

A Study of Some Biochemical Changes in Hydatid Cyst Patients Before And After Surgical removal of hydatid cyst

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Abstract:

Hydatid disease is a major public health and economic problem in Iraq causing morbidity and mortality, This study was done to illustrate some biochemical changes, hemoglobin, blood group and CRP in hydatid cyst patients before and after 15 days of surgery.

Twenty patients with hydatid liver cyst infection were enrolled in this study consist of (15 male) and (5 female), Those patients were matched with twenty (14 male) and (6 female) apparently healthy subjects as controls, The results of the study were as the following Significantly high serum triglyceride and serum bilirubin levels were observed in patients with hydatid cyst before and after 15 days of surgical removal when compared with healthy controls And significantly high serum bilirubin level in hydatid cyst patients before surgery when compared with patients after 15 days of surgical removal of the cyst.

Blood glucose, urea and hemoglobin level for both studied subjects were within normal range as in healthy controls. Group O was more frequently in hydatid cyst patients than non O group (A, B, AB), Elevated CRP in 14% of hydatid cyst patients before surgery when compared with healthy controls, while after 15 days of surgical removal the mean level of CRP was decreased to 4% .

In conclusion all studied parameters may be helpful in following up the effectiveness of surgical treatment. Further investigation in this regard with a larger group of patients is recommended to explore the potential of these parameters compared to alternative measures in monitoring hydatidosis infection and surgical removal of hydatid cyst on hydatid cyst patients.

الخلاصة:

يعد مرض الأكياس العدرية من المشاكل الصحية والاقتصادية الكبيرة المنتشرة في العراق مسببا لزيادة في معدل الوفيات.

أجريت هذه الدراسة لتوضيح نسب بعض المتغيرات الكيميائية والهيموغلوبين وفصيلة الدم والبروتين المتفاعل C قبل وبعد الأزالة الجراحية للكيس العدرية.

تضمنت الدراسة عشرون مصاب بكيس عدرية على الكبد 15 ذكر و 5 أنثى تم مقارنتهم بعشرين شخص سليم 14 ذكر و 6 أنثى كسيطرة.

أوضحت نتائج الدراسة ارتفاع مستوى الدهون الثلاثية واللبروبيين بالدم بمعدلات معنوية عالية في مرضى الأكياس العدرية قبل وبعد خمسة عشر يوم من العملية الجراحية عند مقارنتهم بالأشخاص الأصحاء السيطرة و كان هناك ارتفاع بمستوى معنوية عالي لللبروبيين عند مقارنة المرضى قبل وبعد العملية الجراحية بخمسة عشر يوما ، كان مستوى السكر واليوريا والهيموغلوبين في الدم لكلا المجموعتين المدروستين ضمن المستوى الطبيعي، وكان الأشخاص ضمن صنف دم O اكثر عرضة للأصابة بمرض الأكياس العدرية من بقية اصناف الدم، كما أظهرت النتائج ارتفاع بمستوى البروتين المتفاعل C لدى مرضى الأكياس العدرية بنسبة 15% عند مقارنتهم بالسيطرة الأصحاء وانخفاض هذا المستوى الى 4% بعد بخمسة عشر يوم من الأزالة الجراحية للكيس العدرية

من خلال النتائج يمكن اعتبار بعض المتغيرات المدروسة في هذا البحث ذات فائدة في متابعة مدى فعالية الأزالة الجراحية للكيس العدرية كعلاج للمريض، فضلاً عن التوصية باجراء دراسات موسعة في هذا المجال مع مراعاة أخذ عينة أكبر من المصابين بالأكياس العدرية لأستكشاف امكانية استخدام هذه المتغيرات مقارنة بالفحوص المختبرية لمتابعة المصابين بالأكياس العدرية ومدى تأثير ازالة الكيس العدرية على الأشخاص المصابين.

Introduction:

Hydatid disease is an important zoonotic infection and public health problem in many areas of the world^[1]. It is an endemic disease in Iraq which is considered to be major economic problem which causes a great morbidity and mortality which attributed in most of the cases with the cyst complications^[2].

In humans, the liver is the organ most frequently affected followed by the lungs^[3]. There are published studies in the recent years demonstrating relationship of biochemical parameters of hydatid cyst fluids from different hosts origins (animals and humans)^[4,5,6]. On another hand there has been a study evaluating the levels of trace elements in patients with hydatid cyst before and one year after operation^[7]. But there are however no reports in literature in which changes in biochemical parameters been evaluated in serum of patients with cystic echinococcus and the exact mechanism responsible for alterations in biochemical levels in patients with hydatid cyst, is largely unclear and requires further evaluation.

