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The spring in Duhok province

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ABO AND Rh BLOOD GROUPS POLYMORPHISM AMONG THE KURDS OF DUHOK, IRAQ

ADIL A. EISSA, MBChB, FIBMS*

Submitted 30 June 2014; accepted 6 Nov 2014

ABSTRACT

Background and Objectives: ABO and Rhesus blood groups distribution had been studied extensively among different populations, however no data are available from Kurdish people living in Duhok, Iraq, thus this study has been conducted to determine the distribution of ABO and Rhesus blood groups phenotypes among Kurdish people living in Duhok, Iraq.

Methods: The study included revision of ABO and Rhesus (D) blood grouping data of 98188 donors who attended blood bank in Duhok in a period extending from January 2005 to December 2013 as well as prospective determination of ABO and Rhesus blood grouping of 1000 individuals attending Azadi teaching hospital for various reasons. Blood grouping was performed by standard tube method.

Results: In relevance to ABO blood group antigens, blood group A was the most common (39.9%), followed by O (36.9%), then B (15.8%) and finally blood group AB (7.4%) among randomly selected individuals in comparison to donors whose most frequent blood group was O (42.79 %). Regarding Rhesus system among the random group, the majority were positive for Rh(D) (91.1%), Rh(e) (95.57%), Rh (C) (75.86%) and Rh(c) (67.98%), while small proportion were positive for Rh (E) antigens (25.12%).

Frequencies of Rhesus genotypes revealed that the commonest presumed Rhesus genotype was R1R1 followed by R1r and R1R2, while rr was the most common presumed Rhesus genotype among Rh(D) negative individuals.

Conclusion: Blood group O donation is widely adopted in the region which contributed to higher prevalence among blood donors and less frequent observation among randomly selected patients. Regarding Rh antigens, blood antigens D,C,c,e were frequent antigens while E antigen was much less common.

Furthermore, ABO and Rhesus (D) distribution appears to be similar to that of Kurdish people living in Turkey and Iran and was somewhat different from most neighboring populations including that of Iraqi Arabs.

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Keywords: ABO, Rhesus, Blood group, Kurds, Duhok, Iraq.

Since the discovery of first and the most important blood group antigens, ABO blood group by Karl Landsteiner in 1900,¹ several other blood groups have been identified (up to 30 blood group system identified by the International Society of Blood Transfusion).² The proportion of each of these blood group antigens is different and varies among different ethnic groups.

The single most important mandatory test for proper blood transfusion is the determination of ABO blood group of both donors and recipients. ABO blood group antigens are also known as histo-blood group antigens as they were found on many tissues, in addition to that on the surface of RBCs, including endothelial and epithelial cells of the lung, gut, urinary tract and reproductive tract as well as in body secretions (particularly saliva) and

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fluids (milk, urine, semen and serum).³ ABO blood groups have been used as genetic markers of populations as the incidence of ABO blood groups differs in populations e.g. group B is found twice as frequently in African Americans and Asians as in white persons.⁴

Furthermore, the Rhesus (Rh) blood groups are second only to the ABO group in importance in transfusion medicine as the Rh antigens, especially D, are highly immunogenic and can cause sensitization, hemolytic disease of the newborn (HDN) and severe transfusion reactions if a person lacking these antigens received blood carrying such antigens.⁵

Till recently pre-transfusion testing included only ABO and Rh(D) matching between patient and donor, however this was associated with increased sensitization specially in patient with chronic transfusion, that is why nowadays there is a trend towards extended matching for ABO, Rhesus (all antigens including D, C, c, E, e) and Kell antigens, whenever possible to increase life span of transfused RBCs and to reduce alloimmunization to RBC antigens specially in patient requiring chronic transfusion particularly patient with sickle cell anemia.⁶

Previous studies from Iraq (Kurd and Arab) had studied extensively ABO and Rh(D) distribution throughout the country.⁷ Limited data regarding other Rh antigens (C,c,E,e)⁸ are available as these antigens are not routinely included in pre-transfusion testing. This study was initiated to find out the frequency of ABO and Rh phenotypes in Kurdish people living in Duhok, Iraq.

METHODS

The study included revision of ABO and Rh (D) blood grouping data of all donors from Kurdish ethnicity living in Duhok (98188 Donors), who attended blood bank

in Duhok in a period from January 2005 to December 2013. Additionally the determination of ABO and Rh blood antigens was done for 1000 randomly selected patients (excluding patients with malignancies, previous transfusion within the last 3 months and autoimmune diseases) attended Azadi Teaching Hospital for various reasons.

ABO blood grouping and Rh typing were done by the standard tube method using IgM monoclonal antibodies (anti-A, anti-AB, anti-B, anti-D, anti-C, anti-c, anti-E and anti-e) from BIOTEC Laboratories Ltd - UK.⁹ Manufacturer's procedural instructions were followed: forward ABO grouping has been done by immediate spin technique and the reverse ABO grouping by taking serum of patients and stored cooled group A, B, O cells. Rh typing was done by standard tube method.

RESULTS

The age of the enrolled individuals ranged from 18 to 60 years (mean 25 ± 7.5) and all were males. ABO and Rh (D) red blood cell antigens prevalence revealed a discrepancy between donors attended blood bank and randomly selected patients attended Azadi Teaching Hospital for various reasons as is shown in table 1. With the most common ABO blood group antigen being group O followed by A, then B and finally AB among blood donors, while blood group A was the most common among randomly selected patients followed by O then B and finally AB. On the other hand, Rh (D) was more frequently expressed on the surface of RBCs of randomly selected patients than donors as shown in the table.

Table 1. Prevalence of ABO and Rh blood group antigens among blood donors and randomly selected patients.

Phenotype	Donors No. (%)	Randomly selected patients No. (%)
A	32209 (32.80%)	399 (39.9%)
B	18513 (18.86%)	158 (15.8%)
AB	5453 (5.55%)	74 (7.4%)
O	42013 (42.79%)	369 (36.9%)
Rh(D)	88281 (89.91%)	911 (91.1%)
Rh(C)	--	759 (75.9%)
Rh(c)	--	681 (68.1%)
Rh(E)	--	251 (25.1%)
Rh(e)	--	956 (95.6%)

Table 1 showed also that the prevalence of other red cells Rh antigens varied: RBCs of majority of Kurds living in Duhok expressed the e antigen (956 patients - 95.6%), followed by C (759 patients-75.9%) and c antigens (681 patients- 68.1%), while the E antigen was the least frequent (251 patients- 25.1%).

Occurrence of Rh combinations as shown in table 2 showed that the DCE and DCce were most frequently observed among Kurds of the region at 31.5% and 30.1% respectively followed by DCCee (13.8%), ce (7.4%), DcEe (6.9%), Dce (4.4%) and DcE (3.9%). Other combination observed in less than polymorphic frequency included DCCe (0.6%), Cce (0.5%), Ce (0.5%) and cE (0.4%). The remaining combinations including DCEe, DCE, CcEe, CcE, CE, cEe, CEe were not found.

Table 2. Rh phenotype among randomly selected patients from Duhok/Iraq.

Rh phenotype		Current Study %
Fisher-Race	Weiner*	
DCE	DCE/DCE(R ¹ R ¹)*	31.5
DCce	DCE/ce(R ¹ r)*	30.1
DCCee	DCE/DcE(R ¹ R ²)*	13.8
ce	ce/ce(rr)	7.4
DcEe	DcE/ce(R ² r)*	6.9
Dce	Dce/ce(Rr)*	4.4
DcE	DcE/DcE(R ² R ²)*	3.9
DCCe	DCE/DcE(R ² R ²)*	0.6
Cce	Ce/ce(r'r')	0.5
Ce	Ce/Ce(r'r')	0.5
cE	cE/cE(r''r'')	0.4
DCEe	DCE/DCE(R ² R ¹)*	--
DCE	DCE/DCE(R ² R ²)*	--
CcEe	Ce/cE(r'r'')*	--
CcE	CE/cE(r'r'')	--
CE	CE/CE(r ² r ²)	--
cEe	dcE/dce (r''r)	--
CEe	CE/Ce(r'y'r')	--

* According to the most common combinations throughout the world.

DISCUSSION

Red blood cells express many antigens on their surface membrane and their expression varies among populations of different ethnicity. Knowing the prevalence of different blood group antigens in any given population is useful in managing cases of alloimmunization following multiple transfusions especially in patients with hemoglobinopathies, patients on dialysis and cancer patients as well as for preparing red cell panels for blood banks.⁷

Both ABO and Rh antigens are governed by autosomal chromosomes (chromosome 9 and 1 respectively) so selecting only males will not affect the results.

