



International Journal of Orthopaedics Sciences

E-ISSN: 2395-1958
P-ISSN: 2706-6630
IJOS 2020; 6(1): 1214-1217
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www.orthopaper.com
Received: 27-11-2019
Accepted: 30-12-2019

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Relief of lumbar symptoms after cervical spine decompression in the patients with an asymptomatic cervical spinal stenosis: A case series

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DOI: <https://doi.org/10.22271/ortho.2020.v6.i1p.1987>

Abstract

Background: Tandem stenosis at cervical and lumbar area of spine is not uncommon in degenerative spine disease in elderly above 60 years. Both of these pathologies may progress independently at each level and severity of stenosis at each level may vary. In early stages cervical stenosis may present as leg tiredness on exertion, early fatigue on standing, night cramps, occasional neck pain but often low back pain, without any neurological signs but sometimes only brisk reflexes which can be overlooked and these symptoms may be considered as claudication. As patient present mostly with lower limb symptoms we try to concentrate mostly in lumbo-Sacral area until there was no evident myelopathy in cervical spine in MRI findings or sign of upper motor neuron like clonus, stiffness, unsteady gait are present clinically. Decompression at both level in single setting is preferred treatment in tandem stenosis but is this aggressive approach really needed or not? Because it may lead to morbidity and mortality in elderly patients. Here we will going to assess whether cervical cord decompression alone will relieve mild to moderate lumbar stenotic symptoms indirectly, as natural history of degenerative lumbar spine disease seems to be favorable in patients who were managed conservatively.

Objective: To determine whether decompression of cervical cord leads to improvement in lower limb symptoms that can prevent or delay other level surgery mostly lumbar spine which may be unnecessary.

Material and methods: We retrospectively analyzed data of 19 patient who were diagnosed as tandem stenosis at cervical and lumbar region but undergone only cervical decompression either in the form of Anterior or posterior surgery or both in last 2 year with at least 1 year of follow up. Patient with lumbar spine instability, associated old or fresh fracture of thoracic and lumbar area, pain originated from infective or tumor pathology were excluded. All 19 patients were assessed with pre-operative and post-operative VAS scores for pain, mJOA score for cervical symptoms, modified ODI score for lower limb symptoms. Preoperatively grading for severity of stenosis at cervical and lumbar levels was done by takahashi *et al.* grading technique depending on MRI findings. Statistical analysis of results were done using paired T test and p value < 0.05 considered to be statistically significant.

Results: Out of the 19 patients 47% patients had mild lumbar stenosis with moderate cervical stenosis got good symptomatic relief and improved their walking ability near normal. Even though 52% of patient had moderate to severe lumbar canal stenosis of which 89% patient happy with their improved walking ability while 10% of those with persistent lower limb symptoms and sever lumbar stenosis need lumbar decompression surgery later. For VAS the value of t is -17.298154. The value of p is < 0.00001. The result is significant at $p < 0.05$. For mJOA score the value of t is 8.720665. The value of p is < 0.00001. The result is significant at $p < 0.05$. For DOI The value of t is -13.191388. The value of p is < 0.00001. The result is significant at $p < 0.05$.

Keywords: Tandem stenosis, Lower limb symptoms, mJOA (modified Japanese Orthopedic Association scale), ODI (Oswestry Disability Index), VAS (visual analogue scale)

Introduction

Tandem spinal stenosis (TSS) is defined as concomitant stenosis at two or more regions of spine usually involving cervical and lumbar level which has been described since the 1960's^[1, 2]. TSS manifests as a mixed picture involving upper and lower motor neuron symptoms and signs like intermittent neurogenic claudication, gait disturbances, paresthesia with varied involvement of upper and lower limbs. Degenerative process of the spine is continuous process

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and by the age of 65 years, around 95% men and 70% women have been shown to have degenerative changes of spine [3-5].

In a case of concomitant cervical myelopathy and lumbar canal stenosis symptoms, surgery for cervical spine halts the progress of clinical worsening of cervical myelopathy. Dilemma arises when patient with tandem stenosis presented with predominant or isolated lumbar symptoms without symptoms of cervical myelopathy but radiographic evidence of cervical spine stenosis with or without cord signal changes on MRI. Incidentally asymptomatic cervical spine stenosis in patients with symptomatic lumbar spine spondylosis has been described with incidence being 23% to 76% in previous studies [5, 7, 8]. In these scenarios, indications for surgery of cervical spine have not been completely established yet in literature [9]. However recently a case series described relief of lumbar symptoms after operating over patients with positive clinical signs of cervical myelopathy [10].

To our knowledge no Indian study yet described outcomes of operating on asymptomatic cervical spine with radiologically evident cervical stenosis with predominantly lower limb symptoms mimicking lumbar stenosis. We present a case series of 19 patients who presented to us with predominantly lumbar symptoms and had complete or near complete recovery of symptoms after their cervical surgery.

