



ORIGINAL ARTICLE

Decompressive Laminectomy for Lumbar Stenosis: Review of 65 Consecutive Cases from Tema, Ghana

Decompressive Laminectomy pour Sténose lombaire: examen de 65 affaires consécutives de Tema, au Ghana

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ABSTRACT

BACKGROUND: There have been previous reports describing patients with lumbar stenosis (LS) in West Africa; however, to date no such report has been published from Ghana.

OBJECTIVE: To provide data on the pattern of lumbar stenosis and the effects of decompressive lumbar laminectomy (DLL) on the clinical course of LS in Tema.

METHODS: Sixty-five consecutive patients who underwent DLL for lumbar stenosis over between January 2001 and December 2004 had their medical records analyzed. The parameters of interest included demographics, pre and post surgical clinical status utilizing the modified low back pain clinical scoring system, operative procedure and complications.

RESULTS: Sixty-five patients (36M, 29F) with a mean age of 51 years constituted the series. All had failed conservative treatment; each patient was operated on once at our institution. Eighty nine percent of the series presented with neurogenic claudication and accompanying motor and sensory deficits. Twenty-seven patients (41.5%) underwent bilateral DLL; the rest underwent unilateral DLL. The mean preoperative score for the series was 2.3; that for males 2.6, females 1.9 ($p > 0.05$). There was a significant difference between patients < 60 years and > 60 years. The mean postoperative score for the series was 8.7. There was a significant difference between preoperative and postoperative scores of series. No mortality was recorded. The complication rate was 15%.

CONCLUSION: In Tema, decompressive lumbar laminectomy for lumbar stenosis achieves significant clinical improvement with attendant low morbidity and mortality rates in patients who have failed conservative treatment. Accompanying disc excision and or fusion are required in only a small minority of patients. *WAJM 2007; 26(4): 283-287.*

RESUME

CONTEXTE: Il ya eu des précédents rapports décrivant les patients atteints de sténose lombaire (PL), en Afrique de l'Ouest, mais, à ce jour, aucun rapport de ce type a été publié en provenance du Ghana.

OBJECTIF: Fournir des données sur le modèle de sténose lombaire, et les effets de décompressive laminectomie lombaire (DLL) sur l'évolution clinique de LS à Tema.

MÉTHODES: Soixante-cinq patients ayant subi une DLL pour plus de sténose lombaire, entre janvier 2001 et décembre 2004 a eu leurs dossiers médicaux analysés. Les paramètres d'intérêt comprenaient les données démographiques, pré et post chirurgical état clinique utilisant la méthode modifiée de la lombalgie clinique système de pointage, procédure opératoire et des complications.

RÉSULTATS: Soixante-cinq patients (36M, 29F), avec un âge moyen de 51 ans constituaient la série. Tous avaient échoué traitement conservateur, chaque patient a été opéré une fois, à notre institution. Quarante-neuf pour cent de la série présentée avec claudication neurogène et d'accompagnement des déficits moteurs et sensoriels. Vingt-sept patients (41,5%) a subi DLL bilatérales; le reste a subi unilatérale DLL. La moyenne préopératoire score de la série était de 2,3, 2,6 pour les hommes que, les femmes, 1,9 ($p > 0,05$). Il y avait une différence significative entre les patients < 60 années et > 60 années. Le score moyen post-opératoire de la série était de 8,7. Il y avait une différence significative entre les évaluations pré et post-opératoire de séries. Aucune mortalité a été enregistrée Le taux de complications a été de 15%.

CONCLUSION: Dans Tema, décompressive laminectomie lombaire pour sténose lombaire permet une amélioration clinique significative, avec les faibles taux de morbidité et de mortalité chez les patients qui n'ont pas fait le traitement conservateur. Accompagnement disque ou la fusion et l'excision sont nécessaires; seule une petite minorité de patients. *WAJM 2007; 26(4): 283-287.*

Keywords: Lumbar stenosis, laminectomy, spinal fusion, Ghana.

Mots clés: sténose lombaire, laminectomie, fusion de la colonne vertébrale, au Ghana.

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Abbreviations: DLL, decompressive lumbar laminectomy; LS, lumbar stenosis; MLBPS, modified lowback pain scoring system; TB, tuberculosis.

INTRODUCTION.

There have been previous reports describing the aetiological, clinical and prognostic aspects of patients with lumbar stenosis (LS) in West Africa¹⁻⁵; to date no such report has been published from Ghana. Decompressive lumbar laminectomy (DLL) for LS has been performed in Ghana for at least 35 years, however there has never been a published report documenting patient demographics, preoperative symptom complex, complication rates and clinical results.

