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Study of Some Biochemical Parameters of Tuberculosis Patients InThi-Qar Province/Iraq

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Abstract

The current study was designed,to estimate of, serum sugar, serum urea and lipid profile of tuberculosis patients in comparison with healthy subjects .Twenty eight TB patients (15 men and 13 female) random, and twenty three healthy subjects(13 men and 10 female) (control group) were used in this study.
The results showed that serum sugar was non significantly ($p<0.89$) higher than control group, serum sugar value was raised with increase of age , and it was no significantly increased ($P<0.909$) in Women compared with Men. While, the serum urea was significantly lower ($P<0.000$) than control group , serum urea level was decreased with increase of age and it was no significantly increased ($p<0.189$) in Men compared with Women. Serum cholesterol in TB patients were no significantly ($P<0.505$) higher than healthy subjects , TC level was decreased with increase of age and it was no significantly increased ($P<0.418$) in Women compared with Men .Tiglycerides (TG) was no significantly ($P<0.085$) lower than healthy subjects,. TG level was no differences with the age, and it was non significantly increased ($P<0.394$) in Women compared with Men.
High density lipoproteins (HDL) was no significantly lower ($P<0.154$) than healthy subjects . HDL level was no differences with the age, and it was no significantly increased ($P<0.019$) in Women compared with Men. Low density lipoproteins LDL in TB patients were no significantly ($P<0.634$) higher than healthy group, LDL level was significantly decreased with increase of age and it was no significantly increased ($P<0.577$) in Men compared with Women. very low density lipoproteins (VLDL) was no significantly lower ($P<0.89$) than healthy subjects .VLDL level was no differences with the age, and it was no significantly increased ($p< 0.394$)in Women compared with Men.

Keywords: Tuberculosis,; Lipid Profile; Sugar; Urea

دراسة بعض المعايير الكيموحيوية لمرضى التدرن الرئوي في محافظة ذي قار/ العراق

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الخلاصة

صممت الدراسة الحالية لقياس مستوى السكر, ومستوى اليوريا , وصورة الدهون في مرضى التدرن الرئوي مقارنة مع الاصحاء لغرض ايجاد الاختلاف في مستويات السكر واليوريا وصورة الدهون بين مرضى التدرن الرئوي والاشخاص الاصحاء. ثمانية وعشرون مريض (15 ذكور و13 اناث)بالتدرن الرئوي ليسوا في حالة صيام. وثلاثة وعشرون 13ذكور و10 اناث)اشخاص اصحاء. بينت النتائج ان هناك ارتفاع غير معنوي في مستوى السكر مقارنة مع الكونترول (0.89), وانه يزداد مع زيادة العمر بينما وجد انه يرتفع بشكل غير معوني في النساء مقارنة بالرجال (0.909). اما مستوى اليوريا فوجد انه ينخفض معنويا مقارنة بالكونترول (0.00) ووجد انه ينخفض مع زيادة العمر ووجد انه يزداد بشكل غير معنوي في الرجال مقارنة بالنساء (0.189). مستوى الكولسترول في مرضى التدرن وجد انه يرتفع غير معنويا مقارنة مع الكونترول , ووجد انه ينخفض مع زيادة العمر ويزداد بشكل غير معنوي في النساء مقارنة بالرجال (0.418).اما بالنسبة للكلسريدات الثلاثية فوجد انها تنخفض بشكل غير معنوي في المرضى مقارنة بالكونترول(0.085) , ووجد انه لايتغير بتغير العمر لكنه يزداد بشكل غير معنوي في النساء مقارنة بالرجال (0.394). مستوى البروتين الدهني عالي الكثافة وجد انه ينخفض بشكل غير معنوي في مرضى التدرن مقارنة بالكونترول (0.154) , ووجد انه لا يتغير مع تغير العمر لكنه يزداد بشكل غير معنوي في النساء مقارنة بالرجال(0.019). اما مستوى البروتين الدهني واطئ الكثافة فوجد انه يرتفع بشكل غير معنوي في المرضى مقارنة مع الكونترول (0.643), كما انه يرتفع مع زيادة العمر في حين وجد انه يزداد بشكل غير معنوي في الرجال مقارنة بالنساء (0.577). ووجد انه مستوى البروتين الدهني واطئ الكثافة جدا ينخفض بشكل غير معنوي في مرضى التدرن مقارنة مع الكونترول (0.89), ووجد انه لايتغير مع زيادة العمر لكنه يرتفع بشكل غير معنوي في النساء مقارنة بالرجال (0.394). لقد وجدنا علاقة جزئية بين مستوى السكر ومرض التدرن الرئوي وايضا مع مستوى اليوريا الذي يعد احد البيانات الحياتية الكيميائية المهمة التي تساعد في تشخيص والتفاعل الملاحظ لعلاج حالة الفشل الكلوي ومستويات الدهون المنخفضة الملاحظة في مرضى التدرن مقارنة مع الاصحاء مرتبطة مع سرعة تحلل الدهون المتكونة وايضا مرتبط بعلاقة مع سرعة تقدم ايض الدهون المرتبط بالمرض المعدي التدرن.

