

Comparative Studies of the Incidence of Surgically Treated Symptomatic Prolapsed Lumbar and Sacral Intervertebral Discs in Males in Basel (Switzerland), Jamaica (West Indies) and Imo and Ebonyi States (South East Nigeria).

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Abstract

Objective and Background: There are various postulated possible causes of surgically symptomatic prolapsed intervertebral discs in the lumbar and sacral regions. They may be acting singularly or collectively. Yet, these factors have not been satisfactorily confirmed. Therefore, the continued search for pre-determinants of this lesion, in males, is hereby being encouraged, and, our views are being presented.

Method: From 1971 to 2009, eighty eight (88) locations of symptomatic prolapsed intervertebral discs in the lumbar and sacral regions in 68 males were treated by us in Basel (Switzerland): 67, in Imo and Ebonyi States (Nigeria): 1 and none in Jamaica (West Indies). The clinical features were those of lower back pains, with or without radiation into the lower extremities, sensory loss and paresis of the limbs. There was a case of loss of urinary bladder and ano-rectal control. All lesions were confirmed through cauda-equinograms and treated under general anaesthesia in knee-chest position (MECCA position). The patients were followed for 3 to 6 months postoperatively.

Results: In Basel (Caucasian population only), there were 84 locations in 67 patients, 4 locations in 1 patient in Imo and Ebonyi States (African population only) and none in Jamaica (mixed population). Their ages ranged from 23 to 70 years in Basel and the only patient in Nigeria was 67 years old. The patients all tolerated the procedures very well and there were no complications postoperatively.

Conclusion: We found surgically treated symptomatic prolapsed lumbar and sacral intervertebral discs in males to have occurred more in Basel, Switzerland than in Imo and Ebonyi States of Nigeria and/or Jamaica, West Indies.

Key Words : Comparative, Studies, Symptomatic, Prolapsed, Intervertebral, Discs, Males, Switzerland, Nigeria, Jamaica.

Introduction

Sciatica is a relatively common condition with a lifetime incidence varying from 13% to 40%¹. The corresponding annual incidence of an episode of sciatica ranges from 1% to 5%¹. Intervertebral disc prolapse, protrusion or extrusion accounts for less than 5% (though, some papers put it between 5% and 10%), of all low back problems, but are the most common causes of nerve root pain and surgical interventions in the lumbar region^{2,3}.

Prolapsed disc could be due to wear and tear from certain jobs that require constant sitting, such as driving, and recreational activities including rowing, skiing, weight lifting, jogging, walking, etc^{1,4,5}. Genetics, body height, age and smoking may also influence the development of this lesion^{1,4-13}. In the lumbar region, the clinical features of this disease include lower back pain (lumbago), and

sometimes, leg pains (radiation pains, sciatica), dyaesthesia, pareses/paralyses, loss of urinary bladder and ano-rectal control.

Plain radiographs of the spine, Electromyograms (EMG) and Nerve Conduction Studies (NCS) could indicate this, but the diagnosis is usually confirmed through contrast myelography, vis-à-vis cauda-equinography, Computerized Tomography Scan (CT Scan), which may need coronal and sagittal views/reconstructions as well as Axial or Magnetic Resonance Imaging(MRI)¹⁴⁻²⁰.

Treatment modalities include conservative measures with physiotherapy, rehabilitation, weight control, anti-inflammatory measures, epidural steroid injections, analgesia-assisted traction therapy (IVSAAT), lumbo-sacral back support and stem cell therapy^{1,4,21-32}. Surgical measures include discectomy/microdiscectomy, fenestration, laminectomy with or without discectomy, artificial disc replacement and nucleoplasty^{4,33-40}.

The outcome of treatment depends on the location of the prolapse, clinical condition of the patient and time of presentation and treatment⁴¹.

Management complications include worsening of pain and neurological status, dural tears, infections, nerve root injury, vascular injury, development of pseudo-aneurysms and arterio-venous fistulas, pulmonary embolism, retroperitoneal injuries, metabolic effects of steroids on the pituitary-adrenal axis, epidural haematomas and abscesses^{1, 3, 22, 31, 42, 43}.

To be differentiated from this lesion, are other lesions, which could cause same symptoms and signs, as infections, abscesses, haematomas, tumors, aneurysms, arterio-venous malformations, endometriosis, spinum bifidum occultum, osteophytes and spondylolisthesis^{1, 4, 44-56}.

We now try to compare the occurrence of surgically treated symptomatic prolapsed lumbar and sacral intervertebral discs in males in Switzerland, Nigeria and Jamaica, using some of these possibly influencing factors.

