

CT and MRI Radiographic Scoring in Spinal Coccidioidomycosis

A RETROSPECTIVE COHORT STUDY | 2013–2022 | N = 42

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IRB-approved retrospective cohort, single center.

1 INTRODUCTION

Coccidioides spp. are dimorphic fungi endemic to the southwestern U.S.; an estimated ~350,000 new infections occur annually, most underdiagnosed or mistaken for community-acquired pneumonia. Spinal disease follows hematogenous dissemination, seeding the vertebral marrow and causing bony destruction, paravertebral abscess, and spinal cord compression.

Gap: no CT/MRI scoring system has existed for spinal coccidioidomycosis since Wrobel et al. (2001) — a 20+ year gap.

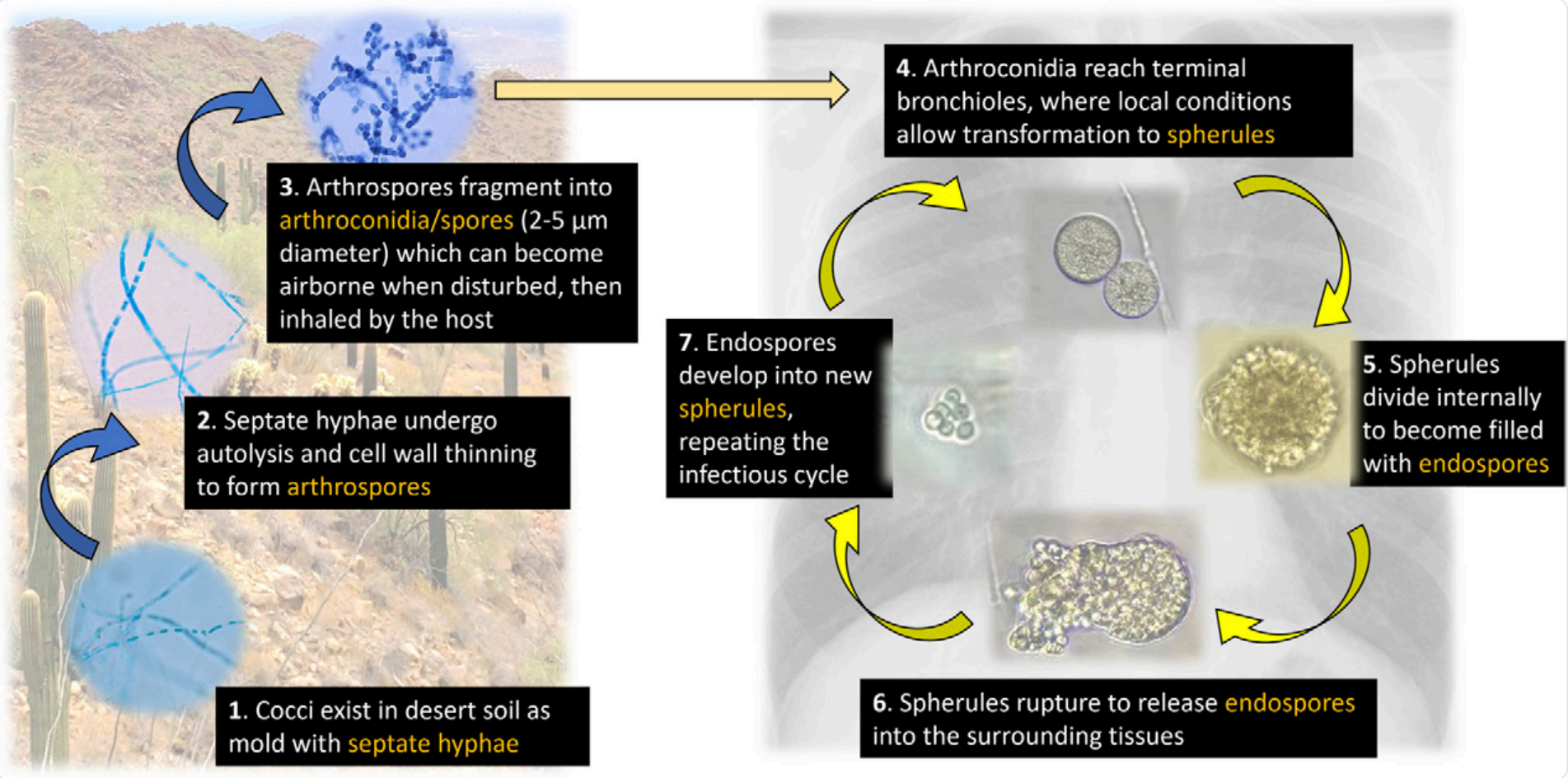


Figure 1. Life cycle of *Coccidioides* spp. Adapted from Haug et al., *RadioGraphics* 2026.

