ANONYLOSING SPONDYLITIS - CONTEMPORARY DETAILED ANALYSIS ON DIAGNOSIS, MANAGEMENT AND MEDICATION

Panchumarthy Ravisankar¹, P. Divya Bhargavi¹, V. Divya Sai Jyothi¹, R. Sampath¹, O. Sai Koushik¹, P. Sai Anvith², P. Pragna³

¹Vignan Pharmacy College, Vadlamudi, Guntur (Dist.) - 522213, Andhra Pradesh State, India.  
²Sri Chaitanya Educational institution, Medical Academy, Lakshmipuram-522007, A.P. State, India.  
³Malla Reddy Medical College for Women, Jeedimetla, Hyderabad-500055, Telangana State, India.

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ABSTRACT

Ankylosing spondylitis (AS) is a long-term disease that affects the joints near the centre of the body, especially the spine and sacroiliac joints which is located at the lowest end of the spine where the sacrum meets the iliac bone in the pelvis. Spondy implies spine Spondylitis and “spondyloarthritis” are synonymous. Ankylosing spondylitis (AS) or Spondylitis is a chronic inflammatory disease of the spine that causes pain in the back, neck, and sometimes hips and heels. However, immune mediated mechanisms involving human leukocyte antigen (HLA)-B27, inflammatory cellular infiltrates, cytokines and genetic and environmental factors play key roles. In advanced cases, the disease can cause new bone to grow and the vertebrae of the spine to fuse together which lead to kyphosis, a type of spinal curvature that results in a forward-hunching posture. New imaging techniques and therapies have substantially changed the treatment options with tumor necrosis factor blockers are more utility for patients. AS thrice more prevalent in men than in women and starts most often between ages 20 and 40. It is 10 to 20 times more common among 1st-degree relatives of AS patients than in the general population. The male-to-female of AS ratio is roughly 3:1. The peak onset is in adolescents and young adults between 15 to 30 years of age this disease gets symptoms before age of 30 and chronically effects till the end of their life. Only five percent gets symptoms after age of 45 but estimates vary and the condition of AS normally begins with young adulthood up to 40 years of age. Cardiovascular involvement happens 1 in below 10% of AS patients, generally in those with severe long-standing disease.

Corresponding author

Dr. Panchumarthy Ravisankar M.Pharm Ph.D  
Flat no. 501, Door no.4-1-16,  
Sapthagiri Sesha Sai Sadan,  
4/2, Lakshmipuram, Guntur-522007,  
Andhra Pradesh, India.  
banuman35@gmail.com  
09000199106.

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INTRODUCTION

Ankylosing spondylitis is a form of chronic inflammatory arthritis that primarily affects the joints, ligaments, and tendons of the spine. The prefixes “spondyl” and “spondylo” are derived from the Greek word for “vertebra.” The ending prefix “itis” means inflammation; thus, “spondylitis” is inflammation of the spinal vertebrae. The ending “itis” means inflammation; thus, “spondylitis” is inflammation of the spinal vertebrae. “Ankylosing” means “fusing together” which implies loss of flexibility of the back and the neck owing to the inflammation. Ankylosing spondylitis (AS) is one category of a family of diseases referred to as spondyloarthritides (SPAs). The words “spondylitis” and “spondyloarthritis” are synonymous. Ankylosing spondylitis (AS) is a chronic inflammatory disease that causes pain in the back and neck and sometimes hips and heels. The back and neck are made up of a column of individual bones known as vertebrae. Ankylosing spondylitis also less commonly known as Bechterew disease and Marie Strümpell disease is a seronegative spondyloarthropathy, which results in fusion (ankylosis) of the spine and sacroiliac (SI) joints, and also seen in large and small joints. It is important to note that in early disease, spinal mobility may be normal [1-3].

In some people, this condition can be affected other joints of shoulders, ribs, hips, knees, and feet. It can also affect the places where the tendons and ligaments attach to the bones often it can affect other organs such as the eyes, bowel, and very rarely, the heart and lungs. Many people who have AS have mild back pain that comes and goes. Others have severe, ongoing pain. Sometimes they lose flexibility in the spine. In the most severe cases, the swelling can cause two or more bones of the spine to fuse. This may stiffen the rib cage, restricting lung capacity.

Statistical facts about ankylosing spondylitis:

Insurance data of the United Kingdom of males indicate an annual loss from back pain of 627 days per 1000 employees. In a sample of 2684 mixed manual workers, 151 (5.6 %) were deemed to have a long-term handicap using the criteria of spells of absence in excess of 6 weeks of admission to hospital continuous or increasingly severe pain lasting more than a year. A further study indicated that 16/10,000 employees obtained early retirement from the Post office on the grounds of low back pain. Limited evidence to support the theory that injury and heavy workloads contribute to the onset of back pain. Around 1 % of the adult population is affected, from an estimate, around 1.7 million Americans aged 20-69 years having spondylarthritides. In the UK, there are around 200,000 people who have been diagnosed specifically with ankylosing spondylitis. In the United States, according to the National Institutes of Health, spondyloarthropathies affect between 3.5 to 13 people per 1,000, vertebrae to fuse together. According to the Spondylitis Association of America nearly 50 % of African-Americans are having Ankylosing spondylitis and estimated to affect around 200,000 people in the UK. The institute reported that Americans spend about $50 billion per year for treating low back pain. Overall, the prevalence of ankylosing spondylitis is between 0.1 % and 1.4 %. In mid-Europe the prevalence is 0-3 to 0.5 %. The incidence of new cases of ankylosing spondylitis is between 0.5 to 14 per 100,000 people per year worldwide.