كلمات مفتاحية: التدرن الرئوي , صورة الدهون , سكر , يوريا

Introduction

Tuberculosis (TB) is a potentially lethal contagious disease and remains a major, globale health cares issue (Gemma and David, 2011). TB is caused via a bacterial microorganism the tubercle bacillus or tuberculosis (TB). It could be affect all part of a body but is major a lung disease wherever it happen centered infection after inhalation. Nearly onethird of the world's population is infected with tuberculosis and the most of that individual live in less growing countries (WHO, 2011). Universally tuberculosis is responsible to more than 1.5 million deaths in each year. Nearly 40 % of the population in India is infected by the tuberculosis . It's the 2nd important cause of death killing 2 million people in every year (Muthraj *et al*., 2010).

Increase the witness indicates the links between low blood cholesterol levels and the number of human diseases involving tuberculosis TB (Akpovi D *et al*., 2013; Deniz *et al*., 2007). Particularly It's indicated which hypocholesterolemia raised the development of tuberculosis while hypercholesterolemia conferment some protections against infection with MTB (Wilson *et al*., 2003; Akpovi *et al*., 2013). In spite of a presence of like connects between cholesterol and tuberculosis'(TB), It isn't known to extent the medicament of the disease affect lipid signs in patients by (TB).

Serum levels of total choleesterol had been found to be low in patients tuberculosis,' and the cholesterol rich diet may hasten purgation of the sputum in these patients,(Akpovi D et al., 2013) . Literature is comparatively sparse on the link between blood serum lipid levels and the happen of anti-tubercular drugs resistance of organism of the tuberculosis TB'complex. Tuberculosis. and diabetes are more of the world's originally causes of death or disability. TB is a contagious disease caused by the bacteria that diffuse from person to other via the air tubercular is infection and can be treated noncommunicable in majority cases with antibiotics. Diabetes is the chronic disease that has variant causes attendant with diet, deportment and

genetics. Different from TB, diabetes isn't infected, and there are no cure in the extensive most of cases (Harries et al ., 2013) .

Tuberculosis is temporarily raise a level of serum sugar, the condition known like destroyed glucose tolerance that is the risk factor to growth diabetes.(Guptan and Shah , 2000) destroyed glucose tolerance is also known like pre-diabetes because it's mostly precedes the onset of diabetes.

Materials and Methods:

This study was effected on 28 PTB infected patients, on the basis of clinical signs, bacteriological diagnosis was requested by the physician for all patients in tuberculosis center in Thi –qar province, Iraq. from December 2015 to May 2016. Patients were involved 15 males, 13 females and in mean age 42.5 ±34.8 years and 23 Apparently were involved 13 males, 10 females healthy volunteers as control group with matching age mean . 5ml of blood were assembled from all patients or control. Those samples were let for 1-2 hours in the room temperature until coagulate next centrifuged in 3000 rpm to 10 minutes blood serum were stowed at –20C to used.

According to a manufacturer's directives Triglyceride (TG), total cholesterol (TC), (HDL) , (LDL) ,(VLDL) , serum urea and serum sugar were assessed to patients group and healthy subjects in known enzymatic methods that using diagnostic kits. (Biolabo SA. Maizy France). While serum sugar and serum urea were assessed by used of enzyme colorimetric kits (Randox Laboratories, Ltd , Admore Antrim ,United Kingdom). The all levels of these parameters were compared between (TB) infected subjects and healthy subjects . All testes done in the laboratory of AL-Hussein Hospital .

Statistical analyses

Statistical analysis was accomplished by the software **minitible** version; the results were recorded by way of mean ± standard deviations (mean ± SD)and(mean ± SE). One way ANOVA test was used to compare parameters in different studied subjects. P-values (P < 0.01) were measured statistically significant.