Materials and Method

Sixty-seven (67) locations in the lumbar and sacral regions in males in Basel, Switzerland, 1(one) in Imo and Ebonyi States, South East Nigeria and none in Jamaica, West Indies, were surgically treated by the author from 1971 to 2010, when he was one of five surgeons in Basel, the only one in Imo and Ebonyi States and one of three surgeons in Jamaica handling such cases. These were retrospective studies. There was no selection of patients by any means and there were no inclusion/exclusion criteria. The patients' ages ranged from 23 to 70 years. Their clinical features were those of lower back pains, radiating pains, impaired sensation and paresis in the affected lower limb/s. There was one emergency case due to loss of urinary bladder and ano-rectal control. Plain spinal radiographs and cauda-equinograms

(picture 1), as well as routine laboratory investigations, were carried out on all the patients. No other radiological investigations were done, either for the lack of such facilities (CT, MRI) and/or the findings with cauda-equinograms were very adequate.

All the operations were done under general anaesthesia in the knee-chest position (MECCA position) (picture 2), through fenestration, in which, from the adjacent laminae on same side of the lesion, the lower part of the upper lamina and the upper part of the lower lamina, together with the in-between yellow ligament, were nibbled off. This gave a clear view and adequate space to remove the pathological process and enucleate the nucleus pulposus totally, through an incision in the annulus fibrosus. The author has never had the need for any form of magnification for such operations to date. This small incision was left open. The rest of the wound was closed in layers, after satisfactory haemostasis, without any drains. All patients were allowed up the next day postoperatively, though physiotherapy was started as soon as they were returned to the ward⁵⁷. The stitches were removed 9 days postoperatively. The patients were discharged home 2 days thereafter, but to return for follow-up checks about 7 days later.

Results

The routine laboratory tests (complete blood count, random blood sugar, serum creatinine, serum calcium, lipid profile, serology for syphilis and retrovirus, urinalysis and stool analysis) were within normal limits. The cauda-equinograms revealed 84 locations in the 67 patients in Switzerland and 4 in the only one in Nigeria. There was no patient with this problem in Jamaica in our series.

In Switzerland, there were 4 prolapses at L2/3, 5 at L3/4, 48 at L4/5, and 27 at L5/S1, none at Th.12/L1, L1/2 and S1/2, totaling 84 (table 1).

Symptomatic Prolapsed Intervertebral Discs in Males in Switzerland.

Table 1: Levels and Age Range in Years.

Level	1-10yrs.	11-20yrs.	21-30yrs.	31-40yrs.	41-50yrs.	51-60yrs.	61-70yrs.	71-80yrs.	Total
Th12/L1	-	-	-	-	-	-	-	-	-
L1/2	-	-	-	-	-	-	-	-	-
L2/3	-	-	-	-	-	4	-	-	4
L3/4	-	-	-	2	1	1	1	-	5
L4/5	-	-	7	11	15	9	6	-	48
L5/S1	-	-	5	16	4	2	-	-	27
S1/S2	-	-	-	-	-	-	-	-	-
Total	-	-	12	29	20	16	7	-	84

Table 2 shows that, at L2/3, there were 2 prolapses on each side, at L3/4, there were 3 on the right and 2 on the left, at L4/5, the right had 20 and the left 28 prolapses, at L5/S1, there were 7 on the right and 20 on the left. In total, the right had 32 and the left, 52 prolapses.

Table 2: Levels and Sides.

Level	Right Side	Left Side	Total
Th12/L1	-	-	-
L1/2	-	-	-
L2/3	2	2	4
L3/4	3	2	5
L4/5	20	28	48
L5/S1	7	20	27
S1/2	-	-	-
Total	32	52	84

Table 3: Side ranges of Age in Years.

Side	1-10yrs.	11-20yrs.	21-30yrs.	31-40yrs.	41-50yrs.	51-60yrs.	61-70yrs.	71-80yrs.	Total
Right	-	-	3	11	7	7	4	-	32
Left	-	-	9	18	13	9	3	-	52
Total	-	-	12	29	20	16	7	-	84

Table 3 shows that on the right side, there were 3 prolapses in the age range 21-30 years, 11 in 31-40 years, 7 each in 41-50 and 51-60, 4 in 61-70 and none thereafter. There was also none in 1-20 years. The left side had no prolapses in the age range of 1-20 years, 9 in 21-30 years, 18 in 31-40, 13 in 41-50, 9 in 51-60, 3 in 61-70 years respectively and none thereafter. The total showed therefore, 12 in the 21-30, 29 in 31-40, 20 in 41-50, 16 in 51-60 and 7 in 61-70 years of age. The patients with bilateral lesions were, 1 at L2/3, (55 years), 1 at L3/4 (36 years), 7 at L4/5 (32, 33, 46, 48, 55, 55, 66 years), the 46-year old being the emergency case, 1 at L5/S1 (39 years), totaling 10 patients. Seven (7) patients had multiple lesions, viz. 1 at L2/3 and L3/4 (53 years), 1 at L2/3 and L4/5 (55 years), 5 at L4/5 and L5/S1 (28, 33, 35, 39, 40 years). The only patient in Nigeria, a 67-year old, had bilateral and multiple lesions at L1/2 and L2/3, totaling 4 locations. All the patients tolerated the procedure very well and recovered from the anaesthesia without any additional gross neurological deficits. There were no complications following surgery. The patients were followed-up for up to 6 months postoperatively. Their wounds healed by primary intention and their pains and previous neurological deficits had all resolved.

