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Decompressive Surgery Alone for Lumbar Spinal Stenosis in Elderly Patients

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Objective: The authors conducted this study to investigate the safety and efficacy of decompressive surgery alone in the treatment of lumbar spinal stenosis in the elderly population.

Methods: All charts and records of 323 patients aged 65 years or older who underwent lumbar spinal decompressive surgery without fusion for lumbar spinal stenosis in the period from September 2003 to August 2007 were reviewed.

Results: A total of 323 patients were identified. Mean age among patients were 72.6years. 197 patients (60.9%) underwent wide decompression, 95 patients (29.4%) had microscopic partial decompression, and 31 patients (9.5%) underwent bilateral decompression via unilateral approach.

Perioperative morbidity seen was among 16 patients (4.9%). There were 5 patients (1.5%) reoperated for hematoma formation. Another 5 patients (1.5%) developed wound infection. Cerebrospinal fluid (CSF) leakage were noted among 3 patients (0.9%). 2 patients (0.6%) had urinary difficulty, and Steven Johnson syndrome developed in one patient (0.3 %). Clinical outcome was evaluated using Macnab' s classification. 40 patients (12.4%) had excellent results, 241 patients (74.8%) had good results, 34 patients (10.3%) had fair results and 8 patients (2.5%) had poor outcome.

Conclusion: Decompressive laminectomy alone is a relatively safe and effective treatment option for the elderly.

Key Words: Spinal stenosis • Decompression • Elderly

INTRODUCTION

The first verifiable report of lumbar spinal stenosis relieved by two level laminectomy was that of Sachs and Fraenkel in 1900[1,2]. Bailey and Casamajor[2,3] in 1911, and Elsberg[4] in 1913 extensively described spinal stenosis as to symptoms, pathologic findings, and relief following surgery. As modern day advances in medicine increase the life expectancy, the elderly population is seen to increase exponentially towards the 21st century. Aging of the lumbar spine is a physiologic process resulting in degenerative changes that may lead to lumbar spine stenosis[5,7,8]. With this aging of the population, and by virtue of advances in modern neuro-imaging, physicians, particularly neurosurgeons are being increasingly confronted with older patients suffering from disabling lumbar spinal stenosis[5,6,10].

Treatment of symptomatic lumbar spine stenosis in the elderly is recommended. Surgical decompression with or without fusion is the standard surgical treatment for patients with moderate to severe lumbar spinal stenosis.

Decompressive surgery with multilevel arthrodesis in the presence of osteoporotic bone and advanced age may lead to significant perioperative morbidity[19]. The prevalence of adjacent segment disease, a condition wherein the motion segment adjacent to the fused area degenerates because of hypermobility and increased biomechanical stress, is now frequently seen.

To avoid such adverse events related to spinal arthrodesis, motion preserving surgeries and minimally invasive techniques have recently been developed for the surgical treatment of lumbar spine disease[2,24].; however, a few technical problems remain to be solved. It was hypothesized that these techniques yield better clinical outcome by reduction of tissue trauma and preservation of the spinal architecture, but only limited follow up data exist to confirm this hypothesis[27].

The controversy, however, lies in the method or approach for treating lumbar spinal stenosis in the elderly as comorbid conditions resulting from the aging process in other systems are seen[8,11]. Many coexisting surgical risk factors such as heart

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disease, chronic pulmonary disease, rheumatoid arthritis, osteoarthritis, as well as post-operative complications make many surgeons hesitate to do a decompressive surgery especially in the elderly patients[11,12].

Although surgical treatment is commonly performed for lumbar spinal stenosis, conflicting reports are seen as to long term effects of surgical and non surgical treatment in the elderly. Proponents of non-surgical management emphasized the similar results as to long term follow ups[13,14,15,27].

Therefore, the authors conducted this study to investigate the safety and efficacy of decompressive surgery alone in the treatment of lumbar spinal stenosis in the elderly population.

MATERIALS AND METHODS

All charts and records of patients aged 65 years or older who underwent lumbar spinal decompressive surgery without fusion for lumbar spinal stenosis in the period from September 2003 to August 2007 were reviewed. The clinical indications for decompressive surgery in these patients were chronic low back pain resistant to conservative treatment and neurogenic radicular pain. Magnetic resonance imaging was used in these patients to confirm the diagnosis of lumbar spinal stenosis. Patients who have symptomatic instability concomitant with mechanical back pain, those who have Grade III and IV spondylolisthesis, and those who underwent simultaneous decompression of same level central and foraminal stenosis were excluded in this study. Other exclusion criteria included presence of spinal infections, recent vertebral fractures, developmental spine deformities, tumors, pregnancies, and severe comorbid conditions preventing surgery.

