

# Prospective Analysis of Functional Outcome of Single-Stage Surgical Treatment for Symptomatic Tandem Spinal Stenosis

## Abstract

**Background:** Tandem spinal stenosis (TSS) is a rare presentation leading to combined clinical features of upper motor neuron and lower motor neuron lesion which includes intermittent neurogenic claudication with or without neurological deficit, progressive gait imbalance and gait disturbances. In literature, there is controversy whether stage surgery or single-stage surgery should be done. **Materials and Methods:** From June 2009 to November 2016 in a series of 1381 patients who underwent surgery for various degenerative spinal conditions, 82 patients were diagnosed with having symptomatic TSS with an incidence of 5.93%. All patients diagnosed with TSS underwent single-stage surgical intervention by one surgical team. The perioperative factors were recorded for each patient. All patients were evaluated preoperatively and postoperatively at each followup with the modified Japanese Orthopaedic Association (mJOA) score, Nurick's grading, Oswestry disability index (ODI) and Cooper scale. **Results:** In this study, 82 patients including 70 males and 12 females underwent simultaneous surgical intervention for symptomatic TSS. The mean age of patients was  $61.78 \pm 10.48$  years. There was a significant improvement in mJOA score, Nuricks grading, ODI and Coopers scale postoperatively as compared to preoperative values ( $P < 0.05$ ). **Conclusion:** Symptomatic TSS can be safely managed by single-stage surgical intervention with good postoperative results or without a significant increase in complication rates. Single-stage surgical intervention helps to relieve the symptoms of both cervical and lumbar spinal cord compression, avoids the risk of repeated anesthesia, reduce the duration of surgery, repeated hospitalization hence, reducing the cost for hospitalization and also reducing the rehabilitation, recuperation time and early functional recovery justifies single-stage surgical intervention.

**Keywords:** Cervical, decompression, lumbar, single stage, symptomatic, tandem spinal stenosis

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## Introduction

Spinal canal stenosis can affect any level. However, it most commonly seen in the most mobile segments, i.e. is cervical and lumbar.<sup>1</sup> Being a degenerative spinal disease, increased incidence of tandem stenosis is due to increased life expectancy in population.<sup>2</sup> Multilevel spinal canal stenosis was first reported by Teng in 1964 and the term tandem spinal stenosis (TSS) was first coined by Dagi.<sup>3,4</sup> The incidence of TSS ranges from 0.9% to 28%.<sup>5</sup> Asymptomatic patient with radiographic stenosis can be seen in patients, however symptomatic individuals with radiographic evidence of spinal canal stenosis needs surgical intervention.<sup>6</sup>

The symptoms of TSS include a combination of clinical features of upper and lower motor neuron lesion. Symptoms

of TSS can be classically described as a triad of neurogenic claudication, combined symptoms in upper and lower limbs (LLs) and gait disturbance.<sup>6</sup> Neurogenic claudication is a typical feature of lumbar canal stenosis.<sup>7</sup> Gait pattern abnormality in TSS is due to multiple factors, which includes neurogenic claudication, weakness, proprioceptive abnormality, spasticity or neuropathy. Patients with TSS usually presents with varying degree of symptoms depending on the level and degree of compression.<sup>4</sup>

As TSS is a rare condition, the ideal treatment of this condition in literature is also controversial. In past, staged surgery was being done. There is controversy regarding which area to be operated first. Some studies state that the dominant area of pathology should be treated first followed by the other, however, some studies state that cervical should be

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operated first followed by lumbar.<sup>3,4,7</sup> There are few studies who recommended simultaneous decompression of both the regions should be done in single sitting.<sup>7</sup>

In this study, we have prospectively evaluated 82 patients with TSS who underwent single-stage decompression at both cervical and lumbar level and evaluated their clinical and radiological outcome after a mean followup duration of  $31.71 \pm 8.21$  months. This study evaluates the results of single-stage surgical intervention for patients presenting with symptomatic tandem stenosis and effects of various factors which affect the outcome.