About 80 % of patients develop the condition before they attain 30 years of age and less than 5 % present with the symptoms at an age above 45 years. Spinal injured patients with previous ankylosing spondylitis, fractures frequently occurred due to minimal trauma and out of them 75 % patients were associated with severe neurologic deficits. Genetic research facts published in Nature Genetics in 2011, on the DNA of 3,000 ankylosing spondylitis patients, declared that the existence of the HLA-B27 gene is the cause of this disease, but also revealed that there are lots more genetic clues about the conditions [4-6].

Ankylosing spondylitis (AS) - Brief analysis:

Ankylosing spondylitis (AS) is a kind of systemic disorder coupled with inflammation of the axial skeleton, large peripheral joints, and digits, nocturnal back pain, back stiffness, accentuated kyphosis, constitutional symptoms, aortitis, cardiac conduction abnormalities, and anterior uveitis. The real ground of spondylitis is unknown hitherto. It is evidently proved from several researches that it is triggered by genetics which is named as HLA - B27 gene and it is mainly responsible for the eruption of spondylitis in most of the cases. AS Patients can feel pain and stiffness from the neck down to the lower back and it is a painful and progressive type of arthritis that could not be cured fully and gradually leads to chronic pain and disability and deformity duly affecting the spine and paves way to eventual fusion of the spine. In addition to physical symptoms, some people with ankylosing spondylitis (AS) also have sensitive feelings of sadness or frustration, owing to their physical inability due to chronic pain to participate in several activities [7].

The sacroiliac joints are located at the lowest end of the spine where the sacrum meets the iliac bone in the pelvis. AS Peripheral joints away from the spine, such as the hips and knees, may also be involved. It is a common inflammatory rheumatic disease that affects the axial skeleton, causing characteristic inflammatory back pain, which can cause to arise structural and functional impairments and diminution in quality of life. It is a complex and potentially debilitating disease that is insidious in onset, progressing to radiological sacroiliitis over several years. Intermittent flare-ups of spinal pain and stiffness are the most common symptoms [8]. Fig.1 shows the Ankylosing spondylitis of normal vertebrae and fused vertebrae.
Nonskeletal problems associated with AS may include inflammation of the iris or uvea (the colored portion of the eye), and less commonly inflammation of the aorta, scarring of the lungs (pulmonary fibrosis), amyloidosis (excess deposition of an abnormal protein in organs and tissues), and inflammatory bowel disease, and Neurological complications include C1 - C2 subluxation (partial displacement of the first and second cervical vertebrae). A tendency for spinal fractures with minor trauma, spinal stenosis (narrowing) in the cervical (neck) or lumbar (low back) regions, chronic inflammatory cauda equina (compression of the low back nerve roots that causes paralysis and cuts off sensation to the legs), and radiculopathy (shooting pain caused by pressure on the nerves) secondary to fracture or compression of the nerve roots. Approximately 95 % of people with ankylosing spondylitis are positive for the HLA-B27 marker. Unlike ordinary back pain, ankylosing spondylitis (AS) is not caused by physical trauma to the spine. The condition could be mild or severe, and may lead to a stooped-over posture known as Hunchback posture [9].

Sacroilitis diagnosis requires studies on x-ray. Treatment is with NSAIDs or tumor necrosis factor inhibitors and physical measures that maintain joint flexibility. However, NSAID treatment has only a symptomatic effect and probably does not alter the disease course. For symptoms refractory to NSAIDs, second line treatments, including corticosteroids are employed which yields limited benefits only.

In advanced AS, abnormal bone growth in the vertebrae may cause joints to fuse, severely reducing mobility. Patients may also experience vision problems, or inflammation in other joints such as the Joints of the hips, knee or shoulders fatigue, insomnia, depression anxiety, strain, stress, frustration, respiratory problems, psoriasis and bowel diseases are also associated with It. There is no cure for ankylosing spondylitis, but treatment aims at the relief of pain and stiffness only.

Enthesopathy: Enthesopathy is a condition that affects the entheses with inflammation. The entheses are sites of tendinous or ligamentous attachment to the bone. Enthesopathy may be due to an inflammatory condition, such as psoriatic arthritis, or a condition owing to injury or overload, such as plantar fasciitis.

**Symptoms associated with enthesitis:**

Symptoms include pain and often swelling of the heel, other commonly affected areas include the toes and elbow and fingers, pelvis and chest wall. Toes and fingers can look like a sausage due to swelling at the entheses.

**Conditions associated with enthesitis:**

1. Achilles tendinitis.
2. Reactive arthritis.
3. Rheumatoid arthritis.
4. Osteoarthritis.
5. Diffuse idiopathic skeletal hyperostosis (DISH).

The doctor may take up numerous different blood tests to decide ankylosing spondylitis. An increased erythrocyte sedimentation rate (the rate red blood cells in the blood) and increased levels of C-reactive protein (a protein that is usually not in blood but in respect of inflammation) which indicates common signs of inflammation in the body. The detection of sacroilitis by radiography, magnetic resonance imaging, or computed tomography is the sophisticated method to diagnose AS.

