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Research Article

Anthropometric study in cœliac subjects in the active phase of the disease and after restriction to gluten.

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Abstract:

Gluten intolerance is noticed by a faltering of weight gain and growth (CSP) ; it is certified by a therapeutic trial under the action of a glutenoprive regime. The aim of this work is an anthropometric study to assess the nutritional status of 16 patients with cœliac disease (MC) aged 08.43 ± 0.49 years ($\overline{X}$ ± SE), examined in 3 phases (B_1, B_2 and B_3). 9 hospitalized patients for reasons other than the cœliac disease will serve as witnesses. The P/T ratio was significantly increased in step (B_2) to (B_1) ($p<0.05$). The difference becomes significant when comparing B_1 to B_3 ($p<0.01$). The individual values of different anthropometric variables of patients with cœliac disease, show that 87.5% of cases have reached a phase of the CSP (B_1). In phase (B_2) and (B_3), respectively CSP persists in 75% and 56.25% of the cases. In conclusion, the patients with cœliac disease have an important phase B_1 failure to thrive. In a period of gluten restriction (RAG), it appears that the rate of CSP varies from one individual to another. Our results suggest that there is no standard length of the growth rate on the period of RAG.

Keywords: Cœliac disease – Gluten – Intolerance - Anthropometry.

INTRODUCTION

Celiac disease (CD) is a common condition responsible for chronic, multifactorial, autoimmune enteropathy induced by the ingestion of cereal gluten in genetically predisposed individuals [1-3].

This condition affects both sexes with a homogeneous distribution and it appears at any age, most often during infancy and childhood [4-5]. It accounts for just over a third of chronic diarrhea and as such constitutes a real public health problem [6-7].

The main clinical signs of celiac disease can occur at any time after the introduction of foods containing gluten in the diet. They are manifested by digestive disorders accompanied by a slowing down of growth and a fall in body weight; in the absence of diagnosis and early treatment, evidence of malnutrition gradually develops [8-12].

Emphasis has been placed here above all on one of the arguments of the positive diagnosis of gluten intolerance which is the clinical study ; whose main evocative elements are a clear break in the growth-weight curve (CSP) [13,8-9].

The diagnosis of certainty of this condition requires a therapeutic test confirming the improvement of this curve under the action of a gluten-free diet [14-16]. This led us to carry out an anthropometric study which aimed to assess the nutritional status of celiac subjects in the active phase of the disease and after restriction to gluten.

SUBJECTS & METHODS

Subjects

25 subjects of both sexes including a group celiac patients (n = 16) and a control group
(n = 09) were formed from the objective criteria of inclusion and exclusion defined in our protocol :

Group cœliac patients

Has 16 subjects, age between 5 and 13 years (08.43 ± 0.49 years, $\overline{X}$ ± S.E) diagnosed at admission to the Pediatric Department of the C.H-U of Sidi Bel-Abbès. All our subjects generally have severe or subtotal severe villous atrophy, very rarely partial villous atrophy.

Description of the subjects

The general characteristics found in our patients are reported in (Table 1).

Table 1 : General features of cœliac patients (n = 16).

	$\overline{X}$ ± S.E (mois)
Duration of breastfeeding	08,39 ± 1,59
Age at the introduction of gluten	05,37 ± 0,41
Age at the beginning of digestive disorders after introduction of gluten	22,31 ± 3,94
Age at diagnosis of CD	64,87 ± 6,05

$\overline{X}$: average ; S.E : standard error ; n : number of subjects.

The frequency of the main clinical signs of celiac patients on admission is shown in (Table 2).

Table 2: Frequency of clinical signs of cœliac patients at admission (n=16).

Symptoms at the beginning	Percent (%)
Diarrhea	62,5
Abdominal distention	87,5
Vomiting	18,75
Anorexia	81,25
Pallor	81,25
Œdema	43,75
Behavioral disorders	100
Stato-weight delay	87,5
Puberty delay	06,25

n : number of subjects.

The association of celiac disease with other pathologies and / or clinical signs is summarized on (Table 3).

Table 3: Association of CD with other diseases and / or clinical signs (n = 16).