## Materials and Methods

In this prospective study conducted at our institute from June 2009 to November 2016 in a series of 1381 patients who underwent surgery for various degenerative spinal disorders, 82 patients including 70 males and 12 females were diagnosed with TSS with an overall incidence of 5.93%. All surgeries were performed by a single team, proximal followed by the distal level surgical procedure. The distal level surgery was started after complete closure of the proximal level. In this study, patients who presented with combined features of neurogenic claudication, progressive gait disturbance and associated upper and LL symptoms with the radiological appearance of stenosis were included. Exclusion criteria were patients presenting with the radiological appearance of spinal stenosis but asymptomatic for the particular level and neurological deficit secondary to stroke, motor neuron disease. Furthermore, in our study, patients who presented with multilevel cervical stenosis who underwent posterior surgeries were included and patients who had symptomatic tandem stenosis but underwent anterior cervical surgery for single-level cervical stenosis were excluded from the study.

Patient demographics were noted including age, sex, duration of symptoms for upper and LL, associated comorbidities. Intra-operative factors such as surgical time, intraoperative blood loss and blood transfusion required were noted to measure single-stage procedure invasiveness. The number of cervical and lumbar levels operated, the type of surgery done, the type of instrumentation required was noted. Intraoperative and postoperative complications were also noted. All patients were clinically evaluated preoperatively and postoperatively at each followup with Nurick's grading, modified Japanese Orthopaedic Association (mJOA) score, mJOA recovery rate, Oswestry disability index (ODI) and Cooper scale (CS) for upper limb (UL) and LL.<sup>8-10</sup> All patients were followed postoperatively at 1 month, 3 months, 6 months, 1 year and yearly after that for 5 years. The minimum followup duration was 2 years.

## Preoperative imaging

All patients were evaluated preoperatively by doing X-rays and magnetic resonance imaging (MRI) of the involved

region with screening of the whole spine. X-rays were done in anteroposterior and lateral view and also dynamic views in lateral position to look for instability. Singh *et al.* and Schizas *et al.* compression grading system was used to evaluate the degree of cervical spinal stenosis and lumbar canal stenosis on MRI scans.<sup>11,12</sup>

## Operative procedure

Under general anesthesia, patient was positioned prone on radiolucent load bearing operation table with horseshoe extension with Gardner well cervical tongs. Single-stage surgical intervention was performed by one surgical team. Lumbar surgery was followed by cervical surgery. Cervical laminectomy was done for multilevel cervical stenosis in patients above the age of 65 years. Cervical laminectomy and lateral mass screw fixation were done for patients below the age of 65 years and above 65 years if instability noted on dynamic radiographs. Patients showing instability on dynamic radiographs of lumbar spine underwent posterior lumbar interbody fusion (PLIF), and in the absence of instability laminectomy with lateral recess decompression was done. Bone graft was used from the local site, no iliac crest bone graft, allografts or synthetic bone grafts were used. Postoperatively, drains were removed on day 1 in case of decompressive surgery and day 2 in case of instrumented surgeries. Patients were discharged on day 2 or 3 in case of decompressive surgery and day 4 or 5 in case of instrumented surgeries [Figures 1, 2 and Flowchart 1].

## Statistical analysis

Data tabulation and analysis were performed by using Microsoft Excel. The postoperative outcome was analyzed using mJOA score, mJOA recovery rate, Nurick's grading, ODI and CS. Paired *t*-test was used to calculate *P* value to evaluate postoperative outcome as compared to preoperative score. To further evaluate the effect of age, duration of symptoms, grades of compression, the number of levels affected, blood loss, surgical time and comorbidities patients were divided into two to compare each variable and un-paired *t*-test was used to calculate *P* value and evaluate the whether these factors have a significant effect on the postoperative outcome. The value of  $P < 0.05$  was considered statistically significant.