Ankylosing spondylitis is often abbreviated to AS and is also known as seronegative spondyloarthropathy, and simply spondylitis and is grouped into a set of overlapping arthritis disorders that are named as Spondyloarthritides or Spondylarthritis [10].
Spondyloarthritis (SPA):

It is a family of arthritis-associated diseases, of which ankylosing spondylitis (AS) is the most common member. The other diseases in this group are:
1. Non-radiographic axial SPA.
2. Reactive arthritis.
3. Arthritis associated with psoriasis (psoriatic arthritis).
4. Arthritis associated with inflammatory bowel diseases (ulcerative colitis or Crohn’s disease).
5. Undifferentiated SPA.

SPA has also been subdivided into “axial” and “peripheral”. SPA involvement is mainly in the spine or outside the spine, such as in the knees and heels whereas AS belongs to the axial class of SPA. Although most patients with USPA more than 75% have chronic, active disease and require long-term therapy for ongoing symptoms, some patients have mild and intermittent symptoms that require intermittent symptomatic therapy. These episodes may last from 1-2 weeks to several months, with long asymptomatic periods that do not require therapy.

Causes:

The substantial causes of occurring AS has not yet clearly known. AS isn't caused due to specific jobs, activities or injuries etc. You are more likely to get AS if any body’s family history suffered from AS it may be the main cause of the patient related to his family. The gene by name HLA-B27 is closely associated with patients having AS. Almost nine out of ten people (90 %) have a positive gene when AS test is conducted. Yet HLA-B27 is present in 8 % of the general population, including healthy people without AS. Recently, two new genes, namely IL23R and ARTS1 were invented which were associated with ankylosing spondylitis.

Symptoms of ankylosing spondylitis:

The most common symptom of ankylosing spondylitis is low back pain that develops unnoticed in the early stages causing inflammation in other parts of the body, including the eyes, called uveitis, and the aortic valve and aorta. Other signs and symptoms of ankylosing spondylitis. The symptoms are caused by inflammation of parts of the lower spine, and this can also lead to damage and fusion due to the growth of new bone in the spine, hips, and the joints between the two (the sacroiliac joints) which lead to deformity known as kyphosis (curvature of the spine). During the course of ankylosing spondylitis progress the fusion can develop as a result of the inflammation of the tissues connected to bones known as enthesitis. This process occurred due to the inflammation gradually erodes the margins of the joints which are replaced initially by fibrous cartilage and next by bone. But a specific gene has been linked to this condition, with a hereditary background, in their families where in leukocyte antigen B27 (HLA-B 27 ) acts as a genetic sign of the disease which is normally existed and found in most people who are affected with AS. It is also assumed that there may be certain external (environmental) grounds to effect ankylosing spondylitis [11]. Fig. 2 shows the difference between normal spine, early AS and advanced AS.

Figure 2: Difference between normal spine, early AS and advanced AS.

The most common symptom of ankylosing spondylitis (AS) is insidious onset of pain in the lower back is the most common symptom. Pain, stiffness, and limited mobility outside the spine, such as in the knees and heels, also occur in some patients. Early symptoms of ankylosing spondylitis include pain and stiffness in the lower back and hips that may start in late adolescence or early adulthood. This pain and stiffness may fluctuate over time and spread to other parts of the body. In the ankylosing spondylitis, fatigue with tire some feeling can be effected with low energy in certain persons. Ankylosing spondylitis can affect the eyes, apparatus around it in ¼ of the people mainly the iris (the coloured part that creates the pupil) and other parts of the eye due to inflammation of iritis (that can cause eye pain, sensitivity to light, and blurred vision) and uveitis (eyes are affected with an inflammation ) which causes redness and pain but does not normally weaken vision. Apart from them neurological and cardiovascular problems may exist [12].
It is believed that ankylosing spondylitis is an autoimmune disease. A trigger such as an infection may cause the body to react abnormally, leading to inflammation. Over time, inflammation of the ligaments around the bone can lead to new bone growth, which can cause separate vertebrae to fuse together (termed ankylosis). This can lead to long-term lack of mobility as well as stiffening of the rib cage, causing restricted chest expansion, reduced lung capacity, and difficulty breathing. The cause of ankylosing spondylitis is unknown and unclear. However, it may have a genetic association. Three important three primary symptoms of ankylosing spondylitis: are Pain, Stiffness and Loss of mobility. Pain is the preliminary symptom of ankylosing spondylitis, especially in the lower back and buttock areas to start with. The inflammation that causes ankylosing spondylitis is not confined to the spine - it is a systemic condition. 1. In other joints (arthritis and synovitis symptoms). 2. In the neck (upper - cervical - spine). 3. At the top of the shin bone in the lower leg. 4. Behind the heel of the foot (inflammation - enthesitis - in the Achilles tendon). 5. Under the heel of the foot. 6. In the chest restricting the breathing. 7. The most common symptom of this condition is stiffness in the back and pelvis. The pain is usually more severe after at rest for some time, after first waking. It generally gets better with movement, but as the condition progresses, it can stiffen the spine causing immobility [13]. Fig.3 shows the Inflammation of As predominantly occurs in the sacroiliac joints, the facet joints and where ligaments attach to the vertebrae.

General symptoms of AS include:
1. Those related to inflammatory back pain - Stiffness of the spine and kyphosis resulting in a stooped posture are characteristic of advanced-stage AS.
2. Peripheral enthesitis and arthritis.
4. Fatigue is another common complaint, occurring in approximately 65% of patients with AS. Increased levels of fatigue are associated with increased pain and stiffness and decreased functional capacity.
5. A reduction in pain and stiffness with physical activity.
7. Difficulty in breathing deeply.