Distribution of ABO and Rh(D) blood antigens among two different groups of individuals (donors at blood bank and randomly selected patients), showed discrepancy between the two groups as blood group O subjects are more likely to be encouraged to donate since they are considered universal donors. This observation had been documented by several other studies from Iraq and some other countries.⁸⁻¹¹

Predominance of blood group A as observed in this study is in contrast to that observed in some other studies from Iraq and surrounding countries including Iran (Persian), Saudi Arabia and Kuwait where group O predominates^{8,12-14} However the former observation is consistent with previous reports on Kurdish people living in Iran and Turkey^{15,16} and also similar to reports from Syria and Jordan.^{17,18} as shown below:

People Group	O	A	B	AB
Iraq (Kurds) ⁸	37.2	32.5	23.8	6.5
Iraq (non-Kurds) ¹²	35.5	27.4	28.5	8.6
Iran ¹³	40.1	30.5	22.0	7.4
KSA ¹⁴	56.8	33.4	6	3.8
Kuwait ¹⁴	44.6	26.7	24.1	4.6
Iran(Kurdish) ¹⁵	37.1	37.2	17.9	7.8
Turkey (Kurdish) ¹⁶	33.7	40.8	18.5	7.0
Syria ¹⁷	37.5	46.3	13.1	3.1
Jordan ¹⁸	36.6	38.4	18.0	7.0
Current Study	36.9	39.9	15.8	7.4

Frequency of D antigen appeared to be comparable to that reported from other Kurdish people living in Iran and Turkey (at 91.1% and 89.2% respectively).^{14,15} Also it appeared to be comparable to that from other Middle East countries including other parts of Iraq, Iran (Persian), Jordan and Syria^{8-11,17,18} as well as to that from India.⁷ however it appeared to be quite different from Chinese.^{19,20} as shown below:

Antigen	Caucasian ¹⁹	Black ¹⁹	Chinese ²⁰	Indian ⁷	Basrah ⁹	Current study
D	85.0	92.0	99.0	93.6	91	91.1
C	68.0	27.0	93.0	87.0	70	75.9
E	29.0	22.0	39.0	20.0	37	25.1
c	80.0	96.0	47.0	58.0	72	68.1
e	98.0	98.0	96.0	98.0	100	95.6

Frequency of other Rh antigens show similarities to some extent to that reported from the region (Basrah) and to that reported from India, but is largely different to that reported from blacks; with low frequency of C antigen and higher frequency of c antigen that maybe responsible to the higher rates of sensitization among patients with sickle cell anemia (black origin) to C antigen.⁶

Rh(E) antigen appeared to be of low frequency throughout the world and this may be explain higher sensitization rate among multiple transfused patients in comparison to that of Rh(e) antigen which appeared to be of high frequency throughout the world.⁷

Finally the frequencies of Rh genotypes among Kurds were estimated based on phenotype/genotype assumptions by

Daniels.²¹ The later table also compares the genotype frequencies with those reported among other population. The commonest Rh genotype was DCe (R¹R¹) followed by DCce (R¹r) and DCcEe (R¹R²), while rr was the most common genotype among Rh(D) negative individuals. The presumed genotype

pattern shows some similarities to that reported among Caucasians, except for the higher frequency of the R¹R¹ and the lower frequency of the rr genotypes among Kurds, while the pattern is very different from that reported from Blacks as shown below:

Rh phenotype		Caucasian ¹⁹	Black ¹⁹	Chinese ²⁰	India ⁷	Basrah ⁹	Current Study
Fisher-Race	Weiner*	%	%	%	%	%	%
DCe	DCe/DCe(R ¹ R ¹)*	18.5	2.0	51.8	42.6	22	31.5
DCce	DCe/ce(R ¹ r)*	34.9	21.0	8.5	32.2	26	30.1
DCcEe	DCe/DcE(R ¹ R ²)*	13.3	4.0	3.0	14.0	16	13.8
ce	ce/ce(rr)	15.1	6.8	0.1	4.6	9	7.4
DcEe	DcE/ce(R ² r)*	11.8	18.6	2.5	0.1	15	6.9
Dce	Dce/ce(Rr)*	2.1	45.8	0.3	1.3	6	4.4
DcE	DcE/DcE(R ² R ²)*	2.3	0.2	4.4	0.8	--	3.9
DCcE	DCE/DcE(R ² R ²)*	0.1	--	0.4	1.1	--	0.6
Cce	Ce/ce(r'r)	0.8	--	0.1	0.3	--	0.5
Ce	Ce/Ce(r'r')	--	--	0.1	--	--	0.5
cE	cE/cE(r''r'')	--	--	--	--	--	0.4
DCEe	DCE/DCe(R ² R ¹)*	0.2	--	1.4	0.5	6	--
DCE	DCE/DCE(R ² R ²)*	0.01	--	--	--	--	--
CcEe	Ce/cE(r'r'')*	5	--	--	--	--	--
CcE	CE/cE(r'r'')	--	--	--	--	--	--
CE	CE/CE(r ² r ²)	--	--	--	--	--	--
cEe	dcE/dce (r''r)	--	--	--	--	--	--
CEe	CE/Ce(r'r')	0.9	--	--	0.2	--	--

*According to the most common combinations throughout the world.

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پوخته

هه‌مه‌جوریا گروپین خوینی ژ جورئ ABO و Rh ل دهف کوردیت دهوکی/عراق

پیشه‌کی و ئارمانج:

فکولینین به‌ربه‌لاف و بشیوه‌یه‌کی به‌رفره هاتینه ئه‌نجامدان لسه‌ر دابه‌شبو نا جورین خوینی ژ جورئ ABO و Rh دناقبه‌را گهلین جیهانی داربه‌لی پا سه‌بارهت کوردین ئاکنجییت پاریزگه‌ها دهوکی لکوردستانا عیراقی هیچ داتایه‌ک لهر دهست نینه . ژ بهر ئه‌فی چه‌ندی ئه‌ف‌ه‌کولینه هاته ئه‌نجامدان بو دیارکونا به‌لافبونا جورین گروپین خوینی ژ جورئ ABO و Rh ل دهف کوردین ئاکنجییت پاریزگه‌ها دهوکی لکوردستانا عیراقی.

ریکین فه‌کولینی:

ئه‌فی فه‌کولینی پیداجونه‌ک کر لسه‌ر داتاین ABO و Rh(D) دناقبه‌را خوین به‌خشادا ئه‌وئیت سه‌ره‌دانا به‌نکا خوینی لده‌کی کرین دماوی دناقبه‌را کانینا دوئی ۲۰۰۵ و کانینا ئیکی ۲۰۱۳ کو ژمارا وان ژی (۹۸۱۸۸) خوین به‌خش بون، زیده‌باری ئه‌نجامدانا تاقیکرنا گروپین خوینی ABO و Rh بو ۱۰۰۰ که‌سان ئه‌وئیت سه‌ره‌دانا نه‌خوشخانا ئازادی کرین ژ بهر ئه‌گهرین جودا . تاقیکرنا هاته ئه‌نجامدان ب ریکا بوریکی سنانده‌ر.

ئه‌نجام:

سه‌بارهت دژ که‌ریت خوینی (ABO) دیار بو کو جورئ خوینی (A) به‌ربه‌لافتین جوره (39.9%) و باشان (O) (36.9%), باشان (B) (15.8%) و لدوماهیکی (AB) (7.4%). سه‌ره‌رای هندئ کو خوینا ژ جورئ (O) (42.79%) به‌لافتین جور بو دناقبه‌را خوین به‌خشادا ،هه‌روه‌سا سه‌بارهت گروپیت خوینی (Rh) زوربه‌ی وان پوزتیف بون و Rh(D) (91.1%)، و Rh(e) (95.57%)، و Rh(C) (75.86%) و Rh(c) (67.98%) ، ده‌مان ده‌م دا ریژه‌کا کیم پوزیتیف بون بو دژکه‌ریت Rh(E) (25.12%).

سه‌بارت هه‌مه‌جوریا جینیا Rh دیار بو کو به‌ربه‌لافتین جورئ جینی (R1R1) و لیدفرا (R1R2 و R1r) و لده‌مه‌کی (rr) به‌ربه‌لافتین جور دناف که‌سین Rh(D) ی وان نکیتف .

ده‌ئه‌نجام:

خوینا ژ جورئ (O) بشویوه‌یه‌کی به‌ربه‌لاف تیت‌ه‌بکارئینان ژبو مه‌رما به‌خشینی له‌ورا بویه ئه‌گهری بلند بونا ریژا فی گروپی دناف به‌را خوبه‌خشادا به‌راورد دگهل نه‌خوشین دی ،سه‌بارهت دژی که‌ریت (Rh) ، دژکه‌ریت خوینی (D,C,c,e) تینه‌ه‌ژمارتن وه‌ک دژ که‌ریت دوباره‌کری ده‌مان ده‌م دا دژی که‌ریت (E) کیمترین ریژه بون .

به‌لافبونا (ABO) و (Rh) دیار بو کو یاوه‌ک هه‌فه لده‌ف گهلئ کوردین ل ترکیا وایرانی و ده‌مان ده‌م دا یا جیواز بو دگهل پرانیا ده‌وله‌تین جیران و عه‌ره‌بین عیراقی.

