Diagnostic imaging for eosinophilic fasciitis: A systematic review

To the Editor: Eosinophilic fasciitis (EF) is a connective tissue disorder marked by progressive induration of skin and subcutaneous tissue. An infiltration of lymphocytes and eosinophils leads to thickening of the fascia surrounding muscle.[1] Although full-thickness incisional biopsy provides definitive diagnosis, magnetic resonance imaging (MRI) and ultrasound have emerged as valuable

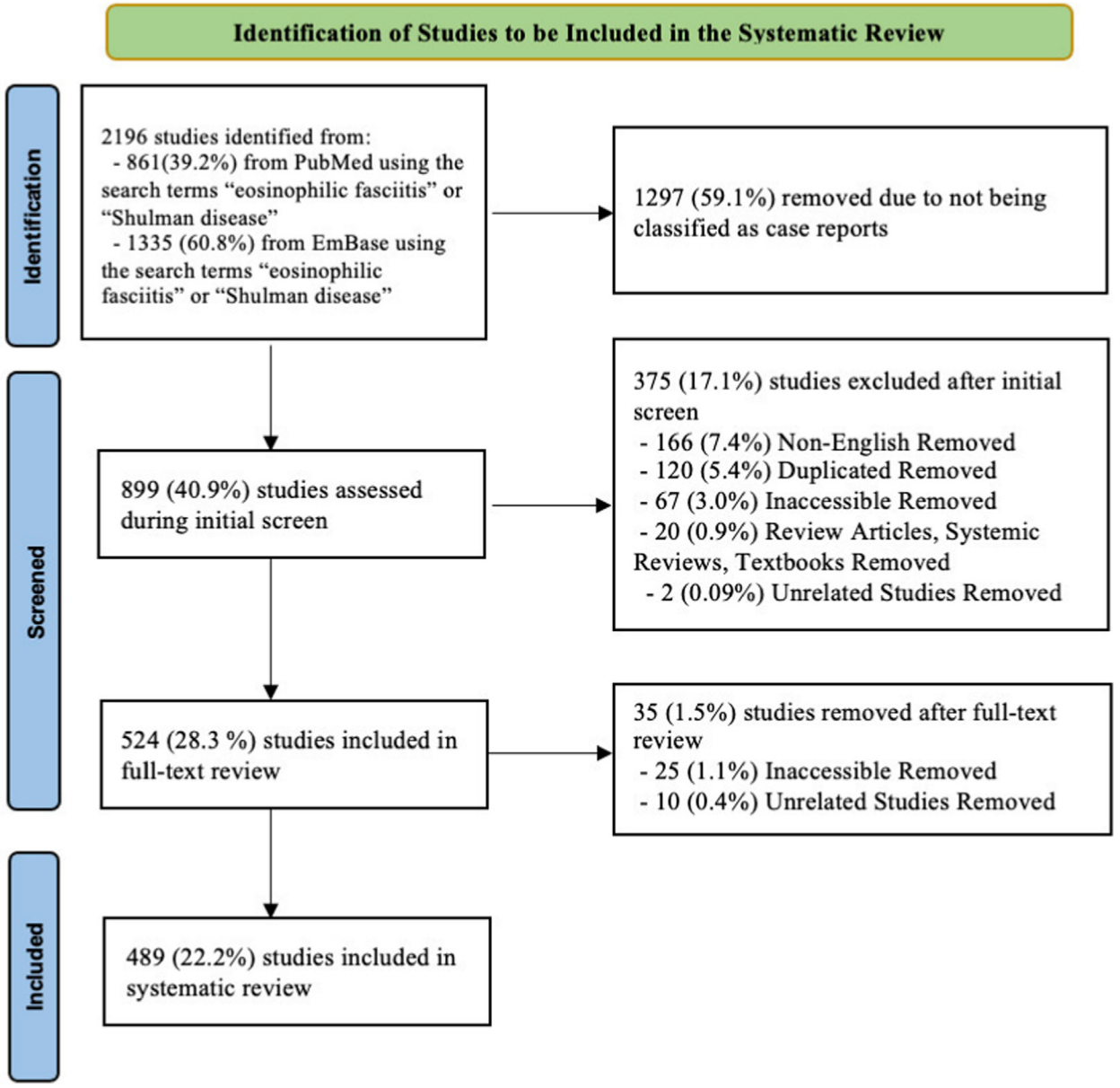

Fig 1. A flow diagram representing the process of screening for studies included in our systematic review. A total of 2196 studies were identified, and through a screening process, 489 studies were included in the systematic review.

