

Contribution of Imaging in the Diagnosis of Cervico-Brachial Neuralgia of Degenerative Origin at the Radiology and Medical Imaging Department of the Bamako Army Medico-Surgical Center

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Abstract

Original Research Article

Cervico-brachial neuralgia (CBN) is defined as radicular topography pain of the upper limb, reflecting the suffering of one of the nerve roots of the brachial plexus: 5th, 6th, 7th, or 8th cervical root, more rarely the 1st dorsal root. This pain is characterized by a paroxysm generally nocturnal, it is spontaneous or provoked and localized on the route of the nerves exiting between the cervical vertebrae which constitute the cervical and brachial plexus. **Aim:** The objective of our study was on the one hand to carry out an anatomico-radiological study of lesions of the cervical spine in cervico-brachial neuralgia and on the other hand to study the radiological aspects of osteoarticular lesions of the cervical spine in cervico brachial neuralgia. **Subjects and Methods:** This was a prospective, cross-sectional, descriptive study concerning 250 patients collected between March 2020 and February 2022 in the medical-surgical center of the armies of Bamako. The study population consisted of consenting men and women presenting for assessment of cervico-brachial neuralgia, who performed at least one radiological examination and who showed lesions indicative of the said disease. **Results:** 250 patients were recruited in our. The average age was 44 years with extremes ranging from 40 to 90 years. 40% of patients were aged between 50 and 60 years. 55% of patients were female. 45% were housewives (housewives). 65% of patients had no history of trauma to the cervical spine. The C7 root was the most affected with 44.8%. The most common radiological abnormality was signs of cervical spondylosis in 90% of cases. Erosions of the vertebral endplates were the most encountered disco-somatic anomalies, i.e. 60% of patients followed by disc void with 25%. The most frequent site of osteophytes was from C5 to C8, or 80%. More than half, or 55.2%, of patients presented with bone demineralization. The most affected side was the right side, i.e. 70% of patients. Radicular pain radiated to the right forearm in 40% of patients. **Conclusion:** Cervicobrachial neuralgia is a neurological pathology linked to degeneration of the cervical spine and our study made it possible to highlight, through radiography and CT scan of the cervical spine, the bone and discovertebral lesions which cause cervicobrachial neuralgia. Age was a determining factor in our study. **Keywords:** Radiography, cervical spine scan, cervicarthrosis.

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INTRODUCTION

Cervico-brachial neuralgia (CNB) is defined as radicular topographic pain in the upper limb reflecting the suffering of one of the nerve roots of the brachial plexus: 5th, 6th, 7th, or 8th cervical root, more rarely the 1st dorsal root [1]. It is very common due to the high demand on the spine to perform numerous movements.

However, it seems that a category of active people is subject to this type of damage: that where the

neck is stressed for a prolonged period in an “anti-physiological” position which generates many constraints.

Neck pain as a whole constitutes a particular pathology. This pathology can appear insidiously and become irreversible if it is not diagnosed and treated in time; they cause discomfort; pains; a limitation of movements which may lead to a temporary incapacity to work or even the complete cessation of usual activity [2]. It is in view of the strong demand on the cervical spine

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and the upper limb in the execution of daily movements, however minimal they may be, and also due to the absence of a detailed radiological study on cervico-brachial neuralgia in our context that we decided to carry out an anatomico-radiological study of cervico-brachial neuralgia.

SUBJECTS AND METHODS

This was a prospective, cross-sectional, descriptive study concerning 250 patients collected between March 2020 and February 2022 in the medical-surgical center of the armies of Bamako. The study population consisted of consenting men and women presenting for assessment of cervico-brachial neuralgia, who performed at least one radiological examination and who showed lesions indicative of the said disease.

Data processing and analysis:

The data collected on the technical sheets were entered and analyzed using SPSS software.

RESULTS

250 patients were recruited in our. The average age was 44 years with extremes ranging from 40 to 90 years. 40% of patients were aged between 50 and 60 years. 55% of patients were female. 45% were housewives (housewives). 65% of patients had no history of trauma to the cervical spine. The C7 root was the most affected with 44.8%. The most common radiological abnormality was signs of cervical spondylosis in 90% of cases. Erosions of the vertebral endplates were the most encountered disco-somatic anomalies, i.e. 60% of patients followed by disc void with 25%. The most frequent site of osteophytes was from C5 to C8, or 80%. More than half, or 55.2%, of patients presented with bone demineralization. The most affected side was the right side, i.e. 70% of patients. Radicular pain radiated to the right forearm in 40% of patients.