Diseases or associated signs	Percent (%)
Parasitosis	31,25
Acrodermatitis entéropatica	06,25

n : number of subjects.

Control group

Formed of 09 subjects, aged 4 to 17 years (10.55 ± 1.47 years), hospitalized for reasons other than celiac disease and having to undergo a biopsy have a jejunal mucosa of strictly normal appearance.

Methods

Chronology of anthropometric measurements of MC subjects

Anthropometric measurements of celiac patients were carried out at different stages : in the active phase of the disease (B_1), in the gluten exclusion phase (B_2) that is to say after 111.00 ± 7.81 days / B_1 and in healing phase (B_3) that is to say after 261.00 ± 10.62 days / B_2.

The individual values of the different anthropometric variables of the MC subjects are compared with standard data established by [17].

Diet and duration

After performing anthropometric measurements in patients with celiac disease during the active phase of the disease (B_1), an essentially dietary treatment was instituted in this group until a definitive cure date. The principle of this treatment is based on the total exclusion of all foods containing gluten as well as products of industrial origin [18-20]. The duration of exclusion of cereal proteins from the diet of gluten intolerants was 372.00 ± 7.01 days.

Statistical analysis

The results are expressed as mean ± standard error ($\overline{X}$ ± S.E). The averages obtained in the MC subjects are compared with each other using the Student's "t" test. The difference between two means was usually considered significant when $p < 0.05$ and not significant in the other cases.

RESULTS

Anthropometric measurements

Anthropometric measures, especially weight and height are an index of the nutritional status of the subjects examined in our work. These parameters as well as the weight / size ratio are indicated in (Figures 1,2,3) respectively.

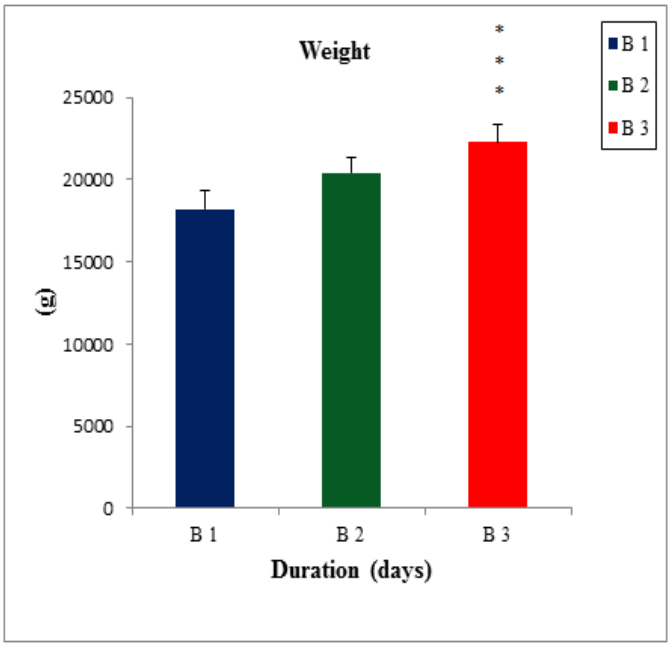

Figure 1 : Weight of celiac subjects (n = 16) in the active phase of the disease (B_1), in the exclusion phase of gluten (B_2) and in the healing phase (B_3).

The results are expressed as mean ± standard error ($\overline{X}$ ± S.E). The averages obtained in the MC subjects are compared with each other using Student's "t" test.
***p (B_1/ B_3) < 0,01.

