Transarticular Occipitocervical Screw Fixation Using A Posterior Occipitocervical Horseshoe Plate: Case Report

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Abstract : We report the use of a novel plate and screw system for posterior occipitocervical fixation in a case with neurological deficit due to basilar invagination. Using this technique, a more rigid fixation than sublaminar wiring can be achieved. In addition, upper cervical vertebrae which are laminectomized for decompression can be stabilized without the risk of cervical spinal canal narrowing due to sublaminar wiring. We discuss the importance of posterior occipitocervical stabilization and emphas ize the advantages of using the plate and screw system.

Key Word : Basilar invagination, cervical stabilization, Occipitocervical junction, Transarticular screw fixation.

INTRODUCTION

Occipitocervical fusion is a generally accepted surgical technic in unstable condition due upper cervical spine pathologies (2,4). In addition to bone fusion techniques, several methods have been proposed in order to achieve rigid fixation (1, 2, 6).

In this study we report a method of transarticular occipitocervical screw fixation using a horseshoe plate.

CASE REPORT

A thirty-year old female patient was admitted to the Department of Neurosurgery of Marmara University Hospital complaining of neck pain, headaches and difficulty in swallowing and describing electric-like shocks spreading down her body on flexing her head forward, for the last 4 months.

Neurological examination revealed quadriparesis with hyperactive deep tendon reflexes, bilaterally positive Babinski's sign and Lhermittes sign. Magnetic Resonance Imaging (MRI) scan showed basilar invagination, occipitalization of the atlas, and demonstrated the odontoid process located anteriorly, narrowing the foramen magnum and causing considerable compression on the spinal cord with herniated tonsils posteriorly (Fig. 1). A two-stage operation, i.e., occipitocervical fusion with instrumentation followed by transoral odontoid resection, was planned. Occipitocervical instrumentation was performed using a horseshoe shaped plate which was fixed to the occipital bone and the first three cervical vertebrae (Fig. 2). Two weeks after occipitocervical instrumentation, the odontoid process was resected using a transoral approach.

The postoperative period was uneventful, and the patient was discharged on the 7th postoperative day.

DISCUSSION

Posterior occipitocervical fusion is a widely used surgical technic in unstable conditions involving C1 and C2 vertebrae due to rheumatoid arthritis and traumatic, inflammatory, neoplastic or congenital causes (2, 4). Increasing popularity of the anterior

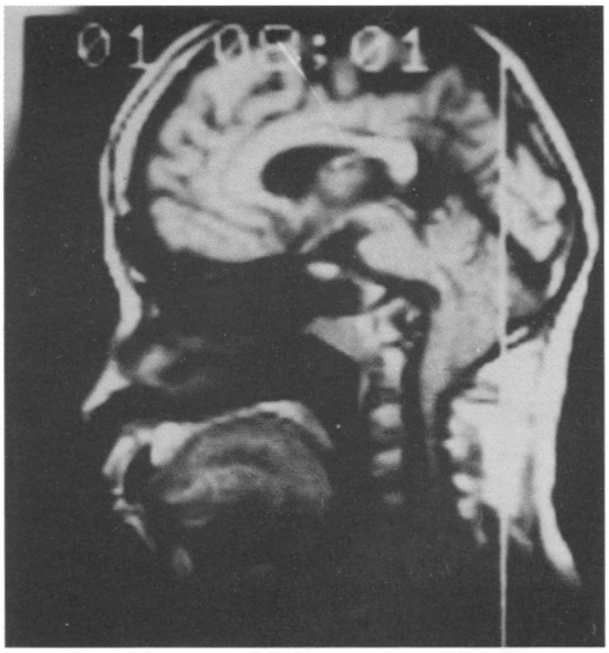

Fig. 1 : Lateral T1 - weighted MR scan showing basilar invagination, medullary compression and cerebellar tonsillary herniation.

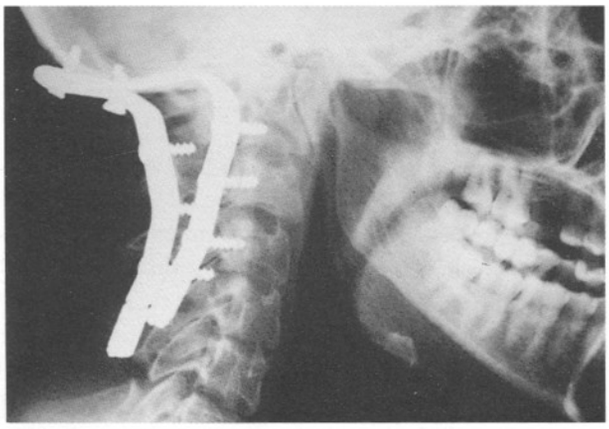

Fig. 2 : Lateral craniocervical x–ray demonstrating posterior horseshoe plate screw fixation.

approach to the occipitocervical region necessitates the use of posterior occipitocervical instrumentation because of the lack of anterior fixation techniques and the high complication rate seen with the use of bone grafts without instrumentation, i.e., non-fusion, infection, and resorption.

In addition to bone graft fusion, several methods have been described in the literature for occipitocervical instrumentation (1,3,4,6). Most commonly used techniques include sublaminar wiring of either a horseshoe or rectangular shaped rod to the first three cervical vertebrae and occiput (1, 6). It is known that internal fixation with sublaminar wiring may result in pseudarthrosis secondary to loosened and/or broken wires due to excessive flexion or extension of the occipitocervic al area prior to the establishment of bony fusion. A safer system, posterior occipitocervical screw fixation, which was first described by Roy-Camille (5), has been popularized worldwide.

In our opinion, the horseshoe plate and screw system reported in this paper is anatomically the most fitting system for the craniocervical junction. There are two distinct advantages of using plate and screw methods. First is achieving a more rigid fixation than wiring without the risk of loosening, and advantage is being able to include the upper cervical vertebrae within the fixation even after laminectomy. Due to this characteristic, the same vertebrae that are lamine ctomized to obtain decompression could be used for stabilization. A potential third advantage that could be important in a subset of patient is prevention of medullary compression secondary to narrowing of the cervical spinal canal due to sublaminar wiring.

We conclude that posterior occipitocervical instrumentation using the horseshoe plate is a safe method for rigid stabilization of the craniocervical region.

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