## Results

The mean age of the patient was  $61.78 \pm 10.48$  years (range 29–83 years). The average duration of symptoms was  $18.81 \pm 11.69$  months (range 4–48 months) for UL and  $27.7 \pm 33.48$  months (range 5–240 months) for LL. Ten patients (12.1%) had the onset of symptoms in UL, 30 patients (36.58%) had the simultaneous onset of symptoms in both upper and LLs and 42 patients (51.2%) had the onset of symptoms in LL. Twenty six patients (31.7%) had the onset of symptoms <1 year and 56 patients (68.2%) had onset of symptoms >1 year. The



**Figure 1:** Sixty-year-old man, wheelchair bound with C3–C7 cervical myelopathy with L4–L5 lumbar canal stenosis. He underwent cervical laminectomy and instrumentation with lateral mass screw for cervical myelopathy and L4–L5 laminectomy with lateral recess decompression for L4–L5 lumbar canal stenosis. (a) Preoperative magnetic resonance imaging whole spine screening showing C3–C7 cervical canal stenosis and L4–L5 Lumbar canal stenosis. (b) Preoperative magnetic resonance imaging of cervical spine showing cervical canal stenosis at C3–C7. (c) Preoperative magnetic resonance imaging of lumbar spine showing lumbar canal stenosis at L4–L5. (d) Preoperative axial magnetic resonance imaging at C6–C7 showing Grade 3 cervical canal stenosis. (e) Preoperative axial magnetic resonance imaging at L4–L5 showing Grade C Lumbar canal stenosis. (f) Two year postoperative magnetic resonance imaging whole spine screening showing good decompression of both cervical spinal cord and lumbar canal. (g) Postoperative magnetic resonance imaging showing good decompression of cervical canal. (h) Postoperative magnetic resonance imaging showing good decompression of lumbar canal. (i) Postoperative X-ray Anteroposterior and lateral view showing cervical laminectomy and fixation with lateral mass screw

mean duration of followup was  $31.71 \pm 8.21$  months (range 24–71 months).

Thirty three patients had Grade 2 cervical canal stenosis and 49 patients had Grade 3 cervical canal stenosis. Twenty-one patients had cervical myelopathy secondary to ossification of the posterior longitudinal ligament, 45 patients due to cervical spondylosis and 16 patients due to both. Eight patients had Grade B lumbar canal stenosis, 42 patients had Grade C and 32 patients had Grade D. The mean surgical duration was  $173.71 \pm 39.31$  min (range 115–290 min). The average blood loss during surgery was  $353.41 \pm 92.85$  ml (range 250–600 ml).

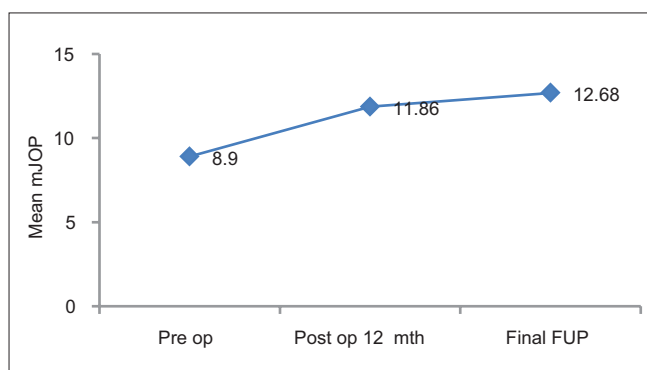
In total, 48 patients underwent cervical laminectomy, 34 cervical laminectomy and instrumentation with a lateral mass screw, 56 lumbar laminectomy and 26 patients underwent PLIF. Twenty-three patients underwent 2 level PLIF and three patients underwent 3 level PLIF. PLIF was done with

pedicle screws and rods with an interbody titanium cage. Local bone graft from the spinous process and lamina was used in all patients to induce fusion [Graphs 1-3].