2 OBJECTIVES & HYPOTHESES

- PRIMARY — FEASIBILITY & SEVERITY**
A five-domain CT/MRI Total Radiographic Score (TRS, 0–14) can objectively quantify disease burden at presentation.
- H1 — MRI SUPERIORITY**
MRI is more sensitive than CT for soft-tissue/marrow involvement; both are equivalent for bone.
- H2 — BIPHASIC TRAJECTORY**
Serial TRS rises early (3 months) before progressively improving, mirroring the slow response of fungal osteomyelitis.
- H3 — CLINICAL CORRELATION**
Higher baseline TRS correlates with need for surgery, helping stratify severity.

3 MATERIALS & METHODS

- Retrospective cohort, single center, southwestern U.S., 2013–2022
- N = 42 confirmed spinal coccidioidomycosis
- Scored at Baseline, 3, 6, 12 mo, and Extended follow-up
- Blinded review by MSK radiology co-investigators

VBD	DS	PA	SC	ME
Vertebral Body Destruction	Disc Space Involvement	Paravertebral Abscess	Spinal Cord Compression	Marrow Edema
0–3	0–3	0–3	0–3	0–3

Total Radiographic Score = sum of 5 domains, range 0–14

Statistics: Shapiro-Wilk, Kruskal-Wallis, Wilcoxon signed-rank, Mann-Whitney U, Spearman ρ ; $p < 0.05$ significant.

4 PATIENT DEMOGRAPHICS (N = 42)

33.2 Median age, yrs IQR 26.6–42.6	81% Male sex n = 34/42	79% Black / African American n = 33/42	
91% Arizona exposure n = 38/42	83% Prior cocci history 15/18 w/ data	≥88% Immunocompetent	
Presenting symptom			n (%)
Back pain			32 (76.2%)
Fever			17 (40.5%)
Weight loss			17 (40.5%)
Weakness / incontinence			11 (26.2%)
Numbness			12 (28.6%)
Median CF titer 1:256; mean WBC 12.76 ×10 ³ (SD 6.04, n = 37).			