الخلاصة

تعدد أشكال فصائل الدم ABO و Rh بين الأكراد في دهوك، العراق

الخلفية والأهداف:

لقد تمت دراسة توزيع فصائل الدم من نوع ABO و Rh بين اكثرية الشعوب على نطاق واسع، ولكن لا توجد بيانات متاحة عن الشعب الكردي من يعيش في دهوك/ العراق، بناء على ذلك اجري هذا البحث لتحديد توزيع فصائل الدم ABO و Rh لدى الشعب الكردي الذي يعيش في دهوك، العراق.

طرق البحث:

تضمنت الدراسة مراجعة بيانات ABO و Rh (D) للمتبرعين الذين زاروا بنك الدم في دهوك في الفترة الممتدة من كانون الثاني ٢٠٠٥ إلى كانون الاول ٢٠١٣ و التي تضمنت ٩٨١٨٨ متبرعا، وكذلك تم اجراء فحص فصيلة الدم من ABO و Rh لـ ١٠٠٠ شخص من الذين حضروا مستشفى ازادي التعليمي لأسباب مختلفة. وقد أجريت فحص فصيلة الدم بطريقة الأنبوب القياسية.

النتائج:

أظهرت النتائج أن مستضدات فصيلة الدم ABO، تبينت أن فصيلة الدم A الأكثر شيوعا (39.9%)، تليها O (36.9%)، ثم B (15.8%)، وأخيرا فصيلة الدم AB (7.4%) عند الاشخاص الذين حضروا مستشفى ازادي التعليمي المختارين بشكل عشوائي في مقارنة مع المتبرعين بأعلى نسبة فئة الدم (O) (42.79%). بشأن فصائل الدم Rh كانت الأغلبية إيجابية ل Rh (D) (91.1%)، و Rh (e) (95.57%)، و Rh (C) (75.86%) و Rh (c) (67.98%)، في حين كانت نسبة صغيرة إيجابية لمستضدات Rh (E) (25.12%). كشفت ترددات ظواهر Rh ان الأكثر شيوعا افتراضيا كانت النمط الجيني R1R1 تليها R1r و R1R2، في حين كان النمط (rr) الأكثر شيوعا بين الأفراد سلبي المستضد Rh (D).

الاستنتاجات:

التبرع بالدم من نوع O يستعمل بشكل واسع في المنطقة و التي ساهمت في انتشار أعلى بين المتبرعين بالدم مقارنة بالمرضى المختارين عشوائيا. وفيما يتعلق بمستضدات Rh: مستضدات الدم (e,c,C,D) اعتبرت مستضدات متكررة بينما كان المستضد E أقل شيوعا.

اثبتت الدراسة بأن توزيع فصائل الدم ABO و Rh (D) للأكراد الذين يعيشون في دهوك/ العراق كانت مماثلة للشعب الكردي الذين يعيشون في تركيا وإيران وكانت مختلفة إلى حد ما مع معظم البلدان المجاورة بما في ذلك عرب العراق.

BLOOD LEAD LEVELS AND KIDNEY FUNCTION AMONG ADOLESCENTS IN DUHOK

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ABSTRACT

Background and Objectives The adverse association between low-level lead exposure and kidney function has attracted much attention. The aim of this study was to examine the association between blood lead levels and kidney function in a sample of adolescents in Duhok, Iraq.

Methods A cross-sectional study was conducted by estimating blood lead levels, serum creatinine and creatinine-estimated Glomerular Filtration Rate (GFR) among 837 adolescents randomly selected from intermediate and secondary schools.

Results Mean blood lead level in the overall adolescents was 3.55 ± 0.98 ug/dl and mean serum creatinine level was 0.72 ± 0.07 mg/dl. Mean creatinine-estimated GFR was 106.47 ± 7.39 ml/min/1.73m². Adolescents with blood lead levels of >5 ug/dl had 101.66 ± 4.32 ml/min/1.73m² lower creatinine-estimated GFR compared with those with lead levels <3 ug/dl (109.42 ± 6.78 ml/min/1.73m²), $P < 0.001$. Blood lead levels were inversely correlated with creatinine-estimated GFR ($r = -0.38$, $P = 0.001$) and positively with serum creatinine ($r = 0.25$, $p = 0.01$) for all adolescents.

Conclusion Our results indicate that the higher blood lead levels in a range below the acceptable limit reported by the Centers for Disease Control and Prevention (10 ug/dl) were associated with a lower creatinine-estimated GFR. Environmental factors have been hypothesized to contribute to this burden

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Keywords: Blood lead, Adolescents, Estimated-GFR

Lead in the environment is still a major risk factor and its effects are mainly observed in developing countries 1,2. At lower levels of exposure (blood levels <10 ug/dl) adverse associations between blood lead and kidney function have been observed in adults 3. Few studies examined the association between low-level lead exposure and kidney function in children and adolescents 4, 5. In Iraq, most studies on lead exposure have conducted on exposure among risk groups 6, 7, 8, and the adverse association between low-level lead exposure and

kidney function is less well known. The present study designed to examine the association between blood lead level and kidney function of school adolescents in urban area of Duhok city, Kurdistan Region, Iraq.

METHODS

Setting and sample

A cross-sectional study carried out during the period 1st, November 2012 until the 31st, August 2013. Adolescent boys and girls from intermediate and secondary schools ($n = 837$) were included

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in the study sample.

The study conducted in Duhok city, Kurdistan Region, Iraq; which accommodates a population of nearly one million people. The city is located in a valley between 2 mountains and areas were chosen at different altitude in the valley: low (540 - <560 m) and high (>630 m) 9 .The schools in Duhok were grouped according to the resident areas. Of these, two distinct altitude areas located on left side and two on the right side on the highway which divide the city. At each area, the schools were grouped into four groups; intermediate and secondary schools for boys; and intermediate and secondary for girls. Therefore, out of 32, 16 schools randomly selected. Students in these schools represented our target population. The required number of students from each class selected randomly from school records by systematic random sampling procedure. The sample size calculated according to the World Health Organization formula to be 76710. Among the adolescents selected, 418 were urban living in low altitude area of both side of Duhok city and 419 were urban living in high altitude area. They were apparently healthy individuals with an age range from 13 to 19 years. Smokers, age more than 20 years and those having a medical history of diabetes mellitus or kidney disease excluded from the study.

Data collection

A pre-tested questionnaire was designed to obtain information on age, gender, and residence (high and low altitude). The age of the student was taken from the school records. Each student was interviewed directly and separately in a special room. A verbal consent for participation and approval to give blood samples for testing was obtained from the adolescents, after the nature of the study had been explained to them.

Blood lead measures

Blood lead (BPb) was measured at the College of Science Analytical Laboratory by flame atomic absorption spectrophotometer using a previously published procedure 11. Briefly, EDTA – blood precipitated with 20% TCA solution. The supernatant solution aspirated directly to the spectrophotometer and the samples run in batches using standard lead solution of 1, 3, 5 and 10 ug/dl. To correct the sensitivity of the instrument, a reagent blank was prepared by mixing an equal volume of 20% TCA with deionized water. The blank gave a reading of 1 ug/dl and this value subtracted from the reading of the samples examined.

Kidney function measures

Estimated GFR (measured in milliliters per minute per 1.73 m²) was calculated using the creatinine based formula of Matzke et al¹². Serum creatinine (S.Cr) level measured by the modified kinetic Jaffe reaction using a Cobas 6300 analyzer (Roche Diagnostics).

Statistical analysis

All statistical analyses performed using the Statistical Package for Social Science, version 19. Independent student t-test used to compare differences between the different groups. Linear regression used to assess associations between blood lead levels and estimated GFR. Pearson correlation coefficient® was used to assess the correlations between blood lead levels with serum creatinine and estimated GFR.

RESULTS

Blood lead levels and kidney function measures in the adolescents shown in Table 1. The mean blood lead level in the overall adolescents was 3.55 ug/dl (range 1.8-6.7 ug/dl) .The mean serum creatinine level was 0.72 mg/dl (range 0.7-1.2 mg/dl) and the mean creatinine-estimated GFR was 106.47 ml/min/1.73m² (range 85-120ml/min/1.73m²). The mean blood lead

levels in adolescents living in low altitude area was higher than in high altitude areas group, ($p < 0.01$). The mean blood lead levels were found to be higher among males and older adolescents than in females and younger age group, but this difference was not significant. The mean serum creatinine and creatinine-estimated GFR values in adolescents living in different altitude areas were significantly different ($p < 0.01$ and < 0.05 respectively). In linear regression analyses, higher blood lead levels consistently associated with a lower creatinine-estimated GFR. Higher blood

lead levels was also associated with a high serum creatinine values (Table 2). Adolescents with blood lead levels of > 5 $\mu\text{g/dl}$ had 101.66 ± 4.32 ml/min/1.73m^2 lower creatinine-estimated GFR (95% CI for mean 100.61 - 102.71 ml/min/1.73m^2) compared with those with lead levels < 3 $\mu\text{g/dl}$ (109.42 ± 6.78 ; 95%CI; 108.70 - 110.14 ml/min/1.73m^2), $P < 0.001$. Adolescents blood lead levels were inversely correlated with creatinine-estimated GFR ($r = -0.38$, $P < 0.001$) (Fig. 1) and positively with serum creatinine ($r = 0.25$, $p = 0.01$); (Fig. 2).

