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Uncommon Types of Disc Hernia (A Report of Three Cases and Review of Literature)

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Aim : To add to literature documentation of uncommon types of disc hernia

Case Reports : *CASE 1 :* A 63year old Cameroonian man with L4/L5 sequestered disc hernia, seen posterior to L5 vertebral body. He had discectomy and symptomatic reliefs were better than pre-operative status conforming to McCulloch's clinical outcome grade 3.

CASE 2 : A 34year old male Cameroonian with chronic back pain and paraesthesia following trauma. Thoracic spine Magnetic resonance imaging (MRI) revealed T11/T12 disc hernia with severe epidural compression. He declined discectomy for an Overseas treatment.

CASE 3 : A 72year old male Nigerian who had L3/L4 iatrogenic spinal fusion 5years ago. Lumbo-sacral spine MRI following recurrent low back pain showed L2/L3 and L4/L5 disc hernias. The L2/L3 hernia above the bony ankylosis interestingly is severer than L4/L5 hernia. He was managed conservatively.

Conclusion : MRI increasing availability in Central Africa will detect more cases of uncommon types of disc hernias.

Keywords : *Disc, Hernia, MRI.*

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I. INTRODUCTION

Magnetic resonance imaging (MRI) is a non-invasive, multi - planar, neuro - diagnostic imaging tool with superiority in excellent soft tissue contrast [1]. Exoneration from bony artifacts is an added advantage in MRI anatomical evaluation of the spine. MRI has become very useful in anatomical evaluation of thoracic disc hernias as its symptoms are non-characteristic [2].

Disc cartilages are the supportive fibrous cartilage of the entire spine. Disc hernia is a degenerative process in which the gel-like centre of disc cartilage called nucleus pulposus ruptures through the tougher outer wall of the annulus fibrosus.[3]. The tougher peripheral annulus fibrosus protects the inner nucleus pulposus from evisceration. But with

increasing age and onset of cartilage degeneration and desiccations, disc herniation ensues. Aetiologies are mainly degenerative or traumatic [3].

The commonest site of disc herniations is in the lumbar spine[1,4]. The site of predilection is L4/L5 disc cartilage[3]. While over 90% of all disc herniation occur in the lumbar spine, the cervical and thoracic spine disc herniations are uncommon.[4,5,6]. The incidence of thoracic disc herniation is reported to be one per million per year [2]

The symptomatology is usually pain and neurological deficits related to the anatomical localization of the disc herniation. Lumbar disc hernia is the commonest cause of low back pain[7].

AIM : To add to available literature documentations of three types of uncommon disc hernias.

SETTINGS: Polyclinic Bonanjo, Douala.

II. CASE REPORTS

a) Case Report 1

F K is a 63 year old male Cameroonian with 2 year history of chronic low back pain that has become un-responsive to usual intake of non-steroidal anti-inflammatory drugs (NSAID). He has normal bladder and bowel control , but has L5 dermatone sensory loss and grade 4 right lower limb power. Straight leg raising test (Lasegue's test) was restricted to 60° on the right and 90° on the left leg. Lumbo-sacral MRI showed 10.9 X8.7mm ovoid material that is isointense to the parent disc and posterior-lateral to the right of L5 vertebral body (FIG 1&2) with type 2 end - plate changes. Axial images (FIG 2) showed compromise of right neural foramen at L4/L5 . Spondylotic changes were confirmed by lumbo - sacral radiograph. A diagnosis of L4/L5 sequestered disc hernia into L5 spinal canal with secondary spondylosis was made. He underwent discectomy and patient had a relief of discomfort better than pre-operative status (McCulloch's clinical outcome grade 3). He failed to come for 6 months post-operative MRI.

b) Case Reports 2

M L is a 34 year old male Cameroonian with chronic low back pain for 2 years due to a hit on the back by a trainee in Karate sport. This led to lower limb weakness and crutches-assisted mobility . Sensory loss from T10 dermatone with hyperactive Achilles' tendon

