

Overlap of Pain Character in Patients with Inflammatory Back Pain versus Chronic Mechanical Back Pain: Review Article

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ABSTRACT

Background: Back pain (BP) is a common musculoskeletal symptom that affects a large percentage of the population. Back pain can be classified according to the cause into mechanical and inflammatory. Inflammatory back pain (IBP) has some distinguishing characters that help in differentiation of it from mechanical back pain. Back pain in axial spondyloarthritis is usually of inflammatory type. There are a number of sets of criteria that have been devised to define IBP. These include the assessment of spondyloarthritis international society (ASAS) IBP experts' criteria, Berlin criteria, as well as Calin criteria.

Objective: Assessment of overlap of pain character in patients with inflammatory back pain versus chronic mechanical back pain.

Methods: Pain, Inflammatory Back Pain, and Chronic Mechanical Back Pain were all looked for in PubMed, Google scholar, and Science direct. References from relevant literature were also evaluated by the authors, but only the most recent or complete study from February 2006 to June 2022 was included. Due to the lack of sources for translation, documents in languages other than English have been ruled out. Papers that did not fall under the purview of major scientific investigations, such as unpublished manuscripts, oral presentations, conference abstracts, and dissertations, were omitted.

Conclusion: There is a great overlap in character of back pain between patients with chronic mechanical back pain and those with axial spondyloarthritis.

Keywords: Inflammatory back pain, Chronic mechanical back pain, Pain character.

INTRODUCTION

Back pain (BP) is a common musculoskeletal symptom that affects a large percentage of the population. It can affect anyone of any age. Back pain has an impact on one's life quality which can lead to disability. As such, it is recognized as a global public health issue with far-reaching economic consequences for both developed and developing nations ⁽¹⁾.

MattiuZZi *et al.* ⁽¹⁾, found that the prevalence of back pain is about 577.0 million cases and incidence is about 245.9 million cases/year and disability-adjusted life years (DALYs) of LBPs is about 64.9 million DALYs during the last 20 years. This reflects considerable ~50% increase in all measures of epidemiology of back pain during the last 20 years .

A staggering 75% of people will suffer from back discomfort at some point in their lives. Back pain can be classified according to the cause into mechanical (90%) and systemic causes (10%) that includes rheumatological causes (axial spondyloarthritis (AxSpA), neoplastic diseases, metabolic diseases and referred pain ⁽²⁾.

Mechanical back pain refers to discomfort felt in the spine, discs, or surrounding soft tissues as a result of conditions such as disc herniation, lumbosacral muscular strain, lumbar spondylosis, spondylolisthesis, acute or chronic traumatic damage, vertebral compression fractures, as well as spondylolysis ⁽³⁾.

Causes of chronic back pain other than AxSpA:

1) Spondylosis

Spondylosis is a degenerative spinal disorder that affects lumbar spines mainly due to mechanical load and relative mobility of the lumbar spines in comparison with thoracic

and sacral spine. It is a progressive condition can lead to canal stenosis and radicular pain. Most cases of spondylosis without neurological impairment are best treated conservatively. But patients with radicular symptoms have good outcomes after surgery ⁽⁴⁾.

2) Disc herniation

A lot of people get back pain because of this. There are many risk factors for disc prolapse such as axial overload, dehydration, and genetic predisposition. Back pain that is caused by disc prolapse usually increases with sitting and forward flexion. Disc herniation may be associated with radicular pain, sensory impairment, or paresis according to distribution of the compressed nerve roots. Radiograph has a role in suggesting disc prolapse. Also, CT has a role in diagnosis but MRI is the gold standard. Management of disc prolapse includes operative and non-operative options. Non operative options should include education and physical exercises besides anti-inflammatory medication ⁽⁵⁾.

3) Spondylolysis

Spondylolysis, or a fracture through the pars interarticularis, is a common cause of back discomfort in children and teenagers. Radiography, CT, and MRI help in diagnosis of spondylolysis. Early detection is critical for early treatment, which involves rest, brace treatment, and physical therapy. Spondylolysis can lead to nonunion or a pars defect if it is left untreated. Some patients may need surgery to correct the par interarticularis or fuse the lumbar facet joints ⁽⁶⁾.

4) Spondylolisthesis

Spondylolisthesis is anterior displacement of the vertebral body in relation to the border of the other vertebral bodies. It has five types. The most common type is isthmic type followed by dysplastic then degenerative type. Most cases are asymptomatic. Symptomatic cases have back pain that increases with extension, limitation of spinal flexion and extension, and in severe cases, patients may develop neurological symptoms and radicular pain. Radiography lateral view is a good tool for diagnosis of spondylolisthesis, but some cases may need radiograph AP view and MRI. Most cases improve with conservative treatment including analgesics, thoracolumbar/lumbosacral brace, and physical exercise with avoiding hyperextension of the back. Only few cases that may need surgery ⁽⁷⁾.

