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Contribution of CT in the Exploration of Non-Traumatic Pathologies of the Lumbar Spine in Adults in Bangui

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Abstract

Background: In Central African Republic, a study carried out in 2019 highlighted the limits of conventional radiography in the diagnosis of non-traumatic lower back pain in adults. **Objective:** The objective of this study is to show the value of CT scanning in the exploration of non-traumatic pathologies of the lumbar spine in adults. **Patients and Method**: Retrospective and descriptive cross-sectional study covering the files of patients aged at least 18 years old, sent for lumbar scanning from March 1 to December 31, 2021 at the medical imaging center. **Results**: In total, 593 scan examinations were performed including 159 (26.8%) examinations of the lumbar spine. The average age of the patients was 49.84 years. The majority were male (66%). 127 (79.8%) were referred mainly to the neurology and rheumatology departments. Common low back pain (n = 97, 61%) was the main reason for requesting a CT scan. The lumbar scan was performed without contrast product in 88.7% of cases. In total, 148 (93.1%) examinations were pathological and dominated by overall disc overhang (62.2%) and somatic and interapophyseal osteoarthritis (16.9%). The other lesions were spondylodiscitis (7.4%), tumor-like lesions (3.4%) and narrow lumbar canal (1.4%).

Keywords

CT Scanning, Lumbar, Bangui, Adults

1. Introduction

The French Society of Rheumatology precisely defines low back, pain as lum-

bosacral pain located at the height of the iliac crests or lower (gluteal folds), medial or lateralized with the possibility of irradiation not extending beyond the knees, but with predominance of pain lumbosacral [1].

Low back pain, acute or chronic, is a common pathology [2] and represents 9% of reasons for consulting a general practitioner (2nd place among consultations), 7% of work stoppages, 8% of radiodiagnostic procedures, 3% of drug prescriptions, 30% of rehabilitation prescriptions and 13% of disabilities (3rd cause of disability) [3]. A systematic review puts this impression into perspective with less worrying prevalence figures, but still with a median of 42% for lifetime prevalence [4]. In the space of ten years, the frequency of low back pain has tripled. We speak of the "disease of the century", which shows the importance that low back pain has taken on in contemporary pathology [5].

The seriousness lies above all in the existence of "red alert signs" which must be identified clinically and make it possible to direct towards specific, sometimes serious, causes at the origin of "symptomatic low back pain" [6]. Although the consequences are less severe, it is a more costly health problem than AIDS, cancer or heart disease [7].

In black Africa, several studies carried out have shown the benefit of cross-sectional imaging, particularly CT and MRI, in the exploration of lower back pain [8]-[10].

In the Central African Republic, due to a lack of technical support, only one study was carried out in 2019 on the medical imaging of non-traumatic lower back pain in adults and highlighted the diagnostic limits of conventional radiography [11].

Since December 2020, the technical platform in the Central African Republic has been reinforced by a multi-slice CT scan. It is in this context that this study on the value of CT scanning in the exploration of non-traumatic pathologies of the lumbar spine in adults was carried out.

2. Patients and Methods

This was a retrospective and descriptive cross-sectional study covering the period from March 1 to December 31, 2021 and covering the files of patients of both sexes, at least 18 years old, referred for a lumbar scan in the center of medical imaging in the CAR.

This was an exhaustive sampling including all the results of lumbar scans carried out in the department during the study period. A pre-established survey form was used to collect data. These data related to sociodemographic variables (age, sex, profession), the indication for the examination performed and the results of the scan.

The data collected was entered into Word 2016 software, and analyzed with Epi-info 2008 3.5.1 software. The Pearson chi-square test was used to compare proportions and the chosen significance level was set at $p = 0.05$.

Given that we had worked on the reports of the scan examinations and also

due to the retrospective nature of the study, we were not able to obtain informed consent from the patients. However, the collection and analysis of the data were carried out regarding a strict respect for anonymity.

3. Results

In total, 593 CT examinations were performed including 159 (26.8%) lumbar spine examinations. The majority (66%) of patients were male with a sex ratio of 1.94.

The average age of the patients was 49.84 years with extremes of 20 and 85 years. The distribution of patients by age groups and their origin are shown in Table 1.

Table 1. Distribution of patients according to sociodemographic data.

Age range (years)	Number (n = 159)	Percentage
<30	7	4.4
[30 - 39]	33	20.7
[40 - 49]	31	19.4
[50 - 59]	53	33.3
[60 - 69]	27	19.9
≥70	8	5
Origin		
Bangui	158	99.3
Outside Bangui	1	0.7

The average was 49/84 years with extremes of 20 to 85 years. The patients came from Bangui in **99.3%** of cases.

The distribution of patients according to profession is presented in Table 2.

Table 2. Distribution of patients according to profession.

Profession	Number (n = 159)	Frequency
Civil servants	93	58.5
Retirees	20	12.6
workers	13	8.1
Traders	12	7.5
Housewives	11	7
Pupils/ Students	10	6.3

Civils servants (58.3%) were the most affected.