Table I: Distribution of Patients According to Their Age

Age (Years)	Number	Percentage %
40-50	25	10 %
50-60	100	40 %
60-70	63	25 %
70-80	50	20 %
80-90	12	5 %
TOTAL	250	100 %

Our study found that 40% of patients were aged between 50 and 60 years.

Table II: Distribution of Patients by Gender

Gender	Number	Percentage %
FEMAL	138	55 %
MALE	112	45 %
TOTAL	250	100 %

More than half of the patients, or 55%, were female.

Table III: Distribution of Patients According to Their Profession

Profession	Number	Percentage %
HOUSEWIVES	112	45%
JEWELER	50	20%
NURSE	38	15%
TAILOR	25	10%
TEACHER	25	10%
TOTAL	250	100 %

Housewives were the most affected in our study with 45%.

Table IV: Distribution of Patients According to Their History of Cervical Trauma

History	Number	Percentage %
NIL	162	65%
TRAFFIC ACCIDENT	50	20%
INTENTIONAL BEATING AND INJURY	25	10%
DOMESTIC ACCIDENT	13	5%
TOTAL	250	100 %

Our work reported that 65% of patients had no history of trauma to the cervical spine.

Table V: Distribution of Patients According to the Affected Nerve Root

Affected Nerve Root	Number	Percentage %
C5	25	10%
C6	38	15.2%
C7	112	44.8%
C8	50	20%
D1	25	10%
TOTAL	250	100 %

The C7 root was the most affected with 44.8%.

Table VI: Distribution of Patients According to the Completion of A Standard Radiography

Standard Radiography	Number	Percentage %
YES	250	100%
NO	00	00%
TOTAL	250	100 %

Standard front and profile radiography was performed by all patients, i.e. 100%.

Table VII: Distribution of Patients According to the Achievement of a Three-Quarter ($\frac{3}{4}$) Profile Incidence

Radiographie De Profil $\frac{3}{4}$	Number	Percentage %
YES	220	88%
NO	30	12%
TOTAL	250	100 %

The $\frac{3}{4}$ profile incidence was achieved by 88% of patients.

Table VIII: Distribution of Patients According to the Completion of A CT Scan of the Cervical Spine

Completion of A CT Scan of the Cervical Spine	Number	Percentage %
YES	250	100%
NO	00	00%
TOTAL	250	100 %

All patients had a CT scan of the cervical spine.

Table IX: Distribution of Patients According to Radiological Signs

Radiological Signs	Effectif	Pourcentage %
UNCODISCARTHROSIS, OSTEOPHYTOSIS	225	90%
ADVANCED CERVICARTHROSIS	12	4.80%
NARROWED FORAMINA	13	5.20%
TOTAL	250	100 %

The most common radiological abnormality was signs of cervical spondylosis in 90% of cases.

Tables X: Distribution of Patients According to Disco-Somatic Lesions (Erosions of the Vertebral Endplates, Disc Void)

Disco-Somatic Lesions	Number	Percentage %
EROSION OF VERTEBRAL PLATE	150	60%
EMPTY DISC	63	25%
ABSENCE DE LESION	37	15%
TOTAL	250	100 %

Erosions of the vertebral endplates were the most encountered disco-somatic anomalies, i.e. 60% of patients followed by disc void with 25%.

Table XI: Distribution of Patients According to the Location of the Osteophytes

Location of Osteophytes	Number	Percentage %
FROM C5 TO C8	200	80%
FROM C5 TO D3	50	20%
TOTAL	250	100 %

The most frequent site of osteophytes was from C5 to C8, or 80%.

Table XII: Distribution of Patients According to Bone Demineralization

Bone Demineralisation	Number	Percentage %
YES	138	55.2%
NO	112	44.8%
TOTAL	250	100 %

More than half, or 55.2% of patients, presented bone demineralization.

Table XIII: Distribution of Patients According to Affected Side

Affected Sides	Number	Percentage %
RIGHT	175	70%
LEFT	75	30%
TOTAL	250	100 %

The most affected side was the right side, i.e. 70% of patients.

Table XIV: Distribution of Patients According to Radicular Pain Irradiation

Pain Irradiation	Numbre	Percentage %
RIGHT FOREARM	100	40%
RIGHT THUMB	75	30%
LEFT ARM	75	30%
TOTAL	250	100 %

Radicular pain radiated to the right forearm in 40% of patients.

