Original Article

LOSS OF MUSCLE MASS IN CHILDREN HIV/AIDS OF VERTICAL TRANSMISSION EARLY WARNING OF AN ADVANCING DISEASE

Fernández Abello, V.; della Paolera, M.; Abot, M.; Cañas M. del R.; Sosa, M.; Aguirregomezcorta, A.;
Hospital for Infectious Diseases Francisco Javier Muñiz
Email: vfernandezabello@hotmail.com

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SUMMARY

The survival of children with HIV and their prognosis depend on the good maintenance of their nutritional status. Protein-calorie malnutrition causes immune deficiency, and wasting is associated with survival. Changes in body composition produce muscle fiber atrophy in skeletal muscle and a decrease in lean mass with severe reduction of the muscle compartment due to protein catabolism and preservation of the fat compartment, in most cases. Weight loss occurs at the expense of muscle mass (MM); predictive factor of therapeutic failure and lower survival in patients with HIV infection. We want to describe body composition in HIV/AIDS children of vertical transmission. Identify those children who present depleted MM. Relate anthropometry with CD4 levels. This is a descriptive and cross-sectional study. Seventy vertically transmitted HIV/AIDS children under HAART therapy were evaluated, who attended the Abbreviated Scheduled Hospital Hospital Muñiz period 2001/2019. Traditional anthropometry was used. L. and Orfila graphs: Weight/Height (W/T) and Height/Age (T/E), Tanner et al. tables: Triceps fold/E and NANHES I, Frisancho AR: Arm circumference/E (PB/E) and Arm Muscle Circumference /Age. (CMB/E) Statistical analysis Excel.

N=70 33 sex F (47.2%) 37 sex M (52.8%) Age 0-18 Median (MED)= 12.6 Mean = 15 Height/E Mean = 96.07 MED= 96.2. 62.8% (n 44) presented normal T/E(N) and 37.2% (n26) low. STD Deviation 39.7 Weight/Height Mode=104 Med=100, 65.7% (n 46) N, 7.2%

(n 5) overweight, 11.4% (n 8) obese and 15.7% (n 11) low P/T. STD deviation 43.4 WBC Very low: 21.4% (n 15), low; 18.6% (n 13), Decreased total WBC: 40% N: 55.7% (n 39) Increased: 4.2% (n 3) Of the children with MM decreased 71.4% (n 20) they present P/TN, 42% (n 12) CD4/E N and 17.8% (n 5) only have decreased MM and the rest of normal parameters. CD4 52.8% (n 37) without involvement, 34.3% (n 24) moderate, 12.9% (n 9) severe.

After more than 15 years of follow-up in vertically transmitted HIV children, we conclude that: a decrease in lean mass is observed even when the rest of the anthropometry may be normal, as well as the CD4 count. The measurement of MM could be used as a screening tool to quickly and easily investigate HIV/AIDS children who present nutritional risk due to increased metabolism, consequent risk of impaired immunity and therapeutic failure, which is not always evidenced by CD4 count, viral load, or growth assessment through weight and height.

Key words: children hiv/aids - nutritional status - body composition - muscle mass depletion - cd4 count

INTRODUCTION

Childhood is the most important period of physical growth and cognitive development of people. Specifically in children with HIV, changes in nutritional status not only compromise their development but also favor the progression of the disease and make them more vulnerable to infections and other diseases that impair their quality of life.

Malnutrition is an important and complex consequence of HIV infection that is related to problems that affect the ingestion, absorption, digestion, metabolism and utilization of nutrients.

The survival of these children and their prognosis, in addition to a timely, early and adequate diagnosis, and prompt access to health services for their care and management, among others, depends largely on the good maintenance of their nutritional status, hence the need to promptly incorporate them into a guided eating plan.

HIV-infected children have important differences in the course of infection when compared to adults, for example, they have much higher viral loads, much more rapid clearance of lymphocytes, infections are more severe or fatal, advancement to the AIDS category is faster and their immune system is much weaker, given their immaturity. In addition, the clinical manifestations are different from those presented by other age groups.

Protein-calorie malnutrition has an impact on the immune system, which causes immune deficiency, so wear is related to survival time.

Among the frequent alterations suffered by these children, changes in body composition and even more so changes in body reserves are undoubtedly a symptom of the wear and tear caused by the disease. Within these changes we want to highlight the progressive decrease in lean body mass that occurs over time and in turn the fat deposits that remain constant, even if they are low.