The mean preoperative mJOA score was  $8.9 \pm 1.97$  which showed significant improvement postoperatively ( $P < 0.05$ ). The mean postoperative mJOA score at 12 months  $11.86 \pm 1.97$  and at final followup  $12.68 \pm 2.17$ . The mean mJOA recovery rate was 32% at final followup. Similarly, there was a significant improvement in the Nurick's grading postoperatively as compared to preoperative value ( $P < 0.05$ ). The mean preoperative Nurick's grading was  $3.65 \pm 0.8$ , and the mean postoperative at final followup was  $1.43 \pm 0.54$ . The mean ODI preoperatively was  $55.39 \pm 10.38$ , which reduced significantly postoperatively to  $31.95 \pm 13.75$  at final followup ( $P < 0.05$ ). The mean preoperative CS for LL was  $3.36 \pm 0.96$  and which showed significant reduction

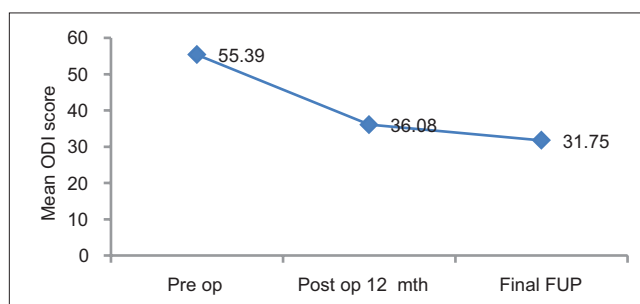


**Figure 2:** Fifty three-year-old gentleman, C3–C7 cervical myelopathy with L3-4-5 lumbar canal stenosis. Patient had undergone lumbar (L4–L5) discectomy 10 years ago. He underwent cervical laminectomy and instrumentation with lateral mass screw for cervical myelopathy from C3 to C7 and revision L3-4-5 laminectomy and posterior lumbar interbody Fusion. (j) Preoperative magnetic resonance imaging whole spine screening showing C3–C7 cervical canal stenosis and L3-4-5 Lumbar canal stenosis. (k) Preoperative magnetic resonance imaging of lumbar spine showing lumbar canal stenosis at L3-4-5. (l) Preoperative magnetic resonance imaging of cervical spine showing cervical canal stenosis at C3–C7. (m) Three year postoperative magnetic resonance imaging whole spine screening showing good decompression of both cervical spinal cord and lumbar canal. (n) Postoperative magnetic resonance imaging showing good decompression of cervical canal. (o) Postoperative magnetic resonance imaging showing good decompression of lumbar canal. (p) Postoperative X-ray Anteroposterior and lateral view showing laminectomy and posterior lumbar interbody fusion. (q) Postoperative X-ray Anteroposterior and lateral view showing cervical laminectomy and fixation with lateral mass screw



**Graph 1:** Showing improvement in mean modified Japanese Orthopaedic Association after 1 year followup and at final followup

postoperatively to  $1.19 \pm 0.79$  ( $P < 0.05$ ). Similarly, there was a significant reduction in CS for UL from  $2.27 \pm 0.83$  preoperatively to  $0.92 \pm 0.64$  postoperatively ( $P < 0.05$ ). In our study, it was found that the duration of disease, younger age, and the severity of cervical compression preoperatively had a significant effect on the outcome. In our study, patients with symptoms of <12 months had significantly better outcome than patients who had symptoms of >12 months ( $P < 0.05$ ). Patients with cervical stenosis of less than Grade 2 had significantly better outcome than patients with compression grading of Grade 3 ( $P < 0.05$ ). Patients with age <60 years also had