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and patellar reflexes were noted. Upper limb showed reduced power but normal sensations. MRI of the thoracic spine showed significant T11/T12 disc hernia (FIG 3). Cervical MRI showed spondylotic changes with posterior osteophytosis on C4-T1. Bilateral narrowing of C5/C6 and C6/C7 neural foramina were shown in the MRI axial acquisitions (FIG 4). Thoracic radiographs supported spondylosis and scoliosis. A diagnosis of T11/T12 disc herniation was made. Patient declined discectomy and went for Overseas treatment

c) Case Reports 3

AA , a 72 year old male Nigerian has worsening chronic low back pain for 5 years with radiation to the lower limbs. He also had frequency , hesistancy , nocturia. normal Fasting blood sugar is normal and serum PSA was also norma (4 IU/L.). Abdomino-pelvic ultrasonography showed probably benign prostatic enlargement with volume of about 65mls. He has had bony fusion surgery as a result of a similar back pain 5years earlier. Lumbo-sacral spine radiograph showed L3/L4 bony ankylosis with L2/L3, L4/L5 disc space narrowing and spondylotic changes. Lumbo-sacral spine MRI showed bony fusion of L3/L4 with little residual anterior or posterior disc cartilage. L2/L3 and L4/L5 disc hernias were seen with L2/L3 severer than L4/L5. He had trans-urethral prostatectomy and conservative management of his multi-level disc hernias. He had post-operative urethral stricture complication in the penile -bulbous urethra which was bougeinaged.

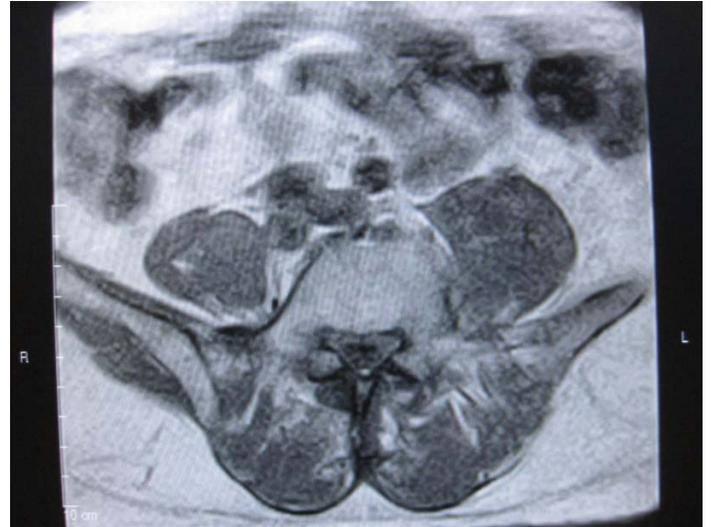


Fig. 2 : Axial T1w Mri Image Showing Sequestered L4/L5 Herniated Disc In The Right of L5 Spinal Canal, Compressing Posterior Theca Sheath.



Fig. 3 : Sagittal T2w Mri Image Showing Significant Anterior Theca Sheath Compression By T11/T12 Disc Hernia



Fig. 1 : Sagittal T1w Mri Image Showing L4/L5 Sequestered Disc Hernia Behind L5





Fig. 4 : Axial T1w Mri Image At T11/12 Showing Showing Bilateral Neural Foramina Narrowing, Worse On The Right



Fig. 5 and 6 : Lumbo - Sacral Radiograph Showing L3/L4 Bony Ankylosis. Intervening