Since 1996, DLL and instrumented stabilization have been introduced in Ghana, with attendant tremendously increased cost of implants. The lack of prior data on LS, DLL and non-instrumented fusion makes this new introduction difficult to justify; it is also difficult to compare the clinical results of the two methods. It has also hitherto been impossible to compare the results of DLL in Ghana with series published from other centres.

Preliminary analysis of DLL for LS will therefore provide important baseline data that will assist in health care planning and serve as a basis for comparison and evaluation as other techniques are introduced and applied. This study analyses the patient demographics, presenting symptoms, operative procedure, postoperative results and complications of patients undergoing elective DLL with or without non-instrumented fusion for LS in Tema, Ghana.

SUBJECTS, MATERIALS AND METHODS

Sixty five consecutive patients with LS who underwent DLL at our institution (T.I.N.) over a 48month period (January 1st 2001-December 31st 2004) had their medical records retrospectively analysed. All the patients in this series conformed to the definition of LS with varying degrees of laminar thickening, facet hypertrophy, ligamentum flavum hypertrophy, disc degeneration or bulge or herniation, with or without spondylolisthesis or scoliotic angulation, leading in various combinations to symptomatic crowding of adjacent nerve roots, cauda equina or conus medullaris.

They all had low back pain with a radicular component and or neurogenic claudication. Non-operative therapy had failed in all 65 cases. This in each case included the use of anti-inflammatory medications, analgesics, and exercise programmes. No patient was operated on for pain only; each patient had a neurologic deficit. All the operations were performed by the senior author (NBA).

The body of data evaluated during the retrospective review included demographics, symptom complex before surgery, surgical procedure, complications and postoperative status. The status of the patient before surgery and the clinical outcomes at six month intervals following surgery were recorded utilizing the modified low back pain clinical scoring system (MLBPS) of Suezawa and Schrieber⁶ (Table 1). The MLBPS at the last postoperative visit was used to compute the clinical outcome; it was mandatory that the visit should be at least six months following surgery in order to be included in the study.

In order to compare two or more groups with outcome variables in more than two categories, a chi-squared test was used; where indicated, the Yates correction for continuity was applied; $P < 0.05$.

Operative Technique.

All the patients were operated on while under general endotracheal anesthesia and in the prone position on bolsters. The surgical objective was complete anatomical decompression of all symptomatically involved neural elements as diagnostically correlated. This led to bilateral laminectomies or hemilaminectomies with or without undermining of facets and or without

foramintomies. In no instance was a facet fully removed or obviously fractured. Disc excisions were performed through a unilateral opening of the annulus.

In order to perform interbody fusion, the endplates were cleared of cartilage and an appropriately sized tricortical autologous iliac crest or spinous process graft used. For intertransverse fusions, decortication was achieved with rasps, rongeurs and curettes; cancellous bone from the iliac crest and laminectomised bone was used as grafts. Haemostatic felt was never left within the operative site; subfascial drains were rarely used.

Postoperatively, the patients were ambulant within the first 72 hours and were discharged home by the tenth postoperative day when all sutures were removed. A physiotherapy regimen was started on the third postoperative day and continued for six to twelve weeks. Patients were examined for follow up at two weeks, four weeks, six weeks, three months, six months and then at six-monthly intervals.

RESULTS

Sixty-five patients (36M, 29F; M/F ratio, 1.2:1) constituted the series. Each patient underwent DLL operation once at our institution. The DLL operations constituted 19% of the 342 neurosurgical operations performed during the study period. The mean age of the patients in the series was 51 (R 19-76) years; that for males was 53 years and females was 49 years. Sixteen patients (25%) were over 60 years old. The mean length of follow up was 26(6-48) months; 27 patients (41%) were followed up for more than 30 months.

Fifty-eight (89%) patients presented with neurogenic claudication with a claudication distance of less than 100m. All the patients had intermittent disabling

Table 1: Modified Low Back Clinical Scoring System

Symptom	Score Awarded		
	2	1	0
Low back pain	none	stress dependent	permanent
Sciatica	none	stress dependent	permanent
Sensory deficit	none	dysthesia/paresthesia	hyperesthesia/anesthesia
Motor deficit	none	grade IV	grade III
Reflex differences	none	1 reflex	2 reflexes

Total: Add score for each symptom; max=10, min=0 9-10(excellent); 7-8(good); 5-6(moderate); <5(poor).

radicular (sciatic) symptoms; 38(58%) reported this as monolateral and 27(42%) as bilateral sciatica. Motor weakness in at least one lower extremity muscle group was present in all patients; accompanying sensory loss was present in 55(85%). Eleven patients(17%) had disturbance of the urinary sphincters. Sixty patients (92%) had at least one disturbance of lower extremity deep tendon reflexes (Table 2).