At the skeletal muscle level, muscle fiber atrophy occurs and therefore a decrease in lean mass. This causes the patient to lose strength and decrease resistance to effort.

Children with HIV/AIDS generally present a severe reduction in the muscle protein compartment, since they present protein catabolism, with preservation of the fat compartment in most cases. The weight loss experienced by these patients is fundamentally at the expense of muscle mass, this being a predictor of lower survival in patients with HIV infection. There is little research that shows the immunological status of children with HIV, the viral load being useful to determine this status and guide the doctor in making decisions regarding the choice and therapeutic changes necessary to modulate the course of the infection, improving quality of life and survival time of pediatric patients with HIV.2

The question we ask ourselves is whether a nutritional evaluation that includes body composition can be a useful, fast and economical tool to detect in pediatric patients with HIV-AIDS, through nutritional attrition but above all through the decrease in body mass. lean, a deficient immune system or a therapeutic failure? Is the evaluation of body composition a fundamental pillar to detect errors and successes in the child's treatment and thus contribute to improving it?

MATERIAL AND METHOD

Cross-sectional, observational and retrospective study. 70 children with HIV/AIDS under HAART therapy who attended through the IAP (Scheduled Abbreviated Hospitalization) period 2001/2019 from the Francisco Javier Muñiz Hospital to the external Nutrition clinic were evaluated.

The beginning of the IAP in our Hospital allowed the nutritional follow-up every three months of the children with HIV-AIDS disease. In each interview, a nutritional evaluation was carried out through food history, anthropometric evaluation and biochemical parameters, instruments that allow arriving at an opportune nutritional diagnosis. The children were evaluated with traditional anthropometry.

Anthropometry is a useful tool for making a nutritional diagnosis; Measurements are simple to perform, requiring simple equipment (scale, pedometer, stadiometer, tape measure, and caliper) and trained observers. The taking of the measurements must be standardized, so that the results are reproducible and their error is predictable.

Recording these measurements allows both the monitoring of the child's growth and the determination of their body composition (fat mass and lean mass), according to standard reference tables.

The standards used to assess the anthropometric data are based on adequate reference populations, which indicate the place that the person has with the total population, not with an absolute standard.
The anthropometric measurements used are weight, height, waist circumference, arm circumference and skinfolds. The CMB index (muscle circumference of the arm) that is calculated from the brachial perimeter and the tricipital fold allows us to know the total lean mass of the individual. The relationship between the different anthropometric parameters and indices, with respect to their age, sex and race, will allow us to know their caloric and protein reserves and nutritional status according to the aforementioned reference standards.
Lejarraga and Orfila charts were used for P / T and T / E, Tanner et al. tables for Tricipital Fold/E, and NANHES I, Frisancho AR for Brachial Perimeter/E and Arm Muscle Circumference/E. Statistical analysis Excel.

For the evaluation and analysis of the results obtained from the variables according to sex and age, the following cut-off points were considered:

The immunological categories of the HIV-AIDS child are established from the total percentage of CD4 + T lymphocytes. At birth it is very high and decreases during the first years of life until it reaches the normal adult level. CD4+ T lymphocytes are the main target of HIV-1, which induces their destruction and consequently the development of immunodeficiency with characteristic clinical manifestations.
For the evaluation of immunological compromise according to the CD4+ T cell count, the following cut-off points were used:

MEASURE	CUT POINT	REFERENCE POPULATION
Percentage suitability for T/E	<95%=Low Size ≥ 95% Normality	Lejarraga and Orfila
Percentage adequacy for P/T	< 90% Underweight 90-110% =Normal 110-120%= Overweight >120=Obesity	Lejarraga and Orfila
Triceps fold (TP)	Pc<10= Decreased fat mass Pc 10-75 = Normal fat mass Pc>75= Increased fat mass	Tanner JM et al.
Arm Muscle Circumference (ABC)	Pc<5= Very low protein reserve Pc 5-10= Low protein reserve Pc 10-90= Normal protein reserve Pc >90 Increased protein reserve	Nhanes I

Immunological classification of HIV infection according to the count of CD4+ T Lymphocytes

	Under 12 months	1-5 years	6-12 years
immune category	No./mm3 (percentage)	No./mm3 (percentage)	No./mm3 (percentage)
1- No Commitment	≥ 1500 (≥ 25)	≥ 1000 (≥ 25)	≥ 500 (>25)
2- Commitment moderate	750-1499 (15-24)	500-999 (15-24)	200-499 (15-24)
Commitment serious	<750 (<15)	<500 (<15)	<200(<15)