Conditions that may cause low back pain (Fig.4) and require treatment by a physician or other health care professionals include: 1. Bulging disc (also called protruding, herniated or ruptured disc). 2. Osteoporosis. 3. Skeletal irregularities. 4. Fibromyalgia. 5. Spondylitis. 6. Herniated Disc (slipped disc). 7. Disc degeneration (Osteoarthritis in the spine). 8. Lumbar spinal stenosis and Spondylo-listhesis. 9. Pelvic inflammatory diseases.

Figure 3: Inflammation of AS mostly occurs in the sacroiliac joints, the facet joints and where ligaments attach to the vertebrae.

Figure 4: Various causes of low back pain.
Other symptoms
1. Fatigue and sleeplessness: Inflammation in ankylosing spondylitis (AS) can affect the entire body causing fatigue and sleeplessness.
2. Anxiety and depression: These may sometimes occur in people with AS.
3. Hip pain: Arthritis of the hips is normal in AS, and creates pain in the groin or buttocks or feeling tough to walk.
4. Heel pain: It is a common area of inflammation is the heel causing pain at the back of the heel (Achilles tendinitis) as well as in the sole of the foot (plantar fasciitis).
5. Shoulder pain: Inflammation of the tendon and bone may cause shoulder pain and limits the mobility of the affected portion of the shoulders.
6. Arthritis in other joints: Pain, stiffness, and swelling in some other single joint (monoarthritis) or a few joints (oligoarthritis) may spread apart from other parts of the body and then spared to the point of joints [14].

Spinal pain:
Spinal pain, almost always in the lower back, is usually the first and most common symptom of AS. Back pain that occurs with AS generally has some of the symptoms such as,
1. Begins in early adulthood before age of 45 years.
2. Has a gradual onset (rather than the sudden onset after an acute injury).
3. Lasts longer than three months.
4. It can worse after taking rest, particularly in the morning or with inactivity.
5. Improves with activity.
6. When the patient wake up in the late night.
7. Can cause morning stiffness lasting more than 30 minutes.
8. Can cause with buttock pain between the left and right sides alternately.
9. Presence of symptoms for more than 3 months.
10. Improvement of symptoms with exercise.

Additional articular manifestations of AS are:
1. Uveitis.
2. Cardiovascular disease.
3. Pulmonary disease.
4. Renal disease.
5. Neurologic disease.
6. Gastrointestinal (GI) disease.
7. Metabolic bone disease.

Clinical revelations of undifferentiated spondyloarthropathy include, 1. Inflammatory back pain - 90 %.
2. Buttock pain - 80 %.
3. Enthesitis - 85 %.
4. Peripheral arthritis - 35 %.
5. Dactylitis - 17 %.
6. Fatigue - 55 %.

Noteworthy features of ankylosing spondylitis:
1. Ankylosing spondylitis is a type of arthritis
2. It mostly affects the lower part of the spine, and where it joins to the hip.
3. An inflammatory disease, ankylosing spondylitis is characterized by pain and stiffness and can lead to loss of mobility.
4. The disease leads to erosion of bones in the spine, which can become fused, leading to spinal deformity in the advanced cases.
5. Ankylosing spondylitis can be difficult to diagnose, but it has a particular pattern of pain symptoms can be seen on X-ray in progressed cases.
6. There is no cure for ankylosing spondylitis, but the pain and inflammation can be managed with drugs, and physical therapy can also relieve and prevent some of the condition's effects.
7. Inflammation can also be affected not only affects sacroiliac (SI) joints, but also other joints and organs in the body, Nonskeletal problems such as the eyes, lungs, kidneys, shoulders, knees, hips, heart, and ankles. It may cause the vertebrae to fuse together. It may also cause a kyphosis of the spine, which gives the spine a forward curve. AS is a true "systemic" disease, and this problem causes changes throughout the body.
8. For patients with ankylosing spondylitis, gravity tends to pull the body forward, and the patient may develop a flexed forward posture.
9. The spine may be realigned through a complex surgical procedure that carries a risk of neurological injury [15].

Identification of hunchback posture:
Hunchback posture can be examined by standing keeping the back side of the head touching the wall duly heels also touching the bottom of the wall keeping the chin parallel to the floor. If the wall touches with the back of the head indicates that there is an abnormal head-forward hunchback posture (irreversible head-forward).

Limited spinal mobility and head-forward posture: Limited flexibility of the back and neck of patients has negative consequences on daily activities, such as wearing shoes and stockings. The most serious consequence is an irreversible head-forward "hunchback" posture which should be set right by suitable posture exercises.
Diagnosis:

The diagnosis of AS is generally made by combining the clinical criteria of inflammatory back pain and enthesitis or arthritis depending on the radiologic findings.

The diagnosis of ankylosing spondylitis (AS) depends on the combination of a number of symptoms, signs, physical examination, laboratory blood tests, and radiographic (x-ray) or magnetic resonance imaging (MRI) changes. Basing on this, a clinician can assign a degree of probability whether AS is the cause of the identified symptoms as per item wise pre-prepared checklist. In general, AS should be presumed to exist if back pain is observed beyond three and under the age of 45. It cannot be cured and the symptoms can range from back pain and stiffness to long-term disability [16].

