Surgical treatment of idiopathic syringomyelia on the basis of intramedullary pulse pressure theory: A Report of nine cases with clinical and radiological outcomes

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Introduction

The intramedullary pulse pressure theory would provide an explanation for the pathophysiology of idiopathic syringomyelia i.e. Syringomyelia develops where the systolic CSF passes through a regional narrowing in the subarachnoid space which leads to increase in CSF velocity and, according to the Bernoulli theorem, decrease in CSF pressure that would cause a suction effect (Venturi effect) on the spinal cord that distends the cord causing syrinx formation.

Methods

This prospective case series study was conducted on nine patients with idiopathic syringomyelia who met our inclusion and exclusion criteria. All the patients were treated by decompressive laminctomy and syringosubarachnoid shunt and followed up during the period between March 2005 and December 2010. Clinical results were evaluated by using the criteria of Japanese Orthopaedic Association Scoring System for Cervical Myelopathy (JOA score). All the patients had preoperative magnetic resonance imaging (MRI) and postoperative MRI two weeks after surgery then every six months in the first year then every year.

Results

The mean age of patients at time of surgery was 32 ±9.79 STD years. 55.6 % of patients were males and 44.4 % were females. The mean duration of symptoms was 54.7 ±25.00 STD months. . At the end of follow up (mean 42.4 ±12.12 STD months) the mean JOA score of the patients showed improvement from 8.2 ±2.53 STD before surgery to 14.4 ±1.42 STD and the mean recovery rate was 72.7 (±10.74 STD) %. Also the mean TDS / TDSC percent was reduced from 84 ±7.14 STD % before surgery to 21.1±3.58 STD %.

Conclusions

The intramedullary pulse pressure theory could explain the pathophysiology of idiopathic syringomyelia. Patients with idiopathic syringomyelia and progressive neurological deterioration could be treated by decompressive laminectomy, to increase the cross-sectional area of the subarachnoid space and stop further propagation of the syrinx, and syringosubarachnoid shunt, to relieve any residual increased pressure within the syrinx for better chance of neurological improvement.

Learning Objectives

- The concept of intramedullary pulse pressure theory

- Surgical management of idiopathic syringomyelia

References

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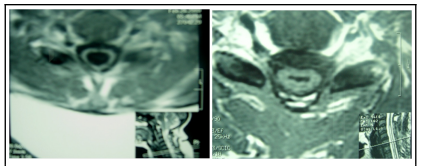
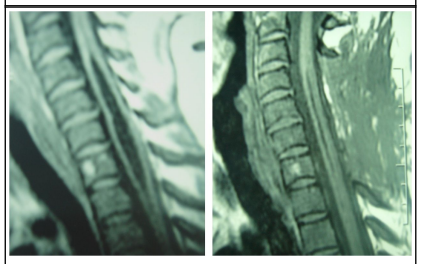
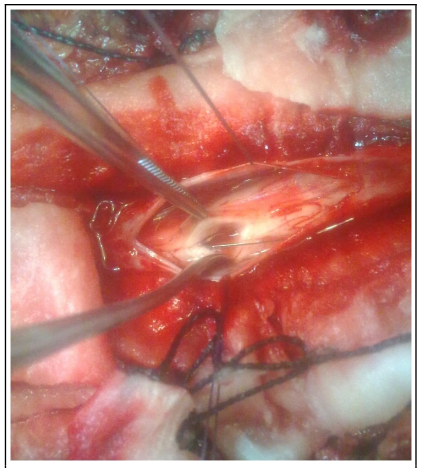


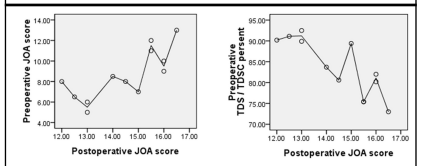
Axial T1- weighted MR images of a patient withidiopathic syringomyelia at the maximum diameter ofthe syrinx; preoperative image (left) and postoperative image(right).



Sagittal T1-weighted MR images of a patientwith idiopathic syringomyelia; preoperative image (left) and postoperative image(right).



One end of the tube is inserted into the syrinxcavity through a posterior midline myelotomy while theother end is inserted into the subarachnoid space.



Correlations between the postoperative JOAscore and the preoperative JOA score (left), and thepreoperative TDS / TDSC percent (right).