International Journal of Radiology Research
www.radiologyjournal.in
E-ISSN: 2663-4562, P-ISSN: 2663-4554
Received Date: 01-05-2019 Accepted Date: 01-06-2019; Published: 08-06-2019
Volume 1; Issue 3; 2019; Page No. 01-03

Epidemiological-clinical and MRI aspects of low back pain common to Antananarivo

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Abstract
Introduction: common low back pain is common and often causes severe disability and socio-economic problems. The aim of this work is to describe the epidemiological and MRI aspects of common low back pain in order to analyze their correlation.
Materials and method: this is a retrospective and descriptive study on MRI of the lumbar spine, performed at the Medical Imaging Center of the Ravoahangy Andrianavalona University Hospital, for 12 months.
Results: MRI of the lumbar spine constituted 19.90% of all MRI examinations. We selected 114 files. The extremes of age were 21 and 86 years old, with an average of 49.7 years. The age group most affected by common low back pain was 51 to 60 years old. Women predominated at 58.77%. The sedentary profession accounted for 70.17% of cases. Chronic low back pain accounted for 43.85% of the reasons for the MRI request. Disc degeneration was the most recovered cause. It includes the 78.07 % disc signal abnormality; disc fissure posterior to 59.64%; 79.82% disc protrusion and 14.91% vertebral plateau remodeling. Posterior vertebral osteoarthritis accounted for 41%. We found chronic evolution and multi-stage involvement of these lesions. The disc lesions had a statistically significant correlation between them. Vertebral arthrosis was associated with lower back pain.
Conclusion: MRI has an important role in the management of common low back pain.

Keywords: vertebral osteoarthritis, MRI, common low back pain, discopathy

1. Introduction
Common low back pain is a frequent symptom, related to vertebral arthrosis [1].Fifty to 70% of adults experience low back pain at some point in their lives [2]. In Madagascar, this is the first reason for consultation at the National Centre for Pain Control (CNLD) and constitutes 27.5% of the reasons for consultation at the Rheumatology service [3].
According to the High Authority of Health (H.A.S) Magnetic Resonance Imaging (MRI) is a complementary examination used as a second intention in the exploration of low back pain[1]. It is a non-irradiating imaging examination; the most efficient for the diagnosis of spinal arthrosic pathologies [4].The objective of our study is to describe the epidemiological-clinical profile and MRI lesions found in patients with low back pain. No similar studies have been done in Madagascar.

2. Materials and method
We conducted our study from the records of all patients referred to the CIM HUJRA for MRI of the lumbar spine, dated from January 1, 2018 to December 31, 2018. We selected 114 files. We included patients over 20 years of age; records with an indication or clinical information for spinal MRI that referred to common low back pain. The MRI examinations were performed on a 0.35 Tesla machine.
We studied some parameters: age, gender, body mass index (BMI), occupation, MRI indication, MRI protocol, and MRI findings.

3 Results
Social profile
The female gender predominated in our study, with 76.4%. The sex ratio was 0.7. The age group [51-60] predominated at 26.3%. The mean age was 49.17 years with a standard deviation of 13.2. Overweight patients predominated with 55.26%. Those with normal build represented 44.73%. The category of sedentary or non-physically active occupations predominated in our case with 80 cases out of 114.

Clinical profile
According to clinical indications for lumbar spine MRI, "lumbosciatic"predominated with 58 cases out of 114. We noted a chronic evolution of symptomatology in 83 cases.
MRI data
Ninety-five patients were examined without injection of gadolinium chelates, while 19 patients were injected with contrast media.
For the image acquisition protocol, we have performed the basic sequences available on our machine (Table 1).
According to MRI findings, discopathy was the most common

abnormality represented by disc protrusions in 80 % of cases and disc signal abnormality: in hyposignal on the T2 weighted sequence, associated with disc height loss, in 78 % of cases (Graded from 1 to 5 according to Pffirmann classification, Table 2 [5]. The other anomalies are listed in Table 3. The alterations of the vertebral plate are classified as inflammatory type 1, fatty type 2 and sclerosis type 3 according to Modic classification [6]. Based on the topography of these lesions, we found the predominance of multi-stage involvement.

Correlation between the different MRI lesions

Only 29 % of cases with vertebral plate revisions did not have posterior vertebral osteoarthritis with a p value= 0.0035. The association of posterior vertebral osteoarthritis with disc signal abnormality was common in multi-stage disorders (36%). Posterior vertebral osteoarthritis was present, regardless of its location, in 52.17% of cases with no disc protrusion. The association of the two anomalies was found in 19 cases in multi-level disorders (p= 0.008).

Grade 3 of Pffirrmann classification was most represented in association with disc protrusion (Figure 1) in multi-level disorders. For the other grades, association with disc protrusion (Figure 2) also predominated in multi-stage disorders

4. Discussion

In our study, the predominance of patients with common low back pain was in the 51-60 age group. The mean age was 49.17 years with a standard deviation of 13.2. These results are similar those of an epidemiological study of patients consulting for low back pain in the service of general medicine, in France [7] affirming the arthrosis origin of common low back pain which is the prerogative of the 5th decade.

The sex ratio was 0.7 in our study, with predominance of the female gender, in line with the French Society of General Medicine (SFMG) in 2017, on the predominant frequency of women suffering from common low back pain [7]. But Laurence B. [8] found a male predominance in his study. Trophostatic post-menopausal syndrome would be incriminated in our study.

In our study, overweight patients predominated with 55.26 % of cases joining Singwe *et al* [9] and Sereni *et al* [10] who reported that obesity has an important role in the chronicization of pain rather than in their development.

