

Operated herniated disk and lumbar spinal stenosis in Togolese patients: anatomical aspects and results of surgical treatment

Koffi-Tessio AVE, Fatigba H, Houzou P, Kakpovi K, Fianyo E, Oniankitan O, Mijiyawa M

Rheumatology Unit, Centre Hospitalier Universitaire Sylvanus Olympio Lomé, Togo

Corresponding author:

Prof. M. Mijiyawa, 08 BP: 80627 Lomé 08 Togo
Email : mijiyawa@tg.refer.org

Abstract

Objective: To determine the anatomical aspects and results of surgical treatment of herniated disk and lumbar spinal stenosis observed in the Rheumatology unit of CHU SO of Lomé.

Patients and methods: This was a transversal study conducted on a series of patients cases admitted to the Rheumatology Unit of CHU SO of Lomé and who underwent surgery for a herniated disk or lumbar spinal stenosis.

Results: One hundred and two patients (37 women, 65 men) were included in the study: 30 (8 women, 22 men) underwent surgery for a herniated disk and 72 (29 women, 43 men) for a lumbar spinal stenosis. Both diseases have occurred in individuals in the prime of age, 92 (90%) with an age between 40 and 60 years. The time between the intervention and the evaluation of the treatment was 9 years on average for the herniated disk and 13 years for the lumbar spinal stenosis. Herniated disk occurred in discs L4L5 and/or L5S1. Lumbar spinal stenosis was showing a rosary image. The responsible factors for the narrowing were hypertrophy of the yellow ligament, posterior interapophysis osteoarthritis and degenerative disc disease. The outcome of surgical treatment was satisfactory in 29 of the 30 patients operated on for herniated disk, and 70 of the 72 were operated on for lumbar spinal stenosis. It has resulted in the disappearance of the nerve root pain and the resumption of normal activity. Low back pain requiring the use of analgesics was present in 40 of 102 patients (39%). Twenty patients, including 10 of the 15 who underwent fusion made use of a lumbar belt. Two patients were subjected to reoperation. Spondylodiscitis complicated the postoperative course of one female patient.

Conclusion: Our results are very similar to those described in the literature both on anatomical aspect and therapeutical aspect.

Introduction

Studies conducted in sub-Saharan Africa over the past three decades have established the epidemiologic and semiological profiles of lumbar herniated disk and lumbar spinal stenosis. These studies have contradicted earlier data, especially those from Southern Africa, marred by methodological bias¹⁻⁴. Lumbar herniated disk is of a profile in every way comparable to that observed in the West; the only semiological peculiarity is the frequent normality of Schöber index, due to lumbar hyperlordosis, characteristic of the morphotype of black subjects; this anatomical data also appears to play a role in the occurrence of lumbar spinal stenosis, which seems much more frequent than in the West, and preferentially affects obese women over 50 years. In sub-Saharan Africa, the risk factors of lumbar spinal stenosis do not seem to be the same with those described in the West where the disease predominates in obese men engaged in hard work⁵.

The treatment of lumbar herniated disk and lumbar spinal stenosis is always medical, surgical sometimes. In the West, it has been subject of evaluation through metrology. This evaluation is particularly focused on pain by taking into account the intensity, the topography, the real life, the perceived, and the socio-professional consequences⁶.

Few studies in sub-Saharan Africa were conducted to decrypt anatomical aspects and to evaluate the surgical treatment of these conditions. This study conducted in a hospital in sub-Saharan Africa aims to describe the anatomical aspects of lumbar herniated disk and lumbar spinal stenosis and to evaluate the results of surgical treatment at mid and long term in patients operated for these conditions.