Table 2: Frequency of Clinical Features in 65 patients

Clinical feature	Number (%)
Radicular pain	
unilateral	37(58)
bilateral	27(42)
Neurogenic claudication	59(89)
Motor weakness	65(100)
Tendon reflex changes	60(92)
Sensory changes	55(85)
Urinary sphincter disturbance	11(17)

Table 3: Summary of Modified Low Back Pain Score (MLBPS)

MLBPS	Number of patients	
	Preoperative	Postoperative
9-10	0	36
7-8	0	27
5-6	8	2
<5	57	0

Thirty four percent of the series had preoperative first time Mantoux reactions of at least 15mm ; they received at least twelve months of antituberculous therapy whether or not a pulmonary or extra pulmonary lesion could be proved. The mean preoperative MLBPS for the series (Table 3) was 2.3 (males=2.6, females 1.9, [>0.05]). However, those aged less than 60 years had a significantly better MLBPS (2.5) than to those aged more than 60 (1.5); ($p<0.05$).

Except for one patient who underwent MRI only, the rest underwent myelography and or CT scan for diagnostic confirmation; 8 (12%) myelography only, myelography with post CT scan in 27(57%) and CT scan only in 19(29%).

Twenty seven (41.5%) patients underwent bilateral DLL; the rest (58.5%) underwent unilateral DLL (hemilaminectomy). In addition to DLL, nine (14%) underwent disc excision; five (8%) underwent fusion. In two patients (3%), tumours were encountered and excised (both had only preoperative CT scanning); the tumours were nodular fasciitis and meningioma.

Four (6%) patients had undergone previous DLL at other institutions; their mean preoperative MLBPS (0.5) was worse than those who were undergoing DLL for the first time (2.4); ($p<0.05$). The average postoperative MLBPS for the series was 8.7 (Table 3); again there was no statistically significant difference between the sexes ($p>0.05$); males 8.6, females 8.8. There was a significant difference for a) mean MLBPS of series preop (2.3) versus postoperative (8.7); ($p<0.001$); b) preop (2.2) and postoperative (8.8) MLBPS of fusion patients ($p<0.01$); c) postoperative MLBPS for patients<60 (8.8) versus patients>60 (8.3); ($p<0.05$); d) mean post op MLBPS of previous DLL (7.5) versus first time DLL (8.8); ($p<0.01$). One patient has a poor MLBPS at 6months post op and is currently undergoing further diagnostic studies. All the patients followed for more than 30months ($n=27$) have good or excellent results (MLBPS of 7 or more).

The following postoperative complications were encountered; 7(11%) had discharging wounds (incisional infections) with positive bacterial cultures that responded to antibiotics; 2 (3%) had urinary retention that resolved with catheterization. The total complication rate was 14%. There was no mortality recorded.

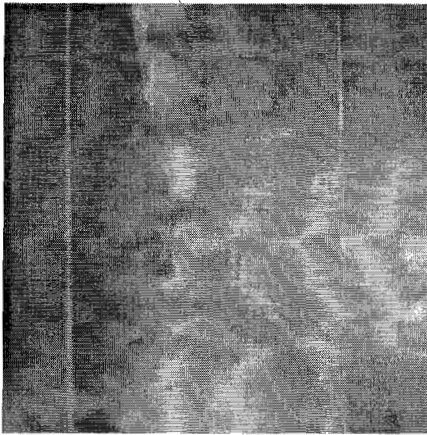
DISCUSSION

Several studies have demonstrated that LS is not uncommon in West Africa; it has been suggested that the clinical pattern for degenerative spinal disease in the region is similar to that seen in the Western world³⁻⁵. About 40% of the patients in a Rheumatology clinic in Lome had spinal degenerative disease. DLL for LS comprised 19% of the total of 342 neurosurgical operations that we performed; we can therefore surmise that

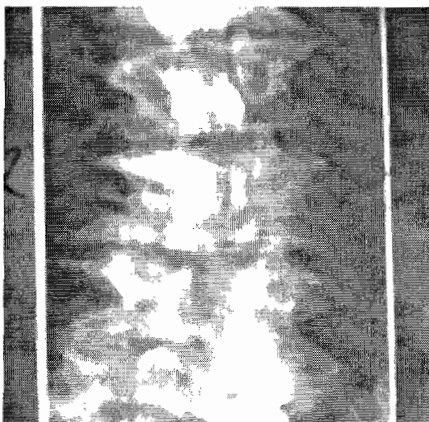
surgery for degenerative spinal disease constitutes about 40% of our neurosurgical procedures⁷.

