
An osteoporotic condition of the spine of patients with longstanding ankylosing spondylitis is prone to fracture. Swimming is the most effective recreational exercise recommended for patients who suffer from this disease. The advantages of swimming are maintenance of range of motion of both the axial and peripheral joints, improvement of chest expansion and pulmonary function, improvement of cardiovascular endurance. This is a case report of longstanding ankylosing spondylitis demonstrated in the L4 vertebra and its posterior element fractures. The cause of the subject’s fractures were posturated to be rotated and hyperextended forces experienced during swimming. In this rigid spine patient, repeated movements such as rotation and hyperextension, even in forces of a small amounts might produce a fracture in the spine. This is a good example to remind any doctor that swimming should be recommended only in early stage of ankylosing spondylitis but not in the late one complicated with severe spinal osteoporosis.

Key words: Ankylosing spondylitis, Osteoporotic spine, Spinal fracture, Swimming.

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ภาวะระดุกสัณฐานหลังจากการว่ายน้ำในผู้ป่วยโรคระดุกสัณฐานอักเสบชนิดยืดติดเป็นระยะเวลานานมีโอกาสเกิดภาวะหลักหักได้ร้าย การว่ายน้ำเป็นการออกกำลังกายที่ดีที่สุดที่มักจะแนะนำในผู้ป่วยโรคนี้ มีข้อดีคือ ช่วยเพิ่มพละกายสันต์หรือของข้อต่าง ๆ ในร่างกายที่จะกระตุ้นสัณฐานหลังและข้อของกระดูกแขนและขา ช่วยเพื่อการขยายตัวของกล้ามเนื้อ ทำงานของข้อและหัวใจซึ่งเพิ่มความสามารถของร่างกาย รายงานผู้ป่วยรายนี้เป็นโรคกระดุกสัณฐานหลังอักเสบชนิดยืดติดเป็นระยะเวลานานเกิดภาวะหลักหักระดับเออร์ซีที่ 4 หัก สาเหตุมาจากเกิดจากแรงบิดและแรงจากกรวยยืดข้างและอ่อนหลังขณะว่ายน้ำ ในผู้ป่วยโรคนี้ แรงเพื่อยืดของกล้ามเนื้อตัวอย่างเช่นในผู้ป่วยรายนี้ก็สามารถทำให้กระดุกสัณฐานหลักหักได้ รายงานผู้ป่วยรายนี้เป็นตัวอย่างที่ดีว่า ในการที่แพทย์จะแนะนำการว่ายน้ำแก่ผู้ป่วยโรคนี้ ควรแนะนำเฉพาะในระยะแรกของโรค ถ้าร่างกายที่เป็นมากจะพยายามให้ภาวะกระดุกสัณฐานหลังไปร่วมกันและไม่ควรแนะนำ
Spinal fractures of ankylosing spondylitis are an infrequent though not rare complication. Commonly, they occur in the cervical spine, but are rare in the lumbar spine which are more often caused by more violent trauma.\(^1\)\(^-\)\(^3\) Leca and Sicard (1970) and Hunter and Dubo (1978) found fractures below the cervical spine in less than one fifth of patients.\(^2\) The incidence of neurological complications are much higher in the cervical region. High thoracic fractures are usually regarded as rather stable, whereas fractures at the thoracolumbar junction are considered unstable and prone to neurological complication. Lumbar fractures always have fewer neurological complications.\(^1\)\(^-\)\(^4\)

The diagnosis of spinal fractures in advanced ankylosing spondylitis may be difficult for several reasons. Firstly, the spinal trauma is often trivial and would not be expected to cause spinal fracture. Secondly, the neurological damage may or may not occur. Thirdly is the difficulty in radiologic visualization of the fracture site. In the flexion deformity of the spine the erosive and sclerotic changes and the concomitant spinal osteoporosis may make the fracture area unclear. Fourthly is the continuous pain episodes from the underlying inflammatory spondylitis, so additional pain sensations may pass unrecognized.\(^1\)\(^-\)\(^5\) Early recognition of the fractures and prompt therapy may improve the prognosis. This is the first case report in the world of lumbar fracture in ankylosing spondylitis resulted from swimming which is not a violent trauma.\(^1\)\(^-\)\(^5\)