Materials and Methods

This was a transversal study conducted on a series of patients cases admitted to the Rheumatology Unit of Sylvanus Olympio Teaching Hospital (CHU SO)

of Lomé and who underwent surgery for a herniated disk or lumbar spinal stenosis. The study was conducted from 1990 to 2012. CHU-SO, the largest health facility in Togo, has 847 beds with an average occupancy rate of 54%. In 2010, 68807 patients were managed out of which 21370 were admitted. Lomé, capital city of Togo, where CHU-SO is located, has 900000 inhabitants, and Togo 6200000. The income per inhabitant is about USD 400 in Togo. Only government employees have been benefiting from medical insurance for the past two years.

The Rheumatology Unit of CHU-SO shares with that of Dermatology unit two pavilions with a total capacity of 28 beds. It opened in October 1989 and hosts an average of a thousand consultants per year. Service staff consists of a Professor in rheumatology, two clinic head assistants, two doctors, a supervisor, two nurses, three nursing assistants and a secretary.

The patients included in the study underwent surgery for herniated disk or lumbar spinal stenosis. The diagnosis of these conditions was based on clinical data and morphological data (standard X-ray, myelography, CT scan, magnetic resonance imaging)⁷⁻⁹. The imagery of these conditions was based on myelography until 1998, date of implementation of the first scanner in Lomé. The cost of the scan for lumbar spine is 60000 CFA (USD 120), and that of MRI, established in 2006, ranges from 150000 (USD 300) to 280000 CFA (USD 560). The patients we could not contact for the collection of information necessary for the evaluation of their treatment were excluded from the study. It was the same with those whose operative report did not include detailed anatomical data according to the study protocol.

Preoperative parameters taken from the records included demographic data (name, age, sex, occupation, address, duration of disease progression before surgery) and semiological data (low back pain, nerve root pain, paresthesia, walking distance, objective sensory disturbances, motor disorders, sphincter disorders, drug treatments, use of lumbar belt, standard X-ray, myelography, scan, magnetic resonance imaging). The operation data and the nature of surgical treatment were taken from operation reports. The patients were operated in Togo or abroad (Benin, Côte d'Ivoire, Morocco, Senegal, France, Switzerland, United States of America).

The collection of the results of the surgical treatment was based on the use of records of the patients included in the study. The data collected were primarily clinical, made of symptoms and opinion of the patients. Only standard X-ray of the lumbar spine in front and in profile was systematically performed postoperatively in all patients, which was not the case neither with the scan nor with the MRI.

Results

One hundred and two patients (37 women, 65 men) were included in the study. Thirty (8 women, 22 men) underwent surgery for a herniated disk and 72 (29

women, 43 men) of lumbar spinal stenosis. Both diseases occurred in individuals in the prime of age, 92 of them (90%) with an age range between 40 and 60 years (Tables 1 and 2).

Table 1: Demographic data of the 72 patients operated for a lumbar spinal stenosis

	Average age at consultation (years)*	Duration of the progress of the disease before intervention (years)*	Duration of follow up (years)*
Female (n=29)	49 (32-67)	6.7 (1-16)	7.2 (0.5-14)
Male (n = 43)	58 (33-78)	5.3 (0.5-24)	10 (0.5-20)
Total (n = 72)	54 (32-78)	5.8 (0.-24)	8.9 (0.5-20)

*the first number indicates the average, and the numbers in brackets indicate the limits.

Table 2: Demographic data of the 30 patients operated for a herniated disk

	Average age at consultation (years)*	Duration of the progress of the disease before intervention (years)*	Duration of follow up (years)*
Female (n = 8)	44.3 (40-49)	1.4 (0.2-10)	18 (7-20)
Male (n = 22)	43 (32-53)	2.4 (0.1-6)	10.8 (1.5-25)
Total (n = 30)	43.3 (32-49)	2.1 (0.1-10)	12.7 (1.5-25)

* the first number indicates the average, and the numbers in brackets indicate the limits