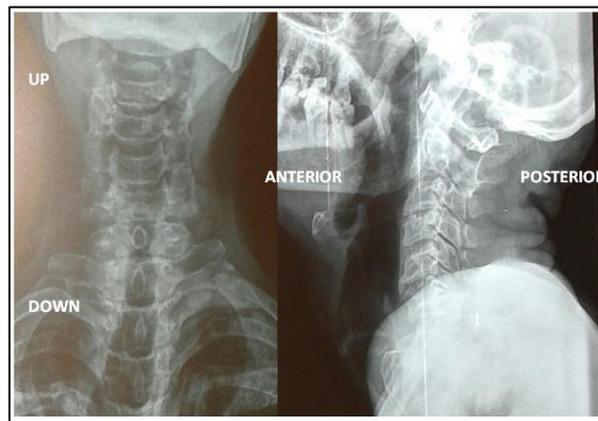


Fig 1: Cervical x-ray Face/Profile

Carried out in a 61-year-old patient, referred by the neurology department for right cervico-brachial neuralgia type C7, in whom we found a pointed

appearance of the C2, C3 and C4 unci with pinching of the C5-C6 and C6-C7 interlines. The profile shows a C4-C5 interapophyseal gap; C5-C6.

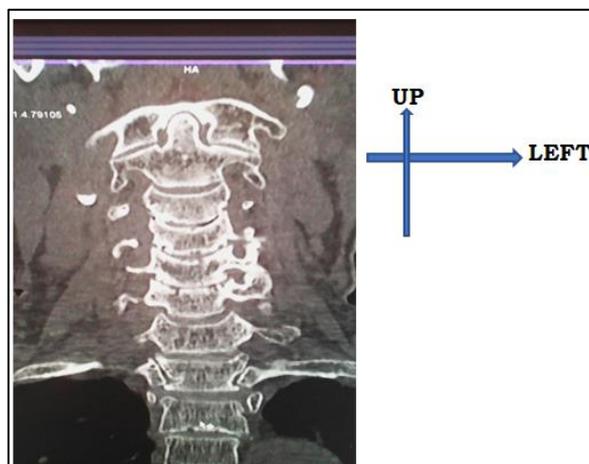


Fig 2: CT of the cervical spine (coronal reconstruction)

Performed in a 59-year-old patient, referred by the trauma department for cervico-brachial neuralgia. This coronal section reveals diffuse bone demineralization, condensation with erosion of the lower

vertebral endplates of C3, upper and lower C4, upper and lower C5, upper C6. A pinch of C3-C4, C4-C5 and C5-C6. There is also a disc gap between C3 and C4.

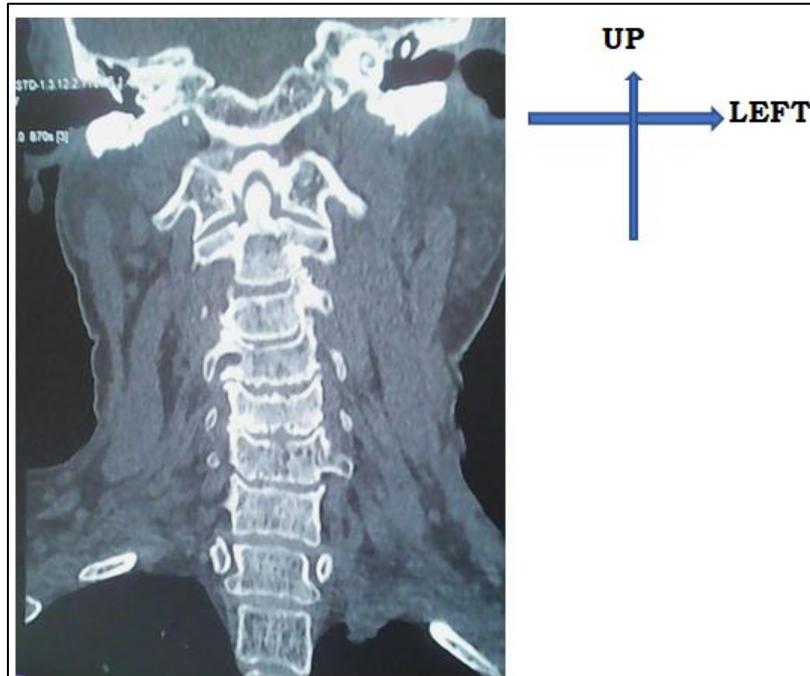


Fig 3: CT of the cervical spine (coronal reconstruction)

Carried out in a 63-year-old patient referred by a rheumatologist for cervico-brachial neuralgia in whom this CT scan found osteophytic beaks on the unci,

condensation and erosion of the vertebral endplates from C4 to C7, and stepped pinching.

