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Spine injury following a low-energy trauma in ankylosing spondylitis: A study of two cases



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ABSTRACT

We report two cases of spine injury following a low-energy trauma in persons with ankylosing spondylitis (AS) and discuss the forensic considerations. A 60-year-old man presented with a wide anterior fracture of the superior endplate of T8 after an accidental fall down three wooden steps. A 93-year-old man presented with disjunction between C6 and C7 and 90-degree spinal angulation after a fall from a standing height or a fall from a bed. Post-mortem multislice computed tomography (MSCT) was performed before autopsy in both the cases. MSCT and autopsy findings were in agreement with a past medical history of AS. A spine injury occurring after a low-energy trauma is unusual and could be suspicious. In the forensic literature we found only a single case, which concerned multiple spinal fractures after a fall from a bicycle at low speed. Such specific mechanisms must be studied and known to the forensic expert. In this context, MSCT is a useful tool to investigate the spine and knowledge of the victim's entire past medical history is essential.

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1. Introduction

Ankylosing spondylitis (AS) is a common chronic inflammatory disease which affects the sacroiliac joints and the spine. It is the major subtype of an interrelated group of inflammatory diseases named spondyloarthritides. The most important clinical features of this group include inflammatory back pain, asymmetric peripheral oligoarthritis, enthesitis and specific organ involvement [1]. Historically, the Rome criteria of 1961 were the first to be developed for the classification of AS [2]. Other criteria followed, which are still discussed in the specialized literature [3]. The pathophysiology remains unknown but associations with genes have been described, and in particular the role of human leucocyte antigen-B27 (HLA-B27) is well established since the 1970s [4]. The prevalence of AS is estimated at 0.2–1.8%, but there is a lack of

epidemiological studies and rates differ depending on whether the population is HLA-B27– (0.2%) or HLA-B27+ (1.2–15.4%) [5].

The disease is characterized by ossification of the spinal joints and ligaments which may lead to progressive rigidity of the spine. The increased risk of injury in the ankylosed spine is well known [6,7]. The prevalence of vertebral fractures in AS patients is 4.8% in HLA-B27+ and 9.9% in HLA-B27– patients [8].

We report two cases of spine injury following a low-energy trauma in persons with ankylosing spondylitis and discuss the forensic considerations.

2. Methods

Post-mortem multislice computed tomography (MSCT) was performed before autopsy in both the cases. Axial MSCT was carried out with 16 mm × 0.75 mm collimation on a Sensation 16 unit (Siemens, Erlangen, Germany). Two- (2D) and three-dimensional (3D) reconstructions were obtained on a Leonardo workstation (Siemens, Erlangen, Germany). 2D reconstructions were obtained using multiplanar reconstruction (MPR). 3D reconstructions were obtained using volume rendering technique (VRT) and maximum intensity projection (MIP) modes. The images

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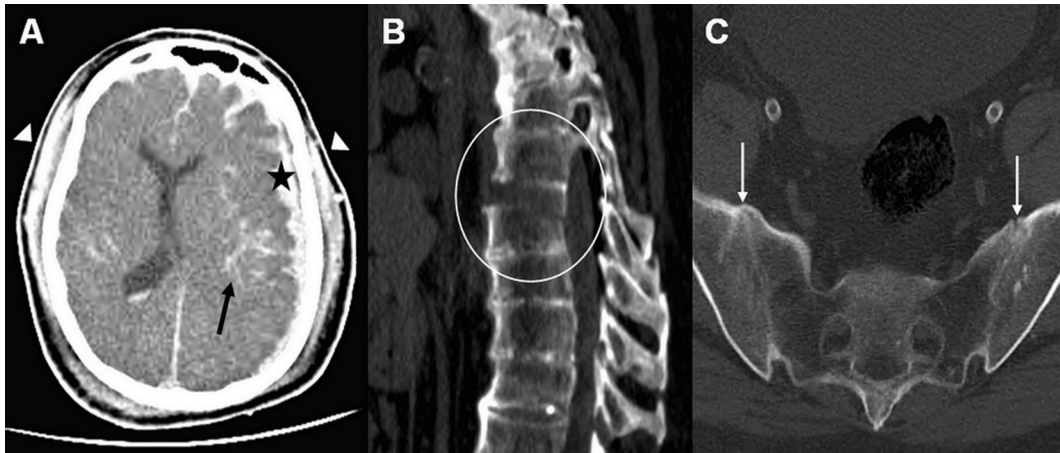