Results and discussion

This study involve 28 TB patients (group 1) and 23 controls (group 2). Average age of Group 1 patient was included 6 males (% 46.15) and 7 females (%53.84) . Average age of Group 2 patient was include 9 males (%60) and 6 females (%40). There was no significant difference in age (p<0.05) between all two groups .

In this study, the level of serum sugar was no significant difference (p<0.89) when the test group and control group were compared together, In addition serum urea level was significantly decreased in tuberculosis group than in the control group(P<00.0).

Table(1) show the levels of Lipid parameters in both groups. patients group have no significantly higher (TC) 195.54 ± 14.67 (p<0.505) than control group in TC levels of 190 ± 40.90. While, TG level was significantly (p<0.085) lower in PTB cases 157.5 ± 62.0 than controls 195.4 ± 94.50 . LDL level was no significantly (p<0.634) higher TB cases 122.9 ± 14.91 than controls 121 ± 16.40 . And the mean of VLDL-cholesterol was no significantly (p<0.89) lower 31.50 ± 12.39 than controls 39.5±20.60. Whereas mean HDL- cholesterol was no significantly (p<0.154) lower 41.071 ± 4.328 than controls 43.46 ± 7.51. These biochemical parameters of all subjects are summarized in (Table 1) (Fig 1).

Table 1: Some biochemical parameters of tuberculosis patients and control group

Test	Patients (N 28) mean±SD	Control (N 23) mean±SD	p-value
VLDL(mmol/L)	31.50 ± 12.39	39.46±20.61	0.89
LDL(mmol/L)	122.9 ± 14.91	120.92 ± 16.40	0.634
HDL(mmol/L)	41.071 ± 4.328	43.46 ± 7.51	0.154
Triglyceride(mmol/L)	157.5 ± 62.0	195.4 ± 94.50	٠.٠٨٥
Total cholesterol(mmol/L)	195.54 ± 14.67	190 ± 40.90	٠.٥٠٥
Blood urea(mmol/L)	23.36 ± 7.02	35.96 ±7.36	0.000
Blood sugar(mmol/L)	204.5 ± 110.8	149.7 ± 29.60	٠.٠٧٨

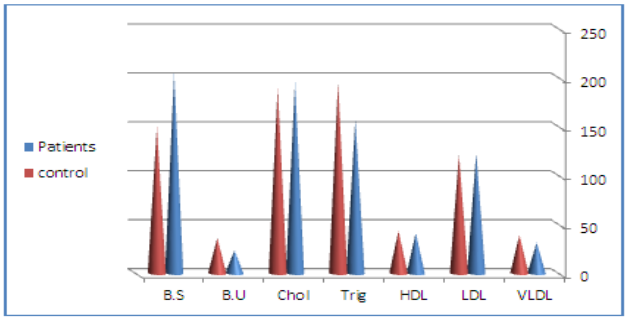

Fig 1: Some biochemical parameters of tuberculosis patients and control group

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Serum sugar value was no significantly increased in Women compared with Men (p<0.909). While, serum urea was no significantly increased in Men compared with Women (p<0.189). Table(1) show effect of sex in the levels of Lipid parameters, TC level was no significantly increased in Women compared with Men (p<0.418), whereas TG level was no significantly increased in Women compared with Men (p<0.394), and LDL level was non significantly increased in Men compared with Women (p<0.577) too. VLDL level was no significantly increased in Women compared with Men (p<0.394). While, HDL level was significantly increased in Women compared with Men (p<0.019) as shown in table 2.

Table 2: Effect of sex on some biochemical parameters of tuberculosis patients.

Parmeters	Gender		P-value
	Men	Women	
	mean± SE	mean± SE	
Blood Sugar (mmol/L)	202.2 ± 26.9	207.2 ± 33.8	0.909
Blood Urea (mmol/L)	25.00 ± 1.89	21.46 ± 1.78	0.189
Cholesterol (mmol/L)	193.40 ± 3.42	198.00 ± 4.53	0.418
Triglyceride(mmol/L)	148.0 ± 10.7	168.5 ± 22.2	0.394
HDL-cholesterol (mmol/L)	39.333 ± 0.785	43.08 ± 1.34	0.019
LDL-cholesterol(mmol/L)	124.47 ± 2.87	121.23 ± 5.18	0.577
VLDL -cholesterol(mmol/L)	29.60 ± 2.14	33.69 ± 4.44	0.394

Results expressed as mean ± S.E

In present study , biochemical parameters mentioned were compared according to age of patients , whereat, serum sugar level was raised with an increase of age , While, serum urea level was significantly decreased with increase of age and lipid profile levels were oscillatory, whereat, TC level was decreased with increase of age, while, TG level was no differences with the age . LDL level was decreased with increase of age, and VLDL level was no differences with the age, and HDL level was no differences with the age as shown in (table 3).