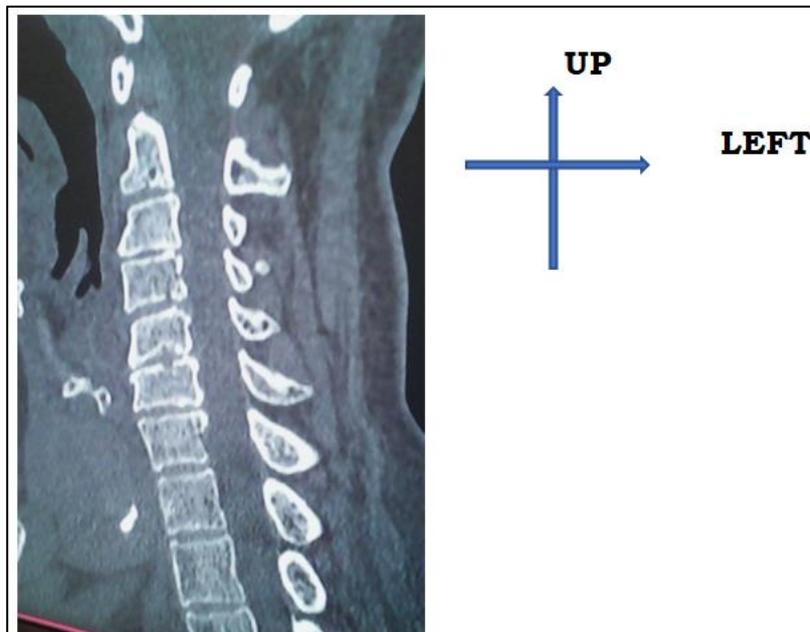


Fig 4: CT of the cervical spine (sagittal reconstruction)

Performed in a 61-year-old patient, referred by the neurology department for cervico-brachial neuralgia. This coronal reconstruction reveals condensation and

erosion of the vertebral endplates from C2 to C7 with a gap in C2, a posterior osteophytic beak of C7 and a stepped narrowing of C2 to C7.

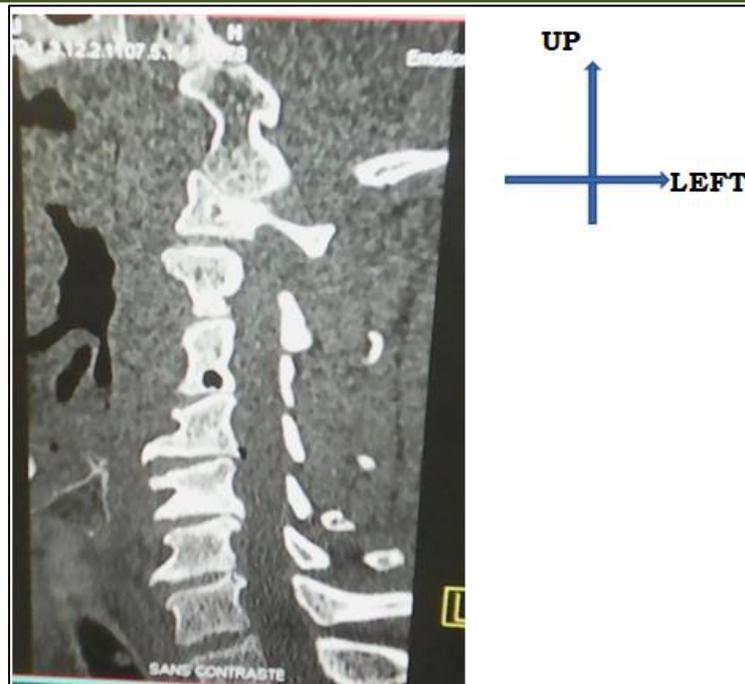


Fig 5: CT of the cervical spine (sagittal reconstruction)

Carried out in a 78-year-old patient, referred by the neurosurgery department for cervico-brachial neuralgia, in whom this sagittal reconstruction CT highlights a collapse of C2, a narrowing of C2-C3, and staged from C4 to T1. There is also a gap in the spinal canal at the level of C6, the anterior and posterior osteophytic beaks of C6, C7, T1 and T2.