In 21 of the 72 patients operated on for LSS, imaging was based on myelography which showed a rosary image in all cases. These were patients admitted before installation of the scanner in Lomé. Thirty-five patients benefited from the scan, and the other 16 benefited from both a lumbar scan and a lumbar MRI. This is the case of patients especially who underwent lumbar fusion. In all cases, the decision for operation was justified by a perfect radio-clinical correlation. Lesions objectified by imaging and responsible of narrowing revealed a degenerative disease in 72 patients, and this was even among the youngest two, aged respectively 32 and 33 years at consultation. The patients aged 32 years suffered seven years of mechanical low back pain, complicated for a year by the addition of a claudicant lumbar nerve root pain limiting walking within 500 meters. This lumbar nerve root pain was associated with paresthesia. The scan showed a spondylolysis L4 with grade I anterolisthesis, and stepped disc protrusions. The intervention consisted

of a complete L4 and L5 and partial L3 laminectomy, removal of hypertrophied yellow ligament, abrasion of articular facets and L4L5 discectomy. In this patient, the surgical report also stated total absence of epidural fat.

Patients aged 33 years and free from any significant pathological history, the narrowing of the spinal canal was related to a discal degenerative affection which created for two years a claudicant lumbar nerve root pain limiting walking within 500 meters. The myelography showed a rosary image with two herniated discs in L3L4 and L4L5. The scan also objectified stenosis in the anteroposterior and malunion of the right pedicle of L4. The intervention consisted of a right L3L4L5 hemi-laminectomy, an L4L5 and L3L4 discectomy, and of a foraminotomy.

The lesions responsible of the narrowing of the canal observed intraoperatively in patients operated on for LSS included a hernia or disc protrusion (31 cases), hypertrophy or shortness of blades (67 cases), hypertrophy of the yellow ligament (27 cases), a posterior inter-apophysis osteoarthritis (20 cases), or the disappearance of the epidural fat (10 cases). These lesions, sometimes associated and stackable to those objectified by imaging, justified in all cases a laminectomy or hemilaminectomy, associated depending on the case to a discectomy, a foraminotomy, an abrasion of the articular masses, or to ablation of the yellow ligament. Lumbar or lumbosacral fusion was performed in 15 patients.

Myelography helped discover herniated disk in four of the 30 patients who were operated on it; in the other 26, diagnosis was based on the scan. The hernia has affected L4L5 disc in 18 patients, L5S1 disc in seven patients, and both in the five other patients. It was calcified and excluded at L5S1 in a patient, and excluded subligamentous in 14 patients. The demographic profile of patients with excluded and/or sub-ligamentous herniated disk was similar to that of patients with an unusual herniated disk. The intervention consisted in all cases of a discectomy. The female patient with calcified L5S1 herniated disk showed no semiological peculiarity: aged 40 years, she suffered for two months from a mechanical nerve root pain responsible of a walking limitation less than 100 meters. Apart from the spinal syndrome, the assessment has objectified Lasegue at 60°, and hypoesthesia to tact in the territory of S1. The scan did not objectify anomaly of L3L4, L4L5 and L5S1 interbody spaces. Myelography highlighted amputation of the right S1 root. Calcification of the hernia was discovered by operation.

The evaluation of the results of surgical treatment includes both patients with LSS and those with herniated disk. The results were good or satisfactory in 70 of the 72 patients with LSS, and in 29 of the 30 patients with herniated disk. Satisfaction consisted of complete or near-complete disappearance of the nerve root pain, net regression of low back pain and improvement in the walking distance compatible with the activities of daily life. Forty of the 102 patients (39%) suffered from low back pain requiring the use of analgesics. Twenty patients including 10 of the 15 who underwent fusion wear a waist belt.

