

## Cervical Spinal Canal Stenosis

**Volume: 06****Issue: 2S****December 1988****Page: 63-68**

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The importance of the initial or constitutional size of the cervical canal in the development of spondylosis was recognised by Paune and Spillane [1] in their important work on cervical spondylosis. They remarked that the development of myelopathy in cervical spondylosis might be related to the initial size of the canal. Hinck and Sachdev [2] and later on Wilkinson [3] et al emphasised the significance of developmental stenosis of the cervical canal. Presently this condition is a well recognised entity.

In the last 6 years we encountered 15 cases of myelopathy which were attributed to developmental stenosis. These patients were considered to have cervical canal stenosis when the diameter of the cervical canal was 12 mm or less. This was observed in one or more segments and these patients showed minimal or no spondylosis changes in plain x-rays.

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### Clinical Features

The following were the clinical presentations of the 15 cases. There were 12 males and 3 females. Eleven patients were less than 40 years old. Three patients were aged 18 years. History of neck trauma preceding the onset of myelopathy was obtained in 4 patients. One of them had two episodes of quadriplegia following trivial injury each time.

All the patients had quadriparesis of varying severity. Redicular symptoms or signs were noted by their infrequent occurrence. Only two patients had root signs. Posterior column impairment was noted in 10 cases. Lhermitte's sign was positive in 3 cases. One patient showed associated skeletal anomaly. The metacarpal bone of ring finger was short on both hands and the 3rd and 4th toes were very short in both feet.

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### Investigation

The sagittal diameters of the canal were measured in the lateral cervical spine X-ray as described by Wolf and Khilnani [4]. Table 1 shows that the value in all the 15 patients. There was a general narrowing of the canal in all the cases (Figure 1). However stenosis was maximum at C3 - C4 levels in 11 patients. Focal narrowing at C 5-6 was seen only in one case. Canal as narrow as 10 mm or less was seen in four patients. Subluxation at C 3/4 was noted in four (Figure 2a & b).

*Table 1 - Sagittal Diameters of cervical canal (No. 15)*

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*•Lateral X-ray of cervical spine showing generalised narrowing of the canal*

*•Lateral X-ray in flexion and extension revealing abnormal contour with sUBLUXATION at C 3/4*

Myodil myelogram was done in all. There was generalised narrowing of dural tube seen in seven patients (Figure 3). Even among these narrowing was more obvious at C 3-4 levels. Localised indentation suggesting a disc protrusion was seen in three patients (Figure 4). In the rest there was narrowing of the dye column associated with multiple small anterior indentations.

*•Myodil myelogram showing diffuse narrowing of dye column*

*•Myelogram in a narrow canal with a disc at C 3/4*

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## **Treatment**

The philosophy of management has been to do a decompressive laminectomy and allow the dural tube to fall back. Dura was not opened in any case. Thirteen patients were treated by laminectomy. At operation one could easily appreciate the extreme narrow canal especially at C 3-4 levels. No significant thickening of ligamentum flavum was noted in any case, and on the contrary it was very thin in most patients. In two patients where there was disc protrusion at a single level anterior disc surgery was done. No interbody fusion was attempted.

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## **Results**

Among the fifteen patients operated all have been followed up ranging from 3 months to 4 years. Six patients are relieved of their symptoms and signs. Seven patients are relieved of symptoms significantly and have minimal signs in the form of exaggerated deep tendon reflexes. Both the groups could resume their occupation. Two patients had deteriorated immediately after operation. One of them improved over 4 -5 weeks to pre-operative status and has remained same subsequently. The second patient has not recovered completely. Both the patients operated by anterior approach have done well.

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## **Discussion**

The normal sagittal diameter of cervical canal is variable. The values of western population shows slightly higher figures compared to Indian subjects [5], [6]. The normal values for Indian subjects are available both for South India and North India [6] (Table 2). Cervical Myelopathy is often seen in patients who have sagittal canal diameter of 12 mm or less. People who are born with a narrow canal are prone to develop myelopathy. The factors which precipitate symptoms in these subjects may be many. Most of these patients are in younger age group. Eleven cases in this study were less than 40 years of age. These patients had minimal or no spondylotic changes in the cervical spine X-ray. Trauma precipitating the symptoms was an important factor. Infact repeated minor injuries could significantly contribute to the development of myelopathy. Minor disc protrusions can compromise the already narrow canal and produce compression. Though most of the cases in the present series failed to show definite disc protrusions the canal is likely to have been encroached upon by minor protrusions

of disc and/or minor osteophytes. However definite indentations by disc were seen in three patients at a single level.

***Table 2 - Sagittal Diameters of cervical canal in normal subjects***

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The approach to treatment has been to do a wide laminectomy and allow the dural tube to be displaced posteriorly. This allows adequate space and relieves the symptoms and signs. In view of the diffuse nature of the narrow canal, decompressive laminectomy has been the procedure of choice. However when a localised indentation was seen (3 cases) an anterior approach was adopted and disc removed in two cases. A further follow-up of these patients would reveal whether this modality of treatment would be adequate or they may still develop symptoms due to a compression at a different level. Extreme care is required while performing laminectomy, as the canal is narrow. Two patients had worsened following this procedure. The rest of the patients had satisfactory outcome following operative treatment.

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