Atlas fracture nonoperative management

Nonoperative management remains the mainstay of atlas fracture treatment. Isolated fractures of the atlas can be effectively managed with 8 to 12 weeks of external cervical immobilization of the craniocervical junction [1]. Collar immobilization or cervical traction for this period of time is usually sufficient to allow for proper healing; however, the type of orthosis required varies [2]. [3]. Nonoperative treatment typically consists of external immobilization through use of a rigid cervical collar, halo-vest, or Minerva jacket [4].

Soft cervical collars are inadequate for immobilization and often result in worsening pain to the patient with neck motion as well as further fracture displacement. Following immobilization, dynamic imaging studies such as flexion-extension films should be ordered to rule out late instability [5].

In the absence of significant displacement, C1 fractures can often be treated with a period of rigid cervical collar immobilization. In cases with more significant fracture displacement, more rigid immobilization with the halo-vest or Minerva jacket may be required. The halo vest is more rigid than the Minerva jacket, providing greater restriction of the C1–2 joint. Flexion and extension of the upper cervical spine is diminished by as much as 75 % when a halo vest is employed. The greater rigidity of the halo orthosis also restricts more lateral movement of the atlantoaxial joint when compared with the Minerva jacket [6]. For this reason, the halo-vest is the preferred option for upper cervical injuries [7]. With injuries extending to the mid and lower cervical spine, thermoplastic Minerva jackets offer greater comfort to patients, fewer complications, and can provide effective stabilization [8]. Despite its superiority over the Minerva jacket, the halo orthosis has significant potential complications. Halo ring slippage, loosening, infection, and irritation and discomfort are common [9] [10]. Halo-vest immobilization (HVI) failure rates reported in the literature reach as high as 85 % [11]. Pediatric patients in particular are subject to complications with use of halo-vests [12].

Such orthoses may not be appropriate for patients who are morbidly obese, or who lack the necessary neurological function to avoid the formation of decubitus ulcers [13]. Instead, cranial traction or rigid cervical collars should be supplemented in these cases with vigilant nursing care [14].

Rigid cervical collars avoid many of the potential complications of more restrictive orthoses at the cost of stability. Thus, patients must be simultaneously assessed for their ability to comply with various immobilization methods as well as their required degree of stabilization. Occasionally, orthotic stabilization will result in nonunion or continued instability, in which case surgical intervention is necessary. Stability is assessed after an appropriate course of immobilization, with flexion-extension radiographs. Greater than a 5 mm increase in the atlantodental interval is often considered unstable and may require surgical intervention [15].

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