

Modic Type 1 vs. Spondylodiscitis-ESR vs. CRP Clinical Correlation

ESR vs. CRP Clinical Correlation – Contribution to Radiologic Interpretation

Difference Between ESR and CRP – Radiologic Implications

Definition: ESR (Erythrocyte Sedimentation Rate) and CRP (C-Reactive Protein) are different markers of inflammation.

Imaging Findings:

Infection: CRP rises faster and is more specific.

Chronic inflammation: ESR remains elevated for a prolonged period.

Radiologic–chemical correlation: Important for monitoring discitis/osteomyelitis.

Differential Diagnosis:

Normal CRP, elevated ESR → generally non-specific chronic inflammation.

Both elevated → infection or active inflammation.

Clinical Correlation:

In suspected discitis–osteomyelitis, MRI correlates better with CRP, whereas CT correlates better with ESR.

1. Kinetic Differences

CRP: Rises quickly (within 6–8 hours) and falls rapidly with treatment response. Best marker for acute processes and treatment monitoring.

ESR: Rises more slowly (24–48 hours) and remains elevated for a long time, even after treatment. Better reflects chronic or prolonged inflammation.

2. In the Context of Discitis / Osteomyelitis

MR correlation – more meaningful with CRP:

MRI is very sensitive in the early phase (bone marrow edema, disc signal changes, paravertebral soft tissue involvement). CRP also rises early, so MRI findings and CRP elevation are usually synchronized. Thus, MRI + CRP together are powerful in early diagnosis and in monitoring treatment response.

CT correlation – more meaningful with ESR:

CT primarily shows late findings (bone destruction, sclerosis, sequestra). These persist even after CRP normalizes. ESR also remains elevated for a long time, so CT findings are more in line with ESR.

3. How Does This Help the Radiologist?

When writing the report, one might add:

“MRI findings correlate with elevated CRP and are strongly suggestive of infection. For treatment monitoring, CRP along with MRI provides more reliable information.”

“Current CT findings are compatible with chronic changes and may correlate better with persistently elevated ESR.”

Modic Type 1 vs. Spondylodiscitis

♦ 1. Imaging-Based Differentiation Disc Involvement

Spondylodiscitis:

Disc shows high T2/STIR signal + contrast enhancement (typical).

Disc height decreases; diffuse involvement of the disc.

Modic Type 1:

Disc usually normal or degenerative (desiccation, protrusion may be present).

No marked enhancement, or only minimal.

👉 Key clue: Active inflammatory signal + contrast enhancement in the disc strongly favors infection.

Endplate Morphology

Spondylodiscitis: Endplates are irregular, eroded, or destructed; contours disrupted.

Modic Type 1: Endplates remain smooth with sharp margins; no erosion/destruction.

👉 Bone marrow edema + intact endplate → Modic Type 1

👉 Bone marrow edema + irregular/eroded endplate → Discitis.

Paravertebral / Epidural Soft Tissues

Spondylodiscitis:

Paravertebral soft tissue collections, epidural thickening, abscess formation possible.

Enhancement along posterior longitudinal ligament is common.

Modic Type 1:

Surrounding soft tissues are clean; no abscess/collection.

👉 Presence of paravertebral soft tissue involvement → ~90% infection.

Diffusion MRI (DWI)

Spondylodiscitis: Restricted diffusion may be seen in disc/abscess.

Modic Type 1: Usually no restriction.

Gadolinium Enhancement

Spondylodiscitis: Disc + endplate + paravertebral soft tissues show diffuse enhancement.

Modic Type 1: Only bone marrow edema region, with subtle/linear/mild enhancement.

♦ 2. Clinical and Laboratory Correlation

CRP / ESR:

Spondylodiscitis: CRP rises quickly, ESR remains elevated for longer.

Modic Type 1: CRP usually normal; ESR may be mildly elevated but clinically insignificant.