According to clinical indications, "lumbosciatic" predominated with 51%. Chronic pain evolution was observed in 72.80 % of cases. According to the literature, posterior vertebral osteoarthritis is a common cause of chronic low back pain [11] and 95% of lumbosciatics or low back pain with root canal syndrome is due to a herniation disc [12]. Most Malagasy still perceive low back pain as a simple malaise and not a symptom whose etiological diagnosis is to be sought.

In our study, 83.33% of cases were examined without contrast injection on an MRI at 0.35 Tesla following the protocol established in Table 1. According to the literature, MRI is not indicated as a first-line treatment for common or asymptomatic low back pain. It is indicated when medical treatment fails or when warning signs appear [13]. In our study, the slice thickness was 5-6 mm; the tissue contrast on the T1 weighted axial sequence is not optimal and there is a lot of noise on the T2 weighted sequence with fat saturation. But overall, the MRI at 0.35 Tesla still holds a place in the exploration of the lumbar spine.

The disc protrusion was the most common on the abnomalities seen on the MRI. It accounted for 83.33% of the cases in which the overall disc bulge and disc protrusion were most commonly found. This result is consistent with of Sawadogo, which confirmed the prevalence of disc herniation in 47 % of cases [14].

Only 29% of cases with vertebral plate revisions did not have posterior vertebral osteoarthritis in our study. Baudreuil J [15] described the prevalence of the Modic type 1 reaction in the context of acutisation of chronic common low back pain. The occurrence of degenerative changes in the vertebral plate in our study would be in the context of an acutisation of chronic pain probably due to the continuation of the daily gestures and activities of our lumbar vertebrae, causing repeated micro trauma to the lumbar spine.

The association of posterior vertebral osteoarthritis with disc signal anomaly was common in multi-stage disorders (36%, p=0.02). It was present, regardless of its location, in 52.17% of cases without a protruding disc. The association between vertebral osteoarthritis and disc protrusion was found in 19 cases in multistage patients (p= 0.008). The prevalence of T2 disc hyposignal is high in asymptomatic subjects and represents 36 to 85% in people aged 20 to 80 years. These anomalies predominate on floors L4-L5 and L5-S1. The prevalence of posterior vertebral osteoarthritis predominates at the L4-L5 level [16]. It can only be deduced that the predominance of these two anomalies, as association or in isolation, in multi-stage disorders presumes the rapid evolution of lumbar arthrosic injuries in Malagasy people, probably due to the excessive stress on the lumbar spine in daily activities or at work or to the participation of other factors triggering the mechanism of low back pain (dietary factor for example or genetic factor).

Grade 3 of Pffirmann's classification has been most represented in association with disc protrusion, especially in multi-stage disorders. For the other grades, the association with disc protrusion also predominated in multi-level disorders. We can deduce that in our series of cases, from the beginning of a disc signal abnormality represented by grade 3 of the Pffirrmann classification, the frequency of subsequent cracking (high intensity zone) of the intervertebral disc is high, hence the high frequency of disc protrusion. There are therefore specific factors for Malagasy people, for the early onset of disc protrusion, probably physical factors (harsh working conditions); nutritional factors and psycho-social factors related to the daily stress of Malagasy people.

5. Conclusion

Common low back pain is frequent and its etiologies are dominated by discopathy in Madagascar. Chronic evolutionary disease but with early onset and multi-level involvement of

lesions were noted in this study. Low magnetic field MRI remains a major asset in the management of low back pain common in Madagascar.

6. Tables and Figures

Table 1: Pffirmann classification

Grade	Signal and height of disk
1	Normal. Homogenous hyperintense
2	Inhomogenous with central band hypointense
3	Inhomogenous, gray with slightly decreased height of disk
4	Hypointense. Moderately decreased height of disk
5	Hypointense. Collapsed

Table 2: MRI lumbar examination protocol with 0, 35 Tesla Siemens Magnetom C at University Hospital Joseph Ravoahangy Andrianavalona imaging center.

Without gadolinium	With gadolinium
Sagittal T2 weight	3 space planes T1 weight
Sagittal T1 weight	
Axial T2 weight	
Axial T1 weight	
Sagittal STIR	

Table 3: List of MRI findings lesions

Abnormalities	Percent %
Modic reaction	15
Disc protrusion	80
Hyposignal and disc pinch	78
Posterior vertebral osteoarthritis	41
High Intensity Zone	60
Spondylolisthesis	8,77
Spondylolysis	0,88

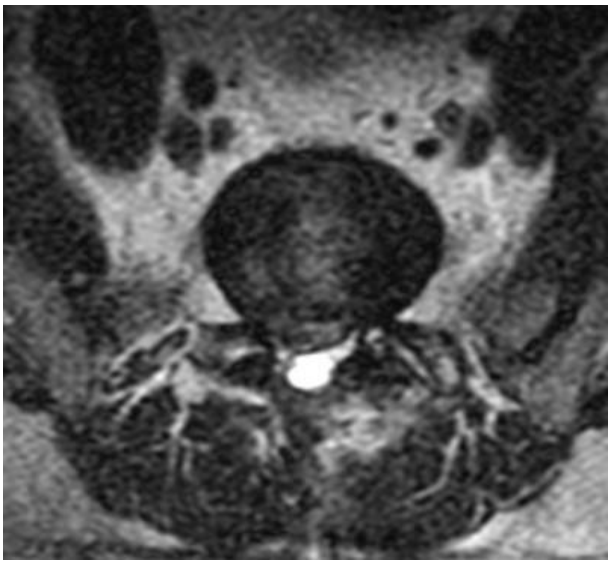

Fig 1: MRI scan showing disc herniation with lumbar canal stenosis

Fig 2: MRI scan in sagittal T2 weight showing abnormal disc signal, grade 4 of Pffirrmann. L4-L5 level

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