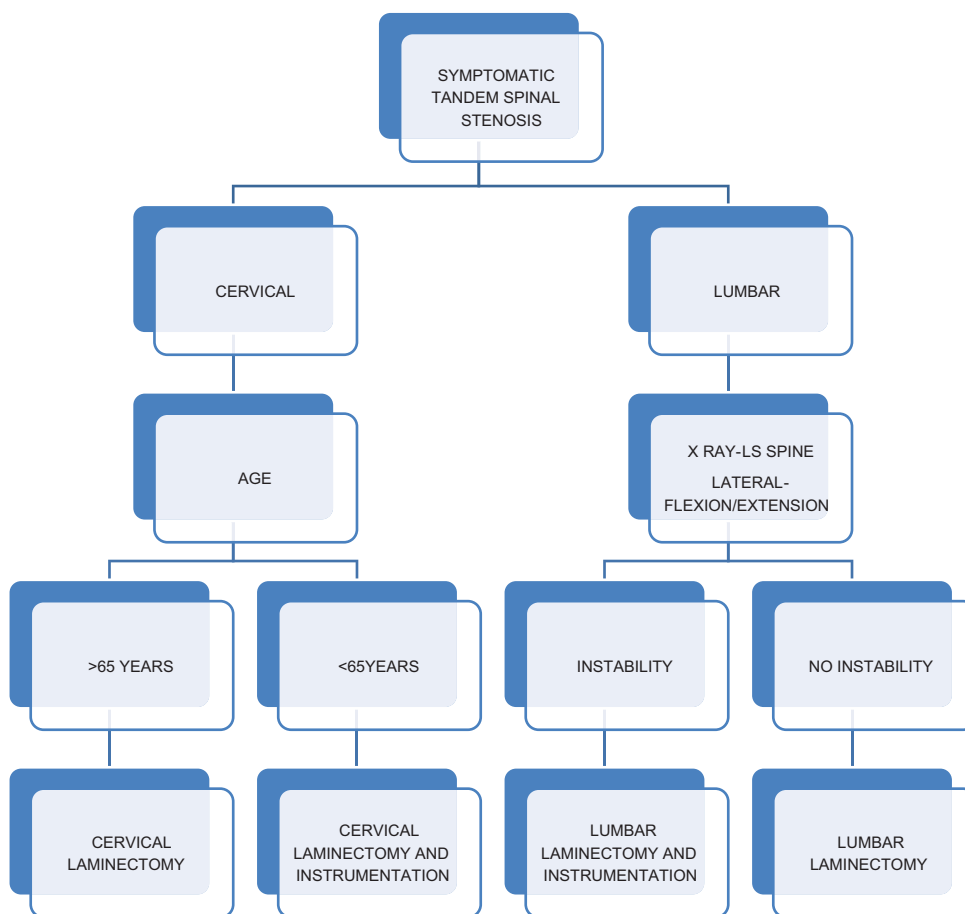


**Graph 2:** Showing improvement in mean Oswestry disability index score after 1 year followup and at final followup

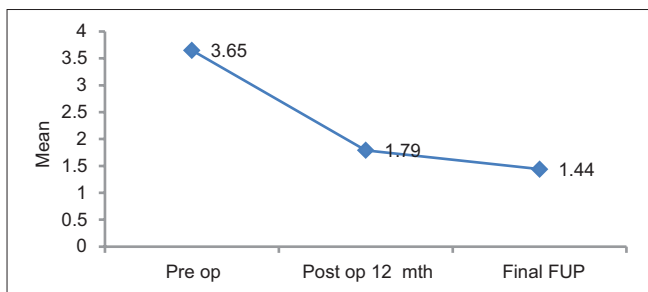
significantly better outcome as compared to patients above the age of 60 years ( $P < 0.05$ ). Number of stenosis level, intraoperative blood loss, surgical time and comorbidities does not have significant effect final outcome ( $P > 0.05$ ) [Tables 1,2 and Graph 4].