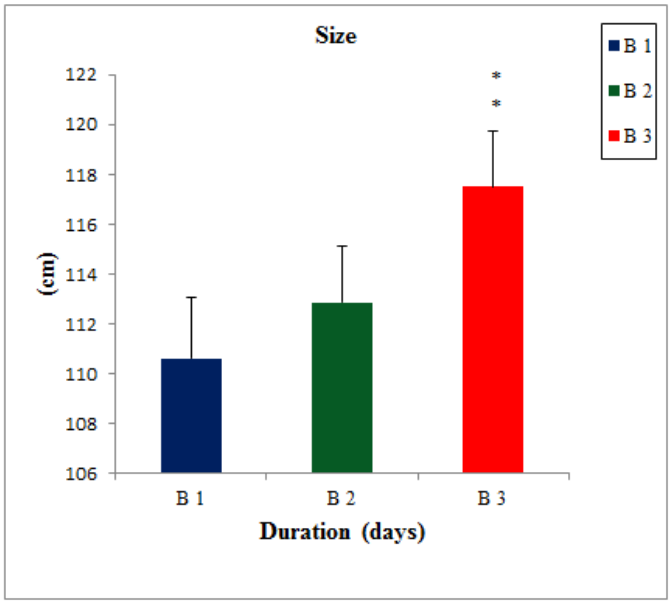

Figure 2 : Size of cœliac subjects (n = 16) in the active phase of the disease (B_1), in the exclusion phase of gluten (B_2) and in the healing phase (B_3).

The results are expressed as mean ± standard error ($\overline{X}$ ± S.E). The averages obtained in the MC subjects are compared with each other using Student's "t" test.
**p (B_1/ B_3) < 0,02.

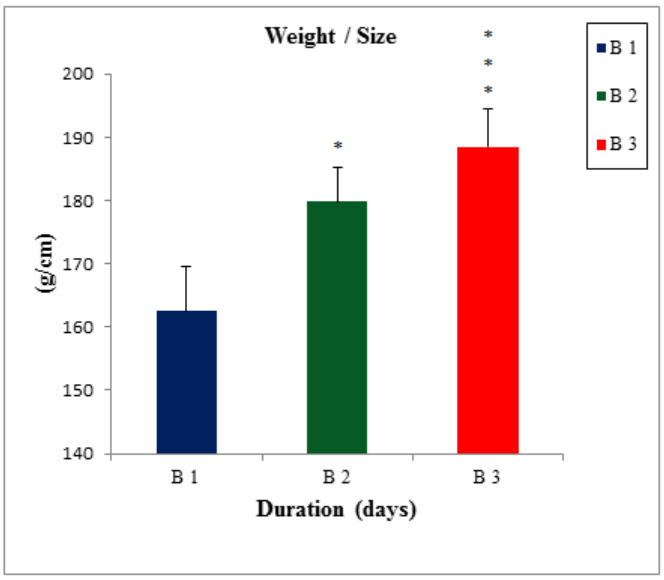

Fig. 3 : Weight/height ratio of cœliac subjects (n = 16) in the active phase of the disease (B_1), in the exclusion phase of gluten (B_2) and in the healing phase (B_3).

The results are expressed as mean ± standard error ($\overline{X}$ ± S.E). The averages obtained in the MC subjects are compared with each other using Student's "t" test.
*p (B_1/ B_2) < 0,05 ***p (B_1/ B_3) < 0,01.

Our results show that the weight and size of celiac subjects are comparable during the two experimental phases : B_1 and B_2. On the other hand, the P / T ratio is significantly increased in the exclusion phase of gluten (B_2) compared to the active phase of the disease (B1) (p <0.05).
In the healing phase (B_3), the weight of the celiac subjects is significantly increased compared to the active phase of the disease (B_1) (p <0.01). Similarly, the difference in size becomes significant when comparing B_1 to B_3 (p <0.02). The P / T ratio is significantly higher in the healing phase (B_3) than in the active phase of the disease (B_1) (p <0.01). This P / T ratio is considered as a good indicator that provides information on the evolution of the growth-weight curve before and at the end of the gluten restriction phase.
If we consider the individual values of the different anthropometric variables of celiac subjects compared to standard data established by [17] (Table 4);

Table 4: Evolution of the weight-of-height curve of MC subjects (n = 16) during the three phases (B_1, B_2 and B_3) compared to standard data established by Sempé and Pédron, (1970).