C-reactive protein (CRP) is an acute phase marker most commonly used to detect inflammation in the body and monitor the activity of a range of inflammatory conditions. Infection and inflammation are most common causes of elevated CRP^[8]. According to literature review the role of CRP has not yet been investigated in cystic echinococcosis (CE). The present study therefore was designed to compare the changes in selected biochemical parameters and CRP in hydatid cyst patients before and after 15 days of surgical removal of hydatid cyst with healthy control.

Materials and Methods:

A study of 20 patients with liver hydatid cyst in Al-Nu'man hospital were accomplished in the period from April to September 2011 and consists of (15 male) and (5 female) with mean age (46.7±11.9),

Sera were collected two times before and after 15 days of surgical removal of hydatid cyst, Those patients were matched with (14 male) and (6 female) apparently healthy subjects (as controls) mean age (49.7±3.96).A relevant history was taken from each patient including age ,sex ,blood group.

Biochemical analysis:

Serum glucose, urea and bilirubin were estimated by use of enzyme colorimetric kit (Randox Laboratories, Ltd, Admore-Antrim, United kingdom).While serum cholesterol and triglyceride were determined by use of enzymatic method diagnostic kit (Biolabo SA., Maizy, France). Blood hemoglobin determination was done by the cyanomet hemoglobin method^[9].

C-reactive protein (CRP) Serum CRP levels were measured via the CRP latex test the results were expressed as positive results if there is presence of agglutination and Negative results express no agglutination.

Statistical significance:

Values were expressed as mean±SD, differences between the mean values were analyzed by chi-square test. While correlation between the data obtained were analyzed by using analysis of variance (ANOVA) to determine the level of significance by using minitab under windows, The criterion for significance was (p<0.05).

Results:

A total of 20 hydatid liver cyst patients and 20 healthy control were covered in this study. The collection of sera was done in Al-Nu'man hospital in Baghdad before and after 15 days of surgical removal of hydatid cyst.

Changes in some of the biochemical parameters mean value in patients with hydatid cyst before and after surgery compared with the healthy controls were as summarized in (Table-1).

Table- 1: Comparison of some biochemical parameters in hydrated cyst patients before and after 15 days of surgery with healthy control.

Serum biochemical parameters	healthy control (n=20)	Hydatid cyst patients		P- value		
		Before surgery (n=20)	After 15 days of surgery (n=20)	Between control & before surgery	Between before & after surgery	Between after surgery and control
Glucose(mg/dl)	79.45±7.667	79.55±8.166	77.75±6958	N.S	N.S	N.S
Cholesterol(mg/dl)	189.4±10.62	214.55±24.73	195.25±19.02	0.001	0.01	0.077
Triglyceride(mg/dl)	72.1±4.78	112.9±30.4	97.8±12.9	0.001	0.05	0.001
Urea (mg/dl)	35.15±3.801	40.650±2.996	38.550±2.982	0.001	0.05	0.01
Total bilirubin	0.155±0.051	0.730±0.1720	0.290±0.112	0.001	0.001	0.001

ANOVA(one-way Analysis of Variance)

Mean serum level of cholesterol, triglyceride, urea, total bilirubin in hydatid cyst patients before surgery were higher than healthy controls ($p < 0.001$). While the mean serum level of glucose remain the same level with health controls so this value didn't reach statistical significance. High statistical significance was seen between the mean serum level of total bilirubin before and after 15 days of surgery ($p < 0.001$) it decreased after surgery, The mean serum level of cholesterol after 15 days of surgery decreased and there was significant deference between cholesterol level before and after 15 days of surgery ($p < 0.01$). The mean serum level of triglyceride and urea were significantly decreased ($p < 0.05$) before and after 15 days of surgery.

Although the mean serum level of glucose decreased after 15 days of surgery but there was no significant difference between mean levels of glucose before and after 15 days of surgery. Statistical difference was observed when mean serum levels of cholesterol, triglyceride, urea and total bilirubin after 15 days of surgery were compared with healthy controls, While no statistical difference was observed when serum levels of glucose in patients after 15 days surgery were compared with the healthy controls.

Table- 2 shows the mean hemoglobin (Hb) of hydatid cyst patients before surgery was higher than after 15 days of surgery , The difference was ($p = 0.071$) but it was still in the normal range.

Table-2: Blood hemoglobin mean level among hydatid cyst patients before and after surgery.

Hemoglobin	Before surgery	After surgery	p-value
Hb mg/dl	13.3±0.92	12.8 ±0.85	0.071

Chi-square test.