The treatment for this condition focuses on controlling inflammation and the actions of the immune system. Corticosteroids a suitable type of medication prescribed, and usually an immunosuppressant drug, such as methotrexate, which render help to relieve the destruction of the joints. Physical therapy and correct posture can also help. Surgery is used to fuse vertebrae when the pain is severe. Brain imaging studies show that some patients with AS have changes in the structures of the brain associated with moods like happiness, sadness, etc.

For accurate diagnosis of AS, the doctor should require
1. A medical history.
2. Physical examination of the patient.
3. X-rays or MRI.
4. Updated complete reports of blood tests of the patient.

Laboratory tests and imaging tests involved in the diagnosis are:
1. C-reactive protein (CRP) : to check for the presence of inflammation.
2. Erythrocyte sedimentation rate (ESR) : another test for inflammation.
3. Complete blood count (CBC), to check for existence of anemia, a complication of the chronic inflammation associated with ankylosing spondylitis, and increased numbers of white blood cells as a marker of inflammation.
4. HLA-B27 : To determine if someone has this human leukocyte antigen on their cells, this significantly increases the risk of developing ankylosing spondylitis.
5. X-rays or other imaging tests: To look for changes in the joints and bones, although it may take several years before characteristic degenerative changes are visible. Early diagnosis allows to help for prevention or to delay complications of the patient depending on the disease condition.

Radiography:

1. Radiographic evidence of inflammatory changes in the SI joints and spine is most helpful in the diagnosis and ongoing evaluation of AS. Early radiographic signs of enthesitis include squaring of the vertebral bodies caused by erosions of the superior and inferior margins of these bodies, resulting in loss of the normal concave contour of the bodies with anterior surface. The inflammatory lesions at vertebral entheses may result in sclerosis of the superior and inferior margins of the vertebral bodies, called shiny corners power.

2. Doppler ultrasonography can be used to document active enthesitis. In addition, this technology may be useful in the assessment of changes in inflammatory activity at entheses during the institution of new therapies.

MRI and CT scanning:

Magnetic resonance imaging (MRI) or computed tomography (CT) scanning of the SI joints, spine, and peripheral joints may reveal evidence of early sacroiliitis, erosions, and enthesitis that are not apparent on standard radiographs. It is imperative that the Patients suffering with AS prone to develop characteristic changes in the sacroiliac joints which connect the bottom of the spine (sacro) to the end of large pelvic bone (ilium) on both sides. These changes in symptoms can be clearly observed in the images of radiograph (x-ray). Imaging tests like magnetic resonance imaging (MRI) are more sensitive than radiographs to identify the suspected AS and inflammation including degree of structural damage to the spine in that area but it is not vividly seen on radiograph.

Blood tests:

There are no exclusively blood tests that, by themselves, are capable of accurate diagnosing the AS. Yet, to identify the existence of one particular type of the human leukocyte antigen (HLA) gene, HLA-B27, may aid to select groups of patients and other test like proteins called “acute phase reactants”, C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) tests are most helpful to identify inflammation in the spots of the body. Often, a rheumatologist will diagnose to identify arthritis and related conditions. Since the AS may affect different parts of the body basing on its condition the patient ought to approach more than one doctor for examination to identify various symptoms such as:
1. Gastroenterologist, to examine bowel disease.
2. An ophthalmologist, who treats eye disease.
3. Specialised Physiatrist, in physical medicine and rehabilitation.
4. Finally Therapist, who imparts stretching and other relevant exercises and appropriate asans and pranayam.
Treatment:
A common treatment adopted methods for all the spondyloarthopathies (ankylosing spondylitis, reactive arthritis, psoriatic arthritis, enteropathic arthritis, and undifferentiated spondyloarthropathy) are medication, exercise and possibly physical therapy, good posture practices, and other treatment options such as applying heat or cold to get relaxation of muscles and reduce joint pain. In severe cases of ankylosing spondylitis, surgery may also be an option.

There are two types of coping strategies. One is passive coping, in which the patient merely depends on medications or on the directions of this specialist doctor. The other is active coping strategy in which the patient himself rebuilds psychological defense systems by joining in patient-organized groups nearby.

For Ankylosing spondylitis (AS) treatment is given for each individual, depending on the nature characteristics and condition of the disease. Although there is no cure for ankylosing spondylitis, exercise and physical therapy can help to prevent joint stiffness and certain medications can relieve pain and inflammation. These include non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen, naproxen, and indomethacin. Other treatments include disease-modifying anti-rheumatic drugs (DMARDs) such as methotrexate or sulfasalazine, and corticosteroids like prednisone. Novel drugs include adalimumab, etanercept, infliximab, and golimumab, which are tumor necrosis factor (TNF) blockers. All of these drugs, however, are associated with side-effects and treatment options should be carefully followed as instructed by the doctor [17].

Medicines and Pharmacologic therapy:
Ankylosing spondylitis is treated with a combination of medication and physical therapy. Several types of medicines are used to treat AS. It is important to associate with the doctor to select the appropriate and safest and most effective medication for AS which include the following.

Nonsteroidal antiinflammatory drugs:
To control pain and stiffness of neck, spine Nonsteroidal antiinflammatory drugs (NSAIDs) are commonly used. They reduce pain, inflammation and systemic symptoms of spinal and peripheral joint pain and morning stiffness in AS patients. Cyclooxygenase-2 (COX-2) inhibitors appear to be as effective as traditional NSAIDs. NSAIDs and COX-2 inhibitors may increase the risk of serious cardiovascular thrombotic events, myocardial infarction (MI), and stroke, which can be fatal. They also increase the risk of serious adverse gastrointestinal (GI) effects, including stomach or intestinal bleeding, ulceration, and perforation, which can also be fatal. Elderly patients are at greater risk for serious GI events. NSAIDs need to be taken on a regular basis for weeks together before their maximum effect is noticed if not by substituteing another NSAID if the former drug do not yield relief from pain [18].

