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Dietary Modification and its Relation to Anorexia in Egyptian School Children Suffering From Uncomplicated Hepatitis A Virus

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Abstract

Dietary modification and its relation to anorexia was studied in children with uncomplicated hepatitis A. Out of 60 cases of acute viral hepatitis collected from primary and preparatory schools, 34 cases (56%) proved to have acute hepatitis A with positive Anti HAV IgM. All of these patients were subjected to full medical history, clinical examination, liver function tests, dietary assessment and followed up for 4 weeks. Anorexia was positive in all cases (100%). A significant negative correlation between the duration of anorexia in days and certain foods mainly honey, molasses and milk, especially if these foods had been taken in the first week was found. These food items beside uncooked vegetables were found to be significantly correlated to the serum level of GPT. They may be helpful in improving liver function and lowering the serum level of GPT. We found that all our patients were taking a hypocaloric and unbalanced diet.

Key words : Diet - Anorexia - School - Children - Hepatitis A - Virus.

Introduction

HEPATITIS A is a benign disease with a mortality rate of less than 1% [1]. However, because of its high incidence it is a public health problem world-wide that causes large economic losses [2]. The disease oc-

curs sporadically or in epidemic form. It is usually spread by the faecal-oral route. Parenteral transmission is extremely rare, but can follow transfusion of blood from a donor who is in the incubation stage of the disease [3].

Age of 5-14 years is the group most affected and adults often are infected by spread from children [3].

In the industrialized countries of Europe, North America and Australia, the incidence of hepatitis A has decreased significantly in recent decades [2]. In the developed world hepatitis A accounts for 20-25% of clinical hepatitis [3]. Screening for hepatitis markers in primary school in Egypt showed that the frequency of anti-HAV IgG was 97.5%[4]. Other investigators found anti-HAV IgG to be positive in 100% of children [5]. While Hussein et al. [6] found that 35 % of cases presented to outpatient clinic of Cairo university children hospital with acute hepatitis were positive to HAV.

There is no specific treatment for uncomplicated cases of acute hepatitis A. This treatment is largely supportive and is directed to regeneration of liver cells by rest and a well balanced diet [7]. Dietary advice is often important in the management of liver disease and may be a critical factor in the control of complications. Unfortunately many patients receive advice of doubtful value. So the aim of this study is to evaluate dietary modification and its relation to anorexia in children with uncomplicated hepatitis A.

Patients and Methods

Patients were collected from primary and preparatory public schools in Giza and Cairo Governorates with the help of

school doctors. The study was completed at the National Research Centre during the period from January 1994 to June 1995. We started with 60 cases clinically diagnosed as acute viral hepatitis and only cases with positive Anti HAV IgM were included in the study (34 cases).

All cases were subjected to the following:

1. Full medical history and thorough clinical examination. Weights were recorded twice at the start and at the end of the study.

2. Liver function tests including serum bilirubin, SGOT and SGPT using calorimetric methods (Bohringer, Mannheim, West Germany). Liver function tests were repeated after 2 weeks and 4 weeks from the onset of the disease.

Serologic diagnosis of Anti HAV IgM was done after 2 weeks from the onset of the disease by ELISA technique Abbot laboratories.

3. 24 hours dietary recalls for 2 non consecutive days per week up to the 3rd week from the onset of the disease were collected from mothers. Mean nutrient intakes for each two recalls per week were calculated.

The parents were questioned about the dietary advices given by the previous examining doctors.

Data were statistically analysed using an IBM computer supplied with an Epi

Info package for medical statistics. Comparison of the means of the food composition items was done by using *t*-test if the item was normally distributed and also its variance was homogenous with 95% confidence. However, if the item's variance was not homogeneous with 95% confidence a non parametric method (Kruskal walks one way analysis of variance) was used. For qualitative data, Mantel-Henzel χ^2 test was used with 5% as a significant level. Also multiple regression techniques were used in the statistical analysis. $p < 0.05$ was considered significant [8].

Results

The results of this study are presented in tables 1-7 and figures 1-4.