Table 1. Blood lead level, serum creatinine, and creatinine-estimated GFR by participant characteristics

Characteristic	No. (%)	BPb $\mu\text{g/dl}$	P value	S.Cr mg/dl	P value	Estimated GFR ml/min/1.73m^2	P value
Total	837(100)	3.55 ± 0.98		0.72 ± 0.07		106.47 ± 7.39	
SEX							
Male	421(50.3)	3.81 ± 1.00	0.82	0.76 ± 0.08	0.57	104.57 ± 7.22	0.61
Female	416(49.7)	3.30 ± 0.90		0.68 ± 0.06		108.39 ± 7.56	
Age(yr)							
13-15	417(49.8)	3.23 ± 0.85	0.71	0.66 ± 0.06	0.09	108.31 ± 8.65	0.07
> 15 -19	420(50.2)	3.86 ± 1.10		0.77 ± 0.08		104.61 ± 6.12	
Residence							
Low altitude	418(49.9)	4.43 ± 0.51	< 0.01	0.80 ± 0.09	< 0.01	103.52 ± 6.30	< 0.05
High altitude	419(50.1)	2.68 ± 0.41		0.64 ± 0.05		109.41 ± 8.47	

Table 2. Mean and SD of serum creatinine and creatinine-estimated GFR associated with blood lead levels

BPb $\mu\text{g/dl}$	No. (%)	S. Cr mg/dl	P value*	Estimated GFR ml/min/1.73m^2	P value*
< 3	341(40.70)	0.73 ± 0.05	< 0.01	109.42 ± 6.78	< 0.001
3-5	426(50.9)	0.74 ± 0.06		104.90 ± 7.37	
> 5	70(8.4)	0.84 ± 0.08		101.66 ± 4.30	

* Onaway ANOVA for serum creatinine and estimated GFR grouped by Pb levels

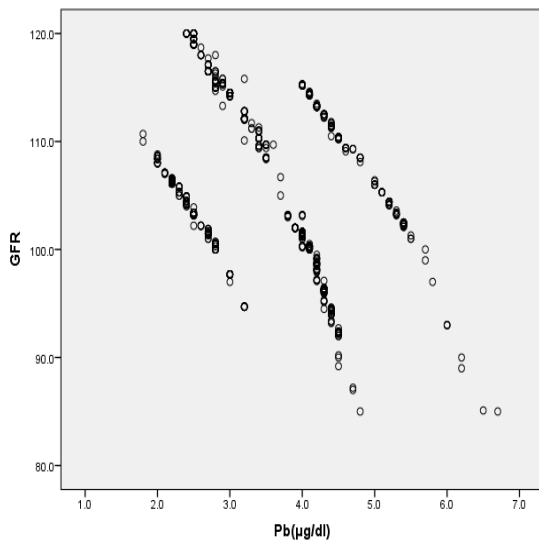


Figure 1. Creatinine-estimated GFR by blood lead levels, ($r = -0.381$, $p < 0.001$)

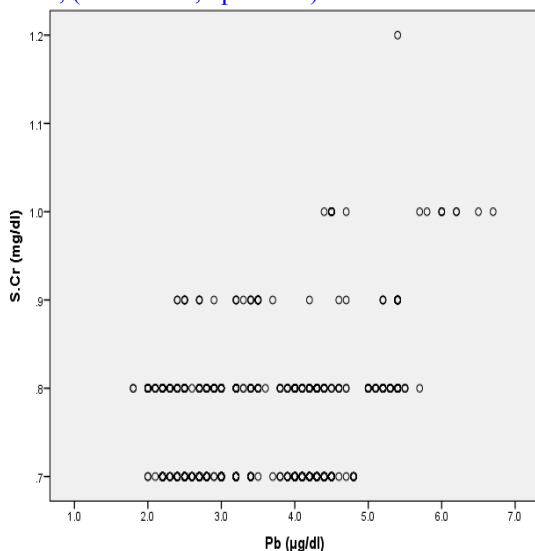


Figure 2. Serum creatinine by blood lead levels, ($r = 0.25$, $p < 0.01$)

DISCUSSION

In this study, we found that, overall, adolescents had blood lead levels below 10 µg/dl, the acceptable limit reported by others 13,14. Nevertheless, we found a significant association between blood lead levels and kidney function, higher blood lead levels were associated with lower estimated GFR and higher serum creatinine. The association was strong and graded throughout the range of blood lead levels. Previous studies conducted in children and adolescents suggest an inverse relation between low-level

environmental lead exposure and kidney function in cross-sectional and prospective analyses 15, 16. Our study extended those findings to adolescents sample at two levels of lead exposure, i.e. adolescents group living at low altitude area and the other group living at high altitude area, indicating that lead exposure at a level common in low altitude areas is associated with lower kidney function. Our previous study conducted in urban individuals living at different altitude areas, has shown that in low altitude area, crowded area in which exposure to lead is higher owing to the greater number of vehicles, gasoline generators, and industrial emissions, also probably due to less wash by air currents, blood lead levels were higher compared to the other area groups. However, increased risk of impaired kidney function suggests that low-level exposure may affect kidney function through early declines in the glomerular filtration rate.

Our study revealed no significant association between the values of blood lead and the factors known to affect blood lead levels and/or GFR of adolescents, such as sex and age. This is probably due to the low lead exposure among the studied population. However, some recent studies found a tendency towards increased blood lead levels with older age 17, 18.

Our results confirm the previously reported finding that higher blood lead levels in a range below the CDC level of concern (10 µg/dl) associated with lower estimated GFRs in a representative sample of US adolescents 5.

Our data of kidney function based on serum creatinine. This already known highly affected by age and sex, limiting the precision of creatinine-based GFR estimates. However, remarkable percent (8.4%) of adolescents with blood lead levels above 5.0 µg/dl had a lower estimated GFR; moreover, blood lead levels seems to have a negative correlation with values of creatinine-estimated GFR

and a positive correlation with serum creatinine levels. Controversial reports exist about a consistent association of low blood lead levels with kidney function 19, 20. A number of studies have found evidence against reverse causation, as an explanation for observed association between lead level and kidney function even in patients with chronic kidney damage, 21, 22. Prospective studies have shown that baseline lead levels are associated with subsequent decline in kidney function, adding evidence to the cause-effect relationship between lead exposure and subsequent kidney function decline. 23. Such inconsistent findings may be due to differences in the study population and research methodologies.

Some limitations of our data need to be considered in the interpretation of these findings. Firstly, our study was cross-sectional which lacks follow up. Secondly, assessment of kidney function was done by creatinine-based GFR estimates, creatinine-based estimates are known to perform less well at higher levels of GFR, and it has been repeatedly suggested that cystatin-based GFR estimates may be a superior marker of early dysfunction. 24 In conclusion, our results indicate that higher blood lead levels below the acceptable limit reported by the current Centers for Disease Control and Prevention (<10 ug/dl) were associated with a lower creatinine-estimated GFR in a sample of adolescents, particularly among those living in low altitude areas. Environmental factors hypothesized to contribute to this burden. Measures to reduce exposure to the metal should be considered, especially in low altitude areas where children and adolescents are particularly at a higher risk of decline in kidney function. Further studies in this area are needed to seek the association of environmental lead exposure with chronic kidney damage.

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پوخته

ئاستین رصاصی دناف خوینی دا دگه کارین گولجیسکا لدهف گهنجین دهوکی

پیشهکی و ئارمانج: پسته پیدانه کا گزنگ هه به ل په یوه ندیا نیگه تیف لناف بهینا کارین گولجیسکا و به رهنکاربون بو ئاستی نزم یی رصاصی.

رێککین فه کولینی: ئەو فه کولینه هاتیه کرن ل سەر دیارکرن رێژا رصاصی دناف خوینی دا و کریاتینین دا دناف خوینی دا. کریاتینین تیته دهست نیشانکرن ب رێژه یا (الترشیح الکبیبی GFR) ل سەرجه می 837 گه نجا هاتیه ژینگرتن ل قوتابخانین ناوه ندی و ئاماده یی.

