

Some Biochemical Estimation In Iraqi Patients with Polycythemia.

Mohammed Sami Kahdem

College of Dentistry University Of Baghdad

KEY WORDS: polycythemia, mucoprotein, protein- bound hexoses, lactate dehydrogenase (LDH)

BACKGROUND: Polycythemia is the abnormal increase in number of circulating red blood corpuscles(RBC).Packed cell volume (PCV) may be as high as 60 percent. A three to four-fold increase in (RBC) count may also be encountered. Polycythemia can be caused by increased production of (RBC) or severe dehydration. A mucoprotein is a glycoprotein composed primarily of mucopolysaccharides. It can be found in the synovial fluid of the knees. Glycoproteins and glycolipids are useful indicators in diagnosis and management of cancer .

OBJECTIVE:

Assess the status of mucoprotein fraction of polycythemic patient's serum.

DESIGN: Serum mucoprotein, protein- bound hexoses concentrations and LDH activity were studied in 25 patients with polycythemia and 25 healthy individuals.

SETTING:

This study included 25 patients with polycythemiq diagnosed by pathologist doctors from Baghdad Teaching Hospital in Baghdad. and 25 healthy subjects as control group. The work was done in the laboratories of College of Science, University of Baghdad.

METHODS: Serum mucoprotein, protein- bound hexoses concentrations and LDH activity were determined by using spectrophotometric method.

RESULTS: Obtained results showed significant elevation in serum levels of mucoid protein and protein- bound hexose of polycythemic group that of healthy control . In addition, LDH activity was significantly elevated in polycythemic patients.

CONCLUSION: The various anomalies observed suggested that the composition of the mucoprotein fraction of serum may be abnormal in diseased subjects.

Introduction:

Ploicythemia is the abnormal increase in number of circulating red blood corpuscles (RBC). Packed cell volume (pcv) may be as high as 60 percent . A three to four fold increase in (RBC) Account may also be encountered.

Some Biochemical Estimation In Iraqi Patients with Polycythemia.....

Mohammed Sami Kahdem

Polycythemia can be caused by increased production of (RBC) or server dehydration. Polycythemia is not "cancer : Since the (RBC) that overproduced do not go on to divide themselves. Rather, it is a" myeloprolifevative disorder", which simply means that too many normal (RBC) are being made (bone marrow loses "equilibrium" and dose not make necessary cells in the proper rations).(1)

Glycoproteins are usually define as protein-carbohydrate complexes in which oligosaccharide and/or polysaccharides are joined by covalent linkage to specific amino acids of proteins. The carbohydrate portion contains amino sugars (glucosamine , galactosamine or sialic acid) and hexoses (galactose, mannose) or fucose (2).

Generally , the term protein -polysaccharide complex indicates that the protein component is the major part of the complex in contradistinction to mucopolysaccharide . Mucoproteins include the al- and <x2 . globulins of serum (and others) .(3)

Mucoproteins some time called glycoproteins, although this term usually refers to those mucoproteins containing less than 4% carbohydrates (4)

Materials AND METHODES:

This study included 25 patients with polycythemiq aged 35-50 with a mean of (43 ± 15 years) and 25 healthy individual aged 20-50 years with a mean of (36 ± 22.8 years) as healthy control group as shown in table (1) . The diagnosis of polycythemiq disease was based on hametological investigations, pcv, Hb and so achieved by hametologic consultant . The biochemical investigation involved in this study included serum estimations of mucoproteins and protein-bound hexoses levels and lactate dehydrogenase LDH activity. The measurement of serum mucoproteins and protein-bound hexoses levels were performed according to the methods of winzlar (5) and harteel (6) , serum LDH activity was evaluated according to procedure of Burtis and Ashwood (7).

RESULTS:

The mean (± SD) of serum LDH activity , concentration of mucoprotein and protein-bound hexoses of polycythemic patients and healthy controls are summarized in table (2).

Table(2) showed that serum LDH activity was significantly elevated in polycythemic patients compared with that of controls (P<0.01) .Significant increased was observed in serum levels of mucoid protein of polycythemic group when compared with that of healthy controls (P<0.01) . Also, the mean values of protein- bound hexoses in sera of polycythemic patients was significantly elevated in comparison with that of healthy controls.

Discussion:

Polycythemia is a disease that usually develops slowly and most patients do not experience any problems related to the disease after being diagnosed . Most of affected, polycythemia vera with an acquired abnormal change in a

Some Biochemical Estimation In Iraqi Patients with Polycythemia.....

Mohammed Sami Kahdem

single hemopoietic (blood-forming) stem corpuscles in the marrow, where blood cells are made. Abnormal cell production gradually dominates normal cell production and many mature and immature red corpuscles are produced(8).

The present study showed significant increase in serum LDH activity observed in polycythemic patients compared with controls.

Vannucchi and Almudaffar and and Rassam observed a significantly elevation in LDH activity of polycythemic patients(9,10) Kurosawa and Iwasaki found an elevation in LDH activity and hyper calcemia in patients of polycythemia transform into Acute leukemia (11).

In many patients, white cell and platelets counts are also elevated . Immature blood cells can give rise to increased LDH activity (12)

The result of present study also showed that Mucoprotein (sermmucoid) and protein-bound hexoses were elevated significantly in polycythemic patients in comparison healthy individual controls.

Williamson reported an increase in mucoprotein and protein -bound hexoses and hexamine levels in polycythemic patients(13). Steinman et al. (14) also found that such increase was limited to hexosamine recovered from the paper electrophoretic fraction. Finally, there is an additional evidence, although fragmentary, of a chemical nature. The various anomalies observed suggested that the composition of mucoprotein fraction of serum may be abnormal in disease (15).