Fig. 7: Intervening Residual L3/4 Disc Was Shown on MRI Image

III. DISCUSSION

The 4 progressive phenomena in disc hernias are disc bulging, protusion or prolapse, disc extrusion and sequestration[8]. Disc bulging, according to description of Jansen is circumferential extension of the disc beyond the interface [9]. Annular bulge represents stretched but intact annular fibres and is usually asymptomatic except when canal is congenitally narrow[9]. If there is now a focal tear of the inner margin of annulus, it is called disc protusion. When the tear is complete, it is called disc extrusion and the extruded disc is contained only by posterior longitudinal ligament. This disc can move cranially and caudad but it is always attached to parent disc. When this disc breaks loose from parent disc and not confined by posterior longitudinal ligament, it can either move superiorly or inferiorly, hence called disc sequestration [9]. When this free fragment lies near its parent disc, it's rounded in shape but irregular or oblong when separated from parent disc [10]. It may migrate to a different inter-space both in midline or in lateral recess, but can rarely penetrate the dura or cross the midline[10]. It is difficult to identify the posterior longitudinal ligament disruption [10]. MRI is the hallmark in the diagnosis of sequestered disc (SD) due to its good soft tissue contrast and multi-planar nature [11]. The complementary use of Gado-pentetate Dimeglumine could obscure or clarify T1W and T2W MRI findings in such disc pathologies [11].

MRI radiological features of SD include Bull's eye sign of a rim enhancing round or oblong intra-spinal

material isointense to parent disc [11]. The non-enhancing centre is regarded as a central dot sign [12]. The enhancing rim is due to inflammation and granulation tissue. Double fragment sign is the low signal intensity (dark line) between the SD and parent disc [12]. SD are easier to recognise in T2W and T2W* due to increased water content [10].

The signs and symptoms of SD are aggressive and severe. For example severe low back pains, lower limb pains and neurological deficits like cauda equine syndrome presenting with weakness of bladder and anal sphincters [13]. The pathogenesis of SD symptomatology is like any other disc herniation. Mechanical compression and inflammation in nerve root / dorsal root ganglia induced by herniated nucleus pulposus may play an important role in pathogenesis of spinal pain [7,14]. In the thoracic spine, the ratio of the diameter of the spinal cord to that of the spinal canal is large and the blood supply to this region is limited. This makes thoracic spinal cord vulnerable to compression from disc hernia [2]. Herniated nucleus pulposus has even been thought as enchondroma arising from intervertebral disc producing nerve root compression [7]. It is also strongly considered that nucleus pulposus has inflammatory properties to affect the nerve root function, structure, vascular permeability and pain [7]. Such immunogenic potential is the current pathophysiological theory incriminating pro-inflammatory mediators produced on the surface of nucleus pulposus and causing nerve root pain [14,15]. Differential diagnosis of SD are Neurofibromatosis, Epidural abscess, Epidural fibrosis, Conjoined nerve roots (Tarlov cysts) and Wrapped disc [5,10].

The incidence of thoracic disc herniation is low compared to that of cervical or lumbar disc hernias. It constitutes only 1% of disc prolapse [16,17]. It actually represents 0.5% and 4.5% of all disc hernias [2]. This is likely due to the unique anatomy and function of the thoracic spine [16,17]. Thoracic disc hernia is only 1% of disc prolapse with 75% of all thoracic hernia occurring below T8 and majority seen at T11/T12 [2,16,17] (as seen in our index patient). This is thought to be due to weakness of posterior longitudinal ligament and increased mobility of lower thoracic spine [2]. Such T11/12 disc hernia was also reported by Isla et al who on surgical intervention even further revealed the hernia to be the rarer intra-dural thoracic disc herniation[18]. In the case of intra-dural disc herniation which forms only 0.26-0.30% of all herniated disc, thoracic type is greater (5%) than the cervical type which is 3% and lumbar taking 92% [19]. It is also most common in the 3rd and 4th decade of life like our own patient [16,17]. But middle age and older people are slightly more at risk if they indulge in strenuous activities. In terms of age incidence our index patient is similar to the case study of Sasaki et al who reported a rarer case of a thoracic

disc prolapsed at T2/T3 disc level [20] Thoracic disc is quite rare [3]. Upper thoracic disc hernia can mimick cervical disc hernias whereas herniation of the rest of thoracic disc hernia can resemble lumbar disc hernia [3].

Thoracic disc injury occur spontaneously and risk factors for thoracic disc hernias are improper lifting, smoking, genetics, recreational activities, injury, pre existing degenerative changes [16,17,19]. Trauma is said to be a factor in only 10-20% of cases as noted in our patient [17].