ئه نجام: تیکرایا ئاستی رصاصی لناف خوینا گه نجا بگشتی $3.55 \pm 0.98 \text{ ug/dl}$ و تیکرایا ئاستی کریاتینین $0.72 \pm 0.07 \text{ mg/dl}$. دهست نیشانکرن ئاستی کریاتینین $106.47 \pm 7.39 \text{ ml/min/1.73 m}^2$ GFR. گه نچین ئاستی رصاصی ل دهف وان 5 ug/dl > ئاستی $101.66 \pm 4.32 \text{ ml/min / 1.73 m}^2$ GFR به راوردی دگه ل گه نچین ئاستی رصاصی 3 ug/dl < ئاستی $109.42 \pm 6.78 \text{ ml/in/ 1.73m}^2$ GFR چونکه کاریگه ری په یوه ندیی نیگه تیف بو دگه ل کریاتینین $r = -0.38$. $P = 0.001$ به ل یی پوزه تیف بو دگه ل دهست نیشانکرن کریاتینین $r = 0.25$, $P = 0.01$ ل دهف هه می گه نجا.

ده رئه نجام: ئه نجامین بدهستقه هاتین دیارکر به رزبونا ئاستی رصاصی دناف خوینی دا لدهف گه نجا کیتر بو ژ ئاستی دیارکری ژلایی سه نته ری کونترولی یی خوپاراستنا به رهنکاربونا رصاصی یی خوجه کو 10 ug/dl ئه و هاتیه گریدان دگه ل نزمبونا ئاستی (GFR) دگه ل وه رگرتنا هه می کارتیکه ری ژینگه هه ئه وین گریدایقه لسه رفی باری.

الخلاصة

مستويات الرصاص في الدم مع وظيفة الكلية لدى المراهقين في دهوك

خلفية وأهداف البحث: يوجد اهتمام كبير للعلاقة المعكوسة بين وظيفة الكلية والتعرض الى مستوى منخفض للرصاص.

طرق البحث: أجريت دراسة مستعرضة من خلال تقدير مستويات الرصاص في الدم، كرياتينين مصل الدم والكرياتينين المقدر بمعدل الترشيح الكبيبي GFR لدى 837 مراهقاً تم اختيارهم عشوائياً من المدارس المتوسطة والثانوية.

النتائج: معدل مستوى الرصاص في دم المراهقين العام $3.55 \pm 0.98 \mu\text{g/dl}$ في الدم وكان معدل تقدير مستوى الكرياتينين $0.72 \pm 0.07 \text{ mg/dl}$ بمعدل الترشيح الكبيبي $106.47 \pm 7.39 \text{ ml/min/1.73 m}^2$ GFR. أكثر من $5 \mu\text{g/dl}$ كان معدل GFR هو $101.66 \pm 4.32 \text{ ml/min / 1.73 m}^2$ مقارنة مع المراهقين الذين كان عندهم مستوى الرصاص أقل $3 \mu\text{g/dl}$ ووجدت $109.42 \pm 6.78 \text{ ml/in/ 1.73m}^2$ GFR وحيث علاقة عكسية بين مستوى الرصاص في الدم والكرياتينين المقدر بمعدل الترشيح الكبيبي $r = -0.38$, $P = 0.001$ وعلاقة ايجابية مع تقدير كرياتينين مصل الدم بلغ $r = 0.25$, $P = 0.01$ عند كل المراهقين.

الاستنتاج: تشير النتائج الى وجود علاقة بين المستويات العالية من الرصاص في الدم والتي هي بمستوى أقل من الحد المقبول $10 \mu\text{g/dl}$ والمثبت من قبل مراكز السيطرة على الأمراض والوقاية مع انخفاض مستوى الكرياتينين المقدر بمستوى الترشيح الكبيبي والاخذ بنظر الاعتبار كافة العوامل البيئية المقترنة بهذا العبء.

CONSERVATIVE TREATMENT OF OBSTETRICAL BRACHIAL PLEXUS INJURY: A COMBINED-STAGED APPROACH VERSUS PHYSIOTHERAPY ALONE

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ABSTRACT

Background and Objectives: Brachial plexus injury is caused by forceful traction on brachial plexus during difficult labour. According to literature, conservative treatment can result in significant improvement in majority of cases. The objective of this study is to determine the exact stages of nonsurgical management of newborn babies with Obstetrical brachial plexus injury.

Methods: Hundred newborn babies with upper brachial plexus injury were included in the study. They were classified randomly into two groups. The first group (50 cases) was received the classical physiotherapy management. The second group (50 cases) was received combined therapy including splint, electrical stimulation and physiotherapy. The treatment was continued till the age of 18 months in both groups. The treatment evaluation was performed by active assessment scale.

Results: The average age of newborn babies at time of presentation was 2 weeks. 90% of the cases were upper brachial plexus injury (44 cases in group one and 46 cases in group two). There was significant improvement in range of motion in group two comparing to group one. Moreover, those who received treatment before the age of 6 weeks demonstrated better response to treatment than those received treatment after the age of 6 weeks.

Conclusions: The effect of physiotherapy in obstetrical brachial plexus injury will be more if it is combined with electrical stimulation and limb splintage. The intervention by conservative treatment should be started as soon as possible after birth because the chance of failure by nonsurgical treatment will increase significantly with increasing age.

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Keywords: Brachial plexus injury, nonsurgical management, physiotherapy, electrical stimulation.

Brachial plexus is consisted of the ventral rami of C5, C6, C7, C8 and T1 nerve roots. They are liable to traction injury during difficult labor. The upper part of the plexus is formed by C5, C6 and C7, while the lower part is formed by C8 and T1.¹ Obstetrical brachial plexus injury is classified according to the level of injury into upper brachial plexus injury, lower brachial plexus injury and total brachial plexus injury. The clinical presentation varies according to the type of injury.² The upper plexus injury (Erb's palsy) is presented with paralysis of the shoulder

abductors and external rotators as well as forearm supinator. Therefore, the baby presented with adducted and internally rotated shoulder with pronated forearm. On the other hand, the lower plexus injury (Klumpke's palsy) is presented with supinated arm and flexed elbow as well as paralysis of hand intrinsic muscles. However, total plexus injury with paralysis of all the muscles of upper limb with ipsilateral horner's syndrome.

Majority of obstetrical brachial plexus injury is of Erb's type (about 90%), the rest is either Klumpke's palsy or total

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plexus injury.¹ The prognosis for brachial plexus injury depends on the level and severity of injury. Regarding the level of injury, prognosis is better for the Erb's palsy than the other two. Similarly, the prognosis is better for neuropraxia than axonotmesis and neurotmesis.

The response to treatment was evaluated by active movement scale. It had been showed that this scale can be used reliably in assessment of newborn babies with Obstetrical brachial plexus injury.^{3,4} The details of the scale are shown in Table 1.⁴

Table 1: Active movement scale for obstetrical brachial plexus injury.

Range of Movement	scale
With gravity eliminated	
No contraction	0
Contraction without movement	1
Movement less than half of range of motion	2
Movement more than half of range of motion	3
Normal	4
Against gravity	
Movement less than half of range of motion	5
Movement more than half of range of motion	6
Normal	7

In the literature, majority of the obstetrical brachial plexus injury responds to conservative treatment (80%).⁵ However, there is still controversy regarding the appropriate regimen for the conservative treatment. The aim of this research is to compare the effectiveness of classical physiotherapy management versus combined therapy including splint, electrical stimulation and physiotherapy.

PATIENTS AND METHODS

Hundred newborn babies with brachial plexus injury were included in the study. The newborn babies were referred to Erbil and Duhok hospitals during the period 2007 to 2012. They were classified randomly into two groups. The first group (50 cases) was received the classical physiotherapy management. The second group (50 cases) was received combined therapy including splint, electrical stimulation and physiotherapy. Newborn babies were received treatment until the age of 18 months in both groups.

The position for the splintage is shoulder abduction and external rotation. The splintage was continued for 6 weeks initially and then changed to night splint. The newborn babies in the second group were also receiving electrical stimulation twice weekly for the whole course of management. The physiotherapy regimen was including treatment by occupational therapist twice weekly and stretching of the upper limb muscles by the parents at home several times a day.

The inclusion criteria was newborn babies who had been diagnosed as obstetrical brachial plexus injury in the first 3 months of life. The newborn babies whom their parents refused the electrical stimulation and those who had associated neurological problems were excluded from the study.

The response to treatment was evaluated by the active movement scale which is a 7-point scale that range from no contraction to full range of movement. The newborn babies were evaluated by this scale monthly till the age of 18 months.

RESULTS

The average of age of newborn babies at time of presentation was 2 weeks. 90% of the cases were upper brachial plexus injury (44 cases in group one and 46 cases in group two).The study revealed that the monthly assessment of newborn babies by active movement scale showed significant improvement($P \leq 0.05$) among those who

received combined regime(group two) in comparison to those who received physiotherapy alone(group one).The

average active movement scale between the groups is shown in Table 2.

Table 2. regular assessment of the newborn babies in the two groups by active movement scale.

