Inflammatory Back Pain and the Diagnosis of Axial Spondyloarthritis

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Back pain is one of the most common musculoskeletal problems in the United States. In 2008, Lawrence and colleagues[1] reported that about half of adults included in a national survey reported back pain in the preceding year. Though the vast majority of patients will have resolution of their symptoms with conservative management, patients with acute back pain are frequently evaluated with unnecessary tests, contributing to increased healthcare costs.[2]

A small portion of the population develops chronic back pain. The National Arthritis Data Workgroup reported 14% of adults experienced an episode of low back pain that lasted more than 2 weeks at some point in their lives; pains lasting more than 3 to 6 months occurred in 5% to 10% of patients with low back pain.[1] These patients are often referred to musculoskeletal specialists for evaluation of potential underlying conditions.

In patients with chronic back pain, seronegative spondyloarthropathy (SNSA) should be considered. Over the last several years, the rheumatology community has moved toward using the term *axial spondyloarthritis* (SpA) to describe the inflammatory disorders characteristically involving the spine previously grouped under SNSA: ankylosing spondylitis, psoriatic arthritis, inflammatory bowel disease related (enteropathic) arthritis, and reactive arthritis following specific enteric and genitourinary infections.[3] The availability of a handbook serves as an important resource when approaching patients with symptoms suggestive of SpA.[3]

Despite improvement in nomenclature, delay in diagnosis of axial spondyloarthritis occurs and results from epidemiologic and clinical factors. Back pain is a ubiquitous problem and the majority of patients have a nonspecific cause of their symptoms; most providers can expect to see no more than 1 or 2 patients with SpA out of 100 referrals for chronic back pain based on a recent estimate of prevalence.[4] Therefore, SpA may not be considered in a busy clinical environment. Furthermore, radiographic changes such as sacroiliitis may take years to develop and typically are not present when clinical symptoms begin.[5] To facilitate consideration of SpA in patients with chronic back pain by orthopedic surgeons, inflammatory back pain and other clinical features suggestive of these disorders will be discussed in the context of classification schemes employed in the current approach to SpA.

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Inflammatory Back Pain

Back pain reported by patients can be conceptually divided into mechanical lower back pain (MLBP) or inflammatory back pain (IBP). The etiology of MLBP usually cannot be precisely defined but involves muscles, ligaments, and degenerative changes of the intervertebral discs or facet joints of the spine.[1] Back pain in axial spondyloarthritis is referred to as IBP with several criteria sets available in the medical literature.[6,7] Though sensitivity and specificity of IBP with respect to the diagnosis of axial SpA are only about 80%,[7] it remains an important component of screening tools proposed to guide referrals for back pain.[5,8]

Calin and colleagues[9] proposed the first set of inflammatory back pain criteria in 1977. Five components were included:

1) Insidious onset of back pain,
2) Age at onset of less than 40 years,
3) Improvement with exercise,
4) Morning stiffness, and
5) Back pain present for 3 or more months.

A 2006 study by Rudalweit and colleagues[6] demonstrated a 4 component criteria for the diagnosis of IBP performed similarly to the original Calin criteria. These criteria included:

1) Morning stiffness > 30 minutes,
2) Alternating buttock pain,
3) Awakening during the second half of the night due to back pain, and
4) Improvement of back pain with exercise but not with rest.

In 2009, experts from the Assessment of SpondyloArthritis International Society (ASAS) developed IBP criteria based on the evaluation of 20 patients with undifferentiated back pain felt by referring rheumatologists to have possible axial SpA.[7] The panel of 13

rheumatologists developed a 5 component criteria with the presence of 4 criteria yielding a sensitivity of 77.0% and a specificity of 91.7% for the presence of IBP; results were similar but with a lower specificity in a validation cohort (n = 648) in which 4 of 5 criteria gave a sensitivity of 79.6% and a specificity of 72.4% for IBP. The "IBP according to experts" criteria include age at onset less than 40 years, improvement with exercise, no improvement with rest, insidious onset, and pain at night with improvement upon getting up.

Clinicians caring for patients with chronic back pain should seek elements of inflammatory back pain as a routine part of their evaluation. According to the ASAS, each of the IBP criteria performs similarly in clinic practice.[3] Regardless of the criteria employed, the finding of IBP is the entry point of published screening strategies and should trigger additional evaluation for axial SpA.[3,5,8]

Classification of Axial Spondyloarthritis

Multiple classification schemes have been developed to facilitate the study of axial SpA. Though not specifically intended for diagnostic use, classification criteria provide a useful framework for the diagnosis of axial SpA in clinical practice. Currently available classification sets include the European Spondyloarthritis Study Group (ESSG) criteria,[10] the Amor criteria,[11] and most recently, the ASAS criteria.[12] See Table.

Clinical Features of SpA

Each criteria set describes clinical features contributing to the diagnosis of axial SpA. Despite some variability between the sets, they all capture clinical features that may indicate SpA in patients younger than 45 years old who have chronic (>3 months) back pain. Clinical features that aid in the diagnosis of SpA can be divided into history, articular manifestations other than IBP, and extra-articular manifestations.