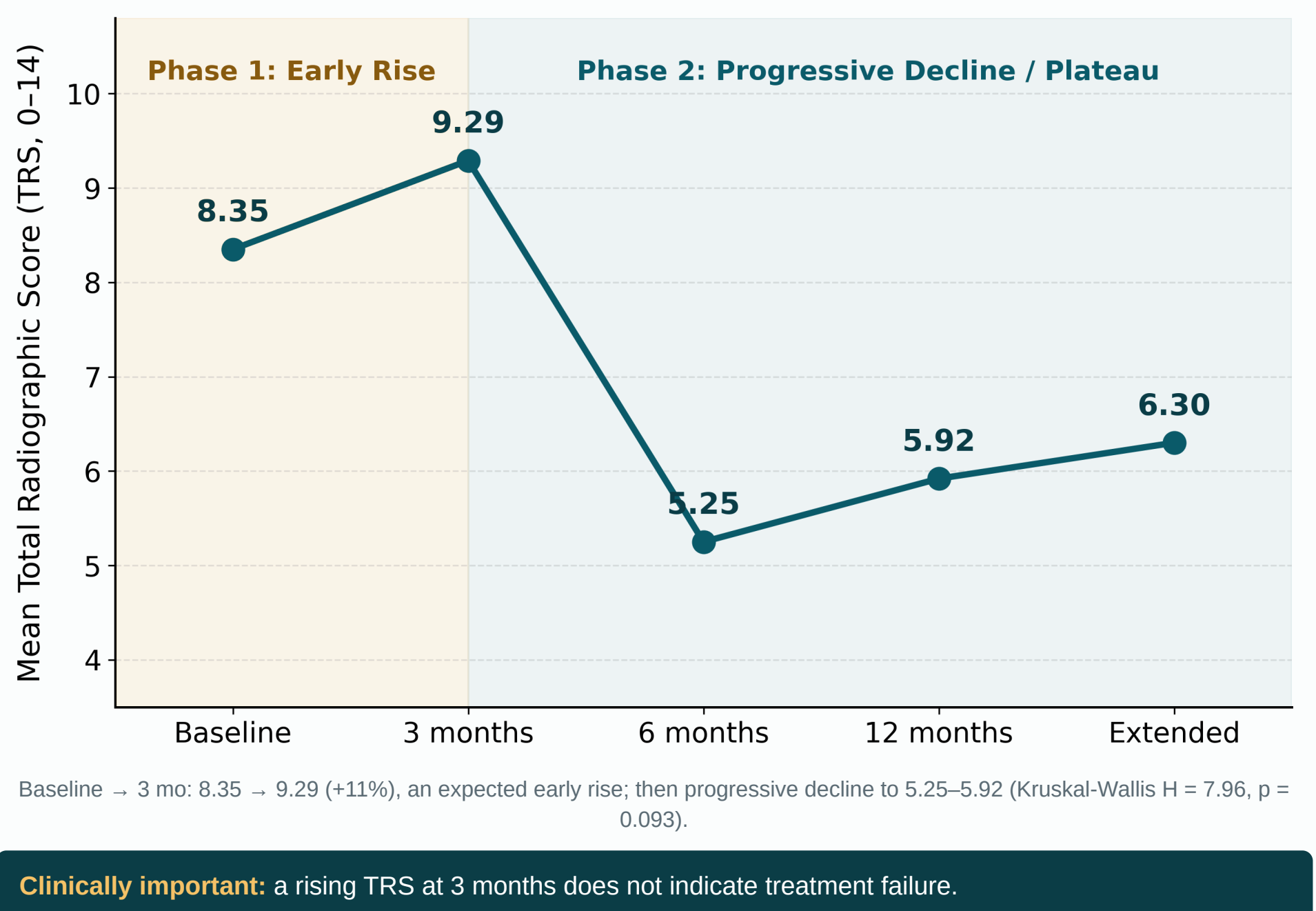
5 BASELINE IMAGING & MRI VS. CT

Baseline MRI (n = 31): mean TRS 8.35/14 (SD 3.38). Marrow edema present in 100% of studies.

Domain	MRI %	CT %	Advantage
Marrow edema	100%	80%	MRI superior
Vertebral body destr.	84%	89%	Equivalent
Disc space involvement	81%	89%	Equivalent
Paravertebral abscess	81%	80%	Equivalent
Spinal cord compression	58%	67%	Near-equiv.

MRI is superior for marrow edema (100% vs. 80%); both modalities are equivalent for osseous and disc findings.

6 LONGITUDINAL SCORES — BIPHASIC TRAJECTORY



7 TREATMENT, SURGERY & OUTCOMES

First-line antifungal: fluconazole (90.5%); amphotericin B for induction in 52.4%.

Surgical procedure (n = 15, 36%)	% surg. pts
Fusion / hardware placement	93.3%
Corpectomy	86.7%
Abscess drainage / aspiration	60.0%
Laminectomy	40.0%

Baseline TRS — surgical: 9.90 vs. non-surgical: 7.19 (p = 0.053, trend).