There were six spine surgeons who participated in the study. All surgeries were done utilizing the posterior approach. Laminectomy and/or laminotomy were performed at each stenotic level. Patients needing more than four levels of spinal decompression were excluded in the study.

The clinical parameters were the American Society of Anesthesiologists (ASA) classification of physical status (Table 2), operative time, estimated blood loss, medical and surgical complications related to the surgery and resumption of activities of daily living with no restrictions.

Complications were identified and classified as (early) perioperative morbidity such as hematoma formation, wound infection, CSF leakage, urinary difficulty and Steven Johnson syndrome, or (late) postoperative morbidity such as epidural fibrosis, recurred disc herniation and instability.

Clinical outcome was evaluated using Macnab's classification for the evaluation of clinical outcome in patients treated for degenerative spinal disease (Table 4). Baseline clinical outcome measurements were done immediately post-op as well as upon follow-ups. Minimum follow up period was 6 months. Follow-up telephone interviews were also done to determine patient satisfaction with the outcome of the procedure and eliminate the subjective aspect of chart review and patient's unwillingness to tell unsatisfactory results in front of their surgeon.

RESULTS

A total of 323 patients were identified (Table 1). 202 patients (62.5%) had 1 level decompressive surgery, 91 patients (28.2%) underwent 2 levels of decompression, 27 patients (8.4%) had 3 levels, and 3 patients (0.1%) had 4 levels of decompressive spinal surgery

The type of surgery done among the groups were also identified (Table 1). A total of 197 patients (60.9%) underwent wide decompression(subtotal or total laminectomy),

Table 1. Clinical characteristics

		N	%
Age grouping			
65~74years		215	66.6
75years ≤		108	33.4
	TOTAL	323	100
Levels of Decompression			
1 level		202	62.5
2 levels		91	28.2
3 levels		27	8.4
4 levels		3	0.9
	TOTAL	323	100
Type of Surgery done			
Wide decompression		197	61.0
Microscopic partial decompression		95	29.4
Bilateral decompression via unilateral approach		31	9.6
	TOTAL	323	100

Table 2. Patient distribution according to ASA classification

Class	Definition	N	%
I	No systemic disease	80	24.76
II	Mild to moderate systemic disease	230	71
III	Severe systemic disease	13	4
IV	Severe systemic disease that is life threatening	-	0
V	Moribund patient with little chance of survival	-	0

95 patients (29.4%) had microscopic partial decompression (unilateral or bilateral laminotomy), and 31 patients (9.5%) underwent unilateral laminotomy for bilateral decompression.

The review of anesthesia records for the 323 patients showed that 80 patients (24.76%) were ASA class I, 230 patients (71%) were ASA Class II, and 13 patients (4%) were ASA Class III (Table 2). Preoperative comorbidities identified in these patients were hypertension, diabetes mellitus, cardiac problem, asthma, angina pectoris, cerebrovascular accident, benign prostatic hypertrophy, Bronchiectasis, hepatitis, Parkinson's disease, chronic renal failure, and thyroid disease.

There were no mortalities noted. Perioperative morbidity was noted in 16 patients (4.9%) (Table 3). Five patients (1.5%) were reoperated for hematoma formation. Another 5 patients (1.5%) were developed wound infection. Cerebr-ospinal fluid (CSF) leakage was noted in 3 patients (0.9%). Two patients (0.6%) had urinary difficulty and Steven Johnson syndrome developed in one patient (0.3%).

Six patients (1.9%) developed late complications (Table 3). Three patients (0.9%) had epidural fibrosis and 2 patients (0.6%) had recurrence of symptoms with noted herniation of lumbar discs upon magnetic resonance imaging. One patient (0.3%) demonstrated symptomatic post operative spinal instability, documented on plain radiographs and computed tomography scan.

Clinical outcome showed that 40 patients (12.4%) had excellent results, 241 patients (74.8%) had good results, 34 patients (10.3%) had fair results and 8 patients (2.5%) had poor outcome (Table 4). Estimated blood loss averaged 135 cc. The average operative time was 79 minutes.

Table 3. Perioperative (early) and postoperative (late) morbidity among patients

	N	%
Perioperative morbidity		
Hematoma removal	5	1.5
Wound infection	5	1.5
CSF leakage	3	0.9
Urinary difficulty	2	0.6
Steven Johnson syndrome	1	0.3
TOTAL	16	4.9
Postoperative morbidity		
Epidural fibrosis	3	0.9
Herniated lumbar discs	2	0.6
Spinal instability	1	0.3
TOTAL	6	1.9

Table 4. Six months post op outcome of patients who underwent decompressive spinal lumbar surgery using Macnab's criteria

Macnab's criteria	Criteria	N	%
Excellent	no pain; no restriction of activity; occasional back pain or leg pain of sufficient severity to interfere with the patients ability to do normal work or capacity to enjoy leisure hours	40	12.4
Good	Improved functional capacity, but handicapped by intermittent pain of sufficient severity to curtail or modify work or leisure activity	241	74.8
Fair	No improvement or insufficient improvement to enable work or leisure activity	34	10.3
Poor	increase in pain in activities further operative intervention required	8	2.5

DISCUSSION

The effectivity and safety of decompressive lumbar spinal surgery among patients are well studied. The increasing number of spinal stenosis cases particularly in the elderly is now one of the most common indication for lumbar spine surgery in this age group[5,28].