Table (1) shows the clinical data of 34 children who had hepatitis A.

As regard the results of liver function tests, the first values showed that total serum bilirubin was ranging from 1.2 to 3.9 mg/dl with a mean of 2.2 mg/dl, while after 2 weeks the total serum bilirubin was ranging from 2.5 to 14 mg/dl with a mean of 5.2 mg/dl. At the end of the study total bilirubin was ranging from 1 to 3.5 mg/dl with a mean of 1.4 mg/dl. The normal value is up to 1 mg/dl.

As regard SGPT (Fig.1) it was found to be from 54 to 86 u/L with a mean of 69.7 ± 15.2 u/L. In second reading it raised to a range from 300-800 u/L with a mean of 570.6 ± 182 . At the end, the values ranged from 19 to 80 u/L with a mean of

31.3 ± 11.9 u/L. The normal value is up to 40 u/L.

SGOT, however, was found to be from 80 to 120 u/L with a mean of 100 ± 19.8 u/L and it was not done again during follow up. The normal value is up to 40 u/L.

Tables (2-5) and Figures (2-4) show the results of dietary analysis, while tables (7 A, & 7.B) show the results of correlation coefficient between anorexia in days and different food items, sex and age and the results of multiple regression analysis to predict anorexia. Table (6) shows the correlation co-efficient of SGPT enzyme in th three readings in relation to food items.

A significant negative correlation was found between the duration of anorexia (in days) and food items. Honey, molases and milk were the main foods which were found to help in reducing the duration of anorexia if were taken within the the first or second week. In multiple regression analysis the results revealed that age and sex were contributing to the duration of anorexia, the younger the age the shorter the duration of anorexia. The duration of anorexia was shorter in females than males. As regard to the correlation co-efficient of SGPT level during the third reading in relation to the food items ,we found that raw vegetables, molases, milk and honey were the food items helping to reduce the level of SGPT to a lower level.

Analysis of previous doctors dietary advices to patients with hepatitis showed that 20 cases (58.8%) were advised to have low proteins high carbohydrates and low fats diets with avoidance of eggs and spices. 8 cases (23.6%) were advised to have the ordinary amounts of proteins, high carbohydrates and no fats or spices in diets. 5 cases (14.7%) were advised to have no proteins (egg, milk, meat or chicken), no fats at all and only carbohydrate diets (honey, molasses, jam, sweet potato, potato, boiled macaroni and fruits) One

case (2.9%) was advised to have ordinary diets with avoidance of spices.

In general the mean percentages of calories from different foods were approximately 80% as carbohydrate, 8% as fat and 12% calories as protein in first week. During the second week the percentage of calories from carbohydrate were 70%, 18% calories as fat and 12% calories as protein. While during the third week, carbohydrate supplied 61% of calories while fat and protein were 20% and 19% respectively.

Table (1): Clinical data of 34 children with hepatitis A

Clinical data	Female		Male		Total		p
	No	%	No	%	No	%	
Age groups (years)							
3-7	10	29.4	5	14.7	15	44.1	*p>0.05
8-12	9	26.5	10	29.4	19	55.9	*p>0.05
					34	100	
+ve Anorexia							
	19	55.9	15	44.1	34	100	
Duration of anorexia							
3-5 days	13	38.2	11	32.3	24	70.5	
6-9 days	2	5.9	8	23.6	10	29.5	
$\bar{x}\pm SD$	4.9±1.5		5.5±2.1				*p>0.05
Weights in Kgm							
1. At the start of the study	28.3±7		24.7±6.1		34	100	
$\bar{x}\pm SD$							
2. At the end of the study	30±6.6		27.1±6		34	100	
$\bar{x}\pm SD$							
School absenteeism (week)							
3-5	13	38.2	15	44.1	28	82.3	
6-8	2	5.8	4	11.9	6	17.7	*p>0.05

* p<0.05 = N.S. (between males and females).

Table (2): Food Composition of the diets consumed in first week distributed by sex of children.

