Hepatitis A infection and occurrence of Insulin dependent diabetes mellitus in a sample of Iraqi children

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Abstract

Background: Hepatitis A is an important endemic disease in Iraq. And Insulin dependent diabetes is one of serious chronic disease that affect children.

Objective: To study the possible relationship between viral hepatitis A infection and occurrence of diabetes mellitus in Iraqi children.

Method: A case control study was done on hundred newly diagnosed diabetic children, who were compared to hundred control children.Serological test were done to both groups to detect antibodies against Hepatitis A by using ELISA method .This study started on 1st of November 2006 and ended at 20th of December 2008 Both groups were collected from Al-Kadhymia Teaching Hospital and Al-Noor General Hospital.

Result: There was slight increase incidence of diabetes mellitus in females (56%) than males (44%) and there was significant negative correlation between Hepatitis A and diabetes mellitus since 11% of diabetic children had positive serological test while 26% of control children had positive result.

Conclusion:there was no relationship between hepatitis A infection and occurrence of IDDM.

Keywords: Hepatitis A, diabetes mellitus, children.

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Introduction

Type 1DM develops as a result of the synergistic effects of genetic, environmental and immunologic factors that ultimately destroy the pancreatic beta cells [1, 2]. Autoimmune process is thought to be triggered by an infectious or environmental stimulus and to be sustained by a beta cell –specific molecule. A number of viruses have been shown to infect the pancreas and induce acute and chronic pancreatitis [3]. The mechanism of pathogenesis of viral infections of the pancreas have been described clearly with the use of animal models of pancreatitis and Coxsackie's virus infections[4,5]. However, acute hemorrhagic pancreatitis complicating mumps infection has been reported.

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As the cell that produce insulin are destroyed the patient become permanently diabetic [6]. In addition to infection by Coxsackie virus and mumps virus infection, other viral agents such as congenital rubella, herpes simplex , varicella, hepatitis and cytomegalovirus have been proposed as being capable to triggering the development of diabetes mellitus type1[7,8].

hepatitis A is an infectious disease commonly found in many developing countries, Also it is common even in developed countries and they found that, hepatitis A infection occurred in about 40% of urban population in the united states[9].

Hepatitis A infection usually is asymptomatic in children and only small percentage has clinical hepatitis of varying severity [10].

Viral infection induces interferon α, and through a complex signal transduction pathway which induces the key antiviral enzyme 25-oligoadenylate synthetase

that then degrades viral and cellular RNA, inhibiting virus replication and promoting the death of infected cells [11].

As hepatitis A is preventable by vaccination [12].So it is important to investigate the effect of this common viral infection on occurrence of insulin dependent diabetes mellitus.

Patients and methods:

A case control study has been applied from 1st Nov.2006 to 20 th of December 2008 which was conducted in AI-Kadhymia Teaching Hospital and AL.Noor general Hospital and involve 100 newly diagnosed I.D.D.M. whose age were bellow 13 years. And one hundred control non diabetic children who were coming to both Hospitals for simple diseases, randomly chosen from both hospitals that were compatible to the diabetic group regarding, age & sex Diabetic and control children were divided into four groups according to age groups. Both groups were submitted to same questions about previous history of jaundice and laboratory investigation to detect antibodies against hepatitis A using ELISA (Bio-kit) to detect specific IgG and IgM antibodies which were done in the same hospitals.

Chi-square test was employed to test differences between proportions. And p value < 0.05 was considered significant.

Results

The study showed insignificant difference between two groups regarding to age [The youngest child in both groups

Was tow years old and the oldest child was twelve years old] since P value was >0.05 as shown in (Table 1).

Table 1: Distribution of diabetic and control group according to age group.

Age group	Diabetic		Control		Total	x^2=0.17 df=3 P=0.8
	No	%	No	%		
2-4 yr	31	31%	32	32%	63	
4-6 yr	34	34%	33	33%	67	
6-8yr	18	18%	19	19%	37	
Above 8yr	17	17%	16	16%	33	
Total	100	100 %	100	100%	200	

Also the study shows slight increase in female percentage (56%) comparing to male (44%) in diabetic group which is also statistically not significant as shown in (Table 2).

Table 2: Distribution of sex according to age group in diabetic and control group.

Age group	Diabetic group				Control group				x^2=0.15 df=3 P=0.9
	Male		Female		Male		Female		
	No	%	No	%	No	%	No	%	
2-4 yr	13	29.6%	18	32.13%	14	31.1%	18	32.74%	
4-6 yr	15	34%	19	34%	14	31.1%	19	34.54%	
6-8 yr	8	18.2%	10	17.8%	9	20%	10	18.18%	
Above 8 yr	8	18.2%	9	16.07%	8	17.8%	8	14.54%	
Total	44	100%	56	100%	45	100%	55	100%	

The study show high percentage of negative serological test for Hepatits A (IgG and IgM) in diabetic group comparing to control group and p value was 0.006 which mean that there are no relation ship between Hepatits A infection and occurance of diabetes in children as shown in (Table 3).

Table 3: Serological test for hepatitis A in diabetic and control group.

Serological test For hepatitis A (both IgG and IgM)	Diabetic group		Control group		Total		
	N O.	%	N o.	%	N O.	%	
Positive IgG	9	9%	24	24%	37	18.5%	X^2 =7.46
IgM	2	2%	2	2%			Df=1 P=0.006
Negative	89	89%	74	74%	163	81.5%	
TOTAL	100	100%	100	100%	200	100%	

Discussion:

The study showed insignificant increase infrequency of the disease in female (56%) than male (44%) which is comparable to result reported in AL-Kuwait (1993) which showed statistically significant female increase incidence rate [13].

Also the study showed significant negative relationship between Hepatitis A and occurrence of insulin dependent diabetes mellitus in children which is the first study done in Iraq to explore the relation ship between one of the common preventable viral disease in childhood and the most important chronic disease in them .we think that there is no such study in neighboring countries ,except there are two small case series from India on acute pancreatitis complicating acute viral hepatitis A, most of these patient had mild-to- moderate pancreatitis with a relatively benign course and uneventful recovery [14]. and there are studies that identify the relationship between other viruses and insulin dependent diabetes mellitus like ,long –term prospective Finnish studies have strongly suggested that infection with enteroviruses such as coxsackie virus may trigger the autoimmune process for example increased frequency of serum

enterovirus antigens and antibodies toward enterovirus were observed during prediabetic phase in children who subsequently develop diabetes[15].So in conclusion there was no positive correlation in our studied cases between hepatitis A and type 2 IDDM, and this mean that the pancreas is not affected by Hepatitis A infection or it might be mildly affected .

So preventive measures against hepatitis A may not have a beneficial value in prevention of childhood IDDM.

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