Sulfasalazine:
Sulfasalazine is a disease-modifying antirheumatic drug (DMARD) is suggested along with NSAIDs to stall or arrest the progress of AS but the patient may get certain relief of arthritis symptoms alone, but could not aid if AS only affects the spine.

Anti-tumor necrosis factor therapy:
A group of medicines known as anti-tumor necrosis factor agents (anti-TNF agents or TNF inhibitors) like Infliximab, Etanercept, Adalimumab, Certolizumab pegol, and Golimumab are often effective in the treatment which may show relief within a few weeks of starting the drugs.

Anti-TNF therapy:
Patients with severe disease in the spine and not responded fully to NSAIDs may also be suggested a glucocorticoid a cortisone-like drug injected into painful or inflamed joints.

Glucocorticoids (steroids):
A glucocorticoid injection into the sacroiliac joint may help to provide relief in patients who have sacroiliac pain that has not responded to other therapies.

Disease-modifying antirheumatic drugs (DMARDs):
These drugs work in different ways to reduce inflammation in AS.

Biologic agents:
These are relatively new types of medicine. They block proteins involved with inflammation in the body.
Surgery: Total hip replacement:
Artificial hip is inserted in patients with AS who suffered with severe constant hip pain with low mobility due to hip joint arthritis. Roughly 1 out of 20 people suffering with AS need a hip replacement at some stage, as their hip now and then badly affected. To correct a severe spinal deformity surgery is seldom needed. Patients may need total hip replacement and total shoulder replacement rarely.

Spinal surgery:
This surgery may be suggested who are suffering from fusion of the bones in the upper part of the cervical spine for a very small number of patients who develop dislocation of these bones to avoid spinal cord damage. In very rare cases, a procedure called osteotomy may be done to get the spine straight, which has fused into a curved-forward position. This surgery involves cutting through the spine so that it can be realigned to a more vertical position. After realignment of bones, hardware can be implanted to hold them intact in their new position.

Wedge osteotomy:
This sort of procedure may be recommended for people who have severe deformities of the neck wherein wedge-shaped piece of bone from a vertebra is removed duly realigning the spine.

Physiotherapy treatment:
Exercise: Exercise should be a part of the treatment program for each patient suffering from AS which includes home exercises; individual or group exercises based on the guidelines of a physical therapist, or physical therapy treatments. The minimum exercise program includes core strengthening, and should also contain isometric strengthening, stretching, and dynamic movements. Because AS can lead to the spine being frozen in an awkward posture, posture training is very important. Modern sedentary life encourages sitting in front of the computer, which causes a shortening of the muscles at the back of the thighs, tilting of the hips forward, weakening of the muscles of the upper back, and a tendency to hold the neck and head too far forward. An accurate posture training program should be aimed at to compensate for these issues. Two types of exercises may help namely 1. Strengthening exercises. 2. Range-of-motion exercises, therefore teach correct posture and body movements to counteract rounding of the upper back (kyphosis). Maintain appropriate activity levels. Implement daily stretching and strengthening exercises. Learn ways to manage your condition.

Suggested day today exercises:
1. Stand with the heels and backside against a wall, push your head back towards the wall and hold 5 counts, then relax and repeat 5 times.
2. Stand with feet apart. Place your hands on your hips. Turn the waist to look behind and then to the opposite side for 5 times.
3. Lying on the back then bending the knees duly keeping feet flat on the ground: then do the following exercise. Put the both hands on the ribs on each side of their chest and breathe in deeply through your nose and release fully through the mouth, pushing the ribs out against the hands while breathing in about 5times.
4. Keep hands on the upper front of the chest and breathe in deeply through the nose duly expanding the ribs and then breathe out slowly and completely through the mouth bringing back the chest to the normal position for 5 times.
5. Lying on the front, looking straight ahead, keeping hands by your sides. Raise right leg from the ground, keeping the knee straight and then with left leg. Repeat the same for 5 times for each leg.
6. Bend the knee on the floor on hands and knees, stretch alternate arms and legs out parallel with the floor and hold for the count of 5. Lower and then repeat with the other arm and leg 5 times each side.

Sports:
Contact sports like cricket, basketball, shuttle etc., shall be avoided since the joints and spine can be injured. Swimming is a good exercise for movement of the muscles and joints.
Yoga:
In most cases, the conditions of slipped disk occur due to wrong posture or bad work habits, for a long time. Yoga for Slipped Disk and Spondylitis is based on the backward bending asanas, pranayama and yogic relaxation poses. Slipped disk is a condition in which a disk in the spinal column becomes displaced from its normal position and presses on the spinal nerves, causing pain which develops over a period of time. Yogic management of slipped disk is based on using certain postures which strengthens the spinal muscles and ligaments that hold the spine together. The most common Asana used for Slipped disk management is Makarasana or the crocodile asan. After practicing these asanas for some time, the muscles and ligaments gained strength. Then the other backward bending asanas like Bhujangasana (cobra pose) Ardha Shalabhasana (half locust pose) Ardha Chakrasana (half-moon pose) Shalabhasana (The full locust pose) Dhanurasana (the bow pose) and Ustrasana (the camel pose) can be taken up. In all the stages, Advasana, Shavasana, Jyestikasana and Makarasana can be used as resting poses. Marjari asan can be done to strengthen the back and shoulders and to get flexibility to the spine. Forward bending asanas should be avoided for back problems, as it may aggravate the condition. The practice of pranayama can be taken up to increase the pranic level and bring flexibility in the whole body and to improve the flow of prana in the body. Proper flow of prana in the body itself relieves much of the pain and stiffness. Pawanmuktasana is especially helpful in this as it removes many pranic blocks in the joints and is good for arthritis and stiff joints. Back should never be strained while performing these asanas.