Historical features that should be elicited when approaching back pain include response to non-steroidal anti-inflammatory drugs (NSAIDs) and family history. An excellent response to NSAIDs is a marker for spondyloarthritis and helps to differentiate IBP from MLBP.[12] Familial forms of spondyloarthritis have been described and indicate a higher likelihood of disease in patients with a positive family history.[12]

Peripheral skeletal manifestations should be sought in patients with IBP. Peripheral arthritis in SpA is common and is often an asymmetric lower extremity oligoarthritis.[3] Enthesitis, inflammation of the skeletal unit where tendon or ligament connects to bone, especially at the Achilles' tendon and plantar fascia, is common in SpA.[12] Finally, dactylitis, so-called sausage digit, also occurs in SpA, particularly in psoriatic arthritis.[12]

Spondyloarthritis is a systemic inflammatory disease and extra-articular inflammatory disease can occur in several organ systems. Skin involvement prior to joint involvement is typical in the majority of cases of psoriatic arthritis. Keratoderma blenorragicum and circinate balanitis are psoriasis-like skin lesions present in some patients with reactive arthritis. Abdominal symptoms of pain, diarrhea, and hematochezia may occur in SpA patients with underlying inflammatory bowel disease. Acute anterior uveitis (iridocyclitis) is the most common inflammatory eye lesion in SpA and results in severe eye pain, redness, and photophobia.

Ancillary Testing

Laboratory and radiographic studies are important adjuncts in the evaluation of IBP when SpA is suspected. Elevated C-reactive protein (CRP) indicates systemic inflammation and is included in the ASAS criteria for SpA.[12] Human leukocyte antigen B27 (HLA-B27) is a cellular marker associated with SpA, especially ankylosing spondylitis.[13] Radiographic sacroiliitis is a characteristic finding of SpA and is included in all the aforementioned classification criteria.[10-12]

HLA-B27 is present in the majority of cases of ankylosing spondylitis and in 42-75% of undifferentiated spondyloarthrtitis.[14] HLA-B*2705 is the most common subtype worldwide.[13] Difficulty in the application of a positive test results from the fact that this marker occurs in unaffected populations. HLA-B27 is estimated to be present in approximately 8% of Caucasians and 2% to 4% of African Americans.[15] Its presence alone is not sufficient for diagnosis; however its presence in a patient with inflammatory back pain increases the likelihood of SpA by a factor of 9.[5] In general, HLA-B27 testing should be reserved for those patients with IBP and therefore a reasonable pre-test probability of SpA rather than as a screening tool in all patients with chronic back pain.

Judicious use of radiographs in patients with IBP can aid in making the diagnosis of SpA. Spinal changes of

Table. ASAS Classification Criteria for Axial Spondyloarthritis[3]

Patients with ≥3 months back pain and age at onset < 45 years	
• Sacroiliitis on imaging (radiograph or MRI)	• Positive HLA-B27
• Plus 1 or more spondyloarthritis feature	• Plus 2 or more spondyloarthritis features
Spondyloarthritis features	
• Inflammatory back pain	• Psoriasis
• Arthritis	• Inflammatory bowel disease
• Enthesitis at the heel	• Good response to NSAIDs
• Uveitis	• Family history of spondyloarthritis
• Dactylitis	• HLA-B27
• Elevated C-reactive protein	

SpA include squaring of the vertebral bodies, sclerosis of the corners of vertebral bodies ("shiny corners"), and syndesmophyte formation.[3] The presence of bilateral sacroiliitis with iliac sclerosis and erosive changes strongly suggests ankylosing spondylitis; similar changes may be seen in other forms of axial SpA.[3]

Clinicians should be aware that sacroiliitis may occur in conditions other than spondyloarthritis. In a study of 315 patients with chronic back pain at a single center, 100 had sacroiliac joint abnormalities on radiographs. Degenerative changes due to osteoarthritis occurred in 75 patients and inflammatory changes were found in 25 patients.[16] Inflammatory changes were found more often in men and degenerative changes were observed more frequently in women.[16] Other disorders that cause radiographic changes in the sacroiliac joint include infection (typically unilateral), hyperparathyroidism, and osteitis condensans ilii, a painful condition developing in postpartum women featuring iliac sclerosis adjacent to the sacroiliac joint.[17]

The main limitation of radiographic changes in making the diagnosis of SpA is the fact that radiographic changes may lag clinical symptoms by several years.[5] Therefore in a patient with IBP, normal radiographs do not necessarily exclude the presence of axial SpA. Magnetic resonance imaging (MRI) of the spine and sacroiliac joints can be a useful tool in selected patients with IBP and normal radiographs when there is a high suspicion for axial SpA.[3]

Conclusion

Back pain is a common clinical problem in the United States. When it becomes chronic, musculoskeletal specialists, including orthopedic surgeons, rheumatologists, and physiatrists frequently become involved in the care of these patients. Unfortunately, a precise etiology of symptoms cannot be identified in many of these of patients.

Axial spondyloarthritis, previously seronegative spondyloarthropathy, is nearly as common as rheumatoid arthritis. A challenge for musculoskeletal specialists is to identify the few patients with axial SpA within the large group of patients referred for evaluation of chronic low back pain. Inflammatory back pain is the characteristic clinical symptom of axial SpA; symptoms of IBP should be sought in all patients undergoing evaluation for chronic back pain. When identified, patients with IBP should have pelvic radiographs looking for sacroiliitis and assessment of HLA-B27 and CRP followed by a referral to a rheumatologist for further evaluation of ankylosing spondylitis or other axial SpA.

Author's Disclosure Statement

The views expressed in this article are those of the authors and do not necessarily reflect the official policy or position of the Department of the Navy, Army, Department of Defense, or the U.S. Government.

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