noninvasive tools to diagnose EF.[2] We conducted a systematic review to evaluate how frequently clinicians use these imaging modalities and which findings characterize EF.

We searched the databases PubMed and EmBase for "eosinophilic fasciitis" and "shulman disease" as on January 16, 2022. In total, 2196 studies were screened, yielding 489 studies with 1703 patients. Our review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines (Fig 1). The mean age of patients was 45.4 years, with 50.4% female (n = 733/1703). A minority (19.1%, 325/1703) had imaging done at the time of diagnosis.

Most patients (76.3%, 248/325) underwent MRI (Table I). Findings included thickening of superficial muscle fascia (40.7%, 101/248), thickening of deep muscle fascia (35.4%, 88/248), and edema (24.5%, 61/248). High-intensity signals were observed in the muscle fascia region for 76.6% (190/248) of patients. Twelve (4.8%, 12/248) had no abnormal findings.

Fewer patients (16.3%, 53/325) underwent ultrasound (Table I). Findings included thickening of the skeletal muscle surrounding the region of induration (13.2%, 7/53), thickening of the superficial/deep fascia (24.5%, 13/53), and thickening of subcutaneous tissue (7.54%, 4/53). Seven (13.2%, 7/53) had no abnormalities and 3 (5.67% 3/53) had postresolution imaging done at follow-up appointments.

In our review, a majority of patients who underwent MRI had findings suggestive of EF. Hyperintense fascial signals on MRI, indicating muscle damage, is a criterion used to diagnose EF; >75% of patients had this finding.[3] MRI has emerged as a tool to guide biopsy sites, particularly when initial biopsy is negative, but a high clinical suspicion remains.[4] MRI also distinguishes EF from similar-presenting connective tissue disorders (ie, scleroderma).[3]

Less than 20% of patients in our review underwent ultrasound. Less than half had findings of EF. Ultrasound's current use is primarily as an adjunct to MRI and biopsy.[5] The modality has also been proven useful in evaluating subcutaneous tissue compressibility pre- and posttreatment; clinical improvement in compressibility indicates improvement.[5]

Overall, MRI is superior to ultrasound in visualizing the abnormalities of EF. However, MRI is expensive, and some patients may have contraindications to its use. As such, we recommend that tissue biopsy, the gold standard, be performed in all suspected EF cases. MRI may be clinically useful as an adjunct to biopsy when biopsy is negative but a strong clinical suspicion for EF remains. Ultrasound should be used as a cost-effective method to assess posttreatment resolution of EF and long-term reemission.

Table I. MRI and ultrasound findings in EF patients

Findings	*n* (%)
Patients who underwent MRI imaging	248 (76.3)
Thickening of superficial muscle fascia	101 (40.7)
Thickening of deep muscle fascia	88 (35.4)
Edema	61 (24.5)
No findings suggestive of EF	12 (4.8)
Patients who underwent US imaging	53 (16.3)
Thickening of skeletal muscle	7 (13.2)
Thickening of the superficial/deep fascia	13 (24.5)
Thickening of subcutaneous tissue	4 (7.54)
No findings suggestive of EF	7 (13.2)

EF, Eosophilic fasciitis; *US*, ultrasound; *MRI*, magnetic resonance imaging.

This review's limitations include missed case reports and incomplete reporting of imaging modalities used. Future studies must determine whether supplemental imaging modalities provide a significant diagnostic or treatment benefit and whether recent advancements in ultrasound technology enable it to better detect EF abnormalities.

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Conflicts of interest

None disclosed.

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