Showing and explaining imaging findings of crystal-induced arthropathies to people with such conditions may help them understand their condition and improve treatment adherence in gout.	2b	C	9.38 (0.92) 96% ≥8
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