COMMENTS AND DISCUSSIONS

This was a prospective, cross-sectional, descriptive study concerning 250 patients collected between March 2020 and February 2022 in the medical-surgical center of the armies of Bamako.

Age:

Our study found that 40% of patients were aged between 50 and 60 years. This corroborates the research of Bouvier M [3] who found that cervico-brachial neuralgia occurred in the majority of cases between the 5th and 6th decades. Coulibaly J-M [4] and Pallis C [5] found an average age of 53-63 years which represented 38.6% of their patients.

Sex:

In our work, 55% of patients were female. Maïga I *et al.*, [5] found that cervico-brachial neuralgia was more common in women than in men at 61.5%. This could be explained by weak neck muscles in women and the precarious working conditions to which these ladies are subjected, especially in rural areas.

The profession:

Our study found that housewives were most affected by cervico-brachial neuralgia with 45%. Similar results were reported in Mali by Adissa H and Coulibaly J. M [4]. This could be explained by the importance of

this pathology in women on the one hand and on the other hand by the precarious working conditions of the latter. This precarious working conditions for women with spinal pathology was noted by Makela *et al.*, [6].

Surgical medical history of patients:

Our work showed that 60% of patients had no history. This study is comparable to that of Friedenber Z. B. and Miller W. T [7] in whom the majority of symptomatic patients had no history, i.e. 78%.

The affected root:

The C7 root was the most affected root with 45%. This score is similar to that of Bouvier M [8] who in his series found type C7 root damage in 50% of cases.

Performing a standard x-ray:

All our patients, 100%, have had a standard x-ray. This could be explained by the fact that standard radiography is less expensive and more accessible. The ¾ profile view was achieved by 88% of those who had a standard radiograph. The advantage of this incidence is the good clearance of the conjugation holes. At Diallo S. [9] all patients took an x-ray, i.e. 100% and almost 90% took a ¾ profile.

Performing a CT scan of the cervical spine:

All patients in our study performed a CT scan of the cervical spine. CT remains the examination of choice in our context to better explore the cervical spine because it allows a multi-planar study in order to identify an etiology of this root pathology.

Radiographic Signs

The most common radiological abnormality was cervical osteoarthritis, in all patients. It included the

following forms: uncodiscarthrosis and osteophytes were the most observed radiological images. The foramina were narrowed in 5% of patients. The anomalies mainly concerned the C6-C7 and C7-C8 foramina. Pallis *et al.*, [5], found similar results in a study which focused on cervicarthrosis. These results are also comparable to those of CH Ben Hadji Yahia *et al.*, [10], who found cervicobrachial neuralgia of the degenerative disco-vertebral type in 80% of their patients.

Discosomatic lesions:

Erosions of the vertebral endplates and a disc gap were found in 40% of patients. But a large proportion, 60%, had no disco-vertebral abnormality. In Porter *et al.*, [11], 38.6% of patients had either erosion of the vertebral endplates and/or a disc gap.

The seat of osteophytes:

The most frequent site of osteophytes was C5 to C8, or 56%. Makela *et al.* [6] reported similar results, C5 and C8 represented 54% as the site of osteophytes.

Bone demineralization:

Bone demineralization was present in 55% of patients. A sign of a low calcium load, it was found in 58% of patients by Oniankitan O, Fiany E, Mijiyawa M [12].

The side affected by the radicular pain:

Single root topography was the most common with involvement of the C7 root in 45% of cases. The involvement of the right upper limb represented 70%. This could be explained by the predominance of right-handed subjects in our society. Farah A. A. [13] found 94.2% of patients reported radicular pain in the right upper limb.

Radiation of radicular pain:

Concerning the irradiation of pain, the right forearm was cited by 40% of patients. This confirms damage to the C7 root which manifests itself as pain radiating either to the forearm or to the finger in extension. On the other hand, Bouvier M [3] noted that the distribution of irradiation between the right and left arms was approximately equivalent and that the bilateral forms were exceptional, i.e. 2.0%.

CONCLUSION

Cervicobrachial neuralgia is a neurological pathology linked to degeneration of the cervical spine and our study made it possible to highlight bone and discover vertebral lesions through x-rays and CT scans of the cervical spine. Cervico-brachial neuralgia is a polyetiological pathology. During our study, the cases which were referred to us for etiological research and which we treated were mainly of degenerative origin.

Other causes such as tumor, infectious, endocrinological or traumatic were not found.

Declaration of conflict of interest: All authors declared that they have no conflict of interest.

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