## Discussion

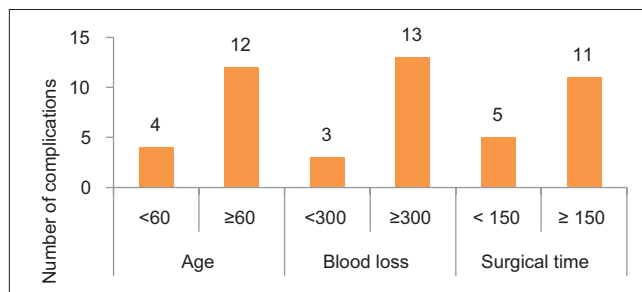
Asymptomatic spinal stenosis is seen in 24%–37% individuals on MRI scan.<sup>6</sup> The incidence of TSS increases to >50% above the age of 50 years and to >75% above the age of 64 years.<sup>4</sup> Epstein *et al.* in their study showed that only 5% of these patients have symptomatic tandem stenosis and surgical intervention is required only in symptomatic patients.<sup>13</sup>



Flowchart 1: Surgical protocol for patients presenting with tandem spinal stenosis



Graph 3: Showing improvement in mean Nurick's grading after 1 year followup and at final followup



Graph 4: Association of number of complications with age, blood loss and surgical time

The chronic severe myelopathy caused by cervical spinal stenosis is reversible in initial stages only if treated with adequate decompression with aggressive physiotherapy.<sup>14</sup> The need for early decompression was shown in our study in which patients with presenting symptoms of <12 months had significantly better functional outcome and neurological improvement as compared to patients with symptoms of >12 months ( $P < 0.05$ ). Hence, early diagnosis and treatment are important for better functional prognosis.<sup>14,15</sup> The residual signs and symptoms of myelopathy are due to irreversible intramedullary changes within the cord that are caused by significant cord compression and the delay between the onset of initial symptoms and surgical

decompression.<sup>16-18</sup> The severity of the cervical canal stenosis also had significant effect on the functional outcome after the surgery. The reason for this significant difference is that the increasing severity of spinal cord compression leads to intramedullary changes in the spinal cord which affects the functional and the neurological outcome.<sup>19</sup> In our study, patients with <Grade 2 cervical canal had significantly better outcome as compared to patients with >Grade 3 cervical canal stenosis ( $P < 0.05$ ). Suri *et al.* in a study conducted on effect of intramedullary spinal cord changes on the functional outcome also concluded that the presence of intramedullary changes have a poor prognosis on the final outcome.<sup>14</sup> They also showed that age at the

Table 1: Analysis of various variables

Variables	Preoperative mJOA	Postoperative mJOA	mJOA recovery rate (%)	Preoperative ODI	Postoperative ODI	Preoperative Nurick's grading	Postoperative Nurick's grading	Preoperative CS (LL)	Postoperative CS (LL)	Preoperative CS (UL)	Postoperative CS (UL)
All patients	8.9	12.68	32.71	55.39	31.95	3.65	1.43	3.36	1.19	2.27	0.92
Age (year)											
<60	9.35	14.35	31.1	52.6	18.43	3.39	1.10	3.25	0.53	2.6	0.35
>60	8.66	11.81	33.55	56.83	38.96	3.79	1.61	3.42	1.53	2.7	1.22
P	0.06	<0.05	0.21	0.03	<0.05	0.01	0.05	0.21	<0.05	0.19	<0.05
Duration of symptoms (month)											
<12	9.57	14.5	30.76	51.1	18.28	3.34	1.03	3.19	0.53	2.57	0.42
>12	8.58	11.83	33.62	57.38	38.3	3.80	1.62	3.44	1.5	2.78	1.16
P	<0.05	<0.05	0.17	<0.05	<0.05	<0.05	<0.05	0.13	<0.05	0.14	<0.05
Cervical compression											
<Grade 2	9.72	14.30	29.84	52.28	22.81	3.27	1.15	3.06	0.63	2.45	0.48
>Grade2	8.34	11.59	34.65	57.48	38.11	3.91	1.63	3.57	1.57	2.89	1.22
P	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lumbar compression											
<Grade C	9.14	13.1	33.26	54.92	28.66	3.61	1.32	3.26	1.08	2.69	0.87
>Grade C	8.54	12.06	31.90	56.08	36.85	3.72	1.6	3.51	1.36	2.75	1
P	0.09	<0.05	0.32	0.31	<0.05	0.26	<0.05	0.12	0.05	0.36	0.2
Number of cervical level											
<3 level	8.59	12.04	32.21	56.55	37.31	3.66	1.57	3.35	1.47	2.73	1.19
>3 level	9.26	13.02	31.71	54.17	26.52	3.65	1.3	3.37	0.9	2.7	0.65
P	0.06	0.09	0.25	0.04	0.09	0.04	0.06	0.01	0.06	0.18	0.22
Blood loss (ml)											
<300	8.68	12.28	32.1	56.51	35.42	3.76	1.52	3.47	1.36	2.73	1.07
>300	9.09	13.02	33.25	54.42	28.96	3.56	1.36	3.27	1.04	2.7	0.79
P	0.17	0.06	0.34	0.18	0.01	0.13	0.09	0.17	0.03	0.43	0.02
Co-morbidities											
Yes	8.83	12.04	32.21	56.55	37.13	3.66	1.57	3.35	1.47	2.73	1.19
No	8.97	13.35	33.25	54.17	26.52	3.65	1.3	3.37	0.9	2.7	0.65
P	0.17	0.06	0.34	0.18	<0.05	0.13	0.09	0.17	<0.05	0.43	<0.05
Surgical time (min)											
<150	9.37	13.12	31.08	54.81	32.4	3.41	1.37	3.04	1.04	2.45	0.79
>150	8.7	12.5	33.39	55.63	31.76	3.75	1.46	3.5	1.25	2.82	0.98
P	0.08	0.11	0.23	0.37	0.42	0.03	0.24	0.02	0.13	0.03	0.11

