CLINICAL ARTICLE

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Clinical Analysis of Postoperative Outcome in Elderly Patients with Lumbar Spinal Stenosis

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Objective : The purpose of this study was to evaluate the efficacy and safety of the surgical treatment for lumbar spinal stenosis in elderly patients.

Methods : The authors reviewed the medical records of 49 patients older than 65 years of age with lumbar spinal stenosis who underwent surgical treatment from January 2002 to December 2004 in our institute.

Results : Average age of patients was 70 years old (32 women, 17 men). Twenty-four patients had chronic medical disorders. All patients were operated under the general anesthesia of these, 29 patients underwent decompressive laminectomy and decompressive laminectomy with instrumentation and fusion in 20 patients. The mean operation time was 193.5 minutes, mean estimated blood loss was 378cc and mean postoperative hospital stay length was 15.3 days. The mean follow-up duration was 11.9 months. The evaluation of outcome was assessed by Macnab classification. At first month after operation, the outcome showed excellent in 7 (14.3%), good in 35 (71.4%), fair in 5 (10.2%), and poor in 2 (4.1%). And at 6 months after operation, 17 patients were lost in follow-up, the outcome showed excellent in 4 (12.5%), good in 25 (78.1%), fair in 3 (9.4%), and no poor cases. There was no significant difference between outcome of laminectomy alone and that of laminectomy with fusion. Six patients (12.2%) experienced postoperative complications which included wound infection (3), nerve root injury (1), disc herniation (1), and reoperation due to insufficient decompression (1). There were no deaths related to operation.

Conclusion : We conclude that the surgical treatment for lumbar spinal stenosis in elderly patients can provide good results with acceptable morbidity when carefully selected. In addition, decision on lumbar spinal fusion should not be against solely on advanced age.

KEY WORDS : Lumbar Spinal stenosis · Elderly patients · Surgery.

Introduction

With increasing life expectancy improvement in geriatric care and settler, attentive management for chronic diseases in modern era, the number of elderly people has dramatically increased. As one of the most common chronic degenerative diseases, the lumbar spinal stenosis also has become more common.

Spinal stenosis is a condition caused by progressive degenerative changes in the structural component of the vertebral column, including the intervertebral disc, facet joints and the posterior ligamentous structures of the spine. These changes results in a slowly progressive narrowing of the spinal canal, with subsequent compression of the neural elements.

Conservative treatments such as pharmacotherapy, physical therapy, epidural block are the mainstays of treatment. However, if these treatments fail surgical options may be considered in selected cases.

Previously many authors have emphasized the surgical treatment for lumbar spinal stenosis in elderly persons with low morbidity[3,12,14-16,20]. In our series, we reviewed our experiences of surgical treatment for lumbar spinal stenosis in elderly persons retrospectively and evaluated the efficacy and safety of surgery.

Materials and Methods

We retrospectively reviewed the medical records of patients older than 65 years who was treated surgically between January 2002 to December 2004 in our institution. Conservative treatments were tried first in all of patients over 4

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Table 1. Macnab classification for the evaluation of clinical outcome

Classification	Criteria
Excellent	no pain : no restriction of activity occasional back pain or leg pain of sufficient severity to interfere with the patient's ability to do normal work or capacity to enjoy leisure hours
Good	improved functional capacity, but handicapped by intermittent pain of sufficient severity to curtail or modify work or leisure activity
Fair	no improvement or insufficient improvement to enable
Poor	increase in activities, further operative intervention required

Table 2. Demographics of patients

Parameters		No. of patients
Age (years)	65-69	24
	70-79	25
Sex	Male	17
	Female	32
Operation level	1 level	27
	2 levels	21
	3 levels	1
	L4-5	40
	L3-4	22
	L5-S1	6
	L2-3	4
Follow up period (months)	1-43 (mean 11.9)	

Table 3. Preoperative co-existing medical diseases

Co-existing medical disease	No. of patients (%)
Hypertension	16 (32.7)
Diabetes	9 (18.4)
Pulmonary asthma	2 (4.1)
Adrenal insufficiency	2 (4.1)
Parkinson's disease	2 (4.1)
Cerebral infarction	1 (2.0)

Table 4. Preoperative clinical symptoms and signs

Clinical symptom and sign	No. of patients (%)
Back pain	49 (100)
Leg radiating pain	33 (67.3)
Neurogenic intermittent claudication	21 (42.9)
Sensory deficit	16 (33)
Motor weakness	4 (8.2)

Table 5. Preoperative symptom durations

Symptom duration	No. of patients (%)
> 12 months	19 (38.8)
12-3 months	12 (24.5)
< 3 months	18 (36.7)
Total	49 (100)

weeks prior to surgery. Patients underwent decompressive laminectomy, in case of segmental instability or possibility of postoperative segmental instability because of wide laminectomy and facetectomy, or instrumentation and fusion. We evaluated the sex, age, preoperative co-existing medical diseases, clinical symptoms, levels of surgery, operation time, estimated blood loss, postoperative hospital stay and types of surgical treatments. Postoperative outcome was assessed by Macnab classification (Table 1).