Biopsies	Stato-weight curve (%)
Reference subjects	100
MC subjects (stage B_1)	87,5
MC subjects (stage B_2)	75
MC subjects (stage B_3)	56,25

We note that in the active phase of the disease (B_1), 87.5% of the sick subjects have an impairment of the weight-of-weight curve. In the gluten exclusion phase, that is to say after 111.00 ± 7.81 days of gluten-free diet (B_2), this impairment of the weight-of-weight curve persists in 75% of cases. Finally, in the healing phase, ie after 261.00 ± 10.62 days of gluten-free diet (B_3), this impairment of the weight-of-weight curve still persists in 56.25% of cases.
At the same time, the 09 patients hospitalized for reasons other than celiac disease show an impairment of the weight-loss curve in 100% of cases compared to standard data established by [17].

DISCUSSION

In the active phase of the disease (B_1), 87.5% of the subjects presented an impairment of the weight-height curve (CSP) compared to standard data established by [17]. These results show the same observations cited by many authors as [21,13,15,22] which show that the clinical forms of celiac disease (MC) are multiple among which is the classic form which is manifested by disorders digestive patients accompanied by a break in the CSP.
At the same time, 12.5% of sick people have a normal weight-of-weight curve. Results concordant with the work of [23].
In this respect, we conclude that the anthropometric parameters show that celiac subjects have a significant failure to thrive in the active phase of the disease.
The therapeutic test demonstrates a rapidly favorable clinical course occurring in 12.5% of cases returning to a normal weight-normal curve after 111.00 ± 7.81 days. These results confirm the work of [24], which shows that the exclusion of gliadin is, as a rule, quickly followed by a favorable weight-of-weight catch-up. The child who follows the diet properly grows and gain weight normally, the latter regains weight and ideal size between 3 and 6 months after the start of the gluten-

free diet.

After 261.00 ± 10.62 days of gluten-free diet / B_2, a weight recovery occurs in 12.5% of cases whereas it is statural in 6.25% of cases. These results are in line with those of [25-26], which show that the weight deficit is greater than the height deficit and under these conditions, the child must have reached a normal weight and height after 6 months. months to one year of treatment.

As for the remaining cases, the weight-and-weight impairment persists in 56.25% of them. It is only statural in 12.5% of cases while that of weight persists only in 6.25% of cases. These results are in agreement with those of [25,27] which show that when the statural deficit is greater, the weight curve recovers more gradually and its recovery takes longer than 1 year. Sometimes the stagnation delay is increased by puberty or it corresponds to a global delay in maturation. The correction of this statural deficit is later, exceeding 2 years of diet [28,25]. Sometimes the evolution of the CSP is less favorable requiring the MC to strictly observe a gluten-free and uninterrupted diet which therefore requires time and efforts of explanations on the part of the doctors, efforts of application and understanding of the parents and then children, especially at school age.

In fact, we note in these subjects with these lesions that the differences for these three parameters are respectively significant when comparing B_1 to B_3 ($p < 0.01$, $p < 0.02$, $p < 0.01$).

In addition, it is well established that a 16% increase in the anthropometric index is noted in phase (B_3) compared to phase (B_1). This explains why the evolution of this index shows a certain nutritional recovery in celiac subjects.

From this, we note that the exclusion of gliadin leads to a normalization of the CSP in some subjects, while others have a favorable catch-up and weight gain, but do not reach the values observed in normal subjects.

In light of these observations made during the gluten-free period, it appears that the rate of growth in weight and weight varies from one individual to another, since it is probably possible for several factors to intervene, such as the age of the individual, its constitution, its genetics, the socio-economic level of the parents, the cultural level, the ecological factors. We must not forget the strict non-compliance of the gluten-free diet, which is the most frequent reason for the absence of a favorable clinical result. All the more so, as these results seem to indicate that there is no standard duration of growth rate with respect to the gluten restriction period.

At the same time, the 09 subjects in the control group had 100% CSP impairment compared to standard data [17]. This delay may be related to other origins, endocrine and genetic in particular.

CONCLUSION

At the end of this study, anthropometric parameters allowed us to assess the nutritional status of celiac subjects. According to these criteria, celiac subjects have a significant failure to thrive, which is an indicator of early malnutrition in the active phase of the disease.

In times of gluten restriction, it appears that the rate of growth in weight and weight varies from one individual to another, since it is probably possible that several factors intervene.

Our results suggest that there is no standard duration of growth rate for the gluten restriction period.

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