Sex	Calories	protein (gms)		Fat (gms)		CHO Carbo. (mgs)	Ca (mg)	Fe (mg)	Vit. A (M)	Vit. A (I)	B ₁ (mg)	B ₂ (mg)	Niacin (mg)	Vit. C (mg)
		Animal	plant	Animal	Plant									
<i>Females:</i>														
\bar{X}	553.3	4.05	9.1	6.9	4.2	103.4	187.3	3.9	52.1	79.1	.29	.37	2.3	53
\pm SD	201.2	3.8	4.6	4.9	2.1	42.4	143.3	2.5	48.1	63.4	.1	.2	1.2	17.2
Range	302-964	1-11	2-16.3	1.2-16.3	3.8-19.1	43.3-192	40-595	1-10	0.8-132	5-260	0.1-.6	0.1-.7	0.5-7.6	3.5-225
<i>Males:</i>														
\bar{X}	483.2	4.5	7.9	5.2	3	98.1	151.9	2.2	40.7	77.4	.4	0.13	0.16	56.9
\pm SD	172.2	2.7	5.2	3.4	1.6	35.3	72	1.2	30.1	28.5	.3	0.14	1.2	41.2
Range	217-901	5-19.2	1.1-24	4-15.6	2-9	48.4-195	66.5-346.3	.5-5	1.5-160	2.5-425	.1-1.6	0.1-2	0-5.8	4.1-334
<i>p</i> -value of diff.	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05
						K.	K.	K.	K.	K.	K.	K.	K.	K.
Total														
\bar{X}	514.1	4.3	8.4	6.0	3.7	100.4	167.5	3.0	46.1	87.8	0.36	0.34	1.92	55
\pm SD	186.1	2.1	3.1	4.1	1.6	90.1	90.1	1.1	19.7	22.0	0.2	.02	0.6	29.7

K - Kruskal-Wallis test for two groups.

Table (3): Food Composition in 2 nd week distributed by sex.

Sex	Calories	Protein (mg)		Fat (mgs)		CHO Carbo. mgs)	Ca (mg)	Fe (mg)	Vit.A (M)	Vit. A (I)	B ₁ (mg)	B ₂ (mg)	Niacin (mg)	Vit. C (mg)
		Animal	plant	Animal	Plant									
<i>Females:</i>														
\bar{X}	99.8.3	.15.6	14.6	16	10.2	163-7	432.7	6.4	169.9	120.5	.6	.81	4.4	38.6
\pm SD	318.3	7.2	7.12	10.3	6.3	52.0	165.6	3.1	11.7	85.3	.2	.3	2.7	42.3
Range	535-1621	1.6-31	3.4	1.2-34.5	4-29.2	82.4-270.4	152-707.5	2.2-15	38.5-449	5-298	0.1-2	0.2-2.5	1.8-13.4	.5-131
<i>Males:</i>														
\bar{X}	748.3	10.1	28.5-10.6	10.1	8.4	145.6	227.4	3.3	83.6	61.2	0.4	0.5	3.0	31.9
\pm SD	278.2	5.3	2.6-2.2	7.5	6.5	55	97.3	1.6	41.11	52.2	.3	0.2	1.6	14.5
Range	339-1610	3.1-22	27.3	0.1-29.4	1-22.2	74.2-282	74-409.4	1.2-8	16.1-234	2-150	0.1-1.3	0.1-1.3	.7-7.6	4.1-146
<i>p</i> -value of diff.	<0.01	<0.05	>0.05	>0.05	>0.05	>0.05	<0.01	<0.01	<0.01	<0.05	>0.05	>0.05	>0.05	>0.05
							K.	K.	K.	t-test				
Total														
\bar{X}	858.6	12.6	12.4	12.8	9.2	153.6	317.9	4.7	121.7	87.2	.47	.63	3.6	34.9
\pm SD	317.9	7.2	6.6	9.2	6.4	53.7	130.1	2.5	91.6	63.1	.25	.30	2.3	14.9

Table (4): Food Composition of the diets in 3 rd week distributed by sex.