CS=Cooper scale, LL=Lower limb, UL=Upper limb, mJOA=Modified Japanese Orthopaedic Association, ODI=Oswestry Disability Index

**Table 2: Association of number of complications with age, blood loss and surgical time, showing that age, increased blood loss and surgical time is associated with increased number of complications**

Variable	Number of complications	P
Age		
<60 (28)	4	0.411 (NS)
≥60 (54)	12	
Blood loss		
<300 (16)	3	0.848 (NS)
≥300 (66)	13	
Surgical time		
<150 (24)	5	0.819 (NS)
>150 (58)	11	

NS=Not significant

time of surgery, multiplicity of involvement, chronicity of the disease also have significant effect on the final functional outcome. In our study also patients age group younger than 60 years have significantly better outcome as compared to patient age >60 years ( $P < 0.05$ ). However, in our study, multiplicity of the level of involvement did not have any significant difference ( $P > 0.05$ ).

Dagi *et al.*<sup>4</sup> and Epstein *et al.*,<sup>13</sup> in their respective study of TSS showed good postoperative outcome after staged decompression. Epstein *et al.* also concluded in their study that in patient who underwent cervical surgery first, there was improvement in myelopathy symptoms; however, the claudication and radiculopathy symptoms in LL did not improve. Furthermore, patients who underwent lumbar surgery first there was no improvement in myelopathy symptoms.<sup>13</sup> Aydogan *et al.*<sup>3</sup> Krishnan *et al.*<sup>6</sup> and Naderi and Mertol,<sup>20</sup> in their respective study showed that simultaneous surgery for tandem stenosis also gives good outcome postoperatively. Eskander *et al.* in their study compared staged and simultaneous surgical intervention for symptomatic TSS. They concluded that both methods have good surgical outcome postoperatively, however age of the patient, duration of surgery and blood loss can have effect on the complication rates intra-operatively or postoperatively.<sup>7</sup> In this study, 82 patients were prospectively studied for results of simultaneous surgical intervention for symptomatic TSS. All patients had significant improvement in postoperative functional outcome as compared to preoperative status with respect to mJOA score, Nurick's grading, ODI and CS for both upper and LL ( $P < 0.05$ ). Staged surgery as shown by Epstein *et al.*<sup>13</sup> and Dagi *et al.*<sup>4</sup> have good postoperative outcome, however staged surgery requires repeated hospitalization, repeated anesthesia, increased financial burden on the patients and prolonged rehabilitation time. We prospectively planned simultaneous surgery for patients presenting with symptomatic TSS to reduce the financial burden on the patient, risk of repeated anesthesia and decrease the rehabilitation time. Passias *et al.* in their study

