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Muscular Dystrophies at The University Clinic of Neurology In CNHU-HKM Of Cotonou in 2020: About A Family Case

DJAOUGA S[1*], DOMINGO R[1], HOUEZE R[1], FATON A[3] TOHODJEDE Y[2], BALLEY G[1], ALAGNIDE E[3], GNONLONFOUN D[1], ADJIEN KC[1], ALAO MJ[4]

[1]University Neurology Clinic, National University Hospital Center-Hubert Koutoukou Maga
[2]University Clinic for Pediatrics and Clinical Genetics, National University Hospital Center-Hubert Koutoukou Maga
[3]University Clinic for Physical Medicine and Rehabilitation (CUMPR) National University Hospital Center-Hubert Koutoukou Maga
[4]Department of Pediatrics and Clinical Genetics, National University Hospital Mother and Child Lagune (CHU-MEL)

[*]**Corresponding author:** DJAOUGA Salim, University Neurology Clinic, National University Hospital Center-Hubert Koutoukou Maga. Email: djaougasalim@mail.com

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Abstract

Introduction: Muscular dystrophies represent a heterogeneous group of pathologies still underdiagnosed in African countries. In Benin, very little data exists so far on these pathologies. This study aimed to describe the clinical and paraclinical profile of a family case of myopathy encountered at the CUN of CNHU-HKM in Cotonou, Benin.

Method: This was a cross-sectional and prospective descriptive study that took place over a period of 06 months. The study population consisted of the index case received in consultation and all the other members of his family reconstituted from a pedigree taking into account 5 generations.

Results: A total of 4 subjects with myopathy were identified. The mode of transmission of the affection in the siblings was of autosomal recessive type. The onset signs were comparable in all affected subjects (falls, walking difficulties). The average age of onset of these signs in our series was 21.5 years. A delay in diagnosis was noted in all patients. The clinical examination always found a deficit of the pelvic girdle highlighted by the sign of Gowers. No intellectual deficit was noted in our patients. The cardio-respiratory examination of our patients did not note any pathological particularities. The loss of mobility occurred in only one of the subjects included around the age of 40 years. CPK levels were elevated in all of our patients. All of the patients had myogenic traces on the EMG. Echocardiography was unremarkable in all our patients. Muscle MRI, EFR and muscle biopsy could not be performed due to technical and infrastructural difficulties.

Conclusion: Myopathies remain underdiagnosed due to the weakness of the technical platform which is still based on insufficient clinical and paraclinical arguments. A nationwide study with the availability of genetic tests is necessary to better understand these pathologies in African countries.

Keywords: muscular dystrophy, autosomal recessive transmission, Benin.

Introduction

Myopathies are characterized by a primary functional or structural impairment of skeletal muscle [1]. They are distinguished from other disorders of the motor system by their clinical and paraclinical characteristics. They include more than 200 pathologies whose origins are mainly primary (genetic or autoimmune) and more rarely secondary (bacterial or viral infection, endocrine diseases, exposure to toxic substances) [2, 3]. The best-known myopathy is that described by Duchenne de Boulogne in the mid-19th century. Today, several dozen other muscle diseases have been identified on clinical and histopathological grounds, and the molecular definition of many of them has been acquired [4,5]. As early as the end of the 19th century, William Erb identified a particular group of these diseases, whose manifestations mainly affected the pelvic and shoulder girdles: limb-girdle myopathies [6].

Study Methods

The present study took place at the University Neurology Clinic (CUN) of the National Hospital and University Center Hubert KOUTOUKOU MAGA in Cotonou (Republic of Benin). This was a descriptive cross-sectional study over a period from April 1, 2020 to September 31, 2020. The study population consisted of the index case seen in consultation and all other members of his family, who were reconstituted on the basis of a pedigree taking into account 5 generations. Any subject presenting progressive muscle weakness with increased CPK levels was considered to be suffering from myopathy. In this way, all patients with myopathies belonging to the index case's family were recruited. The family context provided important support and elements for the diagnosis.

Results

Various findings in the study are illustrated in Figures 1, 2, 3, and 4, and in tables 1 and 2.

