Adolescent Idiopathic Scoliosis

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Adolescent idiopathic scoliosis (AIS) is a condition which causes an abnormal curvature of the spine. It is common with between 2 - 4% of children aged 10 - 16 being affected. The deformity is actually rotational but it leads to an abnormal lateral curvature of the spine. The curvature should be greater than 10 degrees from the midline for the condition to be diagnosed. The condition has a genetic component and multiple genes are responsible.

Classification

The classification of idiopathic scoliosis is simple and age based:

- Infantile Scoliosis : onset before the age of 3 (1%)
- Juvenile Scoliosis : onset between the ages of 3 - 10 (12 - 21%).
- Adolescent Scoliosis : onset between the age of 10 and skeletal maturity (~ 80%)

Differential Diagnosis

There are multiple causes of secondary scoliosis in adolescents including:

- Connective tissue disorder (Ehlers-Danlos, Marfans)
- Neurological disorders (Syringomyelia, Cerebral Palsy, Polio, Neurofibromatosis)
- Musculoskeletal (Leg Length Discrepancy, DDH, Osteogenesis Imperfecta)

History and Examination

AIS is a diagnosis of exclusion. History and examination should seek to exclude the above differential diagnoses before the diagnosis of AIS is made. There are a number of red flags which should be sought and primary among these is the presence of pain and neurological symptoms. Any adolescent with pain and / or neurology has a serious pathology such as infection or a tumour until proven otherwise. This these patients prompt imaging is essential.

Other red flags which should be sought include excessive stiffness, rapid progression and left sided thoracic curves. The thoracic curve is quite consistent in pointing to the right in AIS, with 90% following this pattern.

One of the simplest diagnostic tests for a true scoliosis is Adam’s forward bend test. Ask the child to bend forwards at the waist until the spine is parallel with the floor with the arms extended. Look along the horizontal place of the back to identify the presence of a rib hump. The presence of a rib hump indicates there is a scoliosis of at least 10 degrees magnitude.

X-ray

Xray findings are of a lateral curvature of the spine as shown in the x-ray below.

Conservative Management

The mainstay of conservative management is rigid bracing where the intention is to prevent progression of the deformity. There are, however, no good studies which prove the effectiveness of the technique. Because the braces are uncomfortable and require intensive and prolonged use the patient compliance is poor.

Surgical Management

Where conservative management fails and the level of deformity continues to increase surgical intervention is often needed, before the deformity gives rise to significant respiratory and cardiac compromise. Of all patients diagnosed with AIS only around 10% go on to progress in the degree of deformity. Risk factors for progression are female gender, skeletal immaturity and larger presenting deformity.

Most commonly the surgery involved the insertion of screws and rods with concurrent correction of the spinal deformity. The extent of the fusion depends of the level of deformity. There are also techniques which involve insertion of 'growing rods' which allow the fixation to 'grow' with the patient.

The risks are significant with surgical intervention with some studies of complications putting the rate at around 50%.