According to requesting service, most of patients came from the neurology and rheumatology departments (Table 3).

Table 3. Distribution of patients by requesting service.

Requesting department	Number (n = 159)	Frequency
Neurology/Rheumatology	127	79.8
General Medicine	30	19
Traumatology	2	1.2

The main reason for CT scan was common low back pain (Table 4).

Table 4. Indications for the examination.

Indication	Number (n = 159)	Percentage
Common lumbago	97	61
Lumbosciatica	52	32.7
Paraplegia	8	5
Walking disorders	2	1.3

Depending on the technique used, the scan was performed without contrast product in 88.7%.

Of the 159 lumbar CT examinations performed, 148 were pathological, or 93.1% of cases. These pathologies are presented in Figure 1.

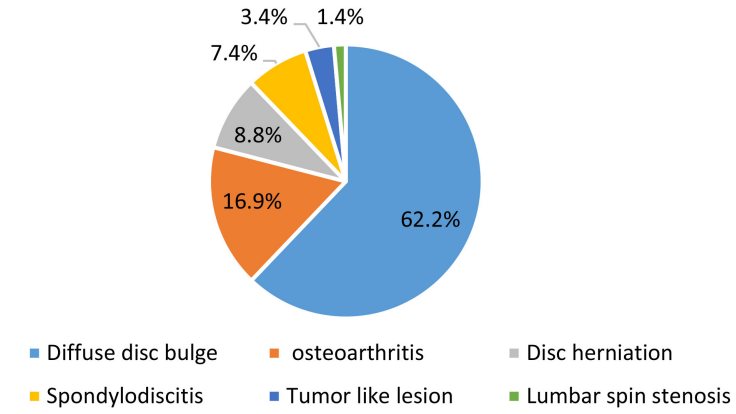

Figure 1. Distribution of pathologies observed. Majority of lesions were diffuse disc bulge.

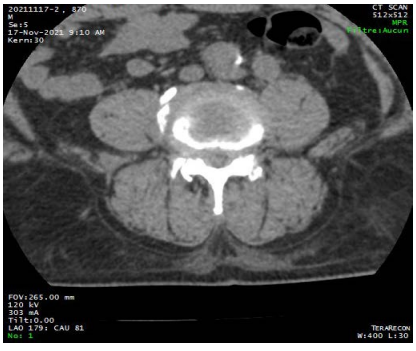

Figure 2. Nocontrast CT scan of lumbar in axial view showing global disc protrusion with bilateral disco radicular conflict.

Diffuse disc bulge are followed by Figure 2 and somatic or interapophyseal osteoarthritis (Figure 3). The majority of discopathies had neurological consequences, 35 cases involved nerve root impingement, 21 cases involved compression of the dural sheath, and the remainder had no neurological consequences. Tumor-like lesions (Figure 4) and narrow lumbar canals were rare lesion.

Figure 3. Nocontrast CT scan of lumbar in axial view showing osteoarthritis of the posterior joints with disc emptying.

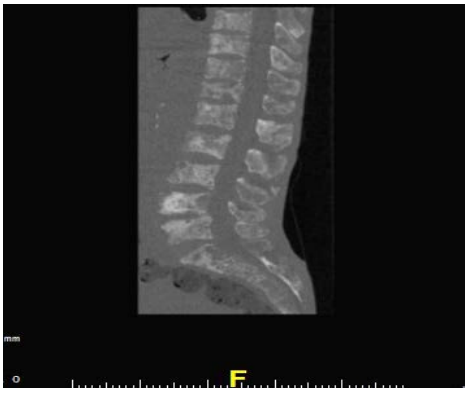

Figure 4. Nocontrast CT scan of lumbar in sagittal view showing mixed lytic and sclerotic lesion compatible with metastasis lesion.

Regarding topography of abnomaly, most of them were located in L4L5 (Table 5).

Table 5. Topography of lesions.

Topography of lesions	Number (n = 148)	Percentage
L1L2	3	2
L2L3	5	3.4
L3L4	90	60.8
L4L5	123	83.1
L5S1	108	73

Majority of abnomaly were located in L4L5 followed by L5S1.

4. Discussion

This study is the first of its kind to be carried out in the CAR. It has some limitations; in particular the retrospective nature of the study and the lack of a myelogram which should be carried out in front of a normal CT examination. However, this study provides information on the extent of non-traumatic lumbar pathology and the contribution of CT scans to their diagnosis.

The average age of the patients (49.84 years) is comparable to the average age of 49.58 and 49 years reported respectively by Deme and Diomande [12] [13]. The most represented age group (50 - 59 years) reveals that the subjects concerned were of an advanced age. For some African authors, this is the age when one practices a professional activity with high lumbar strain [14] [15].

The male predominance is also observed by some authors [10] [16] even if other works have reported the predominance of the female sex [17] [18].