The three major clinical presentation of thoracic disc herniation are axial pain, radiculopathy and myelopathy [21,22,25]. Axial pain with local compression of the surrounding anatomy causing thoracic back aches. Radiculopathy due to compression of passing nerve root leading to radiating pain along the rib cage and abdomen. Myelopathy due to compression of the spinal cord leading to paraparesis of the legs, difficulty in walking, bowel and bladder control disorders. The pain could be midline, unilateral or bilateral and has an attendant radicular distribution [21,22,25]

Radiological investigations of disc hernias include, Computed tomography (CT) myelogram, Myelogram, Electromyography,, Conventional radiography, and Nerve conduction velocity studies. The preferred modality of choice is Magnetic Resonance imaging (MRI) due to its multi-planar and good soft tissue contrast. With MRI, percentage spinal compromise by calculating mean canal cross-sectional area can be done, assisting in surgical prognostications [6].

The presence of a residual disc in between the fused L3/L4 vertebrae in the third case report supports acquired aetiology of spinal fusion (iatrogenic arthrodesis) instead of congenital vertebral segmentation anomaly.

Management of disc hernia could be conservative or surgical. The implication of chemical factors in patho-genesis of pain in disc hernia justifies conservative management [14]. This is supported by the fact that disc surgery does not consistently provide commensurate pain relief. Besides, large disc hernias are not always symptomatic and severe pain may be present in patients without any imaging evidence of nerve root compression. [14] Conservative therapy is often effective and considered as the severity of symptoms and neurological signs are often not well correlated with the size of disc hernias [14]. Methylprednisolone, Diclofenac, Indomethacin, Doxycycline and Cyclosporine may induce variable inhibition of this inflammatory effect [14,15]. Conservative management includes, rest, physical therapy, home exercise, hydrotherapy, epidural steroids, chiropractic manipulations and medications. This

includes drugs like non-steroidal anti-inflammatory drugs, muscle relaxants like Carisoprodil, Benzodiazepine [17]. Herniated disc reabsorbs over time especially the larger uncontained extruded disc and SD [13]. These types tend to regress even to a greater extent. [13].

Surgical treatment (Micro-discectomy) is done when conservative treatment fails. Surgical treatment is discectomy. This could be micro-surgical discectomy or minimally invasive endoscopic discectomy [20,25,26]. Minimally invasive micro-endoscopic discectomy causes less muscle injury than a traditional discectomy [26]. Thoracic disc hernias represent only .15% and 1.8% of all surgically treated hernias [2]. Transthoracic anterior-lateral route allows wide exposure for decompression [2]. In lateral approach to thoracic disc herniation, micro-surgery is done through a costo-transversectomy [22, 23]. Percutaneous micro-decompressive endoscopic thoracic discectomy with added application of non-ablative lower Holmium laser energy for disc shrinkage (laser thermolysis) appears to be easy, safe and efficacious. This less traumatic, easier outpatient treatment leads to excellent results, faster recovery and significant economic savings [24].

Patient after discectomy are able to return to normal job activity within 6 weeks [13]. McCulloch's judges functional outcome after discectomy into grade 1-4. Grade 1-is complete relief of symptoms, Grade 2 is mild discomfort and able to participate in all activities and grouped as satisfactory. Grade 3- is better than pre-operative status with significant limitations of activities and/or requiring medications and/or bracing. Grade 4 is unsatisfactory, no better than pre-operative status and unable to return to work [13]. Complications of discectomy exist. But a rare complication of recurrent radiculopathy resulting from epidural gas has been reported in 4 different cases [25].

Reoccurrence thoracic disc hernia is by proper lifting technique, good posture, dignity during standing and sitting, appropriate exercise, healthy weight and lean body mass, strengthened abdominal weak muscles, avoidance of smoking and positive attitude to stress.

IV. CONCLUSION

In conclusion, this is a further addition to literature documentations of uncommon types of disc hernias like thoracic disc hernia and sequestered disc hernia. Anticipation of further literature inputs will arise with increasing availability of MRI machines in developing world like Central African region.

The authors declare no conflict of interest.

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