Sex	Calories	Protein (gms)		Fat (mgs)		CHO Carbo. mgs)	Ca (mg)	Fe (mg)	Vit.A (M)	Vit. A (I)	B ₁ (mg)	B ₂ (mg)	Niacin (mg)	Vit. C (mg)
		Animal	plant	Animal	Plant									
<i>Females:</i>														
\bar{X}	1373.1	21.1	21	20.2	14.6	205.8	595	8.4	221.6	242.4	0.9	1.1	6.4	47.5
\pm SD	390.2	9.6	8.5	12.1	7.5	66.7	243	2.1	105.2	222.8	0.4	0.4	2.8	39
Range	773-2426	3.5-36	7.2-42	2-44.5	4-25.5	101.2-321	253.2-976	4-15	61.1-876	51.5-698	0.2-2.2	0.4-2	3.6-13.7	0.1-180.5
<i>Males:</i>														
\bar{X}	1050.9	14.5	71.9	16.9	11.7	162.5	375.1	6.2	186.8	154.5	0.7	0.8	4.9	21.5
\pm SD	296.7	6.6	10.1	10.5	5.5	65.0	143	2.9	121.2	116.1	0.3	0.5	2.5	11.3
Range	567-1556	3-24.1	2.2-50	2-41.4	3-20	81.5-302	164-623	2-13.1	19-721.5	13-559	0.2-2.6	3-2.3	0.2-12.4	0.5-85
<i>p</i> -value of diff.	<0.01	<0.05	>0.05	>0.05	>0.05	>0.05	<0.01	<0.05	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05
Total														
\bar{X}	1193.1	17.4	19.3	18.4	12.9	181.6	472.2	7.2	202.2	193.3	81	1.0	5.6	33
\pm SD	372.8	8.6	8.22	10.2	6.5	68.3	120.3	3.1	106.4	102	0.50	.5	2.7	24.7

Table (5) : Percent of children taken each item in 1st, 2nd and 3rd week distributed by sex.

	Honey	Molase	Cook veg.	Raw Veg.	Fruits	Eggs	Red meat	White meat	Milk	Cheese
1st week										
Female	66.7	13.3	60	48	86.7	-	13.3	-	46.7	-
Male	52.6	5.3	21.1	21.1	94.6	-	10.5	5.3	47.4	10.2
Total	58.8	8.8	38.2	29.4	91.2	-	11.8	2.9	47.1	5.9
2 nd week										
Female	53.3	20	66.7	53.3	80	20	46.7	20	80	33.3
Male	63.2	10.5	84.2	47.4	89.5	21.1	42.1	15.8	68.4	21.1
Total	58.8	14.7	76.5	50	85.3	20.6	44.1	17.6	73.5	26.5
3 rd week										
Female	80	6.7	73.3	40	73.3	40	66.7	26.7	73.3	60
Male	52.6	15.8	89.5	42.1	78.9	31.6	52.6	36.8	84.2	52.6
Total	64.7	11.8	82.4	41.2	76.5	35.3	58.8	32.4	79.4	55.9

Table (6) : correlation coefficient between Anorexia (in days) and SGPT in relation to food items during the study.

	Honey	Molase	Uncooked	Fruits	Eggs	Milk
1. Anorexia	-.67*	-.34*	-.12	-.10	-	-.35*
* 1st week						
* 2 nd week	-.54*	-.34*	-0.5	-.16	-.42*	-.72*
2. SGPT						
* 2 nd analysis	-.21	-.01	-.39°	-.13	-.03	-.35*
3 rd analysis	-.33*	-.37*	-.39*	-.02	-.01	-.36*

* = Significant correlation.

Table (7) : Results of Multiple Regression Analysis (A) using age and sex to predict anorexia.

	R ² (%)	Coefficient	p
Anorexia in days	35%		
Constant		-0.7113	<0.01
Age (years)		0.305	<0.05
Sex (male)		1.077	<0.01

(B) : Using different food items to predict anorexia during 1st and 2 nd weeks.