The family investigation enabled us to find and examine 36 subjects. During this examination, 4 patients were diagnosed with myopathy (figure 1)

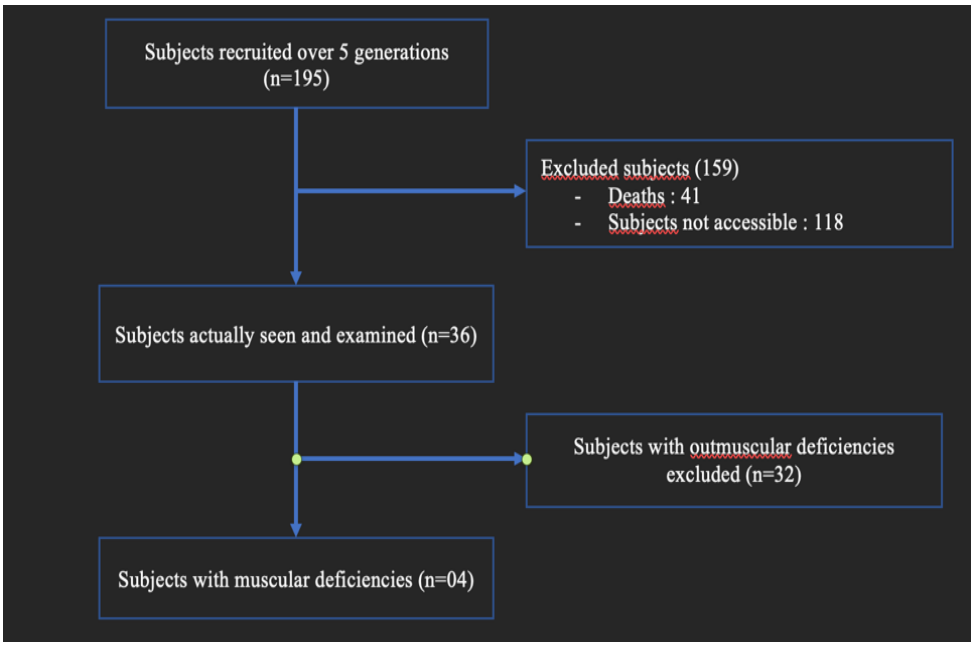

Figure 1: Five-generation family flow chart (CNHU-HKM, 2022)

The family tree, covering 5 generations, describes the links between family members and their status with regard to the condition (Figure 2):

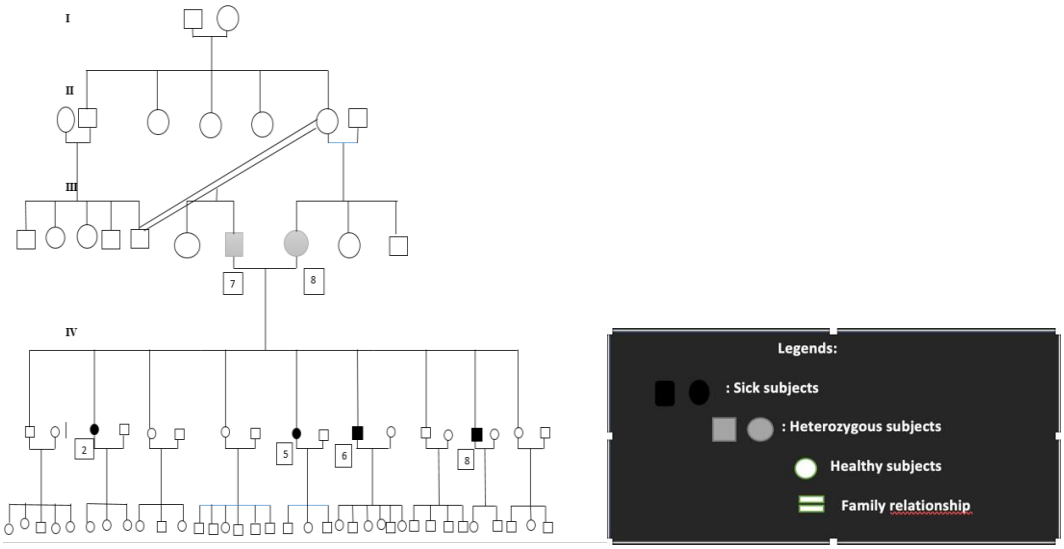

Figure 2: Family tree covering 5 generations (CNHU-HKM, 2022)

Observations:

A total of 4 subjects with myopathy were identified. The main findings of the various clinical and paraclinical examinations are summarized in Tables I and II: certain clinical aspects are illustrated in Figures 3 and 4. All affected subjects presented with scapular detachment and associated hyperlordosis, and one had moderate scoliosis (Figures 3). The only bedridden patient had lost her ability to walk by the age of 25. The other three still walking, albeit with difficulty.