	Average scale by Active Movement Assessment					
	Group one (50)			Group two (50)		
Follow-up after treatment	Upper injury (44)	Lower injury (5)	Total injury (1)	Upper injury (46)	Lower injury (3)	Total injury (1)
Initial presentation	2	1	0	2	1	0
2 months after	2	1	0	3	2	0
6 months after	3	2	0	5	3	1
12 months after	4	2	1	6	4	2
18 months of age	5	3	1	7	5	2

In both study groups, those who received conservative treatment before the age of 6 weeks (70%), showed better response to treatment than those who received the treatment after the age of 6 weeks (30%), (p value < 0.05).

DISCUSSION

There is still controversy regarding the type of treatment in obstetrical brachial plexus injury in the literature.^{1,5,7} the study found that those who receive combined regimen showed better results than those who received physiotherapy alone. It has been shown that splinting the limb in resting position will facilitate the nerve recovery and reducing the gap between the two nerve ends.⁸ Furthermore, the resting position will allow stretching of the affecting muscles and therefore prevents secondary deformities. The splintage can be in the form of cast, brace or orthoses. Secondly, applying splint to the arm will prevent putting the newborn baby in the traditional Landek as it has adverse effect on the plexus injury.

On the other side, electrotherapy had shown to be effective as a part of treatment regimen in a wide range of the neurological problems including obstetrical brachial plexus injury.⁹ Electrical stimulation can facilitates

physiological activities and tissue regeneration. Moreover, electrotherapy prevents muscle fibrosis and atrophy while waiting for the nerve recovery. Similarly, physiotherapy is effective in strengthening and stretching the muscles as well as in preventing secondary deformities. However, the study showed that the effect of physiotherapy will be significantly more if it combined with limb splintage and electrical stimulation.

The study also showed that newborn babies who received treatment after the age of 6 weeks would respond less to nonsurgical treatment than those who were received treatment before that age. Because with increasing age, there is increased risks of scar formation and secondary deformities and the chance for the surgical intervention will be increased significantly.^{2,8}

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پوخته

چارهسەرکردنی بۆ نەشتەرگەری بۆ برینداربوونی کۆمەڵە دەمارى ملی منداڵ لە کاتى لەدایکبوون: بەراوردکردنى چارەسەرکردن بە رێگای چارەسەرکردنى جیاوازی قۆناغدار بەرامبەر چارەسەری سروشتی بە تەنها

پێشەکی و ئارمانج:

برینداربوونی کۆمەڵە دەمارى ملی پوودەدات لە ئەنجامی راکێشانیکی بەهێز لەسەر ئەم کۆمەڵە دەمارە لە کاتى لەدایکبوون. بەگوێرەى توێژینه‌وه‌کان، چارەسەری بۆ نەشتەرگەری دەبیته هۆی چاکبوونه‌وه‌یه‌کی بەرچاو لە زۆریه‌ی نەخۆشه‌کاندا. ئامانجی ئەم توێژینه‌وه‌یه بریتیه لە دیاریکردنیکی وردی قۆناغه‌کانی چارەسەرکردنی منداڵی تازه لە دایکبووی تووشبوو بە برینداربوونی کۆمەڵە دەمارى ملی به‌ی نەشتەرگەری.

رێگای لێکۆڵینه‌وه:

سەد منداڵی تازه لەدایکبووی تووشبوو بە برینداربوونی کۆمەڵە دەمارى سەرۆی ملی دیاریکران بۆ لێکۆڵینه‌وه‌که. دابه‌شکران بەشیوه‌کی هەرمه‌کی بۆ دوو پۆل. پۆلی یه‌که‌م (٥٠ نەخۆش) چارەسەرکرا بەرێگای چارەسەری سروشتی. پۆلی دووهم (٥٠ نەخۆش) چارەسەرکرا بە رێگای به‌ستن، هاندانی کاره‌بایی و چارەسەری سروشتی. چارەسەرکردن بەرده‌وام بوو تا ١٨ مانگی تەمەن لە هەردوو پۆله‌که‌دا. هەلسه‌نگاندنی چارەسەرکردن ئەنجامدرا بەرێگای خشته‌ی هەلسه‌نگاندنی تایبەت.

ئەنجام:

تیکرایى تەمەنی منداڵه‌کان لە کاتى پشکنینی یه‌که‌م (٢) هه‌فته بوون ٩٠٪ نەخۆشه‌کان بریتی بوون لە برینداربوونی کۆمەڵە دەمارى سەرۆی ملی (٤٤ نەخۆش) ل پۆلی یه‌که‌م و ٤٦ نەخۆش لە پۆلی دووهم). ئەنجامیکی بەرچاو بەدیكرا لە مه‌ودای جووله‌ لە پۆلی دووهم بەراوردکردن لەگەڵ پۆلی یه‌که‌م. هەروه‌ها ئەوانه‌ی چارەسەریان وه‌رگرت لە پێش‌گه‌یشتن به‌ تەمەنی (٦) هه‌فته ئەنجامی باشتریان هه‌بوو لەگەڵ چارەسەرکردن به‌ به‌راوردکردن لەگەڵ ئەوانه‌ی چارەسەریان وه‌رگرت دواى تەمەنی (٦) هه‌فته.

دەرئەنجام:

کاریگەری چارەسەری سروشتی لە برینداربوونی کۆمەڵە دەمارى ملی لە کاتى لەدایک بوون زیاد دەبیته به‌ به‌کارهێنانی هاندانی کاره‌بایی لەگەڵ به‌ستنی باسک لەگەڵ یه‌که‌دا. پێویسته چارەسەرکردن به‌ زووترین کات دەست پێ بکړیت دواى لە دایک بوون له‌به‌ر ئەوه‌ی ئەگەری سەرئەه‌وتنی چارەسەرکردنی بۆ نەشتەرگەری زیاد دەبیته لەگەڵ زیادبوونی تەمەن.

الخلاصة

العلاج التحفظي في إصابات الضفيرة العضدية الولادي: العلاج الشمولي بالمراحل مقابل العلاج الطبيعي وحده

خلفية وأهداف البحث:

الجر القوي على الضفيرة العضدية أثناء الولادة الصعبة يتسبب بإصابة الضفيرة العضدية عند الأطفال حديثي الولادة، وفقاً للأبحاث يمكن للعلاج التحفظي إلى تحسن ملحوظ في غالبية الحالات. الهدف من هذه الدراسة هو تحديد المراحل الدقيقة للعلاج غير الجراحي حديث الولادة أثر بإصابات الضفيرة العضدية.

طرق البحث:

الدراسة تشمل ١٠٠ طفلاً حديثي الولادة أثر الإصابات الضفيرة العضدية، تم تصنيفها بشكل عشوائي إلى مجموعتين، المجموعة الأولى (٥٠ حالة) كانوا قد عولجوا بطريقة العلاج الطبيعي الكلاسيكي، المجموعة الثانية (٥٠ حالة) كانوا قد عولجوا عن طريق العلاج المتكامل من خلال استعمال التجبير، التحفيز الكهربائي والعلاج الطبيعي. استمر العلاج حتى سن الـ (١٨) شهراً في كلى المجموعتين. ثم تقييم العلاج بواسطة جدول التقييم الخاص.

النتائج:

كان متوسط العمر للأطفال في وقت الفحص الأول (٢) أسابيع ٩٠% من الحالات كانت من نوع إصابات الضفيرة العضدية العليا (٤٤ حالة) من المجموعة الأولى و (٤٦ حالة) من المجموعة الثانية. كان هناك تحسن ملحوظ في مدى الحركة في المجموعة الثانية. وعلاوةً على ذلك، الأطفال الذين تلقوا العلاج قبل عمر (٦ أسابيع) أظهرت استجابة أفضل للعلاج من الذين تلقوا العلاج بعد عمر الـ (٦ أسابيع).

الاستنتاجات:

تأثير العلاج الطبيعي يكون أكثر إذا كان جنباً إلى جنب مع التحفيز الكهربائي والتجبير، تدخل بالعلاج التحفظي، يجب أن تبدأ أقرب وقت ممكن بعد الولادة لأن فرصة فشل العلاج غير الجراحي تزيد بشكل ملحوظ مع زيادة العمر.

THORACIC OUTLET SYNDROME: FIVE YEARS EXPERIENCE

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ABSTRACT

Background and Objectives Thoracic outlet syndrome is mainly neurogenic presenting with pain, parasthesia, and weakness of upper limb and uncommonly with vascular symptoms (venous or arterial), the objective of the study is to evaluate patient with thoracic outlet syndrome from clinical, radiological and electrophysiological point of view with its correlation with operative finding and outcome.

Methods This prospective study included 147 patients (132 females and 15 males) presented with signs and symptoms of thoracic outlet syndrome, their data collected including age, gender, symptoms, clinical examination sings, provocative test results, radiological findings, electrophysiological, surgical findings and procedures, with postoperative clinical, radiological and electrophysiological assessment and follow up, patients data were collected from Azadi Teaching Hospital and Duhok Private Hospital (Duhok City), from January, 2009 – January, 2013.

