Management of Typical and Atypical Hangman’s Fractures

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Aims
Although most authors agree Hangman’s fractures can be managed conservatively a degree of uncertainty still exists. We retrospectively reviewed management and outcomes of these fractures.

Methods
Retrospective analysis of 282 patient records was performed. Forty-one patients with typical and atypical hangman’s fractures were identified. Typical hangman’s fractures were defined as traumatic spondylolisthesis of the axis causing a bilateral pars interarticularis fracture. Fractures involving the posterior cortex of C2 on one or both sides are defined as atypical.

Information was gathered on demographics, radiological measurements, management and outcomes. The radiological records were reviewed and graded by a radiologist according to the modified Effendi system.

Results
Forty-one adult patients were included. There were twelve (29%) typical fractures and twenty-nine (71%) atypical.

Five typical fractures (38%) were managed with a rigid collar and five (38%) were managed with a halo orthosis. In the atypical group, six (21%) were managed with rigid collar, twenty two (76%) using halo and one (3%) surgically.

Two typical fracture patients had surgery, one for associated injuries and one for progression of fracture whilst in halo. One patient in the atypical fracture series underwent surgery for failure of conservative management.

Bony union was achieved in all patients on radiological follow up. No new neurological deficits were documented. Neck pain and stiffness was reported in the atypical group with 9 (33%) experiencing symptoms compared to one (8%) in the typical group. Three patients were lost to follow up.

Conclusions
Management of atypical Hangman’s fractures are similar to the classically described bilateral pars fracture. The majority of Hangman type fractures can be treated conservatively. Radiological follow up is essential to identify cases of non union. In our series three patients underwent surgical fixation after failure of conservative management.
Management of Typical and Atypical Hangman’s Fractures
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Objectives
Hangman’s fractures are considered to be one of the most frequent types of high cervical spine injury accounting for 20-22% of all axis fractures (1). Currently there are no rigid guidelines for the management of hangman’s fractures.
A retrospective review of management strategies and clinical outcomes of typical and atypical hangman’s fractures to assess best practice of management of the fractures by analysis of prospective data.

Methods
Analysis of prospectively collected data from patients who sustained a hangman’s fracture and were treated at the Walton centre. Information on demographics, management and outcomes was collated and radiological records were reviewed and graded according to the modified Effendi system (2).

Modified Effendi System

| Type 1 (21) | 51% |
| Type 2 (17) | 42% |
| Type 3 (6) | 0% |
| Type 2a (3) | 7% |

Results
Forty-one patients (age range 21-86 years) presented to the Walton centre with hangman’s fractures between 2007—2009. Twelve (29%) typical fractures and twenty-nine (71%) atypical hangman’s fractures were included. The most common mechanisms of injury were falls (56%) and road traffic accidents (34%), with a similar incidence of falls and road traffic accidents occurring between typical and atypical fractures.
Five typical fractures (38%) were managed with a rigid collar and five (38%) with halo orthosis. Twenty-two atypical fractures (76%) were managed with a halo, six (21%) with a rigid collar and one (3%) surgical patient.
Surgery was performed on two atypical fracture patients, one for associated injuries and one for progression of fracture whilst in a halo device and one due to failure of conservative management.
Neurological signs and symptoms were reported on admission by five (12%) patients, four of which were either transient monoparesis or paraesthesia. One patient had a dense hemiparesis which only partially recovered, however this was probably due to associated injuries.
On radiological follow up bony union was achieved by all patients.
Nine atypical patients (33%) reported neck pain and stiffness only one (8%) of the typical patients reported neck pain and stiffness.

Discussion
There is a general consensus among authors that the majority of hangman’s fractures can be managed conservatively by external immobilization using a cervical collar or halo orthosis (3)(4). Collars were used to manage patients who were unable to tolerate a halo or due to surgeon management preference.
There are currently no absolute indications for primary surgical management. Surgical management should be considered if a fracture is unstable or if conservative management fails (2)(3)(4)(5).
Symmetry of atypical hangman’s fractures has not been shown to affect outcome and therefore it has been suggested management strategies should be the same (6)(7)(8).

Conclusion
Atypical hangman’s fractures can be managed in a similar way to the classically described bilateral pars fracture.
Conservative management should be the first line treatment for the majority of hangman type fractures.
It is essential to use radiological follow up in order to identify cases of non union.
Neurological deficit is a rare complication of both typical and atypical hangman’s fractures.

References
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