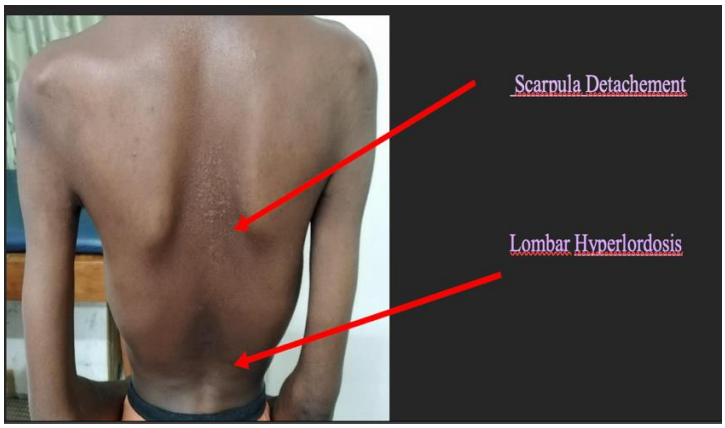

Figure 3: Illustration of scapular detachment and hyperlordosis in a 30-year-old patient (CNHU-HKM, 2022).

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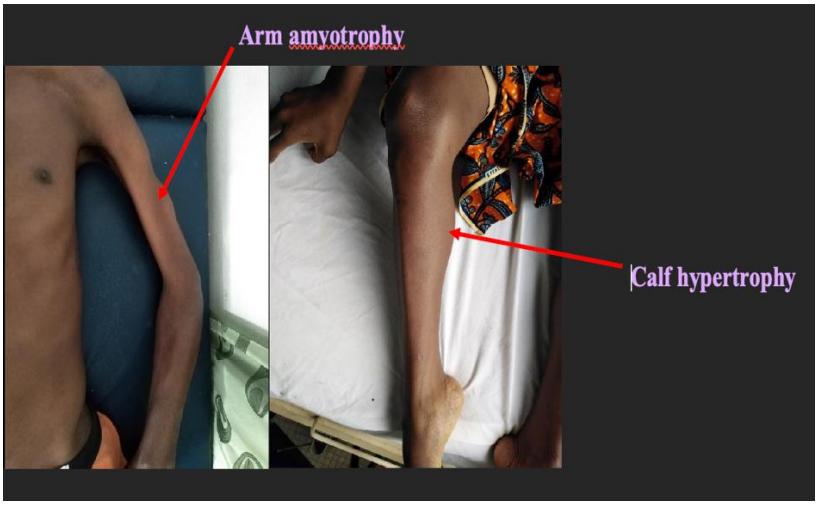

Figure 4: Illustration of arm amyotrophy and calf hypertrophy (CNHU-HKM, 2022).

Respiratory examination was strictly normal in all patients. Cardiological examination revealed palpitations in one of the four affected subjects.

Table I: Summary of clinical characteristics of affected subjects (CNHU-HKM, 2022).

	Age of onset	Signs of onset	Topography and symmetry of deficit	Gowers' signs	Gait pattern	Presence or absence of calf pseudohypertrophy	Idiomuscular reflexes	Myalgia cramps	Tendon retractions	Orthopaedic signs (scapula detachment, scoliosis, etc.)	Cognitive disorders	Other signs (palpitations, dyspnoea, swallowing disorder, etc.)
IV.2: Girl 48y Absent Absent	**22y**	**Gait disorder Falls**	**Proximal and symmetrical deficit of hip and arm flexors and extensors**	**Present**	Waddling	Present	Abolished	Absent	Absent	**Scapula detachment with dorsolumbar scoliosis**	Absent	Absent
IV.5: Girl 43y	**25y**	**Gait disorder**	**Proximal and symmetrical deficit of flexors and extensors**	**Grabbing**	**Grabbing**	Present	Abolished	Present+	Absent	**Scapular detachment with hyperlordosis and dorsal scoliosis**	Absent	Absent
IV.6: Boy 40y	**20y**	**Weaknes s of pelvic limbs**	**Proximal and symmetrical flexor and extensor deficits**	Present	**Waddling**	Present	Abolished	Present ++	Absent	**Scapular detachment with hyperlordosis and lumbar scoliosis**	Absent	Absent
IV.8: Boy 32y Absent Present	**19y**	**Falls Gait disorder**	**Proximal and symmetrical deficit of flexors and extensors**	Present	**Waddling**	Present	**Abolished**	Present+	Absent	**Scapula detachment with hyperlordosis and dorsal scoliosis**	Absent	**Palpitation++**
++ : modest ; + : restrained												