REFERENCES:

1. Streiff, MB, Smith B, Spivak JL. The diagnosis and management of polycythemia vera in the era since the Polycythemia Vera Study Group. Blood, (2002); 99: 1144.
2. Yageeswaren.G.cell surface glyco lipids and glyco proteins in malignant transformation. Adv Cancer Res. (1983);3:289-350.
3. Passamonti F, Malabarba L, Orlandi E, Barate C, et al.(2003) Haematologica 88 (1): 13-8.
4. Taoka, T. and L.C. Fillios. Early effects of protein depletion on hepatic glycoprotein synthesis in the rat. J. Nutr (1971). 101: 93.
5. Winzlar RJ. Determination of serum glycoproteins. In: Click D. Method of Biochemical Analysis, Vol.2,ed.2. Newyork Interscience publishers, (1955):279-311.
6. Hatree EF. Determination of proteins, Amodification of lowly Method. Anal Biohem (1972);48:422-427.
7. Burtis ,c,s. and Ashwood, E.R.T,ETZ Textbook of clinical chemistry 6th Ed.(1994) chap18.pp.812-818.
8. Ania BJ, Suman VJ, Sobell JL, et al. Trends in the incidence of polycythemia vera among Olmsted County, Minnesota residents, 1935-1989. Am. J. Hematol. (1994);47: 89-93.
9. Vannucchi.A.M, etal prospective identification of high risk polycythemia vera patients based on JAK 2v617F allele burden. Leukemia . 1Sep(2007).21;1952-1959.
10. Almudaffar.S.A, and Rassam .MB. (1979) Biochem App . Biol,15(3); 238-244
11. Karosawa.M.Iwasaki.H. Mega karyoblastic transformation of polycythemia vera with hypercalcemia . Annals of Hematology (2002). Volume 8, number 11 November ; 668-671.
12. Adamson JW, Fialkow PJ, Murphy S, Prchal JF and Steinmann L. Polycythemia vera: stem-cell and probable clonal origin of the disease. N. Engl. J. Med. (1976);295: 913-916.
13. Williamson. P.J. Erythropoietin transfusion science. (1991) Volume 12, issues. 1-2, pages 15-23.
14. Steinman H, Kobza-Black A, Lotti T, Brunetti L, Panconesi E and Greaves M. Polycythaemia rubra vera and water-induced pruritus: blood histamine levels and cutaneous fibrinolytic activity before and after water challenge. (1987) Br. J. Dermatol.. 116 (3): 329-333.

Some Biochemical Estimation In Iraqi Patients with Polycythemia.....

Mohammed Sami Kahdem

15. Neuberger, A., Marshall RD and Gottschalk A Some aspects of the chemistry of the component sugars of glycoproteins. In: A. Gottschalk. ed. Glycoproteins, eisevier Publ. (1966) Co, New York,. 158.

الخلاصة:

مرض Polycythemia هو فرط الزيادة باعداد كريات الدم الحمراء وقد لوحظ ان الزيادة بكريات الدم الحمراء قد تكون ثلاثة الى اربعة اضعاف اعداد الكريات الحمراء في الحالة الطبيعية كما لوحظ ان هنالك زيادة في ال PCV قد تصل الى 60% في الحالة التي درست في هذا البحث.

ان سبب المرض اما يكون نتيجة فرط انتاج الكريات الحمراء او فقدان السوائل بشكل كبير . ان mucoprotein هي عبارة عن بروتينات مرتبطة بجزئته سكر على شكل ارتباط متعدد السكريات mucopolysaccharide وهذه ممكن ان تتواجد في سوائل الجسم مثل السائل المنوي او في سوائل مفاصل الجسم (الركبتين) . ان هذه المركبات Glycoliplid & mucoprotein تعتبر مفيدة كدليل في تشخيص ومعالجة السرطان .

اخذت عينات مصل من 50 حالة تم تقسيمها الى 25 منها من المصابين بمرض Polycythemia تم تشخيص الحالة المرضية لهم في مستشفى مدينة بغداد التعليمية و 25 حالة الاخرين بحالة طبيعية (healthy control) تم قياس مستويات ال mucoprotein, protein- bound hexoses, وفعالية ال LDH للحالات المذكورة بطرق طيفية ، وتم اجراء القياسات في كلية العلوم جامعة بغداد. اظهرت النتائج وجود زيادة معنوية في مستوى ال mucoprotein في مصل المرضى مقارنة بالاشخاص الاصحاء والمرضى المصابين بالامراض غير السرطانية (Control) ($P < 0.01$) اضافة الى ارتفاع معنوي في مستوى ال LDH عند المرضى مقارنة ب (Control) والاصحاء .

ان هذه التغيرات المعنوية التي قيست في هذه الدراسة يمكن ان تقترح بان تركيبة هذه المركبات المتعددة الجزئيات في مصل المرضى ممكن ان تكون حالتها بشكل غير طبيعي في المرضى الذين تم اختيارهم في هذه الدراسة.

Some Biochemical Estimation In Iraqi Patients with Polycythemia.....

Mohammed Sami Kahdem

Table(2) The host information of patients ,control and normal subjects studied.

Case	No of case	Female	Male	Age year	Mean \pm SD
Polycythemia	25	7	18	35-60	43+15
Healthy control	25	9	16	20-50	36 \pm 22.8

Table(1): Mean \pm SD of the studied mucoprotein, protein- bound hexoses and hexosamine of healthy and polycythemic subjects.

Parameters	Polycythemic subjects Mean \pm SD	healthy control Mean \pm SD
LDH	300 \pm 100*	126 \pm 45
Mucoprotein mg/dl	22.7 \pm 9.5*	13.5 \pm 1.8
protein- bound hexoses (mg/dl)	190 \pm 30*	90 \pm 10

* Significant difference at $p < 0.01$