Fig. 1. Post-mortem MSCT study. (A) Pericerebral haemorrhage (cause of death): axial view of subgaleal haematomas (arrow heads), subarachnoid (arrow) and subdural haemorrhage (star) with mass shifting. (B) Thin sagittal reconstruction using maximum intensity projection showing an anterior fracture of the superior endplate of T8 with discontinuity at the disk between T7 and T8 (circle). (C) Axial view of the osseous fusion of the sacroiliac joints (arrows).

were interpreted by a board-certified radiologist. The autopsies were performed by two board-certified forensic pathologists.

3. Cases

3.1. Case 1

3.1.1. Case history

A 60-year-old man accidentally fell down three wooden steps while inebriated. His roommate saw the fall but left him snoring and lying on the ground. She called for help seven hours later. When the emergency physician arrived, the victim's breathing ceased, followed by cardiac arrest during aspiration of the buccal cavity. Cardiopulmonary resuscitation was performed but was not successful. The manner of death was suggested to be accidental and a medico-legal autopsy was ordered to determine the cause of death.

3.1.2. MSCT findings

MSCT examination showed a linear fracture of the left cranial vault associated with a subgaleal haematoma, a large subarachnoid haemorrhage and left subdural haemorrhage with mass shifting (Fig. 1A). At the thoracic spine, a spinal injury was observed with a wide anterior fracture of the superior endplate of T8 and discontinuity at the disk between T7 and T8 (Fig. 1B). MSCT examination also revealed numerous rib fractures, which were

indicative of resuscitation manoeuvres. We also noted ossification of the anterior longitudinal ligament throughout the spinal column and osseous bridging of several intervertebral joints, particularly in the thoracolumbar spine, as well as osseous fusion of the sacroiliac joints (Fig. 1C). These MSCT findings were in agreement with a past medical history of AS.

3.1.3. Autopsy findings

At autopsy, we confirmed the cranial vault fracture and the subarachnoid and subdural haemorrhage (Fig. 2A). We also found a large haemorrhage in and around the T8 spinal fracture, without spinal cord injury (Fig. 2B). In this case, the public prosecutor did not order toxicological and pathological analysis. The manner of death was determined to be accidental, while the cause of death was attributed to the pericerebral haemorrhage. The pre-existing spinal stiffness due to AS accounted for the T8 vertebral fracture despite the fall being from only a low height.

3.2. Case 2

3.2.1. Case history

The corpse of a 93-year-old man was discovered at night in his room near his bed. His wife, who slept in a separate room, was alerted when she heard a muffled noise. The corpse presented numerous abdominal stab wounds and a cook's knife and a boning

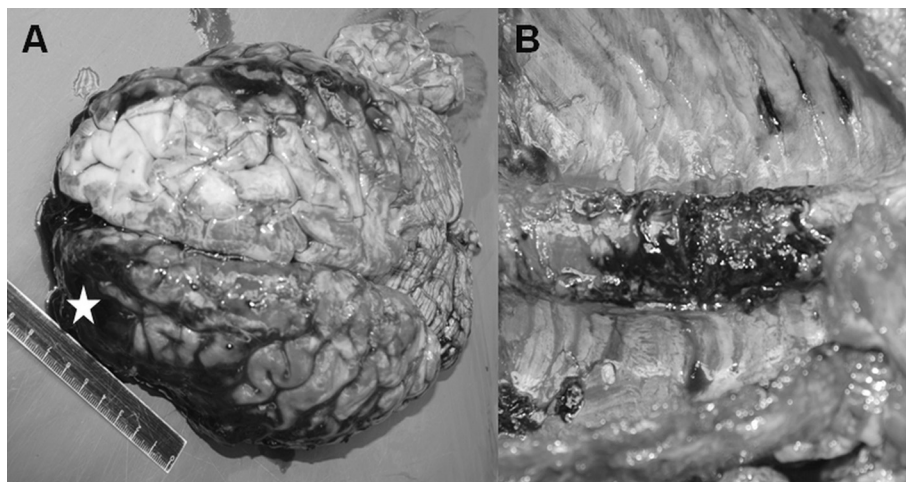


Fig. 2. Autopsy study. (A) Large subdural haemorrhage of the left convexity (star). (B) Haemorrhage in and around the T7 and T8 spine fracture.

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