	R ² (%)	Coefficient	Adjusted OR
1 st week			
constant = 6.7607	47.6%		
Honey		-2.30494	10.1
Molase		-0.5017	1.7
Milk		-0.5371	1.7
2nd week	58.8%		
Constant = 1.446			
Honey		-.3268	1.4
Molase		-.8483	2.3
Eggs		-.9689	2.6
White meet		-.30199	1.4
Milk		-2.8183	16.7

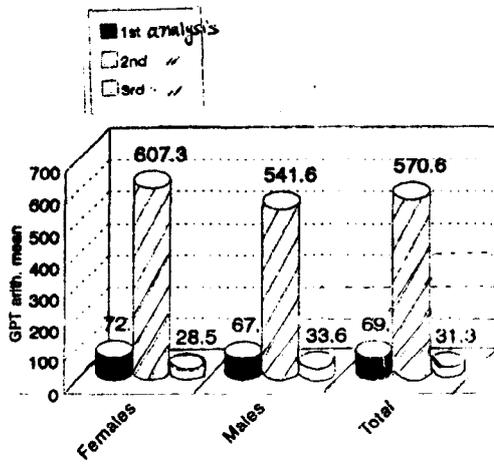


Fig. (1): GPT profile in first, second, and third analysis among studied children distributed by sex.

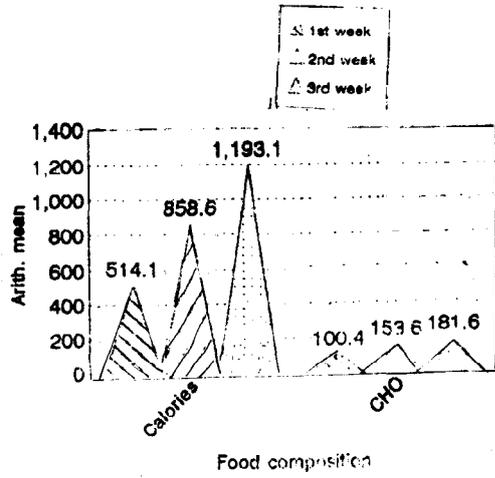


Fig. (2): Arithmetic mean of calories and CHO of ill children in first, second and third week.

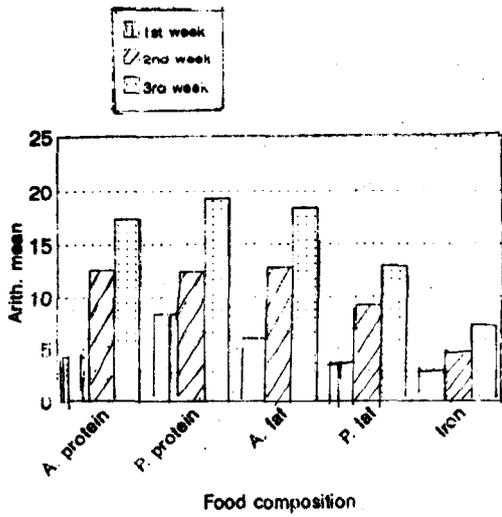


Fig. (3): Arithmetic mean of some important food composition of ill children in first, second and third week.

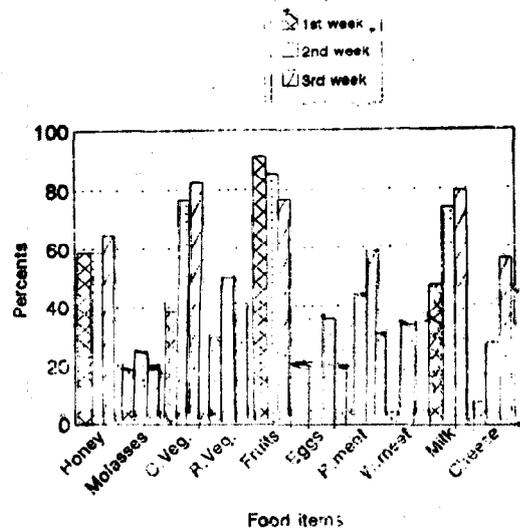


Fig. (4): Percent of ill children who had taken each food item in first, second and third week.