showed that single stage surgery for circumferential spinal fusion is associated with lesser chances of perioperative complications and also better deformity correction as compared to staged surgical procedure.<sup>21</sup> Similar to tandem stenosis, in double crush syndrome in which the nerve is compressed at two different levels, optimal results are obtained when surgical decompression is done at both the levels.<sup>22</sup>

The simultaneous surgery for TSS can be compared with simultaneous surgery for bilateral total knee and bilateral total hip replacement. In a study conducted by Reuben *et al.* there was 36% reduction in the cost of simultaneously performed bilateral total knee arthroplasty as compared to unilateral one, similarly there was 25% reduction in the cost of simultaneously performed bilateral total hip arthroplasty.<sup>23</sup> Stubbs *et al.* in their study have shown that bilateral total knee arthroplasty under same anesthesia does not increase the perioperative complications, reduces the hospital stay of the patient.<sup>24</sup>

One of the drawbacks of simultaneous surgical intervention for tandem stenosis is increase in surgical time. Krishnan *et al.*<sup>6</sup> and Eskander *et al.*,<sup>7</sup> showed that there is increase in complication rates as the surgical duration increases and the intraoperative blood loss increases in simultaneous surgical intervention and hence, it affects the final outcome after the surgery. However in our study, no correlation was found between the complication rates with respect to increased surgical time and intraoperative blood loss. Furthermore, there was no significant difference in the final outcome between the patients in whom the surgical time was <150 min as compared to patients in whom it was >150 min ( $P > 0.05$ ). Similarly, there was no significant difference in the outcome in group of patients in whom blood loss was <300 ml as compared to patients in whom blood loss was >300 ml ( $P > 0.05$ ). The reason for increased duration of surgery and increased intra-operative blood loss in our study was more number of levels involved and instrumented surgeries. We believe that adequate decompression, surgical techniques and proper fixation are more important for better final outcome as compared to surgical duration and blood loss. Increased surgical duration and blood loss might affect in early postoperative period but not in the long term.

In our study, simultaneous decompression at both cervical and lumbar level was associated with good resolution of the preoperative symptoms. Thus, the patients are able to rehabilitate faster and return to their daily routine activities in shorter duration of time with the advantage of avoiding a second surgical procedure. This helped to reduce patient morbidity and repeated anesthesia with the advantage of single hospital stay, avoiding psychological trauma of second surgery as well as reduce the expenditure on health care without a significant increase in complication rate. Single stage simultaneous decompression also helped

to reduce the need for a second intubation during second surgery as most of the patient had difficult intubation and other associated co-morbidities.

There are certain limitations to our study also. In this study, there was no control group, in which staged surgery was performed and hence, no comparison could be made between the two methods. As most of the patients in our study were from poor socioeconomic strata, these patients could not be subjected to repeated surgeries keeping in mind the financial constraints. Another limitation was that the MRI grading system for cervical and lumbar stenosis was manual and subjective. As most of the MRI setups are deficient in exact calculation of cross sectional area of the spinal cord, manual grading system was the best in our setup. In future, studies should be conducted where exact cross sectional area should be calculated at the stenotic level which can help to define the effect of severity of stenosis on the outcome.

## Conclusion

The diagnosis of TSS should always be kept in mind in a patient presenting with mixed features of upper and lower motor neuron signs in an elderly patient as single-stage surgical treatment of both can be done with good postoperative functional outcome without significant increase in the complication rate. This helps in reducing the cost for hospitalization, avoid need for repeated intubation in difficult cases as well as reducing patients morbidity by avoiding the need for second surgical procedure.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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