Results Among 147 patients, females affected most commonly (90%), and pain was main presenting symptom (100%), cervical rib found in 61 (41.5%) patients, 3 minutes stress test was positive in 93.2% of cases. Neurophysiologic examination were suggestive of TOS in 80.3%, conservative treatment was effective in 79% of cases ; however operation had been done for 31 (21%) patients, where complete relieve obtained in 93.5% of operated patients, no major morbidity or mortality has been recorded.

Conclusions Diagnosis is a collection of symptoms, signs and investigations. Surgery still indicated in many cases with excellent outcomes without permanent disability.

Duhok Med J 2014;8(1): 23-33.**Keywords:** Thoracic outlet, Cervical rib, Surgery

Thoracic outlet is the space between the spine and shoulder under the clavicle, contains upper and lower brachial plexus and peripheral nerves, axillary artery and subclavian artery and vein.¹ Thoracic outlet syndrome (TOS) is a condition that arises from the compression of one or more of the neurovascular structure(s).² There are three distinct clinical types of TOS, neurogenic TOS, arterial TOS and venous TOS.³ The main etiological factors contributing to TOS are: Low lying shoulder compressing the neurovascular bundle between the first rib and clavicle, congenital fibromuscular band crossing the thoracic outlet which tent up the brachial plexus, abnormalities

or hypertrophy of scalene muscles, cervical ribs, a broad first rib and fracture or exostosis of the first rib or clavicle.⁴

Neurogenic manifestations are observed more frequently than vascular ones. Symptoms consist of pain, paresthesias, motor weakness and occasionally atrophy of hypothenar and interosseous muscles, which is the ulnar type of atrophy. The symptoms occur most commonly in areas supplied by the ulnar nerve, which include the medial aspects of the arm and hand, the fifth finger, and the lateral aspects of the fourth finger. The onset of pain is usually insidious and commonly involves the neck, shoulder, arm, and hand. The pain and paresthesias may be precipitated by

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strenuous physical exercise or sustained physical effort with the arm in abduction and the neck in hyperextension. In some patients, the pain is atypical, involving the anterior chest wall or parascapular area. Symptoms of arterial compression include coldness, weakness, easy fatigability of the arm and hand, Raynaud's phenomenon is noted in approximately 7.5% of patients with thoracic outlet syndrome. Venous obstruction or occlusion, commonly recognized as effort thrombosis (Paget-Schroetter syndrome), and results in edema, discoloration of the arm, distention of the superficial veins of the limb and shoulder.¹⁻⁴ On examination, decreasing radial pulse(s) and reproduction of symptoms by provocative tests (Adson or scalene) test, Costoclavicular test (military position), Hyper abduction test.⁵ Bruit is very commonly heard at the lateral third of the infraclavicular area as the arm is brought from neutral into the abducted, externally rotated position.⁶ Supraclavicular neck tenderness, 2.5 cm above the clavicle and 2.5 cm lateral to the midline is present Pressure for 5 to 10 seconds in the same area, which is directly over the brachial plexus or abducting the arms to 90 ° in external rotation for 3 min will elicit symptoms.⁷ Successful scalene muscle block by injection of local anesthetics is indicated by relief of symptoms in the hand or arm.³

The usual investigations required are: Cervical spine and chest x - rays detect cervical ribs, anomalous first ribs, and the callous of healed clavicular and first - rib fractures. Magnetic Resonance imaging (MRI) is used to evaluate cervical spine and disc disease.⁷

Neurophysiology testing is helpful to exclude ulnar and median nerves neuropathies and to confirm the diagnosis of TOS in which there is prolonged F - wave latencies with decreased sensory action potential amplitudes of median, ulnar and medial cutaneous nerves of the forearm and needle electromyography (EMG) shows feature of axonal loss

particularly of C8 - T1 innervated muscles.^{8, 9} Angiography is the primary diagnostic procedure in subclavian vein and/or artery obstruction. Duplex scanning and Magnetic resonant angiography (MRA) which can accurately identify vascular obstruction.^{10, 11}

Initially, most patients are treated conservatively with physical therapy, except those with vascular problems. The primary goals of physical therapy are to "open up" the space between the clavicle and first rib, improve posture, strengthen the shoulder girdle, and loosen the neck muscles.² Exercises designed to relax and stretch the scalene muscle are used, combined with hydrotherapy, massage, and other techniques. These efforts may be accompanied by use of non steroidal anti-inflammatory agents, muscle relaxants, and non-narcotic pain medications as needed.³ Conservative treatment should be continued for several months and majority of patients will improve significantly and will not require surgery where surgery is indicated in the following conditions: Failure of conservative therapy after several months and persisting disabling symptoms that interfere with work and activities of daily living,⁴ Conduction velocity shows slight or no improvement or regression,⁵ narrowing or occlusion of the axillary subclavian artery with or without peripheral emboli and thrombosis of the axillary subclavian vein. 1 Surgical approaches includes supraclavicular, transaxillary first rib resection³ and posterior thoracoplasty approach.⁵

METHODS

This prospective study was conducted at the Azadi Teaching Hospital and Duhok Private Hospital (Duhok City), from January, 2009 - January, 2013. One hundred forty seven patients (132 females and 15 males) with symptoms and signs of thoracic outlet syndrome where enrolled in this study. Oral consent was obtained from all subjects after the nature of the study had been explained to them. The study

protocol was approved by Medical and Ethical Committee of Faculty of Medical Sciences – University of Duhok. A pre-tested questionnaire was designed to obtain information about age, gender, presenting symptoms, site, duration and radiation of pain, associated symptoms (numbness, parasthesia, weakness), Presence of bruit over subclavian artery. Result of the provocative tests (Adson and scalene test),³ minute stress test, and tenderness over scalenus anterior muscle, bilateral examination of radial pulse and blood pressure, cervical spine X-ray findings (like cervical rib) (Figure 1).

Operative findings and surgical technique used to relieve the pressure, postoperative complications and follow up were also recorded. The recommended electrophysiological protocol^{8,9} was applied for diagnosis of preganglionic neurogenic TOS. All operated patients (31) were approached through anterior cervical supraclavicular incision, platysma muscle incised Omohyoid muscle and a pad of fat removed, scalenus muscle identified and partially excised (Figure 2), subclavian artery retracted medially (Figure 3) and brachial plexus retracted laterally (Figure 4). Cervical rib (Figure 5) and any compressing band identified and excised, cervical rib excised with its periosteum (Figure 6).



Figure 1. Plain X –ray long bilateral cervical ribs

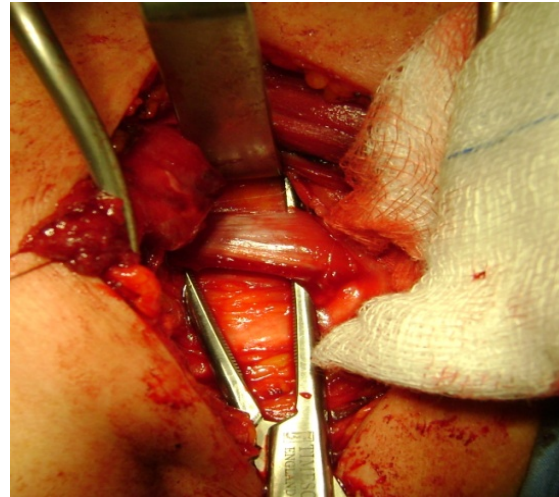


Figure 2. Scalenus anticus muscles excised partially

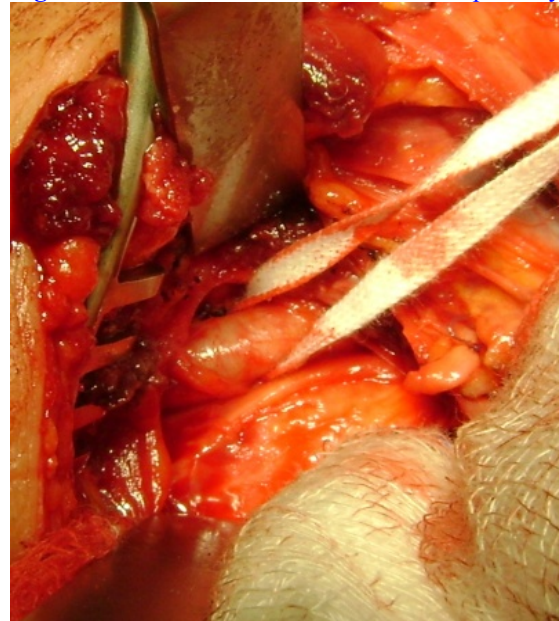


Figure 3. Subclavian retracted bilaterally medially



Figure 4. Brachial plexus retracted laterally

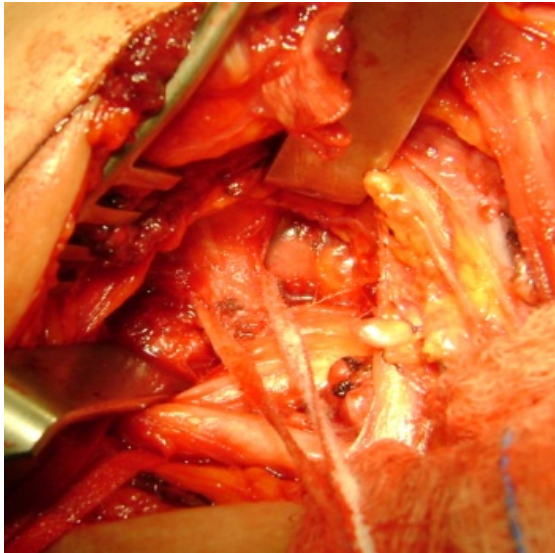


Figure 5. Exploration and isolation of cervical rib



Figure 6. Excised cervical rib with periosteum

RESULTS

Gender and age distribution of the patients are shown in figures 7 and 8 respectively.

