



A Novel Approach to Jefferson's Burst Fracture treated with Posterior C1 Lateral Mass Screw Approximation

Peter Jarzem BSc(Eng), MD, FRCSC; Mahdi Bassi MBChB, FRCSC; Mohammed Abdullah S Mansi

Introduction

The unstable atlas burst fracture ("Jefferson fracture") is a fracture of the anterior and posterior atlantal arch with rupture of the transverse atlantal ligament and an incongruence of the atlanto-occipital and the atlanto-axial joint

facets. The question of whether to treat surgically or nonsurgically remains controversial. Current operative treatment usually involves C1-C2 arthrodesis

Methods

A 20-year-old patient sustained a Jefferson fracture from a frontal MVA. She had a 12 mm lateral mass displacement and has no neurological deficits. Initial treatment consisted of Cervical Traction for 12 weeks, which failed to obtain union on CT scan. In order to preserve cervical range of motion and to reduce the lateral mass subluxation she underwent a lateral mass re-approximation from a posterior approach.

Results

At 1 year post surgery the patient remained neurologically intact with minimal neck pain. Her ROM is within normal limits. She has returned to her previous functional level. The 10 mm lateral subluxation seen on preoperative CT has been reduced to 5mm on follow-up CT scan, and her flexion extension views demonstrate a variation in ADI of 3.7 mm.

Conclusions

Postoperative X-ray and CT demonstrated that the lateral masses had been approximated to within 5 mm of anatomic position and that the total translation of C1 on C2 in flexion and extension was an acceptable 4 mm. At 2 years post operative, the patient has a full range of cervical range of motion, no significant neck discomfort and has finished her university studies.

Learning Objectives

The purpose of this case report is to answer the question of whether if one level fracture repair fixation can be performed in Jefferson fracture without complications, and with a reasonable clinical outcome.

[Default Poster]

References

(1)Ruf M, Melcher R, Harms J. Transoral Reduction and Osteosynthesis C1 as a Function-Preserving Option in the Treatment of Unstable Jefferson Fractures. Spine (Phila Pa 1976). 2004 Apr 1; 29(7):823-7.

(2)C. Hein, H.-P. Richter, S. A. Rath. Atlanto-axial Screw Fixation for the Treatment of Isolated and Combined Unstable Jefferson Fractures. *Acta Neurochirurgica*. 2002;144(11):1187-92.

(3) Magerl F, Seemann P (1985) Stable posterior fusion of the atlas and axis by transarticular screw fixation. In: Kehr P, Weidner A (ed) *Cervical spine I*, Straubing. Springer, Wien New York.

(4)Fountas KN, Kapsalaki EZ, Karampelas I, Dimopoulos VG, Feltes CH, Kassam MA, Boev AN, Johnston KW, Smisson HF, Troup EC, et al. C1-C2 Transarticular Screw Fixation for Atlantoaxial Instability. South Med J. 2004 Nov; 97(11):1042-8.

(5)Oda I, Abumi K, Sell LC, Haggerty CJ, Cunningham BW, McAfee PC. Biomechanical Evaluation of Five Different Occipito-Atlanto-Axial Fixation Techniques. Spine (Phila Pa 1976). 1999 Nov 15;24(22):2377-82.

(6) Perriui P., Benedetto N., Lorenzo N. Transoral Approach to Extradural non-neoplastic Lesions of the Craniovertebral Junction. Spine 2014;156.

(7)Wang J., Zhou Y., Zhang Z., et al. Direct Repair of Displaced Anterior Arch Fracture of the Atlas Under Microendoscopy: Experience with seven patients.

(8)Wang C., Yahn M., Zhou H., et al. Open Reduction of Irreducible Atlantoaxial Dislocation by Transoral Anterior Atlantoaxial Release and Posterior Internal Fixation. Spine 2006;31(11).

(9)Menezes A. Surgical Approaches: Postoperative Care and Complications
"Transoral-Transplatopharyngeal Approach to the Craniocervical
Junction".Childs nerv Syst. 2008;24.

(10) Kingdom T., Nockels R., Kaplan M. Transoral-Transpharyngeal Approach to the Craniocervical Junction. Otolaryngology-Head and Neck Surgery 1995;113.

(11)Yin Q., Xia H., Wu Z., et al. Surgical Site Infections Following the Transoral Approach: A review of 172 consecutive cases. J spinal Disord Tech 2013.

(12) Lee TT, Green BA, Petrin DR. Treatment of Stable Burst Fracture of the Atlas (Jefferson Fracture) With Rigid Cervical Collar. *Spine (Phila Pa 1976)*. 1998 Sep 15;23(18):1963-7.

(13) Cosan TE, Tel E, Arslantas A, Vural M, Guner AI. Indications of Philadelphia collar in the treatment of upper cervical injuries. *Eur J Emerg Med.* 2001 Mar;8(1):33-7.

(14) Scott D. Daffner MD A1, Alexander R. Vaccaro MD. Advances in