5) Scoliosis

The spine curves to the side in scoliosis. Scoliosis can be classified into two categories: structural and nonstructural (postural). In terms of aetiology, structural scoliosis is classified as either idiopathic or non-idiopathic. It is still unknown what factors lead to the development of scoliosis. However, several factors, such as inheritance, growth or hormonal malfunction, bone mineral density change, abnormalities in body part tissue and biomechanical variables, may play a role in the occurrence of the disease. Scoliosis treatment options range from observation and monitoring to the use of braces and exercise to surgical correction, depending on the patient's age and the severity of their condition ⁽⁸⁾.

6) Vertebral compression fractures (VCFs)

Vertebral compression fractures (VCFs) are characterized by abnormal loading on the vertebral body's anterior half and the anterior longitudinal ligament, but not on the vertebrae's posterior half or the posterior osseous ligamentous complex. Osteoporosis, hormone imbalance, radiation exposure, trauma, and secondary fractures are all risk factors for spontaneous VCFs. although myeloma and spinal metastases are the most common causes. In addition to causing kyphosis and other back problems, VCFs also causes pain in the spine ⁽⁹⁾.

Back pain in AxSpA

Involvement of the axial joints (spine and sacroiliac joint) and the peripheral joints as well as extra-articular involvement (uveitis, inflammatory bowel disease, and psoriasis) are hallmarks of AxSpA, which is a chronic inflammatory illness ⁽¹⁰⁾. In the early stages of AxSpA, before any radiological abnormalities of the sacroiliac joints have developed, patients often have chronic back discomfort ⁽¹¹⁾. AxSpA is characterized by inflammatory back pain, which originates from the spine and sacroiliac joints. However, there are other possible causes of pain in these patients, for example back pain may occur due to degenerative changes, syndesmophytes, vertebral fractures, fibromyalgia and other rare causes as

subarachnoid cysts and atlanto-axial dislocation, which may also lead to neurological symptoms ⁽¹²⁾.

As a result, it's crucial to properly assess the source of back pain in these patients and explore all possible differential diagnoses. It is critical to get the right diagnosis, because therapies might differ significantly. It is also important to notice any change in the nature of the reported back pain during follow-up of patients with AxSpA ⁽¹³⁾.

Differentiation between inflammatory and mechanical back pain

Inflammatory back pain (IBP) has some distinguishing characters that help in differentiation of it from mechanical back pain. These characters include gradual onset of chronic back pain in young adulthood, that improves with exercise and worsens with rest, and associates with morning stiffness more than thirty minutes ⁽¹⁴⁾. However, these characteristic symptoms of IBP don't present in every patient with AxSpA, and they also present in a significant proportion of patients with chronic back pain from other causes ⁽¹⁵⁾.

Criteria of IBP

Numerous sets of criteria have been developed for defining IBP these include the Calin criteria which is the first set of IBP criteria ⁽¹⁶⁾, Berlin criteria ⁽¹⁷⁾, and the Assessment of Spondyloarthritis international society (ASAS) IBP experts' criteria ⁽¹⁸⁾.

The Calin criteria was developed in 1977, In this study a questionnaire of 17 questions is applied to three unequal groups, the total number of participants was 138. The first group included patients already diagnosed as AS, the second group included patients complaining of back pain due to any other cause, and the third group includes individuals not complaining of back pain. After assessment of this questionnaire, only five questions were considered as prominent features of IBP. Under-40 years old onset, gradual beginning, greater than 3-month persistence, morning stiffness, relief by exercise, if four out of these five conditions hold true, the sensitivity is 95% and the specificity is 85% ⁽¹⁶⁾.

In 2006 another set developed, a questionnaire applied to 101 patients with AS and 112 patients with mechanical back pain. Statistical analysis of surveys yielded that the criteria of morning stiffness lasting more than 30 minutes, back pain doesn't relieve after rest but relieved by movement, awakening in the second half of the night due to back pain and alternating buttock pain. Three out of four criteria must be met for a diagnosis, with sensitivity at 33% and specificity at 98%, with two of the four items met, the sensitivity rises to 70% and the specificity decreases to 81% ⁽¹⁷⁾.