RESULTS: Of the total sample (n=70), 33 people correspond to the female gender and 37 people to the male gender, 47.14% and 52.8% respectively.
The total sample (n=70) was made up of 0 and 18 years old. Of which 14.28% (n=10) of the sample was represented by children between 0 and 5 years old, followed by children between 6 and 12 years old, representing 54.38% (n=38) of the population. sample and 31.42% (n=22) corresponding to children from 13 to 18 years old. being the median of
12.66 and the mean of 15.

SUITABILITY SIZE/ AGE: Height for age reflects the linear growth achieved for that age, at a given time. When height for age is short, the WHO proposes to differentiate between short stature and stunted growth.
Of the total sample (n=70), mean: 96.07 Median 96.2. 62.85% (n=44) presented a percentage of height adequacy for age within normal ranges while 37.14% (n=26) presented this low percentage. The STD deviation for T/E is 39.775

TABLE Nº1. CLASSIFICATION ACCORDING TO SEX (N=70)

SEX	AMOUNT	PERCENTAGE
FEMININE	33	47.14
MALE	37	52.8

Source: self made.

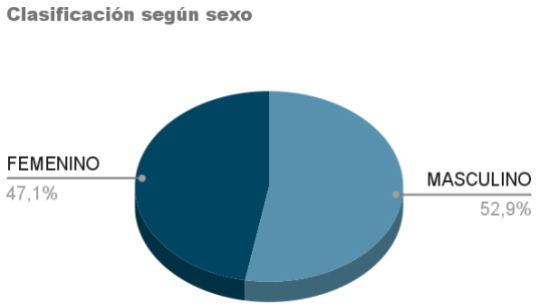


TABLE Nº2. CLASSIFICATION ACCORDING TO AGE (N=70)

Age range	Quantity	Percentage
0 a 5 years	10	14,28%
6 a 12 years	38	54,38%
13 a 18 years	22	31,42%

Source: self made.

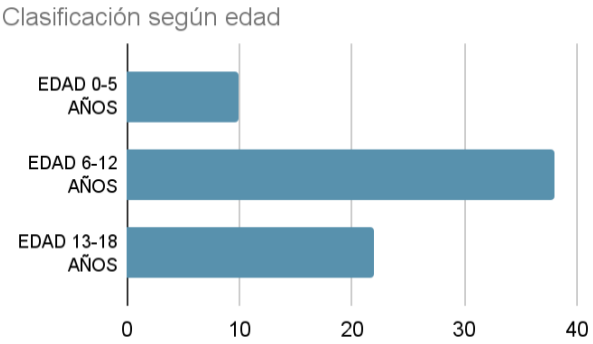
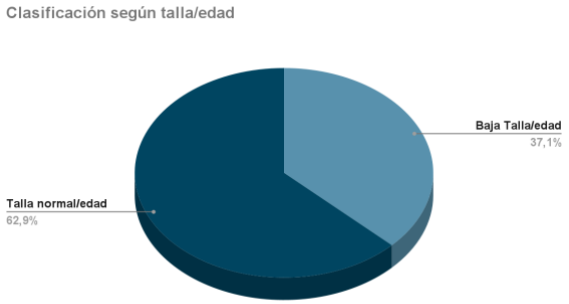


TABLE Nº3. CLASSIFICATION ACCORDING TO HEIGHT/AGE PERCENTAGE

Suitability SIZE/AGE	<95% (low height for age)	>95 (normal height for age)
Number of children	26	44
Percentage	37.14	62.85

Source: self made



37.14% of the sample presented short stature for age

SUITABILITY WEIGHT/SIZE

The Weight for Height reflects the relative weight achieved for a given height, describes the total body mass in relation to said height and allows to measure past situations. Of the total sample (n=70), Mode: 104, median: 100. 67.71% (n=46) presented a percentage of weight adequacy for normal height, 7.14% (n=5) presented overweight, 11.42% (n=8) presented obesity and 15.71% (n=11) presented this percentage below normal parameters. The STD deviation for P/T is 43.48

ARM MUSCLE CIRCUMFERENCE (ABC)

The arm circumference reflects both caloric and protein reserves, and allows the identification of children at risk of protein malnutrition. However, the measurement of the perimeter is influenced by the thickness of the tricipital fold, the value of the radius of the bone, the muscle mass and the possible retention water present at that site. One way to reduce the error caused by these variables is to calculate the mean muscle circumference of the arm (CMMB (cm)= PB (cm)- (0.314 x PT (mm))

Of the total sample (n=70), 21.42% (n=15) had a very low arm muscle circumference, 18.57% (n=13) had a low WBC, 55.71% (n=39) presented this measurement within normal parameters while 4.2% (n=3) presented this measurement above normal parameters.