Pain management:
The heat will help to relieve pain. Try a hot bath before going to bed may be trying to relive pain. Hot bath or shower with moderately hot water helps to lessen severity of morning stiffness.

Bedrest:
It isn't suggested since it hastens up the spine stiffness. Performance of everyday prescribed exercises for the back, chest and limbs will keep them flexible and easing morning stiffness.

Acupuncture:
This antiquated technique involves inserting thin needles through the skin, which may stimulate the body’s natural pain relievers. “Studies on acupuncture for back pain relief have shown mixed results.”

Ankylosing spondylitis-Ayurveda - treatment:
According to ayurveda it is one of the rheumatic diseases, which is a chronic inflammation that causes arthritis of the spine and sacroiliac joint-the joint at the base of the spine where the spinal column joints the pelvis. Alkalosis means the fusion of vertebrae to each other. As per Ayurveda rheumatic pains are due to the formation of toxins in the body called aama and according to modern science, the toxins can be correlated with auto antibodies which are body’s own defense systems destroying body’s own tissues. These toxins are unknown as agama in ayurvedic terminology. So the concept of treating Ankylosing spondylitis is digesting the aama.

Treatment:
Ayurveda offers excellent therapies for tearing Ankylosing spondylolosing the strength of ayurveda in the area of spine and joint treatments is globally appreciated. From the Ayurvedic perspective, the disease can fall under amavata, which may be effectively managed when intervention is started in its early stages. Niruha basthi with Balaguduchyadi yoga, combined by Shama treatment with Rasnerandadi kwatha and Simhanada guggulu has been found effective in curbing its progression.1. The extract of turmeric is effective treatment for AS to ease inflammation a rigidity in the spine and reducing inflammation in other affects the organs.
2. Giloy.
3. Dry ginger is used to reduce inflammation.
4. Ashwagandha and Meth also useful for A.S.

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Naturopathic Therapy:
1. Hydrotherapy hot and cold compress may alleviate severe pain.
2. Avoid animal fats, tea, coffee and alcohol.
3. Drink plenty of pure and fresh water.
4. Drinking Ciden vinegar with honey daily 3 for days to get good results.
5. Medical Clearly seeds, yucca, bog bean black cohosh wild yam, is effective at reducing inflammation, stiffness and pain.

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Manipulation: 
Skillful use of the hands and manipulation of the spine, especially the neck, is not helpful for ankylosing spondylitis, moreover it may be harmful. Sleep: A firm bed will be more comfortable than one other foam bed. It is always better to keep a firm bed in order to prevent any tendency for spinal curvature. Sitting posture: Without any treatment Ankylosing spondylitis causes increased bending of the spine, so it must be kept strictly straight and erect to the extent possible. Hardback, upright chairs or straight-backed chairs are better posture than low, soft, slopybending chairs. Never bend forward or backward or stretch across a desk or bench. Ensure the seat is at the proper comfortable height and don’t sit in one position for lengthy periods unmoved the back. It is suggested lying flat on your front for a short time in the morning and evening may aid to prevent the spine stiffening and back pain.

Sex:
1. Sex: It may be painful if anybody has inflammation in the sacroiliac joints or lumbar spine, moreover mobility lacking in the hips becomes a problem. Therefore, it is better taking suitable pain relief tablets before hand.
2. Work: Ankylosing spondylitis can cause difficulties at work, especially If anybody performing a physically strain some job absolute rest is direly needed if the pain is highly severe. It is better to take rest lying flat for at least 10 minutes during lunch hour.
3. Driving: The ankylosing spondylitis patient should follow: while going a long journey, stay at least 5 minutes and stretch the body outside the car.
   While driving a vehicle a wraparound rear view mirror may improve visibility while driving if the AS sufferer cannot turn his head and neck sides or back. If stiffness in either neck or back is existed reversing parking is difficult task, so fitting specialised mirrors are helpful in such situation.. Ensure the head rest is correctly adjusted if the stiffness in the neck persists to avoid injuries to the head.

Ankylosing spondylitis – complications:
Complications related to ankylosing spondylitis (AS) and problems outside the spine, joints, and related tissues are uncommon, with the exception of anterior uveitis.

Anterior uveitis:
Uveitis implies inflammation of part of the eye, is the most common effected in the AS-related problem which does not involve the joints. Anterior uveitis affects the iris, the colored part of the eye, which causes pain in the eye, blurring of vision, and light sensitivity which may be cured with suitable eye medications.

Spinal fractures and spinal cord injuries:
Spinal fractures and spinal cord injuries are common in patients with AS than in the general people. Patients with spinal cord injuries may have only minor initial neurological symptoms such as neck pain, numbness, or weakness need rest without movement apart from immediate medical treatment. Computed tomography (CT) and magnetic resonance imaging (MRI) are more sensitive imaging techniques than plain radiograph.