Two patients with a CLR were re-operated on. The first case was a woman, company director who was then 30 years old having a lumbar nerve root pain related to a herniated disk, subject to laser treatment in Poitiers. This treatment resulted in failure leading to reoperation ten years later: the female patient was suffering from bilateral claudicant lumbar nerve root pain confining her almost completely to bed, and associated with paresthesia and sphincter disturbances. MRI revealed herniated disk in L4L5 and L5S1, associated with an L4 grade I anterolisthesis. The reoperation consisted of a double discectomy and an L4-sacrum fusion. The exact evaluation of the reoperation performed twelve years ago is this difficult today because of the coexistence of a major depressive syndrome. The second patient with LSS and subject to revision surgery was a 60 years old bank executive whose first operation, consisting of a laminectomy, was followed by a notable decrease of low back pain and nerve root pain. A fall due to a slip which occurred three months after the first operation resulted in the return of the lumbar nerve root pain. An MRI revealed L4L5 herniated disk subject to discectomy. A patient operated on for a herniated disk had postoperative after effects marked by spondylodiscitis. The failure of antibiotic treatment underpinned by the assumption of a banal germ led to the initiation of TB treatment. This resulted in retrobulbar neuritis attributable to Ethambutol.

Discussion

Our study included 102 cases of patients operated for a LSS or a herniated disk. The rosary picture at myelography and/or scan and/or MRI was characteristic of the LSS. The same tests contributed to the diagnosis of herniated disk. Brevity or thickening of blades, degenerative disc diseases, hypertrophy of yellow ligament and posterior inter-apophysis osteoarthritis were the lesions responsible for the lumbar canal stenosis in our patients suffering from LSS. The intervention consisted in actions to stop these lesions. Fifteen patients with a lysis were subject to fusion. Herniated disk affected mostly L4L5 and L5S1 discs and required a discectomy in all cases. The results of this surgical treatment were satisfactory in 99 of 102 patients operated with an average duration of more than eight-year follow-up. The results were characterized by the complete or near-complete disappearance of the nerve root pain, notable improvement in the walking distance, regression of low back pain, and resumption of activities. The limitations of our study should be taken into account for a relevant measure of its results. We excluded patients that we could not be able to contact to proceed to the evaluation of treatment, and patients whose operation report was without a detailed description of the anatomical lesions. In addition, the cases which underwent surgery only represent a small proportion of our patients with herniated disk or LSS justifiable of a surgical treatment, which cost is not affordable with the majority of our patients. This cost justifies the small proportion of

patients operated for conditions whose frequency and impact have been reported in an earlier study conducted in the department. It also justifies the small proportion of women operated for LSS, a condition that seems to touch with predilection obese women aged about 50 years^{4,5}. The results of our study agree with the main data from literature, both anatomically and therapeutically.

From the anatomical point of view, the two diseases have no special feature: the anatomical aspects of lumbar spinal stenosis and herniated disk of the black Africans are similar to those of the Caucasian and the Asian. Herniated disk affected with predilection levels L4L5 and L5S1, location of lumbar herniated disk in 80-90% of cases⁷. Lumbar spinal stenosis featured both congenital aspect and acquired aspect. Like other authors^{10,11}, we found that the boundary between the two nosologic entities that are herniated disk and lumbar spinal stenosis is sometimes blur, a claudicant herniated disk that may be responsible of symptoms similar to that of LSS. Lesions found in our patients (disc attack, posterior interapophysis osteoarthritis, hypertrophy of yellow ligament) are similar to those reported in the literature. Thus, in a general journal on the different aspects of LSS, Issack *et al*¹¹ have established the role of degenerative factors in lumbar canal stenosis. The lesions mainly touch the intervertebral disc, the posterior joints and soft elements, including the yellow ligament. The long-term effect is more significant with the surgical treatment than the medical treatment.