Discussion

The majority of herniated discs will heal themselves in about six weeks and do not require surgery⁴. However, the presence of neurological deficits requires some type of surgical intervention or the other, even if minimally invasive.

Cauda-equinograms are still very useful, especially where CT and/or MRI are not available/affordable. There was no adverse reaction to either of the contrast used {Amipaque(metrizamide) or Lopamiro 300(iodo/trometamol/edetate calcium disodium/hydrochloric acid)}.

The operation in the knee-chest position, keeps the intra-abdominal contents farther away from the operation site to avoid injuring them while the operation lasts. In Basel, Switzerland, the author was one of five surgeons, in Imo and Ebonyi States,

Nigeria, the only one and in Jamaica, one of three that operated on such patients. In our series, both in Switzerland and Nigeria, there were no prolapses up to the age of 20 years, as observed by others, though, there were some in other papers, and none after the age of 70 years^{1, 13}. In Switzerland, the incidence peaked at the range 31-40 years as against in the 5th decade in other papers¹. We noticed that, before the age of 51 years, there were no prolapses at L1/2 and L2/3 levels, but, thereafter, 4 at L2/3, then none after the age of 60 years in Switzerland, then 2 each at L1/2 and L2/3 in Nigeria at the 61-70 years range. This agrees with other findings, that, with advancing age, there appears to be a relatively increased incidence of herniation at the L2/3 level¹.

So far, there has been no explanation for this observation.

The incidence of this lesion is supposed to be age related, but our series showed a decline after the age of 50 years and none after the age of 70 years¹. More information will probably be required. The majority of cases in Switzerland were at L4/5, which agrees with some, as against L5/S1 found by others^{1, 3, 17, 22}. The only case in Nigeria, at L1/2 and L2/3, has no base for comparison.

In Switzerland, there were more lesions on the left (52 to 32), as with others, though theirs included females³. In Nigeria, they were equal, 2 on each side. The peaking for both sides was from 31 to 40 years in Switzerland.

The bilateral lesions were mostly at L4/5 in Switzerland, spread equally from 31 to 60 years, with the only emergency case at 46 years.

The multiple lesions in Switzerland, were mostly (3 of 6) at L4/5 and L5/S1, with 2 at the 31-40 years age range, all being on the left side. In Nigeria, they were at L1/2 and L2/3 from 61 to 70 years, with no side difference. For the occurrence of this lesion, risk factors such as genetics, did not appear to be contributory, since it did not occur in any twins or relations in our series. Recreational activities, like skiing, might have played a role, since the Switz, as observed by the author, enjoyed/enjoy this sport, which is practically absent in Nigeria and Jamaica. Skiing has a lot to do with movements in the lumbar and lumbo-sacral regions. Physical activities such as driving, associated with occupation, cause exposure to vibration at

around 4-5 Hz, which may coincide with resonant frequency of the spine in the seated position and so, lead to a direct mechanical effect on the lumbar disc¹. By their standard of living, the Swiss owned more cars and did a lot more driving than Nigerians and/or Jamaicans, though, statistical evidence is required to confirm this. However, with Nigeria's growing population and sophistication, especially in Imo and Ebonyi States, we might experience an upsurge in the occurrence of this disease in Nigeria.

Another risk factor is tobacco, from smoking, which disturbs the metabolic balance of intervertebral discs, and coughing, causing marked elevations of intra-disc pressures, or a possible fibrinolytic effect of tobacco¹. The Switz, like other Caucasians, smoked a lot, while this habit is just beginning to grow in Nigeria and Jamaica.

Other risk factors, like environmental pollution and poor sanitation, as well as body height and age, together with the earlier mentioned ones, should be further closely looked into to reduce the occurrence, if not completely eradicate the occurrence of this seriously incapacitating disease, especially in populations where, it is still not much known.

Conclusion

From our series, surgically treated symptomatic prolapsed lumbar and sacral intervertebral discs in males occurred much more in Basel, Switzerland than in Imo and Ebonyi States, South East Nigeria and none in Jamaica. We think that more studies should be carried out to ascertain the more recent status in the entire world and definitely identify, if possible, predisposing factors towards the total elimination of this lesion.

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