Leukocytosis:

May be present in spondylodiscitis.

Not expected in Modic Type 1 changes.

Pain:

Spondylodiscitis: Persistent, nocturnal, rest pain; fever may accompany.

Modic Type 1: Mechanical pain; worsens with activity, improves with rest.

♦ 3. “Practical Summary / Key Tricks” for Radiologists

1. Check the disc:

T2/STIR hyperintensity + enhancement → infection.

Normal disc → Modic Type 1

2. Check the endplate margin:

Sharp → Modic Type 1

Irregular/eroded → Spondylodiscitis

3. Check soft tissues:

Paravertebral/epidural collection → infection.

4. Think clinical-lab:

Elevated CRP + fever → Spondylodiscitis

Normal CRP + mechanical pain → Modic Type 1

5. On follow-up:

CRP decreasing + MRI improving → treatment response in infection.

Modic lesions may persist chronically, sometimes converting to Type 2.

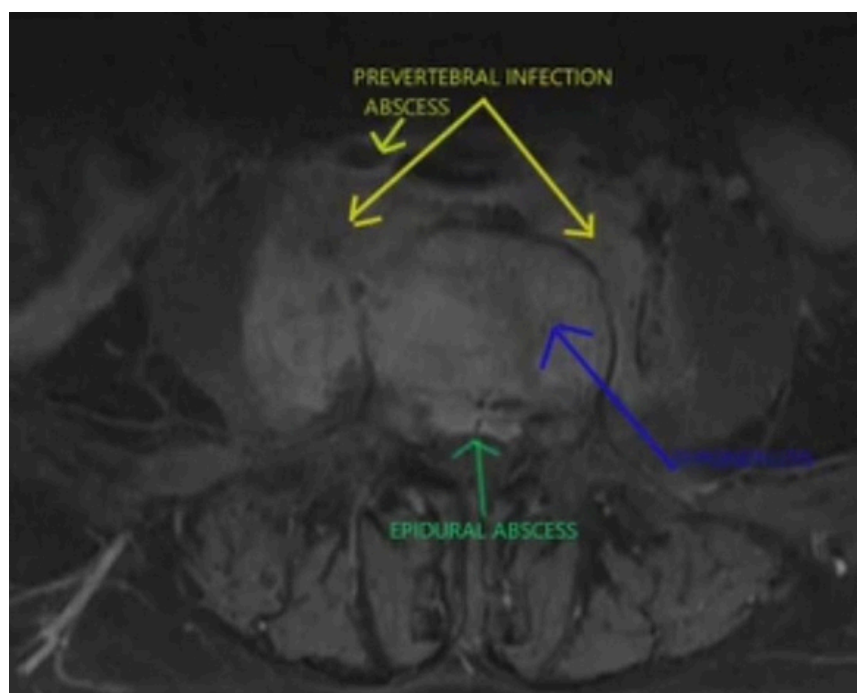
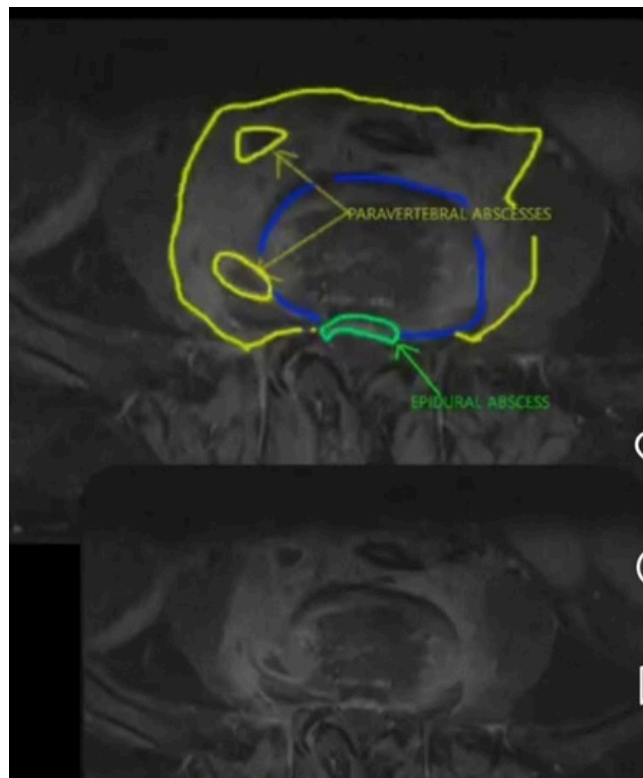
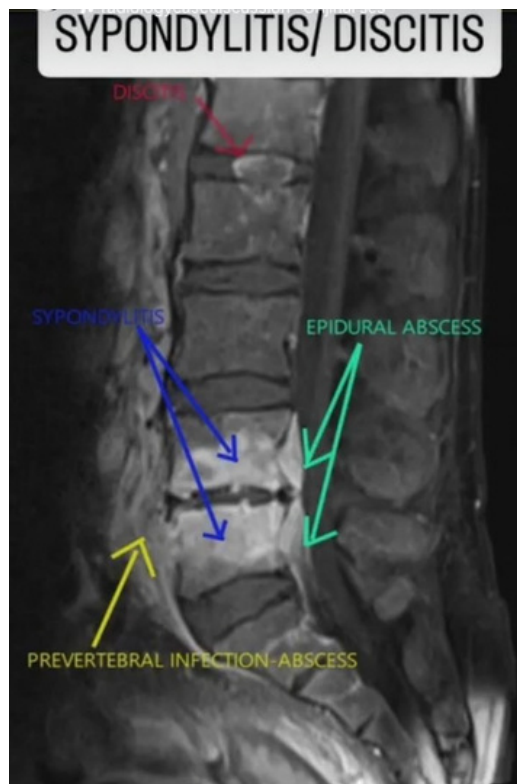
♦ 4. Example Reporting (Scenario)