It appears from this study that civil servants (58.3%) were those who had more performed the lumbar scan. This could explain the purchasing power of these people which can allow them to pay for this examination which remains a little bit expensive (75,000 CFA francs) for the average Central African. In fact, the Central African lives on less than 2 USD per day (Economic Report of the Central African Republic, World Bank 2022).

Regarding the indications for lumbar CT, the American College of Radiology (ACR) published in 2016 an update of its guidelines concerning the use of imaging in the management of acute low back pain; only low back pain persisting after 6 weeks of medical treatment and physical therapy as well as low back pain accompanied by "red flags" should be referred for imaging [19] [20]. The analysis of the indications for lumbar CT shows that the clinical information in our possession is not sufficient to know whether the benchmarks concerning imaging were respected in the face of common low back pain, the main indication for CT in our series (61%). A profound gap between the rules of good practice and reality cannot be excluded in these conditions.

The indication for CT scanning was justified for other reasons, namely lumbosciatalgia (32.7%), paraplegia (5%) and walking disorders (1.3%).

Of the 159 lumbar CT scans performed, 148 (93.1%) were pathological, which is consistent with the work of Van Rijn and Bischoff which shows that the scanner is sensitive in the exploration of lumbar pathologies in 77.4% and specific in 73.7%. Even if MRI is presented as the imaging of choice with respective specificities of 95.7% and 92.8%. However, in the face of a normal CT examination, myelo CT should be performed in the absence of an MRI [21] [22] which was not done during this study.

The main lesions observed on the scanner were disc anomalies (71%), including 62.2% overall disc overhang and 8.8% disc herniation. Somatic or interapophyseal osteoarthritis was observed in 16.9%. These results are corroborated by the average age of patients and the most represented age group. Indeed, overall disc overhang and osteoarthritis are degenerative pathologies, occurring in el-

derly subjects. Degenerative spine pathology is a disease caused by natural or premature aging of the joints of the spine, and most often results from disc degeneration and posterior inter-apophyseal osteoarthritis [23]. Our results overlap with those of Sonhaye in Togo [10], Deme [12] in Senegal and those of Dammers and Koehler in the Netherlands [24] who reported a predominance of disc anomalies respectively in 57, 44.1 and 50.4/% of cases. However, these authors highlighted disc herniations as being the main disc damage, contrary to our results which present overall disc overhang as the main disc damage. The other lesions observed were Spondylodiscitis (7.4%), tumor-like lesions (3.4%) and narrow lumbar canal (1.4%).

5. Conclusion

Non-traumatic lumbar pathology is common in our context and is the prerogative of adults in their fifties mostly male with common low back pain. It is dominated by degenerative lesions, and most often involves the intervertebral disc at the bottom of the lumbar spine. In the absence of MRI, CT is of major interest in the exploration of lumbar spine pathology.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Annex

Survey sheet

No. /___ /___/___/

1) Identity

- Age /___/___/ years
- Gender: 1 Male /___/ 2 Female /___/
- Profession: 1 Housewife /___/ 2 Civil servant /___ / 3 Worker /___/ 4 Pupil or Student /___/ 5 Trader /___/ 7 Others to specify /_____/
- Place of residence: 1 Bangui /___/ 2 Outside Bangui /___/

2) CT imaging

- Requesting department: 1 Neurology/Rheumatology /___/ 2 General Medicine (internal) /___ / 3 traumatology /___/ 4 Others to specify /_____/
- Examination technique used:

✓ With contrast product: 1/___/

✓ Without contrast agent: 2/___/

3) Scanner indication

1 Common low back pain /___/ 2 Chronic low back pain/___/ 3 Unilateral lower back pain /___/ 4 Bilateral lumbosciatalgia /___/ 5 Paraplegia /___/ 6 Health check /___/ 7 Cauda equina syndrome /___/ 8 Gait disorder /___/ 9 Others /___/ to specify …….

4) Expected result

- **Degenerative lesions**

1 Narrow lumbar canal /___/ 2 Narrowed lumbar canal /___/ 3 Conflicting disc herniation /___/ 4 Non-conflicted disc herniation /___/ 5 Spondyloarthrosis /___/ 6 Zygapophyseal osteoarthritis /___/ 7 Overall non-conflicting disc overhang /___/ 8 Conflicting overall disc overhang /___/

- **Infectious and inflammatory lesions**

1 Pott's disease /___/ 2 Non-tuberculous spondylodiscitis /___/

- **Tumor-like lesions**

1 Secondary osteocondensing lesion /___/ 2 Myeloma /___/ 3 Chrondrosarcoma /___/ 4 Osteoma /___/ 5 Osteoblastoma /___/ 6 Lumbar cyst /___/ 7 Others /___/ to specify ……..

- **Soft tissue lesions**

1 Paravertebral spindle /___/ 2 Thickening of the ligamentum flavum /___/ 3 Epiduritis /___/ 4 Soft tissue abscess (Normal) /___/

5) Site of lesion

1 L1-L2 /___/ 2 L2-L3 /___/ 3 L3-L4 /___/ 4 L4-L5 /___/ 5 L5-S1: /___/