Table II: Summary of paraclinical characteristics of affected subjects (CNHU-HKM, 2022)

	CPK (U/L) (VN= 0-195)	**Blood tests (CBC,VS, CRP, Ionogram, Calcemia...)**	**EMG**	**Cardiac ultrasound (ETT)**
IV.2: Female, age 48	**756 (high)**	**Normals**	**- Myogenic tracing on detection examination. - Motor and sensory NCVs normal, - No decrements on repetitive low-frequency stimulation**	**- LVEF preserved. -No signs of hypokinetic cardiomyopathy or heart failure**.
IV.5: Female, 43ans	1345 (hign)	Normals	**- Myogenic tracing on detection examination. - Motor and sensory NCVs normal, - No decrements on repetitive low-frequency stimulation**	**-- LVEF preserved. -No signs of hypokinetic cardiomyopathy or heart failure**.
IV.6 : Mâle, 40ans	1874 (high)	Normals	**- Myogenic tracing on detection examination. - Motor and sensory NCVs normal, - No decrements on repetitive low-frequency stimulation**	**- LVEF preserved. -No signs of hypokinetic cardiomyopathy or heart failure**.
IV.8 : Mâle, 32ans	2834 (high)	Normals	**- Myogenic tracing on detection examination. - Motor and sensory NCVs normal, - No decrements on repetitive low-frequency stimulation**	**-- LVEF preserved. -No signs of hypokinetic cardiomyopathy or heart failure**.

Discussion

This study is one of the few carried out in West Africa describing the clinical and paraclinical profile of Duchenne like muscular dystrophy. Despite the lack of genetic testing in our patients, the data obtained gives an overview of the characteristics of this condition in black Africans.

Family tree: this established the relationship between the 2 spouses (coefficient 0.0625), parents of the sick children. It enabled us to determine the mode of transmission of the disease. In fact, none of the affected subjects' parents was affected by the disease, it did not affect all generations, and lastly, subjects of both sexes were equally affected. These three characteristics, which are specific to autosomal recessive inheritance disorders, led us to conclude that our patients had Duchenne-like myopathy (the only autosomal recessive inheritance muscular dystrophy). Above all, analysis of this tree raises the issue of genetic counselling. Indeed, the probability that subjects considered apparently healthy are heterozygous like their parents, and therefore carriers of the condition, were not negligible. Genetic counselling will therefore have the overriding interest of preventing the occurrence of other cases in the family. The data from the family tree study also had the merit of refocusing the framework for further research, particularly molecular biology, which was not yet possible on site. In addition, the family tree is already providing us with target population support for the use of the genetic marker to search for heterozygotes in the extended family. Finally, with the support of biological tests, it will be possible to confirm to parents which children have been spared the disease.

Clinical aspects: signs of onset were comparable in all affected subjects, represented by falls and walking difficulties. Similar early symptoms, including frequent falls, loss of gait, difficulty running and climbing stairs, have been reported previously in Cameroon and Italy [11, 12]. The mean age of onset of these signs in our series was 21.5 years. This is higher than the 11 years reported by Moumouni et al. in Niger in 2011 [13], and considerably higher than the 13 months reported by Sonan et al. in Côte d'Ivoire in 2007 [14]. In our series, despite the onset of symptoms averaging around 21 years of age, the clinical diagnosis of myopathy was not made until a much later age (averaging 40.7 years). This late diagnosis suggests that modern medicine is not the first port of call for care. Clinical examination always revealed a pelvic girdle deficit, easily demonstrated by Gowers' sign. Deficiency of the pelvic girdle preceded that of the shoulder girdle, despite the observation of systematic detachment of the shoulder blades. This chronology of girdle involvement has also been described in gamma-sarcoglycanopathies of the Maghreb, Niger and India [13,15,16]. The idiomuscular reflex was abolished in all subjects in our series. The same observation was made by Sonan et al. in Côte d'Ivoire [14] and Sadanand D. et al. in India [17]. hypertrophy of the calves have also been consistently reported. This is thought to be the result of progressive replacement of part of the muscle tissue by fatty (adipose) tissue, due to the necrosis-regeneration lesions that characterize muscular dystrophy. However, this sign is not specific to this type of myopathy, as it has been reported in other myopathies, notably dystrophinopathies [18, 19]. Two other signs were constant in affected subjects, as described by other authors: symmetrical detachment of the scapulae (fig. 3 and 4) and arm amyotrophy [17]. Loss of mobility occurred in only one of the subjects around the age of 40, which is in line with the results of studies carried out in other populations. Duchenne like has the particularity of a relatively slow evolution with an almost normal life expectancy, in contrast to dystrophinopathies which rarely exceed the 2nd decade of life [20].