Therefore, it can be affirmed through the data obtained that a portion close to half of the sample presents this measurement below the normality parameters (39.99%). Within this group of children with decreased muscle mass, we found that 71.42% (n=20) had adequate weight for height, 42% (n=12) had a CD4 within normal values for their age, and 17.8% (n=5) plus all other normal anthropometric parameters.

TABLE Nº 4. CLASSIFICATION OF CHILDREN ACCORDING TO SUITABILITY OF WEIGHT/SIZE

Suitability WEIGHT/SIZE	UNDER WEIGHT	NORMAL	OVERWEIGHT	OBESITY
Number of children	11	46	5	8
Percentage	15.71	67.7	7.14	11.4

Source: self made

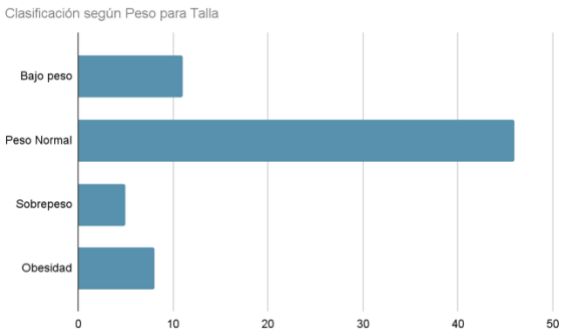


TABLE Nº 5. Classification of children according to CMB/AGE

Number of children	WBC Very low	WBC Low	Normal WBC	elevated WBC
Quantity	15	13	39	3
Percentage	21.42	18.57	55.71	4.2

Source: self made

39.99% of the sample presents CMB below normal parameters. Within this group of children with decreased muscle mass, we found that 71.42% (n=20) had adequate weight for height, 42% (n=12) had a CD4 within normal values for their age, and 17.8% (n=5) plus all other normal anthropometric parameters.

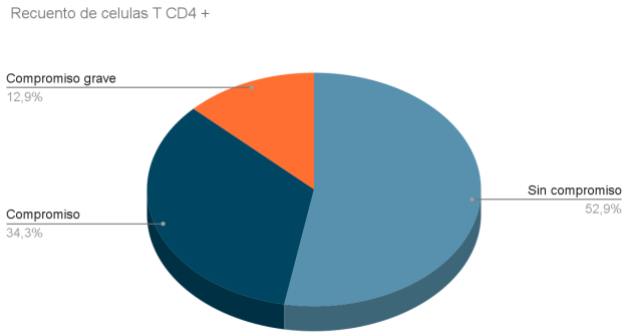
VALUES OF CD4+ T LYMPHOCYTES:

Of the total sample (n=70), 52.85% (n=37) had no compromise, 34.28% (n=24) had moderate compromise, while 12.85% (n=9) of the sample presented severe compromise.

TABLE Nº6. CD4+ LYMPHOCYTE COUNT

TL CD4+ count	Without obligation	moderate commitment	serious compromise
number of children	37	24	9
Percentage	52.85	34.28	12.8

Source: self made



CONCLUSIONS

After more than 15 years of nutritional follow-up, a population with a high nutritional risk was observed, which is evidenced through the measurement of anthropometric parameters such as height for age, and CMB (arm muscle circumference) for age. , The decrease in muscle mass is still observed despite the fact that the rest of the anthropometric measurements may be normal, as well as the CD4 count. This alteration of body composition, which occurs at the expense of lean mass depletion, is a predictor of lower survival, with which this measurement could be used as a screening tool to screen all HIV/HIV children in a simple and rapid way. AIDS who present nutritional risk with increased metabolism and consequent risk of impaired immunity, which is not always evidenced by CD4 count, viral load, or growth assessment through weight and height.

The evaluation of body composition carried out periodically is today a new challenge and a fundamental pillar that can help us determine if the treatment is being adequate or not for the child infected by the Acquired Immunodeficiency Virus.

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