​**Introduction of intraoperative imaging to preserve function in complex Atlas-Hangman-fractures**

Authors -Pankaj Singh, Satish Verma,Dattaraj Sawarker, Amandeep Kumar, Deepak Agarwal,P S Chandra Sashank Kale, Bhawani Shanker Sharma,Ashok Kumar Mahapatra

**Introduction and Objective:**

Combination fractures of the C1–C2 complex especially atlas & hangman are relatively uncommon. Retrospective study to evaluate the treatment and its outcome of combined C1- hangman’s fracture with and without intraoperative O- arm based navigation system.

**Material & methods :**

Out of 37 patients of hangman’s fracture managed at our centre during February 2009 to August 2014, eight patients (21.62%) had combined C1 and hangman’s fracture. We included 7 patients (male/female:6/1; age 23-81 years, mean 44.29 years) in our study who had follow up. Neurodeficit was present in 3 patients (ASIA B in 1 pateint and ASIA C in 2 patients). Operative intervention was performed in 6 patients. Specific treatment was determined by the combination of fractures. We used O-arm (intraoperative CT scan with navigation) in 3 patients (after we got one in our hospital) and its use allowed us to do more anatomical and more motion preserving procedure in these 3 patients. In 1 patient C2 pedicle screws and C3 lateral mass screw and rod fixation, and in 2 patients C2 pedicle screw and C3-C4 lateral mass screw and rod fixation was done.

**Results:**

There were no intraoperative surgery related complications. The mean follow-up period was 20.6 months. Neurological recovery occurred in all 3 patients with preoperative neurological deficits. Radiological fusion occurred in all cases. Rotation at C1-2 was preserved in all 3 cases operated under O-Arm guidance and in one patient with type 1 fracture who was managed conservatively

**Conclusions:**

The goals in treating these complex fractures are to achieve early maximum stability and preserving maximum range of motion. These are often competing phenomena. Treatment in patients with these combination fractures is based on the type of hangman’s fracture. Good healing can be achieved in elderly patients also and we should be aggressive in management of these patients with new intra operative CT scans and navigation system.