Kabre et al in Ouagadougou¹ and Ba² et al in Dakar found a marked preponderance of males in their series; this was also the finding of Levy⁸. In contrast, Mijiyawa et al³⁻⁵ had a preponderance of females; our results do not indicate any gender preponderance. The mean age of our series is similar to that of Kabre et al¹ and is significantly lower than that reported from the West.^{9, 10, 12, 17} The reason for this is not altogether evident. However, we might speculate that not withstanding the demographic difference between the age structure in Africa compared to the West, there is a clear difference in the pathoanatomy of LS in West Africa when compared to the West. The total myelographic block extending for multiple levels (“ECOWAS SPINE”, Figures 1 and 2) often seen in studies done in the region is possibly due to extensive spondyloathropathy caused by and or accelerated by frequent subclinical or clinical infections such as malaria, enteric fever, tuberculosis and HIV. These infections often lead to loss of hydration which can significantly affect the integrity of the discs, facet joints and ligaments triggering a “cascade” of events that initiate and sustain the spondyloathropathy. We have also noticed that almost invariably, these patients (with ECOWAS spine), have several scarification marks in the lumbar region placed by “traditional healers”; we have termed this a “SWERDNA SIGN” (Figure 3). It is therefore our observation that the clinical relevance of this sign is that in West Africa, it indicates the presence of multi-segmented lumbar spine degenerative disease that often improves with surgical decompression.

In addition to DLL, 34% of our series received anti tuberculous chemotherapy on account of first time Mantoux reactions of at least 15mm in diameter; we surmise that this contributed to the clinical improvement of LS. Several studies have shown that tuberculous spondylitis is common in the lumbar region and the Mantoux test is positive in 50-67% of patients; there is often no indication of pulmonary involvement.^{19, 20, 21, 22, 23} Tuberculous spondylitis must therefore

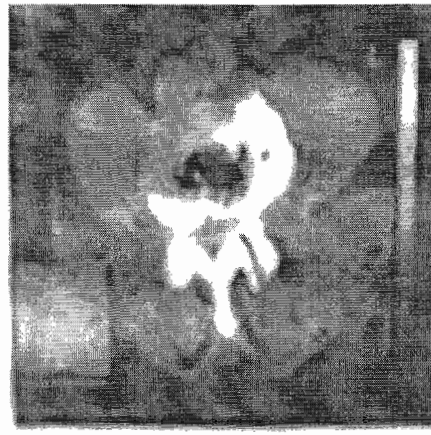


A

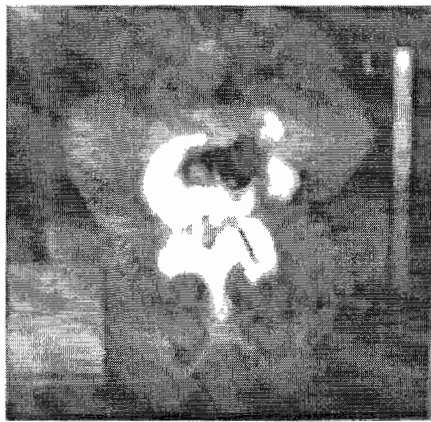


B

Fig. 1: Lateral (upper panel) and AP (lower) views of myelogram in a patient with neurogenic claudication. Multiple thecal sac defects with extensive osteophytes and irregular disc spaces are evident; a classic example of "ECOWAS SPINE".



A



B

Fig. 2: Postmyelogram CT scans through lumbar spine of a patient showing (A) facet hypertrophy, thecal sac compression; (B) bilateral nerve root compression and vacuum phenomenon- pathognomonic of degenerative disc disease.