Results

The records of 49 patients (32 women and 17 men) were reviewed (Table 2). The mean age was 70 years old (range 65-79). The number of patients who had preoperative co-existing medical diseases was 24 (49.0%). Hypertension was the most common medical disease (32.7%). Second most common medical disease was diabetes (18.4%). Others included pulmonary asthma, adrenal insufficiency, Parkinson's disease and cerebral infarction (Table 3).

All of patients presented symptoms of lower back pain, 33 (67.3%) patients had radiating leg pain, and 21 (42.9%) patients showed neurogenic intermittent claudication. Neurological deficits were seen in 20 (40.8%) patients, 16 (32.7%) patients had sensory deficits and 4 (8.3%) motor weakness (Table 4).

Symptom durations before surgical treatment were less than 3 months in 18 (36.7%) patients, 3 to 12 months in 12 (24.5%) patients and over 12 months in 19 (38.8%) patients (Table 5).

The L4/5 and L3/4 were the most frequently treated levels (81.6% and 44.9%, respectively). Twenty-seven patients underwent a single-level procedure, the others underwent a multilevel procedures.

The 49 surgical procedures consisted of lumbar decompressive laminectomy alone in 29 cases (59.2%) and decompressive laminectomy with posterior spinal fusion with pedicle screw fixation in 20 cases (40.8%). The mean operation time was 193.5 minutes, mean estimated blood loss was 378cc and average length of postoperative hospital stay was 15.3 days. The mean follow-up period was 11.9 months (1 month-43 months).

The postoperative outcome was determined by Macnab classification (excellent, good, fair, poor) one month, postoperatively, in 49 patients and sixth month follow-up examination in 32 patients (17 patients were lost to follow up). At one month, 7 (14.3%) patients showed excellent, 35 (71.4%) patients good, 5 (10.2%) patients fair and 2 (4.1%) patients poor. At six month follow up examination, 4 (12.5%) patients showed excellent, 25 (78.1%) patients good, 3 (9.4%) patients fair and none poor (Table 6). Satisfactory results (excellent, good) from laminectomy with fusion cases was 85% at first month, 93% at sixth month. These were comparable with the satisfactory results of laminectomy alone (86%, 89%, respectively).

Postoperative complications were noted in 6 cases (12.2%) that included 3 cases of wound infection, 1 case of nerve root injury, 1 case of intervertebral disc herniation and 1 case of insufficient decompression causing need of reoperation (Table 7). These were no details related to operation.

Table 6. Postoperative outcome

Macnab classification	No. of patients (%)			
	Laminectomy		Laminectomy and fusion	
	Post-op 1 month	Post-op 6 months	Post-op 1 month	Post-op 6 months
Excellent	5 (17)	3 (17)	2 (10)	1 (7)
Good	20 (69)	13 (72)	15 (75)	12 (86)
Fair	2 (7)	2 (11)	3 (15)	1 (7)
Poor	2 (7)	0	0	0
Total	29 (100)	18 (100)	20 (100)	14 (100)

Table 7. Postoperative complications

Complication	No. of patients (%)
Wound infection	3 (6.1)
Nerve root injury	1 (2.0)
Disc herniation occurrence	1 (2.0)
Reoperation due to insufficient decompression	1 (2.0)
Total	6 (12.2)

Discussion

As number of elderly person is being greatly increased, the number of degenerative lumbar spinal disorders are also increasing as well. This is especially true with, lumbar spinal stenosis which is a common condition in elderly patients.

Over the years, repeated axial loading and rotational strains of lumbar spine may lead to disc degeneration, disc bulging or herniation, facet hypertrophy, thickening of ligamentum flavum and osteophyte formation. All of these changes may cause entrapment and/or ischemia of the spinal neural elements. The pathophysiological mechanisms involved in the development of stenosis have been extensively discussed elsewhere[4,10,18].

Clinically, the symptoms and signs of lumbar spinal stenosis may vary depending on the severity and shape of canal narrowing. Lower back pain is the most common symptom and neurogenic intermittent claudication, defined as pain associated with paresthesiae or numbness in legs during exercise or walking is also frequent symptom[4,10,11]. In our series, back pain and neurogenic claudication were main presenting symptoms occurring 100% and 42.9%, respectively. Also 33 (67.3%) patients complained of radiating leg pain. These symptoms were controlled similar to the symptoms reported in other reports.