Case report

A thirty-five year old man was consulted for rehabilitation at Chulalongkorn Hospital in March 1993. He has had a 20 years history of ankylosing spondylitis. He developed an acute severe low back pain while he was swimming one day before admission. Clinical findings revealed severe low back pain on changing his position with marked tenderness at the spinous process of the fourth vertebrae. Straight leg raising test were negative on both sides. There was no neurological deficit.

Total and differential white blood cell counts and the erythrocyte sedimentation rate were within normal limits. Radiographic findings revealed a classical bamboo spine with marked osteoporosis and radiolucent lines at the posterior element and vertebral body of the fourth lumbar spine. This was suspected of fracture which was confirmed by CT scan. (fig 1, 2, 3, 4) A bone scan showed increased radioisotope uptake at the seventh cervical vertebra, the fourth lumbar vertebra and the first sacral vertebra. (fig 5) Magnetic resonance imaging showed no acute lumbar disc herniation. Bed rest for four weeks with administration of a nonsteroidal antiinflammatory drug and a muscle relaxant were prescribed, together with a rehabilitation program to relieve the pain by using modalities and to maintain range of motion, strength and endurance. The bone mass density was 0.77 g/square cm., below two standard deviation of normal values. Nasal calcitonin spray was also prescribed for relief of the severe pain and to prevent from bone resorption. The pain progressively decreased and the patient started progressive ambulation in the fourth week with lumbosacral corset supporting the lumbar spine.
Figure 1. Chest x-ray showed classical bamboo spine with marked osteoporosis.

Figure 2. X-ray: L-S spine, lateral view showed radiolucent lines at posterior element and vertebral body of the fourth lumbar spine suspected of fracture.

Figure 3. X-ray: L-S spine, oblique view showed radiolucent lines at areas correspond to lateral view.

Figure 4. CT. scan confirmed the fracture at vertebral body of the forth lumbar spine.

Figure 5. Bone scan showed increase radioisotope uptake at the seventh cervical vertebra, the fourth lumbar vertebra and the first sacral vertebra.
Discussion

Vertebral osteoporosis is a well recognised radiological feature of advanced ankylosing spondylitis. The spinal fracture site most frequently involved is the cervical, thoracic and lumbar spine segments, respectively.

There are three possible explanations for the fourth lumbar spinal fracture in this case. Firstly, radiographic features of this patient showed a free area of ankylosis at the fourth and the fifth lumbar intervertebral space. This segment escaped from fusion while other levels had become ossified, causing high stress and biomechanical failure between the long ankylosed and short mobile segments. (fig. 6)

Secondly, the bone density measurement in this case showed severe osteoporosis. The repetitive small rotated forces that should not cause fracture to a normal spine, could do so in an osteoporotic spine. Thirdly, a stiff kyphotic spine might result in high stress near the most mobile segment, and with repeated trauma it could lead to fatigue and a stress fracture.

Swimming, as a non-weight bearing exercise, is the most recommended recreational exercise in ankylosing spondylitis, but it can cause twisting and rotational forces. In addition, a kicking legs extended force can cause fracture at the most mobile fragile spine, as in this case. (fig 7)

![Crawlsroke](image1)

![Twisting & rotational force](image2)

![Extensional force](image3)

**Figure 7.** Swimming can cause twisting and rotational force. In addition kicking legs, extended force can cause fracture at the most mobile fragiled spine.

**Conclusion**

An osteoporotic spine of patients with longstanding ankylosing spondylitis is prone to fracture. This is a good example to remind any doctor that swimming should be recommended only in an early stage of ankylosing spondylitis, but not in a late one complicated with severe spinal osteoporosis.
References