Neurologic problems:
Cauda equina syndrome is a rare problem that occurs in people with chronic disease who are suffering from severe stiffening of the spine occurring damage to several nerves in the lower back, causing an unusual sensation and weakness of the lower extremities, and trouble with the bladder and bowel control. Dysfunction of erection or impotence may be noticed in males.

Cardiovascular disease:
The most serious problem that can affect the heart gets a leaking aortic valve (aortic regurgitation) which may lead to heart failure, leg or ankle swelling (edema) and shortness of breath due to exercise or exertion. This requires monitoring and, in some cases, treatment with medications or even surgery.

Pulmonary disease:
AS patients are unable to fully expand the chest normally during breathing because of stiffness between the ribs and the spine.

Ulcerations in the bowel:
Certain patients with AS will develop ulcerations in the lining of the bowels which do not usually cause any symptoms.
Ankylosing spondylitis and diet:

There is no any specific diet or dietary supplement which has been authenticated scientifically useful for reliving or reduce ankylosing spondylitis. But a healthy diet with proteins and vitamins apart from doing light suitable exercises are the best for everyone, and they may be very helpful if AS exists. Keeping a healthy weight is essential to reduce stress on painful joints. To control signs of ankylosing spondylitis the diet this is good to manage healthy weight duly keeping the body in proper shape. The foods that enable to fight against inflammation, keeping the bones strong and healthy heart and one should habituated to such diet depending on the positive response of the body. Eat plenty of colored fruits and a vegetable since they filled with antioxidants, which aids to protects cells and reduce arthritis symptoms. Consume whole grains such as brown rice, buckwheat; quinoa etc., instead of processed one’s which are good for heart health. Cultivate inevitably habit of drinking 8 to 10 glasses of clean fresh water every day. Drinking alcohol or such drinks should be abandoned. Anybody suffering from spondylitis must supplement their diet with calcium and vitamin “D” to avoid osteoporosis, which causes bones to thin and its fractures. Should be avoided high-fat and high-cholesterol foods, particularly saturated fats, which promote inflammation and heart ailments. Omega-3 fatty acids, found in flax seeds, walnuts, chia seeds, fish such as tuna and salmon and it's oil, cod-liver oil, canola oil, soybean oil, roasted soy bean seed, spinach(cooked and boiled), cauliflower, broccoli, spinach(cooked and boiled) consists of plenty of omega fatty acids which reduces the gravity of AS disease activity.

Safety measures:

A fused, immobile, inflexible spine is more easily fractured than a normal spine. Because of the increased risk of serious spinal injury from even minor falls or other accidents, patients with AS should take care to avoid such incidents. Safety measures to be taken by the patient include the following:
1. Avoid alcohol drink completely. Narcotic pain-relieving drugs such as codeine and sedatives namely sleeping pills should be used cautiously.
2. To modify risk involved falling daily routine works like Shower or tub grab-bars and night lights to avoid falling down. Remove or secure loose rugs, and keep walkways free from disorder and other things that could make the patient tripped (make a false step).
3. To avert further increase of deformities of the neck, the patient should use a very thin pillow while sleeping using stiff bed keeping comfortable position on it.
4. If the patient has an inflexible spine, avoid contact sports and other high-impact activities.

Way to cope up with ankylosing Spondylitis:

Ankylosing spondylitis (AS) can affect daily life in various ways. Dressing, reaching, rising from a chair, getting up from the floor, standing, climbing steps, looking to the side or over the shoulder, exercising, and doing household and other work-related tasks become more difficult due to the limited joint and spinal motion. So proper care should be taken seeking suggestions from the doctor.

CONCLUSION

Ankylosing spondylitis (AS), a spondyloarthropathy, is a chronic, multisystem inflammatory disorder involving primarily the sacroiliac (SI) joints and the axial skeleton which is a long term painful disease that affects the spine, bones, muscles and ligaments that connect bones, often runs in families, with first-degree relatives (parents, siblings, and children) of an affected person having a higher risk than the general population. Researchers are constantly and keenly examining the vital aspects such as 1. To understand in-depth causes of AS with regard to improve better lifestyle and other factors that lead to worse outcomes.
2. Genes associated with AS risk development of blood tests to predict AS risk or to aid in conducting early diagnosis.
3. New drug therapies for AS.
4. Adopting prescribed treatment with regular exercise.
5. To stick on to Practice good posture.
6. Strictly quitting smoking.
7. To avert a bacterial infection, which is a factor led to aortitis.

Even though there is no permanent cure for AS treatment has been improved by inventing new medicines which are highly helpful in controlling the condition with relief. Studies revealed that the people suffering from ankylosing spondylitis for at least 20 years, who are engaging physical strain jobs coupled with other health problems, or smoking experienced more functional limitations from their disease. Highly educated people with ankylosing spondylitis in the family observed to have less severe limitations of their disease. Researchers aren’t sure what causes this form of the inflammation in this autoimmune disease, but they believe that it may have a genetic component. Research is still continuously going on to understand the valid grounds underlying the onset and progressive course of the disease. In recent years, great progress has been made in the development of diagnostic tools, therapeutic approaches, and validated outcome measures in the understanding of the pathogenesis of ankylosing spondylitis (AS). The futures of successful treatment depend on the development of pharmacological agents capable of both altering the disease course through intervention at sites of disease pathogenesis, and controlling symptoms.
REFERENCES