

Painful Spinal Conditions in Young Children and Adolescents

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Abstract

There are numerous etiologies of back pain in the pediatric population. Most of the children experiencing the back pain who are seen in orthopaedic outpatient need careful evaluation of underlying biomechanical and musculoskeletal cause. Nevertheless, other causes like rheumatic, infectious or oncologic etiology need to be considered. This research explores evaluation, differential diagnoses, and diagnosis of back pain in young children. Back pain in children, adolescents and young adults is less common than in mature adults. One of the pertinent issues in the determination of the incidence and prevalence of the lower back pain in ways that, it is defined. Low back pain may be defined as the low back pain with no clinical cause, non-organic and non-specific pain. It is normally used as a descriptive term for different types of back pain. Mechanical pain is also a confusing term that refers to pain without the pathological underlying cause but is conversely used to explain conditions that arise from trauma or overuse such as the intervertebral disc prolapse, muscle pain or spondylolysis. Over the years, back pain has been considered as a sinister presentation within the young age group. Present studies now show that there are many children who experience back pain, but there are very few of them who seek medical intervention mainly because they think it's normal. When assessing adolescents and children with back pain, it is essential to consider social factors, psychological and lifestyle, because spinal pain does not mean that the child has a spinal disease. Additionally, it is important to consider critical underlying conditions and perform the required investigations to describe these causes without over-investigating the patients with non-specific musculoskeletal pain.

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Introduction

Painful spinal conditions are fortunately less common in children and young adolescents than in adults. Although back pain has always been considered a sinister presentation in the young age group, some studies have shown that there are many children who experience back pain in the absence of any underlying conditions. However, some of them require further investigation to exclude serious pathology. Most common type of back pain in childhood is the low back pain and there is a small chance of recurrence with increased intensity [1]. Prevalence may vary in young children depending on the definition of pain and the source population. Also, back pain is common among 10% to 25% of athletes and is more prevalent in gymnasts and players [2]. The prevalence of back pain in young children during the young age is more common [3]. Symptoms (red flag) that trigger an in-depth investigation include inflammatory back pain, worsening

pain over time, neurologic effects, night time pain, weight loss and fever.

Radiation, nature and site of the pain, plus relieving factors or exacerbating factors need to be determined. For instance, back pain that is related to exercise and is relieved with rest may be associated with pathology. Nevertheless, spinal tumor or discitis in the child may surface with obvious discomfort whenever lying supine for the diaper changes.

Pain timing is very crucial. Early morning stiffness suggests an inflammatory process with the nocturnal being closely associated with of infection or tumor. The history of changes in mobility or posture should be investigated and a direct inquiry regarding the experienced neurological signs like weakness or any change in bowel or bladder functions. Investigations into the medication history must identify the use of drugs like corticosteroids (in

asthma or endocrinal disorder) that are related to osteoporotic vertebral crush fractures. Additional factors to be considered are certain sporting activities and the style, type, and weight of the backpack bag. The prevalence of back pain among family members that are related to chronic pain may be relevant because of the increased risks of the condition or could support an illness behavior that is not normal.

Imaging

Investigation starts with imaging that can identify Scheuermann disease, spondylolisthesis, spondylolysis and fractures. The utilization of radiographs remains controversial without universal imaging protocol. There are health experts who recommend radiographic imaging after every three months for the non-traumatic back pain.

Magnetic resonance imaging is an important modality for evaluation of detailed anatomy, joint inflammation and soft tissues without radiation [4]. Computed tomography is quick to get and is a preferred modality for emergency evaluations [5]. The bone scan also includes radiation but helpful in the diagnosis of inflammation sites close to the open physis that may be hard to evaluate by other mean [6].

Laboratory evaluation is essential in patients with inflammatory back pain and involves testing for blood culture, C- reactive protein, sedimentation and complete blood count. Uric acid and lactic dehydrogenase are important when the health expert is suspicious of the malignancy being present [7].

Differential Diagnosis

Keeping a wide differential diagnosis is very important when examining back pain. Research has shown that over 80% of back pain that is presented to the emergency room is acute in onset with a viral syndrome, urinary tract infection, idiopathic, muscle strain and direct trauma [8]. Also, there are other case studies that demonstrate that over half of the pediatric patients who have been examined in the orthopedic clinic for cases of low back pain had an underlying spinal injury [9]. In all these case studies, the common diagnoses were tumors, Scheuermann, spondylolisthesis, discitis and osteomyelitis [2, 10].

Infectious causes

There are numerous structures in the back that are prone to infection including the sacroiliac joints, fibrocartilagenous disc and the vertebrae [11].

Mycobacterium tuberculosis causes spinal tuberculosis involving bony vertebral bodies, but to some extent, it may also include the surrounding tissues, disc, and the spinal cord. In most cases it involves the lumbar spine and lower thoracic in children. Also, it gets very hard to diagnose unless there is an increased index of suspicion. The condition also presents itself with fever, back pain, and neurologic symptoms. Treatment is very controversial but includes antibiotics and at times surgery [12].