The comparison of the distribution of blood groups in the hydatid cyst patients with that in healthy controls population shows that group O was found more frequently in hydatid cyst patients than in

healthy controls and vice versa for non-O groups which were lower in hydatid cyst patients than in the healthy controls (Table- 3).

Table-3: Distribution of blood groups among hydatid cyst patients compared with healthy control.

Blood group	Healthy control (N%)	Hydatid cyst patients (N%)
A	(20%)	(10%)
B	(25%)	(10%)
AB	(5%)	(10%)
O	(50%)	(70%)
RH +ve	(80%)	
Total	20	20

CRP was significantly increased before surgical removal of hydatid cyst ($p < 0.05$) compared with healthy control. Whereas high significant increase of CRP in patients before and after 15 days of

surgical removal ($p < 0.001$) but no significant decrease where shown between CRP levels after 15 days of surgical removal when compared with healthy control.

Table-4: CRP among hydatid cyst patients before and after surgery and healthy control

CRP	Healthy control	Hydatid cyst patients		p-value		
		Before surgery	After surgery	Between control & before surgery	Between control & after surgery	Between before & after surgery
(+)	7%	14%	4%	0.05	N.S	0.001
Total	20	20	20			

Discussion:

Lipids such as cholesterol and triglycerides are insoluble in plasma. Circulating lipid is carried in lipoproteins that transport the lipid to various tissues for energy utilization^[10].

In the present study, significantly increase of serum cholesterol and triglyceride levels were observed in patients with hydatid cyst before and after 15 days of surgical removal when compared with healthy controls. Also significantly high serum cholesterol and triglyceride level in hydatid cyst patients before surgical removal when compared with patients after 15 days of surgical removal of the cyst. Which probably mean that the serum levels of both cholesterol and triglyceride decreased after 15 days of surgical removal.

It was established fact that infection and inflammation produce

moderate changes in plasma lipoprotein pattern in variety of inflammatory disorders^[11,12,13]. Because it induce the acute phase response (APR) leading to multiple alterations in lipid and lipoprotein metabolism. Plasma triglyceride levels rise from increased VLDL secretion, In rodents hypercholesterolemia occurs due to increased hepatic cholesterol synthesis^[14].

Total cholesterol may either go up or down in an unpredictable way during the course of various infectious diseases^[13]. Recent studies have shown elevated levels of lipoprotein like cholesterol in patients suffering from parasitic infection^[15,16,17] demonstrated that hypercholesterolemia and hypertriglyceridemia was observed in uncomplicated and complicated malaria patients.

The mean level of serum bilirubin in hydatid cyst patients before and after 15 days of surgical removal were found to be

significantly high when compared with healthy control, Also significant high mean serum bilirubin level between before and after 15 days of surgical these results suggest that pathological change in the liver occurred in hydatid cyst patients since most of our patient had a liver hydatid cyst which results in the malfunctioning of this organ. No significant deference between glucose levels of hydatid cyst patients before and after 15 days of surgical removal and healthy control (Table-1). In support of this result^[18] found that some parasitic infestation appear to have little, if any impacts on blood glucose level in human. The mean levels of urea in hydatid cyst patients before and after 15 days of surgical removal has been evaluated from healthy control but in normal levels as in healthy control, which means that the infection didn't affect the kidneys since most of patients had liver hydatid cyst, elevated serum urea has been associated with kidney diseases^[19].

Also hemoglobin concentration for both studied subjects was within normal range as in healthy control. There were no associations between hookworm infection intensity and hemoglobin concentration^[20].

The results of blood group in this study suggest that subjects with different blood groups have different susceptibilities to hydatidosis infection. Group O was more frequently in hydatid cyst patients than non O group. Clinical studies provide supporting evidence in favor of an effect of ABO group on disease severity^[21].

Elevated CRP in 14% of hydatid cyst patients before surgery when compared with healthy control indicates the presence of infection while after 15 days of surgical removal the mean level of CRP was decreased to 4%, This goes with^[22] study who showed significantly elevated serum CRP level in cystic echinococcosis patients and it returned to normal level three months after operation. CRP level increase very rapidly in response to trauma, inflammation, and

infection and decrease just as rapidly with the resolution of the condition^[23].

In conclusion, high levels of plasma lipids, particularly cholesterol and triglyceride, total bilirubin may point to hydatidosis infection. On the other hand this study indicated those 15 days after surgery, all parameters which may have a role in hydatidosis pathophysiology decreased near to normal levels suggesting that they may be helpful in following up the effectiveness of surgical treatment. Further investigation in this regard with a larger group of patients is recommended to explore the potential of these parameters compared to alternative measures in monitoring infection and surgical removal of hydatid cyst in patients with hydatid cyst infections.

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