Table 3: Effect of age on some biochemical parameters of tuberculosis patients.

Parameters	Age		
	9-25	25-50	>50
	Mean ± SE	Mean ± SE	Mean ± SE
Blood Sugar (mmol/L)	168.1 ± 22.8	202.9 ± 26.4	214.1 ± 35.1
Blood Urea(mmol/L)	24.14 ± 3.01	23.15 ± 2.11	21.57 ± 1.53
Total Cholesterol (mmol/L)	200.43 ± 6.75	198.85 ± 2.94	190.64 ± 3.74
Triglyceride(mmol/L)	156.4 ± 18.0	153.08 ± 8.82	157.9 ± 21.6
HDL-cholesterol (mmol/L)	41.86 ± 2.08	42.615 ± 0.964	40.07 ± 1.23
LDLcholesterol(mmol/L)	127.29 ± 6.34	125.62 ± 3.50	119.00 ± 3.81
VLDL - cholesterol(mmol/L)	31.29 ± 3.59	30.62 ± 1.76	31.57 ± 4.31

The present study is in the evaluation of serum sugar, serum urea and lipid profile in tuberculosis(TB) patients. The reiterated studies at a relation between diabetes and tuberculosis impact of diabetes upon a reiterated of potential tuberculosis has been lesser realize. A few exist reports on the higher prevalence of potential tuberculosis contagion between diabetics have been discomfited by a no presence of control group (Vega *et al* ., 1996) .In some studies, the prevalent of TB contagion wasn't affected via the extant of diabetes (Webb *et al* ., 2009 ; Brock *et al* ., 2006), or its impact was terminated after adapting for others variables. Consequently, it appear that diabetic patients (Chan-Yeung *et al* ., 2006) aren't at major risk to infection with tuberculosis.

Some studies explain glucose intolerance is not characteristic to tuberculosis and may come to pass in a setting of all contagion like pneumonia (Basoglu *et al* ., 1999) but several researches have proved a particular link between diabetes and tuberculosis TB (Ottmani *et al* ., 2010 ; WHO., 2011) , the level of this impact may be affected via some factors like age diabetes type severity of diabetes spread of tuberculosis in a region and ethnicity the danger of tuberculosis is arise between patients whose are using insulin (Dobler *et al* ., 2012) especially those whose need addition doses from Insulin (Jeon *et al* ., 2010). Diabetic TB patients are mostly older from those without diabetes mellitus disease. This can be due to a correlation of type2 diabetes disease with older age. Several have suggested no difference with period of gender and other reported higher frequency between men (Ruslami *et al* ., 2010 ; Singla *et al* ., 2006) .

Serum urea level was significantly decreased in tuberculosis group than in the control group, that cannot be separated with increase in the production of Reactive Oxygen species (ROS)in tuberculosis (Tirkey1 *et al*., 2005; and Reddy *et al*., 2004),

Urea levels are essential biochemical data that might be utilized for help a diagnosis and observing reaction

to medication with renal spoilage (Klotman P E 1999). Recent study, a serum urea levels were significantly lower in tuberculosisTB patients than in the healthy group. This result is compatible with study of Folaranmi and Adesiyan (2004). Ugwuja and Eze (2007) justified that increased urinary loss because of osmotic diuresis might make the common and often essential motive of reduced electrolytes. Nnodim et al (2012) reported that significantly increased in the level of serum urea in tuberculosise than in the controls. This cannot be unattached with increasing in the production of Reactiv Oxygen species (ROS) in tuberculosis (TB). In both States the production of free radicals increases which Influences a renal states. Those free radicals proteins enzymes and DNA can consequently creating some pathological disorder (Tirkey *et al*., 2005; and Reddy *et al*., 2004). When the equilibrium among free radical and antioxidants are discomfited there might make electrolyte imbalance in addition to raised urea level (Nwanjo and Oze, 2007; Madebo *et al*., 2003).