The indications for decompressive surgery were chronic low back pain resistant to conservative treatment and neurogenic claudication or radicular leg pain with associated neurologic signs and spinal stenosis shown on cross-sectional imaging.

Although it is agreed among many surgeons that surgical treatment is the treatment of choice, decompression without fusion appears to have some controversies as to stability, safety and efficacy especially in the elderly population[4,8,11,14,18].

Currently, different treatment options are available for the treating spine surgeon. Included in his arsenal are decompressive spine surgery alone, decompressive spine surgery with fusion, decompressive spine surgery with fusion and with rigid or semi rigid fixation such as X-stop (St. Francis Medical Technologies, Inc., Alameda, CA), Dynesys Dynamic Stabilization System (Zimmer Spine, Inc., Warsaw, IN), Graf ligamentoplasty (Sem Co., Montrouge France), etc. The high cost of these implants and the extent of surgery, as well as prolonged operative time favor the decompressive surgery alone for treat-

ment among the elderly.

Fredman et al[28], in their study of decompressive surgery alone involving 122 patients showed good results. Ashraf, et al[8], and Kim et al[11], in their respective series also showed that advanced age did not increase the morbidity associated with surgical decompressive surgery alone in the treatment of lumbar spinal stenosis. However, in a meta-analysis of the literature some authors found that 69% of patients treated with decompression alone for lumbar spinal stenosis experienced a favorable outcome, whereas 90% of those treated with decompression and fusion experienced a satisfactory outcome[20].

Our present study investigating 323 consecutive cases of lumbar spinal decompressive surgery alone in the elderly population demonstrated favorable outcomes as well as satisfaction in this patient population. Clinical successful outcome in our series demonstrated 12.4% excellent and 74.8% good results. These results are similar to Sanderson and Wood[17] series (81% of 31 patients 65 years or older) and to Kim[11] et al, 82.7% in patients 65~69 years and 81.8% in patients 70 years or older). Our series of elderly patients treated surgically for lumbar spinal stenosis probably represents the largest known reported in the Korean literature.

Major complication rates for the very elderly patients approach 20% for spine surgeries[31]. The presence of preoperative comorbidities in our study did not affect the overall outcome of pain relief or resumption of daily activities. The low rate of perioperative morbidity (4.6%) seen in our study is interestingly lower than the previous series (18% in Deyo, et al[16]; 10.3% in Kim, et al[11]. Our results of a very low infection rate (1.5%) contradicts the high infection rates commonly observed among surgery in the elderly population (14%, Wang, et al[29]; 18% in Deyo et al[16]. Even with more extensive surgery in patients having as many as four levels of decompression, the presence of late complications was relatively low among our subjects (1.9%).

The mortality rate seen among patients in the elderly group ranges from 0.6~0.9%[8,16].

Blood transfusion requirements and development of complications either during or after surgery was found to have significant correlations in Ragab et al[8] study. They recommended aggressive intraoperative blood transfusion to decrease the incidence of complications. In this study, the average blood loss was only about 135 cc.

Our study has certain weak points. First, the lack of a long term clinical follow up is a common concern among spinal surgeons as the risk for the late recurrence of symptoms is generally seen in the 5-year post operative period[29]. Second, like the study of Fredman et al[28], our patients who went under the knife were classified as only ASA I, ASA II, and ASA III. This bias may be due to the fact that most high risk patients, under ASA IV and V were not cleared for surgery, and therefore were excluded from the study population. The results of this study should not be extrapolated to patients classified as ASA IV nor ASA V. Third, no single clinically accepted modality was used to assess the patients' preoperative pain level as well as preoperative level of functional disability for uniformity in the indications of the surgery, and also for post operative comparison, since six spinal surgeons were involved in the study. Difference in the interpretation of the patients' level of pain and functional disability may lead to a biased result. Lastly, no stratification as to sexual orientation was done as the patients' pain threshold maybe influenced by the difference in their sexual orientation.

CONCLUSION

Geriatric patients can still benefit from decompressive surgery alone, even with multiple levels of decompression without fusion. Surgical decompression alone is a relatively safe and effective treatment option for the elderly.

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