Paraclinical aspects: All blood tests (CBC, VS, CRP, blood calcium and and ionogram) were normal. The normality of these tests ruled out any acquired cause of myopathy. CPK levels, which represent markers of muscle necrosis, were elevated in all our patients, as reported in other studies of myopathies [11-13]. CPK levels were also found to be higher in younger patients, in line with the literature, which shows that CPK levels are higher at the onset of the disease and decrease with age, in parallel with fatty involution of the muscles [13]. In our series, all patients had pure myogenic EMG tracings. This result is similar to that of Maiga A. [19], who also found myogenic tracings in all his patients. In other words, both EMG and CPK are tests that can be used to detect any muscular disorder, whatever its origin. Muscle MRI, EFR, genetic assessment and muscle biopsy have not been carried out due to financial, technical and infrastructural difficulties. Future studies will take these aspects into account for greater characterization.

In terms of treatment: short-term corticosteroid therapy was introduced in the three subjects who had not yet experienced severe gait impairment. Corticosteroid therapy had been shown to be beneficial, although the timing of its prescription is still a matter of debate. It is thought to help stabilize the disease by delaying clinical progression and correcting muscular weakness [21]. Clinical trials are underway to evaluate certain curative treatments that have already produced encouraging results in mice, some of which (Translarna®) have even received conditional marketing authorization in the USA and Europe (Institut of Myology, France) [22].

Evolutionary and prognostic aspects: at this stage of evolution, our patients' vital prognosis was preserved in the absence of cardiorespiratory complications, which are the main cause of myopathy's seriousness and determine its vital prognosis. Rhythm and conduction disorders, or dilated or non-dilated cardiomyopathy, can be the cause of death in patients at a relatively young age [23]. It is difficult to predict with certainty the absence of cardiac complications. However, cardiac complications are observed mainly in patients with α, γ and b sarcoglycanopathies, whereas respiratory complications such as restrictive syndrome, sleep apnea, respiratory failure and pulmonary infections occur mainly in α and γ sarcoglycanopathies [24]. Progression is usually slow and, above all, highly variable. Several studies emphasize the great intra- and interfamilial variability [25].

Conclusion

Myopathies are a heterogeneous group of muscular pathologies that are relatively rare worldwide, but even more so in African countries such as Benin. They remain under-diagnosed due to the weakness of the technical platform, which is still based on insufficient arguments: clinical and paraclinical signs (CPK elevation, myogenic EMG tracing). We have reported 4 cases of Duchenne like whose diagnosis was essentially based on clinical and paraclinical findings.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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ETHICAL APPROVAL

Not applicable.

Author Contribution

DJAOUGA S, DOMINGO R, HOUEZE R, FATON A: Consultation of the patient and family investigation for the family tree

DJAOUGA S, DOMINGO R, HOUEZE R, FATON A: Writing and original draft preparation

DJAOUGA S, DOMINGO R, HOUEZE R, FATON A TOHODJEDE Y, BALLEY G, ALAGNIDE E, GNONLONFOUN D, ADJIEN KC, ALAO MJ: manuscript reviewer

All the authors read and approved the final manuscript.

REGISTRATION OF RESEARCH STUDIES

Not applicable

GUARANTOR

The Guarantor who is responsible for the present case report is DJAOUGA SALIM.

DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

PROVENANCE AND PEER REVIEW

Not commissioned, externally peer-reviewed

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