Materials and Methods

A retrospective study was performed in department of orthopedic at B.K.L Walawalkar Rural Medical College and Hospital, Sawarda, India. Data was collected from June 2017 to December 2019 At least period of 1 year of follow up. Patients with predominantly lower limb symptoms like pain, paresthesia, lower limb tiredness, claudication, with occasional upper limb symptoms or neck pain who had

undergone cervical surgery were selected, patient with lumbar spine instability, associated old or fresh fracture of thoracic and lumbar area, pain originated from infective or tumor pathology were excluded. All 19 patients were assessed with pre-operative and post-operative VAS [11] (visual analogue scale) scores for pain, mJOA [12] (modified Japanese Orthopedic Association scale) score for cervical symptoms, modified ODI [13] (Oswestry Disability Index) score for lower limb symptoms. Preoperatively grading for severity of stenosis at cervical and lumbar levels was done by takahashi *et al.* [14] grading technique depending on MRI findings. Statistical analysis of results were done using paired T test and p value < 0.05 considered to be statistically significant.

Results

Total 19 patients were selected, out of which 6 were female and 13 were male. Age ranges from 40 to 70 years. 21% patient were diagnosed as OPLL at cervical spine and 79% were tandem stenosis. 47% patients had mild lumbar stenosis with moderate cervical stenosis got good symptomatic relief and improved their walking ability near normal. Even though 52% of patient had moderate to severe lumbar canal stenosis of which 89% patients were happy with their improved walking ability while 10% of those with persistent lower limb symptoms and sever lumbar canal stenosis undergone lumbar decompression surgery afterwards as shown in Table 1.

For VAS the value of t is -17.298154. The value of p is < 0.00001. The result is significant at $p < 0.05$. For mJOA score the value of t is 8.720665. The value of p is < 0.00001. The result is significant at $p < 0.05$. For DOI The value of t is -13.191388. The value of p is < 0.00001. The result is significant at $p < 0.05$ as shown in Table 2

Table 1: Preoperative and post-operative data

Sr. No	Age/sex	Cervical Stenosis Takahashi grade	Lumbar stenosis Takahashi grade	VAS score		M JO A score		ODI score		2nd surgery at lumbar level with 1 year F/U
				Pre OP	Post OP 1yr F/U	Pre OP	Post OP 1yr F/U	Pre OP	Post OP 1yr F/U	
1	42/M	3	2	7	1	17	19	35%	10%	No
2	56/M	3	3	8	2	16	19	40%	12%	No
3	64/M	4	3	7	3	17	18	45%	20%	No
4	58/F	3	3	6	2	16	18	32%	16%	No
5	68/M	3	4	8	3	16	18	48%	24%	No
6	46/F	3	2	6	1	18	19	28%	8%	No
7	48/M	3	2	7	3	17	19	24%	10%	No
8	62/M	3	3	8	2	17	18	32%	20%	No
9	70/M	4	3	7	3	15	18	45%	20%	No
10	64/F	4	3	8	2	15	16	40%	26%	Yes
11	56/F	3	2	9	1	18	19	34%	16%	No
12	40/M	3	2	8	1	18	19	30%	8%	No
13	57/M	3	2	7	2	18	19	24%	14%	No
14	66/F	4	4	9	5	14	17	62%	40%	Yes
15	60/M	3	2	6	3	17	19	26%	18%	No
16	59/F	4	2	8	2	14	18	48%	22%	No
17	56/M	3	3	8	2	16	18	40%	24%	No
18	62/M	3	3	7	3	15	18	32%	18%	No
19	52/M	3	2	6	2	15	19	22%	10%	No

Table 2: Analysis of paired t test

Score	Paired t Test		
	t Value	p Value	result
VAS	-17.298154	< 0.00001	significant at $p < 0.05$
mJOA	8.720665	< 0.00001	significant at $p < 0.05$
ODI	-13.191388	< 0.00001	significant at $p < 0.05$

Discussion

Tandem spinal stenosis typically involves cervical and lumbar spine with radiological prevalence from 23% to 76% and Molinari *et al.* [15] have mentioned that the prevalence of symptomatic patients being from 0.09% to 25%. This high occurrence of TSS can be compounded by 5% per year of

development of cervical myelopathy from asymptomatic cervical stenosis [16].