When symptoms of lumbar spinal stenosis are controlled by conservative treatment, the surgical treatments may be considered[3,7,12,13,15,16]. Most authors agree, that advanced age should not be a contraindication for surgery, and this view was supported by several studies, showing no difference in outcome and rate of complications between elderly patients and the younger population[7,9,11,19,20]. In our series, 24 patients (49%) had systemic chronic diseases, but these were well controlled state and acceptable for general anesthesia with low anesthetic risk.

The various surgical treatments (partial laminectomy, wide laminectomy, laminoplasty, foraminotomy, bilateral canal widening through unilateral approach and laminectomy with fusion) for lumbar spinal stenosis have been introduced with satisfactory results[1,3,12,15-17,21,23].

Sanderson et al.[20] reported 81% excellent, good results after surgery in patients over 65 years old. Kalbarczyk et al.[14] also reported 83% of excellent, and good results. Moreover, Ji et al.[12] and Cho et al.[3] reported the good results after laminectomy for bilateral decompression (72.2%, 81.3% respectively). They emphasized the efficacy of minimal approach and microsurgical technique for lumbar spinal stenosis.

The most controversial issue remains the defining of indications for spinal fusion. Several authors reported the efficacy and safety of spinal fixation and fusion with instrumentation in lumbar spinal stenosis[5,8,22]. Conley et al.[5] reported the good outcome after surgery with knots rods in 25 elderly patients with lumbar spinal stenosis. He achieved 52% of excellent, 44% of good and 4% of poor outcome and 86% of fusion rate. Yone et al.[22] also reported good results after spinal fusion in elderly patients with lumbar spinal stenosis with instability. According to the literature, the postoperative instability after laminectomy does not exceed 2%[10]. Recently Ji et al.[12] advocated the unilateral approach for bilateral decompression that having the advantages of prevention of postoperative instability by preserving the contralateral facet joint and neural arch. In our series, 29 patients underwent laminectomy alone, the others underwent laminectomy with fusion. We have performed the spinal instrumentation and fusion in cases with preoperative instability or in cases with wide laminectomy and facetectomy that might be associated with postoperative instability. Postoperative outcome of our study showed that there was no significant difference between the laminectomy alone group and laminectomy with fusion group.

Risk of complications after surgical treatments in elderly patients should be considered carefully. Many authors reported acceptable postsurgical complication rates in elderly patients. Benz et al.[2] reported that the overall complication rate after decompressive laminectomy in elderly patients was 40%; however, serious complications occurred in only 12% of patients. Kim et al.[15] reported that no difference was seen between the two age groups (65-69 years of age group and over 70 years group) with respect to the surgery related complications. Deyo et al.[6] also reported in their study that complications were noted in 18% of the patients who were 75 years of age or older.

In our series, we have experienced 12.2% of overall complication rate and this was similar to those of other series.

Conclusion

Our study results indicate that surgical treatment for lumbar spinal stenosis in elderly patients, with appropriate preoperative evaluation and attentive perioperative care, can expected to provide good results with acceptable morbidity. The outcome of lumbar spinal fusion in elderly patients was comparable with that of laminectomy alone. Therefore, decision on lumbar spinal fusion should not be against safely on advanced age.

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Commentary

As the life expectancy of the elder population increase, and by virtue of modern neuro-imaging, physicians and particularly neurosurgeons are being increasingly confronted with older patients suffering from disabling lumbar spinal stenosis. Many of these patients become candidates for surgical corrective procedures, because, despite advanced age, surgical decompression may lead to significant pain relief and improve the individual's quality of life. On the other hand, the fear of medical complications and uncertainty over the results of operative treatment make many surgeons cautions as to the extent of surgery, especially the question of combining decompression with stabilization. But, several authors have agreed, that advanced age should not be a contraindication for surgery, this view being supported by several studies, showing no difference in outcome and rate of complications between elderly patients and younger population. The result of this article follow in the wake of several published literature and dose not draw many spine surgeons' interest. Several studies have been done to assess the risk of morbidity and mortality occuring in elderly patients undergoing spinal surgery. But the authors does not assess the risk factors influencing the morbidity and mortality in elderly patients undergoing spinal surgery, and this article dose not also compare the age-related effects on the surgical risk and clinical outcome directly between different elderly aged groups and various surgical treatments. Because many different risk factors are existed and influenced reciprocally on each other in spine surgery, simple comparison of age may be meaninglessness, especially in selected cases which have well-controlled concomitant diseases. In addition, osteoporosis is one of the most important parameters influencing the stability of the spine in elderly patients, postoperatively and this study dose not mention postoperative spinal instability in patients with osteoporosis. I suggest that precise evaluation of patients' condition, with intensive care, and rehabilitation before and after surgery seem most important in obtaining good outcomes in elderly patients.

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