Discussion

Hepatitis is a major health problem in all parts of the world especially in tropical and subtropical areas. This study was carried out to evaluate dietary modifications and their relation to anorexia in children with uncomplicated hepatitis-A.

The duration of clinical symptoms and abnormalities in liver function tests was ranging from 3 up to 6 weeks. So hepatitis A is usually a self limited illness. This can be explained by the intensive but short-term interferon production in patients with hepatitis A. It is tempting to speculate that the high interferon production in hepatitis A patients contributes significantly to the good prognosis of this disease [9]. In contrast, most patients with acute hepatitis B or C produce only minor amount of interferon but for a prolonged period (>6 weeks), this evade an important early defense mechanism against viral infection [9,10].

Anorexia was the commonest symptom at the onset of the disease in all cases (100%). This anorexia could explain the marked decrease in the food intake especially during the first week. It also explained the gradual increase in food intake noticed during the second and third weeks with gradual regain of the appetite. The problem of anorexia in hepatitis A patients must be overcome. Hence every effort must be done to encourage the patient to eat. From the study we found that, ini-

tially, foods of liquid to soft consistency were preferable, progressing to a wider selection of foods with convalescence. As regard to the food items and their relation to anorexia, we found that there was a significant correlation between the duration of anorexia and certain foods mainly honey, molasses and milk, especially if these foods were taken in the first week, they could shorten the duration of anorexia. These food items also with uncooked vegetables might help in lowering the serum level of GPT. A longer duration of anorexia was found in male patients. This could be due to a milder infection in the female patient or that the male patient was using food and anorexia as a weapon to gain control over the family. While the relation between age and duration of anorexia could be explained by the fact that the outcome of HAV infection depends on the age at which it occurs. The duration of anorexia was increasing with the increase of age [2].

Before considering more details about nutrition in our cases, it is worthwhile considering dietary requirements in normal children. These requirements are frequently presented as Recommended Dietary Allowances (RDA'S). The requirements for a child of one year are calculated as 1000 calories daily with an additional 100 calories daily for each subsequent year of life [11]. The normal diet

consists of approximately 50% calories as carbohydrate, 35% as fat and 15% as protein.

In the present study all of our patients consumed hypocaloric diet throughout the whole studied period with a non significant difference between males and females. The diet was also unbalanced.

The ingestion of extracalories would presumably be associated with increased insulin secretion. Animal experiments have suggested that insulin (particularly in association with glucagon) increases the survival of mice suffering from fulminant viral hepatitis by protecting against initial cell damage and by enhancing hepatic regeneration [12]. So sufficient calories should be provided to maintain weight or to increase weight gain if needed. The results given in tables 2,3 and 4 indicated clearly that protein and fat intake were deficient and did not cover the daily requirements. At least 1gm protein or more per kilogram of body weight daily is needed to overcome negative nitrogen balance, to promote regeneration of parenchymal cells and to prevent fatty infiltration of the liver [13,14]. This can be assured by small to moderate meals at meals time with between meals supplements of high protein beverages which are frequently more acceptable than large meals. The following high protein, high carbohydrate, moderate fat diet is appropriate to meet the nutritional goals for the patient whose

appetite has returned [13]. This dietary advice is important in the management of uncomplicated acute hepatitis A. Dietary restrictions which may be suggested by some doctors can lead to diets that are frequently monotonous and unpalatable and do not meet the nutritional goals for the patients. It would appear from the results of this study that efforts to improve knowledge about the nutritional therapy in hepatitis are of great importance and should be directed at doctors.

School absenteeism was another educational and social problem facing children with acute hepatitis A. The duration of absenteeism was ranging from 3 up to 6 weeks. Vaccines have been developed to combat hepatitis A virus to gain control over the infection [15,16].

Finally the present study suggests that efforts to improve doctor's knowledge about the nutritional therapy in hepatitis is a must to avoid unneeded restrictions of diet. Also vaccination in early infancy may help in solving the problem of school absenteeism due to this disease.

Such efforts might be a satisfactory solution to overcome the complications due to this disease.

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