False localization signs [21] of spinal cord have been described previously. D R S Jameison *et al.* [21] had a case which described the sensory level 11 segments lower to the pathological level. False localization leads to delay in diagnosis and a timely diagnosis of cervical myelopathy has been shown to halt the disease progression. Ross *et al.* [17] had presented a report with cervical compressive myelopathy with predominantly knee pain. Neo *et al.* [18] described ipsilateral popliteal pain caused by cervical disc herniation. Langfitt TW *et al.* [19] described pain in the back and legs caused by cervical spinal cord compression. Scott M *et al.* [20] described tumors of high thoracic and cervical spine as cause of lower extremity symptoms. One explanation has been given is that the spinothalamic tracts cross obliquely 2 or 3 level [21] above the affected segment but it still doesn't explain the pathological levels present 9 segments [22] or 7 segments [23] away from sensory level. Another explanation is that the lamination of sensory tracts places the cervical tracts more centrally but this theory doesn't explain the occurrence of this phenomenon in centrally occurring lesions. Other theory states venous stasis leading to hypoxia damaging anterior horn cells [24]. However it again falls short of explaining that hypoxia damage will require involvement of a consistent region of spine which has decreased arterial pressure but there is no consistency of level of segment involvement in reported cases. Basically, whatever the explanation irritation of spinothalamic tract leads to false localization.

Some authors had tried to establish clinical symptoms associated with this phenomenon [18, 19, 24]. They had described it as bilateral, diffuse, burning, boring or aching. If it is unilateral then the cord compression is contralateral to symptoms. In older patients the pain presentation may not be consistent with other musculoskeletal disorders, like osteoarthritis of knee. Although these findings may be helpful a definitive diagnostic test is unavailable and relief of leg symptoms after cervical decompression is the only conclusive way at present. Goerge Ghobriel *et al.* [9] have mentioned that though a surprisingly high incidence of TSS (76%) and 5% of them may develop of cervical myelopathy from asymptomatic cervical stenosis as mentioned by Lee SH *et al.* [16]. In literature operative guidelines for management of asymptomatic or incidentally founded cervical stenosis have not been established yet.

Presence or absence of clinical cervical myelopathy can make a significant impact on prognosis [9]. Though asymptomatic, patients with signs indicating upper motor neuron involvement like hyperreflexia, Hoffman's sign and Babinski's sign are to be considered myelopathy. Prognosis of symptomatic patients with cord changes on MRI have been shown to have poorer prognosis than those without cord changes. However, prognosis of asymptomatic patients with incidentally found cervical cord changes have not been described. It is imperative to make such a distinction because studies have found that signs of myelopathy will precede symptoms which carry grim prognosis. Sung RD *et al.* [26] have shown that patients with radiculopathy and electrophysiological abnormalities of the cervical cord have a 90% chance of developing symptomatic myelopathy. However, usefulness of electrophysiological studies in detecting cervical myelopathy in patients without signs and symptoms has not been described [9].

Aebli *et al.* [27] have shown in a recent imaging study of trauma patients have shown that a Torg-pavlov ratio of <0.7

was a possible predictor of symptomatic spinal cord injury following minor trauma.

Diffusion tensor imaging (DTI) and diffusion tensor tractography (DTT) are new MRI modality which does the functional assessment of the spinal cord [28]. It detects cord abnormalities even if the T1 and T2 weighted images are normal. It is used to detect region of the cord involvement i.e. anterior, lateral or posterior. However it is not yet developed enough to pick up whether lumbar, thoracic or cervical tracts are involved. Imaging modalities are yet to arrive at this stage. In view of these evidences it becomes very important to widen our approach when we see a patient with leg symptoms. We need to be careful in ruling out involvement of upper levels of spine clinically and radiologically before concluding that presenting symptoms are not from the lumbar spine or degenerative arthritis of knee or hip. Daniel Felbaum *et al.* [10] in their study had 6 patients who had presented with solely leg symptoms. Some patients radiographic findings did not match clinically and some had myelopathic signs without symptoms. In our study 2 patients had prior lumbar surgery whose symptoms didn't resolved by first surgery got very good relief after cervical decompression with mean pre-operative VAS score of 6.7 vs. 3.7 postoperative with P value <0.05

Our patients had predominantly paresthesia's and leg pains which were mimicking lumbar symptoms. 47% patients with mild lumbar stenosis with moderate cervical stenosis had good symptomatic relief and improved their walking distance near normal. Even though 52% of patient had moderate to severe lumbar canal stenosis of which 89% patient happy with their improved walking ability while 10% of those with persistent lower limb symptoms and severe lumbar stenosis need lumbar decompression surgery later. Eskander, *et al.* [29] shows that no significant difference in mJOA and ODI score in staged procedure vs simultaneous one at the end of 7 year follow up, However patient age, blood loss, and operative time do significantly impact outcomes hence management tailored accordingly to reduce morbidity. So if we gave cervical decompression surgeries as first preference then we can delay second surgery at lumbar spine until patient demands for second surgery afterwards if there is not much relief in lower limb symptoms after first surgery.

The drawbacks of our study were that the sample size is small. We did not use DTI sequences in MRI. Our study duration is also less and needs to reassess this outcome by long duration follow-ups.

Conclusion

We must have a broader perspective to accommodate the idea of screening the upper levels of spine clinically and radiologically with any patient with predominant or isolated lumbar symptoms before taking operative intervention. Staged procedure also reduces morbidity in elderly patient. Cervical decompression as first intervention in tandem stenosis may prevent or delay second surgery at lumbar level.

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