Pyogenic sacroiliitis is more common among young adolescents than toddlers. It has been accounts for 1% - 2% of joint infections

in children. Predisposing factors may include the acne, severe atopic dermatitis and trauma [13].

Spondylodiscitis of the intervertebral endplate or disc has been seen in almost all ages and is commonly associated with illness within the past few months. A researcher [14] reported 12 spondylodiscitis cases out of 520 cases of patients who presented with back pain. Many cases are limited and will resolve without the use of any antibiotics. Bracing alleviates pain and promotes healing. It is essential to continue following these young ones considering the fact that long-term studies have shown decreased spine fusion and motion a few years after the diagnosis.

Juvenile idiopathic arthritis

The cervical spine is often involved in juvenile idiopathic arthritis (JIA). The lumbar and thoracic spines are not affected. Therefore, the back pain that is associated with JIA is not common. The onset of JIA is normally associated with adolescence or late childhood, with the young boys being more prone than the adolescents. Although the presence of sacroiliitis at presentation, the involvement of spine takes place in later days and pain is normally associated with the stiffness. Lumbar spine flattening and lumbar lordosis loss with reduced spinal motion are evident in examination [1].

Plain radiographs have low sensitivity for detection of the early changes of spinal involvement and sacroiliitis involvement in JIA. Both CT and bone scintigraphy will detect determine disease early in advance but may involve significant radiation exposure. Magnetic resonance imaging is suggested because it detects inflammatory changes and synovial changes within the marrow without radiation.

Patients suffering from JIA must be referred to the professional pediatric rheumatologist for additional management that may be shared with the referring professional. Physiotherapy has a major role to prevent loss and focus on perfect posture hence preventing loss of movement range in inflammatory arthritis patients [15, 16].

Vasculitis

Vasculitis is a systemic blood vessel inflammation that affects vessels of any size and therefore may affect various organs with a number of presentations. Basically, it impacts the aorta, but could also affect other vessels including carotid arteries, subclavian and renal. Whenever the mid-aorta is included, they could be referred lower back pain [17]. Diagnosing this condition may be difficult because the signs are not specific and include hypertension, headache, claudication, fever and abdominal pain.

Spondyloarthropathies

Spondyloarthropathies include IBS-related arthritis, psoriatic arthritis, and enthesitis-related arthritis. Despite the fact that there are numerous similarities present with sacroiliitis, there are numerous differential features and detection of the underlying diagnosis can greatly affect the treatment. The most common features of spondyloarthropathies may include sacroiliitis, enthesitis, low back pain and HLA-B27 positivity [18].

Reactive arthritis is normally characterized by painful arthritis that occurs after the urogenital and enteropathic infections that include *Chlamydia trachomatis*, *campylobacter*, *shigella*, *salmonella*, and *Yersinia*. Characteristically, reactive arthritis is very painful and in most cases it raises septic arthritis suspicion [19].

Psoriatic arthritis is a category of the JIA and is often characterized by psoriasis and arthritis. Both psoriatic and ERA arthritis have a prevalence rate of 0.28 – 88 cases per every 100 children. Diagnosis of arthritis may follow or precede the psoriasis diagnosis. Dactylitis, interphalangeal arthritis and nail pits could raise diagnosis suspicion [20].

Spondyloarthropathies and spondylolysis are very rare among children who are under five years and more common in children over ten years old. Symptoms are low back pain, occasionally spreading to the posterior thigh or buttocks. Although the onset is insidious, at times it will follow an acute injury [20].

Scheuermann's disease

Currently, the etiology of Scheuermann's disease has not been well investigated. However, the disease has been associated with repeated trauma or growth variation. Additionally, there is a replicating association in a few patients, and this suggests a genetic cause. The pain associated with this disease is mild and occurs after a long period of exercises or sitting [21] on examination, the patients that have been affected have a larger than 40 degrees fixed kyphosis that remains visible on forward

bending and hypertension. Spinal radiographs are adequate to confirm Scheuermann's disease clinical diagnosis. Also, there may be flattening and irregularity of the vertebral end plates, schools nodes, and the narrowed intervertebral disc spaces. Over one-third of patients having scoliosis plus kyphosis. Magnetic resonance imaging is reserved for the patients whose diagnosis is not clear.

For most patients the cause of Scheuermann's disease is benign with the symptoms subsiding with the skeletal maturity. NSAID treatment and activity modification is adequate in management for many patients, but those who having severe deformity requires surgery or spinal bracing.

Conclusion

Spinal pain in children demands a careful and thorough examination of signs and symptoms. However, pre-pubertal children are likely to experience more critical underlying pathology. On the other hand, adolescents are more susceptible to have non-specific low back pain without demonstrable pathological causes. Imaging and laboratory investigations should be aimed at the severe signs and symptoms. Also, imaging plays a major role in diagnosing underlying conditions and is invaluable in exclusion of underlying pathology in a few cases. The chosen diagnostic imaging should be discussed with a specialist who has the required knowledge in pediatric musculoskeletal disease. For most conditions, surgery is occasionally considered after the rigorous trial of traditional management.

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