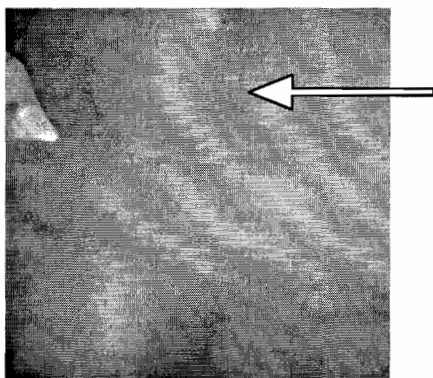


Fig. 3. Arrow pointing to lower row of five scarification marks in the lumbar region of a patient with neurogenic claudication and multiple segmented thecal sac defects on myelography ("SWERDNA SIGN"). An upper row of three scarification marks is also evident .

always be considered in cases with progressive backache, tenderness and a positive Mantoux test especially in TB endemic regions.

Neurogenic claudication was by far the commonest presenting symptom in our series; other workers had documented sciatic or radicular pain as their most common presentation^{1,2}. However, all our patients on close questioning admitted to a history of intermittent disabling radicular pain that was more often unilateral. That many of our patients had been reduced to a lifestyle of at least partial dependency is reflected by the very low mean preoperative MLBPS of 2.3. However, it is important that the low MLBPS and the extensive changes on the radiologic

studies do not lead the neurosurgeon to treat the pathoanatomic changes on the CT scan or myelogram instead of the patient. Meticulous history taking followed by an accurate neurologic examination are indispensable in planning and executing the proper surgical procedure. This has led us to the concept of the "culprit lesion" when faced with extensive pathoanatomy on radiologic studies. We often found that these "culprit lesions" were amenable to treatment via hemilaminectomy, consequently, almost 60% of our cases underwent hemilaminectomy with attendant clinical improvement. The advantages of this method include excision of soft tissue within the vertebral canal that is compressing neural tissue, limited damage to the bony structure and preservation of vertebral column stability¹¹. We do not support the contention that partial facetectomies should be included for all nerve roots, symptomatic or not at the levels of laminar decompression and partial laminectomies of adjacent levels to decompress threatening stenosis¹⁷.

Silvers et al¹³ after a total of 258 consecutive DLL concluded as follows; for all age groups through at least the eighth decade of life, DLL is a relatively safe operation with a high medium to long term success rate; lumbar instability following laminectomy is rare, even in individuals presenting prior to surgery with degenerative instability conditions; lumbar fusion in addition to DLL procedure is rarely required for degenerative spinal stenosis. However, Hopp and Tsou reported a 17% reoperation rate for instability related to spondylolisthesis in their DLL series¹⁴. They also found that the preoperative indicators of potential instability were the presence of degenerating discs as evidenced by traction spurs, diminished disc height, the presence of listhesis, and scoliosis or asymmetry in the narrowed disc; total facetectomy and destabilization of the pars interarticularis resulted in an increased risk of instability as well. Bilateral DLL in our series was 41% and we studiously avoided total facetectomy; our fusion rate was only 8%.

Caputy and Luessenhop reported a full laminectomy rate of 85% and a

hemilaminectomy rate of 15%; by the third year more than 20% of their patients had reverted to the surgical failure category¹⁷. After comparing three fusion techniques (including noninstrumented and instrumented posterolateral fusion) in a prospective randomized study in a homogenous population with chronic back pain; Fritzell et al¹⁸ found that no fusion technique produced superior clinical outcome irrespective of whether complications were included or excluded in the analysis. They noted that complications increased significantly with increasing technicality of the surgical procedure.

The postoperative MLBPS of the series was significantly improved compared to preoperation (8.7 compared to 2.3; $p < 0.001$); only one patient reported a poor result at six months. However, we should expect that with longer follow up, the percentage of patients with excellent or good results will fall^{12,13}. Indeed, since our study contains only retrospective data, our clinical results must be treated with caution since its reliability is limited; after surgery patients tend to score their preoperative condition as being worse¹⁵. Kabre et al noted that surgical results were satisfactory in 74% of their series¹; at six months, 98% of our patients had good or excellent results.

Only 14% of our series underwent disc excision which seems to support the observations of Levy and Matheson^{8,16}, especially since two of the patients who had disc excisions were non-Africans. The finding of two tumours in the series supports another observation of Levy; he found 1 spinal tumour for every 11 discs in Europeans and three times as many tumours as discs in Africans⁸.

The mean age of patients undergoing DLL for LS in Tema is 51 years; there is no gender preponderance; most of them present with neurogenic claudication and various sensorimotor deficits; most benefit significantly from the operation. Attendant spine fusion and or disc excision is only required in a small minority of patients. The most common

complication is superficial wound infection.

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