The results of recent study that showed the level of TC was significantly higher in patient group with tuberculosis, whereas some studies have evidenced that patients with tuberculosis mostly have low cholesterol levels(Akpovi *et al*., 2013, Perez-Guzman *et al* ., 2002). The convenient levels of cholesterol are important for a suitable functioning of an immune system inverse infection (Heiniger and Marshall, 1982). Perez-Guzman *et al* .,2005 have evidenced that the cholesterol-rich diet hastens bacteriologic sterilization in patients with tuberculosis. Cholesterol constitutes 30% of the total lipids content in the cell membrane and participates in the liquidity of this structure(Thomas *et al* ., 2011) Hence cholesterol is consisted in the activity of membranebound enzymes and membrane functions like phagocytosis and cells developed. In the study published by Gatfield and Pieters, an evident confusion of the susceptibility of a macrophage for phagocytose mycobacteria was noticed when they were consumed of cholesterol (Gatfield J and Pieters J ,2000) . Whereas Burkhard et al were evidenced that hypercholesterolemia may prompt a considerable impedance of antiviral cellular immune responses prompting deferred viral clearance from spleen and nonlymphoid organs. As an outcome of the irritated virus host equilibrium mice created serious immunopathologic disease (Burkhard *et al* ., 2016). Nutrition is an essential factor which affects capability to infection (Magdalena D and Magdalena K , 2012). Link between tuberculosis and malnutriition is very known tuberculosis may lead to malnutriition , malnutriition can predispose for tuberculosis (Zachariah.R and Spielmann .MP , 2002). Lipids are essential factor that specify our nutritional states Low lipid levels lead to increased ability to different infection such as tuberculosis(Deniz *et al* ., 2006, Volpato , 2000).

In this study , the results of TG and LDL correlates with the findings of previous studies (Kwiatkowska *et al*., 1999).Triglyceride (TG)and Low density Lipoprotein (LDL)are important components of cell membrane that are quickly attacked through (ROS) and free radicals. Membrane bound (TG) and (LDL) are destroyed by lipid peroxidation. Serum lipids can so be used to membrane bound (TG) and (LDL) resulting in the decrease in their level in tuberculosis cases. Reduced concentrations for lipid constituents might have resulted from tissues and cells detriment and subsequently conduct to slim and weight loss that are mostly noticed with tuberculosis patients . The lower levels of a lipid constituents noticed in tuberculosis patients whenever compared with a healthy subjects might too be subsequently of decomposed rate of lipids creation and advanced rate of lipids catabolic rate correlated with tuberculosis infection.

Akpovi *et al* ., 2013 have shown that HDL-C decrease in TB patients compered with control subjects and this correlates with our results . In general, HDL-C catabolism increases during inflammation and decreased serum HDL-C concentration may be mainly due to inflammation caused by tuberculosis (Griese M , 1999 , Deniz O and Gumus S. 2007 and Ghorbani H. 2006). Response to inflamation during the acute phase of (TB)is characterized by an over expression of proteins such as phospholipase A2 and circulating amyloidA (Tietge *et al*., 2002) which stimulates HDL-C catabolism (Deniz *et al*., 2006).

HDL- cholesterol defends arterials wall of circulatory system (Kasim *et al* ., 2012). HDLcholesterol is affected via body's metabolic state and complete derangement in lipids creation and raised catabolism (by lipid peroxidation) results in low (HDL) in this work .

HDL has been demonstrated to be low in the patients infected by inflammatory diseases such as pneumonia and tuberculosis (Deniz *et al* ., 2006) and a close links have been shown between acute period reactant and HDL cholesterol. Some authors (Perez-Guzman et al ., 2005;1 Deniz et al ., 2006; Volpato et al ., 2000) found

serum lipid levels, particularly of HDL, to be low in pulmonary tuberculosis TB when compared to the healthy group and emphasized that low level of HDL in TB can to be related to acute period proteins, induced via medication through the inflamatory process this was assumed to be required to possible lipoprotein oxidation. (Volpato et al ., 2000).

Conclusion

In conclusion according to our results we found that patients with tuberculosis have higher serum sugar than healthy subjects, while it was raised with increase of age , and it was no significantly increased in Women compared with Men. And they have lower serum urea level than healthy subjects, while it was decreased with increase of age and it was no significantly increased in Men compared with Women. Whereas TC and LDL levels were higher than control group, TC increase of age and it was no significantly increased in Women compared with Men, while LDL was significantly decreased with increase of age and it was no significantly increased in Men compared with Women. HDL and VLDL were lower than control group, HDL was no differences with the age, and it was no significantly increased in Women compared with Men, while VLDL was no differences with the age, and it was no significantly increased in Women compared with Men. That proved to be a consequence of the disease itself rather than a risk factor .Further research is needed with larger number of patients and longer follow up periods in order to provide additional support to this assertion .

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