“At the lumbar vertebral endplates, T1 hypointense and T2/STIR hyperintense signal changes are observed. Disc space is preserved, and disc signal appears normal. Endplate contours are smooth, and no abnormal paravertebral soft tissue/abscess is seen. Findings are suggestive of Modic Type 1 degenerative changes. Clinical and laboratory (CRP, ESR) correlation is recommended to exclude infection.”--

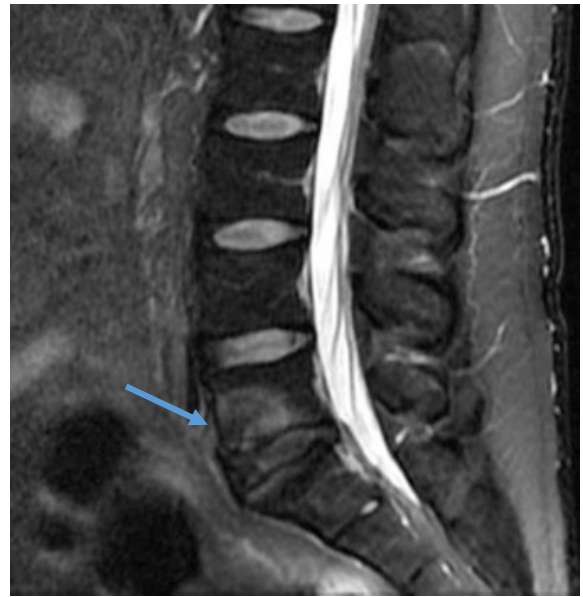
👉 For radiologists, the most reliable imaging clues: disc appearance + endplate contour + paravertebral soft tissues.

👉 For clinicians, the most reliable lab mark

Visual Spot Check



Spondylo-discitis (Source: radiologycasediscussion (RCD) Case Archive)



Modic Type 1 changes (Source: Radiopaedia.org)