33% AKI mainly ampho B	36% Readmission n=15/42	9.5% Mortality 4 patients	7.1% CNS involv. n=3/42
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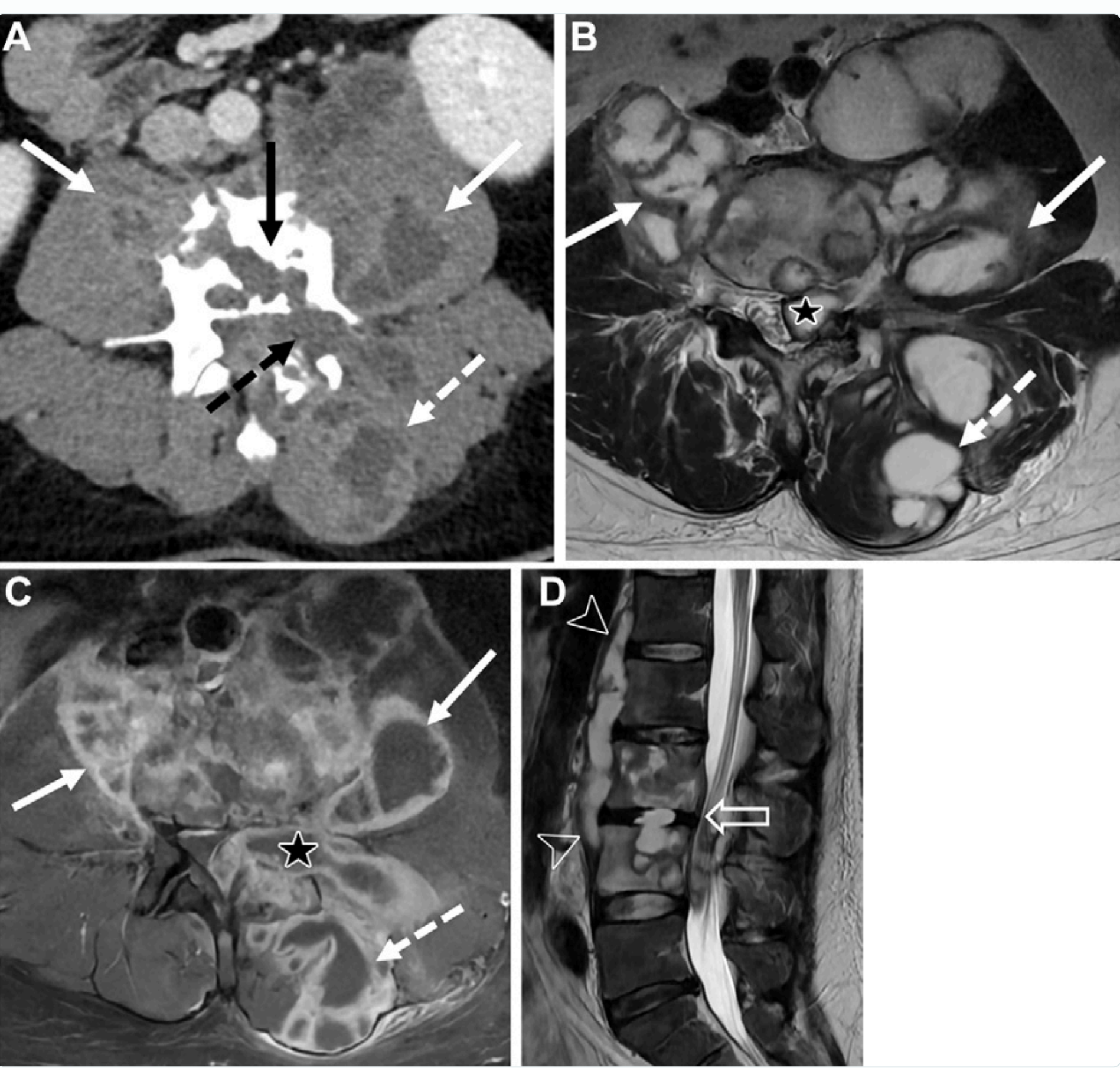


Figure 2. Representative CT (A) and MRI (B–D) of spinal coccidioidomycosis showing vertebral body destruction, paravertebral/psoas abscess, and epidural extension — illustrating the 5 TRS domains. Adapted from Haug et al., *RadioGraphics* 2026, Fig. 14.

8 CONCLUSIONS

- First structured CT/MRI scoring system for this disease**
Feasible and reproducible across all 5 domains.
- Baseline imaging confirms advanced, multidomain disease**
Mean TRS 8.35/14; marrow edema present in 100%.
- MRI outperforms CT for soft tissue; equivalent for bone**
100% vs. 80% sensitivity for marrow edema.
- A biphasic trajectory is the defining longitudinal pattern**
Rise at 3 months is expected, not treatment failure.
- Higher imaging severity trends toward surgical need**
TRS 9.90 vs. 7.19, surgical vs. non-surgical (p = 0.053).

9 LIMITATIONS & FUTURE DIRECTIONS

- Retrospective, single-center; imaging availability non-uniform
 - Baseline MRI scored in only 31/42; no inter-rater reliability testing
 - Underpowered for correlation analyses — results are exploratory
- Next:** prospective multi-center validation, formal κ /ICC reliability, TRS cut-offs for management decisions, and extension to *Aspergillus*, *Blastomyces*, and *Histoplasma* spinal infections.

REFERENCES

- Wrobel CJ, et al. Vertebral coccidioidomycosis. *J Neurosurg Spine*. 2001.
- Haug NA, et al. Imaging of musculoskeletal coccidioidomycosis. *RadioGraphics*. 2026.