In 2009, the Assessment of SpondyloArthritis international Society (ASAS) IBP experts criteria was developed. Criteria include: age lower than 40 years, gradual onset, reduction of pain with exercise, back pain doesn't relieve after rest, pain at night, with at least four of the five criteria met, the sensitivity is 77% and the specificity is 91% ⁽¹⁸⁾.

Individual parameters of IBP

Age of onset

The peak prevalence of back pain in general population is between 40 and 50 years⁽¹⁾. While, AxSpA usually begins in the second or third decade of life⁽¹²⁾.

According to Calin⁽¹⁶⁾, and ASAS criteria⁽¹⁸⁾, one of the requirements for IBP is an onset age of less than 40 years. According to the Berlin criteria, a patient must have had their symptoms first appear at an age younger than 45 in order to be diagnosed with IBP⁽¹⁷⁾.

Duration of symptoms

Back pain can be classified according to duration into acute (less than one month), subacute (from one to three months), and chronic (more than 3 months or if pain occurs episodically within a six-months period)⁽²⁾.

Chronicity of back pain is a typical feature of IBP. But mechanical back pain can also be associated with chronic back pain of ≥ 3 months in duration that can complicate recognition of IBP and delay diagnosis of AxPsA⁽¹⁸⁾. Chronicity of back pain is considered one IBP criteria according to Calin criteria⁽¹⁶⁾. Also, it is an entry criterion for IBP according to Berlin criteria⁽¹⁷⁾, and ASAS criteria⁽¹⁸⁾.

Mode of onset

Insidious onset of back pain means slow onset, which can be differentiated from acute or rapid onset but there is no consensus on the definition of insidious onset. Some consider that it means onset over 3 weeks, others consider it as onset within month up to a year. For the option (over 3 weeks), the sensitivity and specificity of insidious onset were 98.0% and 14.0%, respectively, and for the option (month up to a year), the sensitivity and specificity became 65.8% and 57.6%⁽¹⁹⁾.

Calin⁽¹⁶⁾ and ASAS criteria⁽¹⁸⁾ consider insidious onset an item of IBP criteria. The Berlin set does not include this item⁽¹⁷⁾.

Morning stiffness

Morning stiffness more than 30 min is one of items of Berlin criteria⁽¹⁷⁾. However, Calin criteria considers morning stiffness an item of IBP without determination of certain period⁽¹⁶⁾. Also, this item isn't included in ASAS criteria⁽¹⁸⁾.

No improvement of back pain with rest and improvement with exercise

Inflammatory back pain is characterized by symptoms that do not lessen with rest. However, it is possible to occur in patients with mechanical back pain. Specificity of this parameter increases from 15% to 90% when used in conjunction with the fact that back discomfort can be alleviated by activity⁽¹⁹⁾.

In ASAS criteria⁽¹⁸⁾, improvement with exercise is a single item and no improvement with rest is another item. While in Berlin⁽¹⁷⁾, both items are combined as a single

item. Calin criteria⁽¹⁶⁾ includes the item of improvement with exercise but doesn't include the item of no improvement with rest.

Alternating buttock pain

Buttock pain occurs in patients with AXSpA and those with mechanical back pain but differs in character. Alternating buttock pain is characteristic of IBP. However, unilateral buttock pain is more common in mechanical back pain, bilateral buttock pain occurs equally in patients with mechanical or inflammatory back pain. The item of alternating buttock pain is included in Berlin criteria only and isn't included in the other two sets⁽¹⁷⁾.

Pain at night and awakening because of back pain during the second half of the night

Pain at night is included as one of IBP items in ASAS criteria⁽¹⁸⁾. While, Berlin criteria for IBP include waking up in the second half of the night due to back pain⁽¹⁷⁾.

When Calin, Berlin, and ASAS sets of criteria were evaluated for specificity and sensitivity in different studies. Sensitivity and specificity of Calin, Berlin, and ASAS criteria were variable in different studies (91.2% & 50%, 75.8% & 83.3% and 74.7% & 72.9%)⁽²²⁾, (85% & 26.9%, 83.9% & 44.8% and 83.9% & 35.4)⁽²¹⁾ and (76% & 90%, 72% & 94% and 64% & 82%)⁽¹⁹⁾. This may be due to that sensation of pain depends more on subjective and psychological states so most items of these sets are liable to change according to patient's expression, culture and awareness⁽²³⁾.

So, we still need a validated classification criteria for IBP to facilitate differentiation between AxPsA and patients with chronic mechanical back pain⁽²⁴⁾.

CONCLUSION

There is a great overlap in character of back pain between patients with chronic mechanical back pain and those with axial spondyloarthritis.

Financial support and sponsorship: Nil.

Conflict of interest: Nil.

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