The results of surgical treatment of our patients are in perfect agreement with the literature data. The evaluation of treatment performed in our patients after an average of more than eight years, showed a high satisfaction rate, only two patients with LSS were re-operated. Our results are in harmony with those from the study of Kaymaz *et al*¹² who demonstrated the beneficial effect of simple posterior decompression by laminectomy, after an evaluation at 6 and 12 months of 80 operated patients. The beneficial effect of surgical treatment applies to nerve root pain as well as low back pain. This is evidenced by the recent prospective study of Jones *et al*¹³ of 119 cases of LSS who underwent laminectomy. This study reported a significant regression of low back pain after an evaluation at six weeks and at one year. The outcome of surgery for LSS seems furthermore independent of race: thus, Lad *et al*¹⁴ after a comparative study between black and white Americans having undergone laminectomy for LSS for at least two years did not find a higher risk of reoperation in blacks. There is, contrast, among blacks a higher risk of post-operative complications, as well as higher hospital duration and costs. One of our patients, a woman, was subject of reoperation after a laser treatment. Her case recalls the results of the study conducted by Cheng *et al*¹⁵ who found a higher risk of reoperation after noninvasive discectomy by endoscopy.

References

1. Ouedraogo DD, Eti E, Daboiko JC, Simon F, Chuong VT, Zué MK. Les lombosciatiques discales non compliquées : aspects épidémiologiques et sémiologiques chez le sujet noir africain. À propos de 143 malades (Côte d'Ivoire). *Sante*. 2007; **17**:93-96.
2. Malemba JJ, Mbuyi-Muamba JM. Clinical and epidemiological features of rheumatic diseases in patients attending the university hospital in Kinshasa. *Clin Rheumatol*. 2008; **27**:47-54.
3. Singwe-Ngandeu M, Meli J, Ntsiba H, Nouédoui C, Yollo AV, Sida MB, Muna WF. Rheumatic diseases in patients attending a clinic at a referral hospital in Yaounde, Cameroon. *East Afr Med J*. 2007; **84**:404-409.
4. Mijiyawa M, Oniankitan O, Kolani B, Koriko T. Low back pain in hospital outpatients in Lomé (Togo). *Joint Bone Spine*. 2000; **67**:533-538.
5. Berney J. Epidémiologie du canal lombaire rétréci. *Neurochirurgie*. 1994; **40**:174-178.
6. Dougados M. La mesure. Méthodes d'évaluation des affections rhumatismales. Expansion Scientifique Publication. Paris, 1997; pages 541.
7. Revel M. Sciatiques et autres lomboradiculalgies discales. *EMC- Rhumatologie Orthopédie*. 2004; **1**: 101-116.
8. Wybier M. Imagerie des hernies discales lombaires. *Rev Rhum (suppl. Pédagogique)*, 1996; **63**: 161SP-170SP.
9. Verbiest H. A radicular syndrome from developmental narrowing of the lumbar vertebral canal. *J Bone Joint Surg Br*. 1954; **36-B**(2):230-237.
10. Turner JA, Ersek M, Herron L, Deyo R. Surgery for lumbar spinal stenosis. Attempted meta-analysis of the literature. *Spine*. 1992; **17**: 1-8.
11. Issack PS, Cunningham ME, Pumberger M, Hughes AP, Cammisa FP Jr. Degenerative lumbar spinal stenosis: evaluation and management. *J Am Acad Orthop Surg*. 2012; **20**:527-535.
12. Kaymaz M, Borcek AO, Emmez H, Durdag E, Pasaoglu A. Effectiveness of single posterior decompressive laminectomy in symptomatic lumbar spinal stenosis: a retrospective study. *Turk Neurosurg*. 2012; **22**:430- 434.
13. Jones AD, Wafai AM, Easterbrook AL. Improvement in low back pain following spinal decompression: observational study of 119 patients. *Eur Spine J*. 2013 Aug 21. [Epub ahead of print].
14. Lad SP, Bagley JH, Kenney KT, Ugiliweneza B, Kong M, Bagley CA, Gottfried ON, Isaacs RE, Patil CG, Boakye M. Racial disparities in outcomes of spinal surgery for lumbar stenosis. *Spine (Phila Pa 1976)*. 2013; **38**:927-935.
15. Cheng J, Wang H, Zheng W, Li C, Wang J, Zhang Z, Huang B, Zhou Y. Reoperation after lumbar disc surgery in two hundred and seven patients. *Int Orthop*. 2013; **37**:1511-1517.