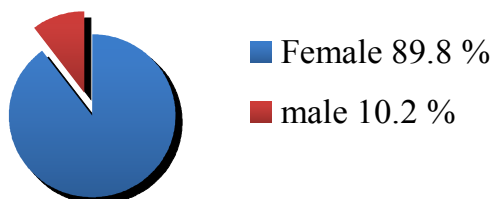


Figure 7. Gender distribution

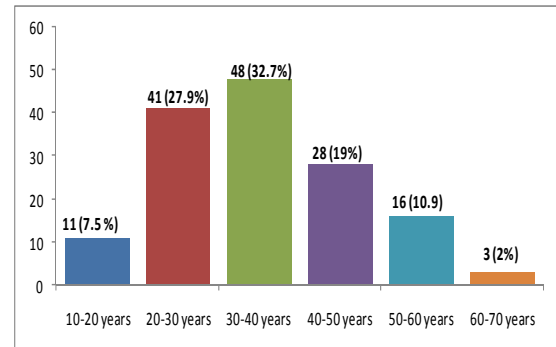


Figure 8. Age distribution

Pain was the chief complaint of all patients (100%) and mainly affecting upper limb(s) 68.7% followed by shoulder and neck (15% and 13.6%) respectively and is combined in 2.7 % of patients, while its radiations were neck and shoulder 50 % followed by hands 23.1 % and less to chest and head (6.1% and 4.8%) respectively, radiation to more than one site is 15.7% of patients. Associated symptoms (numbness 11.6%, parasthesia 8.2%, weakness of upper limb 15.6% and its combined 64.6%).

Duration of TOS is illustrated in Figure 9.

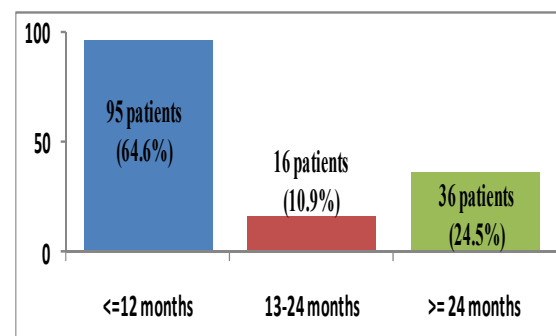


Figure 9. Duration of pain and associated symptoms

Results of clinical examination are shown in table 1.

Table 1. Findings of clinical examination (Total number = 147)

Positive Clinical Signs	Number
Distal Arterial Pulse	145(98.6%)
Symmetrical Blood Pressure in Both Upper limbs.	139(94.6%)

Positive Clinical Signs	Number
Subclavian Artery Bruit	36(24.5%)
Adson Test	97(66%)
Three Minutes Stress test	137(93.2%)
Scalenus Muscle Tenderness	114(77.6%)

Imaging and Neurophysiologic studies revealed that 61 (41.5 %) patients have unilateral or bilateral cervical ribs, 8 (5.4 %) patients have abnormal lateral cervical spine X – ray (including inter vertebral space narrowing, spondylosis, ...etc).

Neurophysiologic examination was abnormal and suggestive of pre ganglionic thoracic outlet syndrome (unilateral or bilateral) in 118 (80.3 %) patients; among them the percentage of right and left TOS were exactly similar and were found in 44 (37.3 %) cases for each; however, bilateral TOS was found in 30 (25.4 %) patients.

Nerve conduction study (NCS) and electromyography (EMG) studies showed that 31 (21%) of patients have additional associated electrophysiological abnormalities, carpal tunnel syndrome 12.2%, cervical radiculopathy 8.2% and ulnar neuropathy at elbow 0.7% only.

Relation of cervical rib with TOS is demonstrated in table 2.

Table 2. Relation of presence or absence of cervical rib with neurophysiologic results.

Relation of Cervical Rib with TOS	Positive EMG & NCS	Negative EMG & NCS	Total
Positive Cervical Rib	53 (36.1 %)	8 (5.4 %)	61
Negative Cervical Rib	65 (44.2 %)	21 (14.3 %)	86
Grand Total	118	29	147

Conservative treatment including changing lifestyle, avoiding lifting heavy weight in affected arm, weight reduction, exercise to strengthen the shoulder girdle muscles in addition to course of analgesia was effective in treating majority of cases 4/5th (79 %), where Surgery was done for only 1/5th of patients (21 %) when conservative treatment was not effective.

Surgery was performed through anterior cervical supraclavicular incision and five categories of operations were done accordingly (Figure 10).

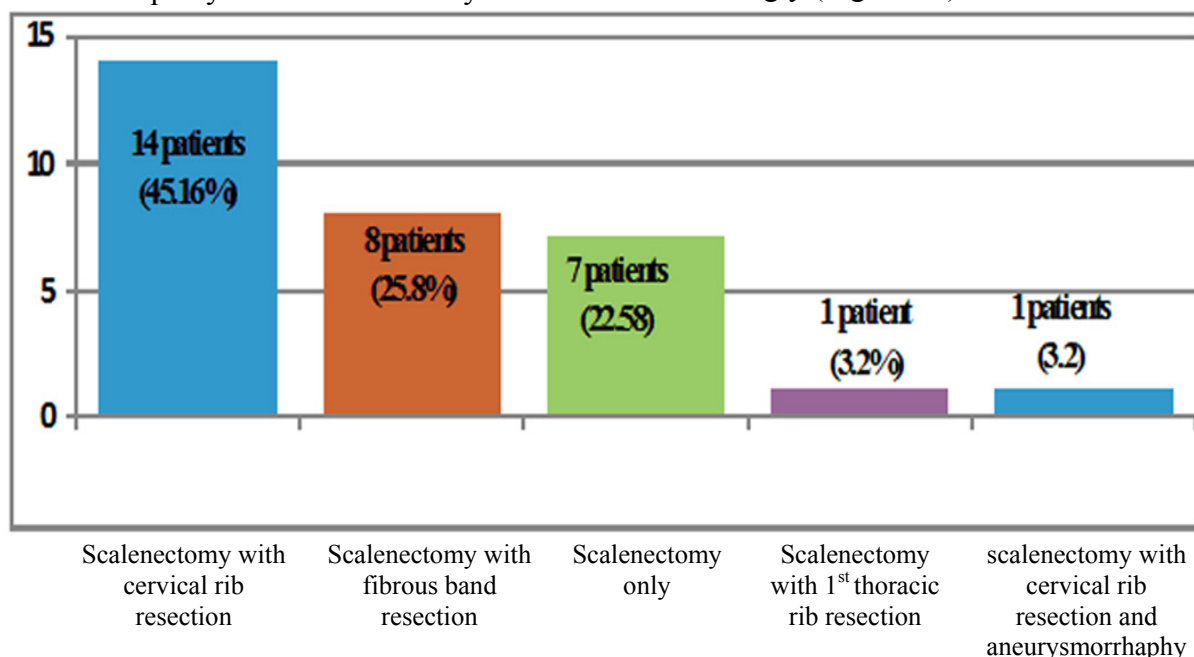


Figure (10). Kinds of surgical interferences for patients operated upon for thoracic outlet syndrome (N = 31).

It's worthy to mention that of total 31 patients operated upon, 6 (19.4 %) were operated for bilateral TOS.

Peroperative and postoperative complications are only in 3 patients (peroperative subclavian vein injury repaired at once, partial thoracic duct injury treated and neuropraxia of brachial plexus) all these patients were treated successfully. Twenty nine patients (93.5 %) got complete relieve of symptoms after surgery; however, in two patients (6.5 %) surgery failed to completely relieve their complaint. Interestingly, none of the patients developed permanent brachial plexus or nerve lesion postoperatively.

DISCUSSION

Thoracic outlet syndrome is an often misdiagnosed cause of arm and neck pain and disability depending on compression to the neurovascular bundle of the thoracic outlet. The complexity in this diagnosis is due to the myriad of symptoms and the different etiologies which characterize this syndrome and, on the other hand, in the lack of a specific diagnostic test or examination.¹²

However, a careful history and thorough clinical examination using some clinical tests especially when a cluster of positive tests are witnessed can be used to support the diagnosis.

The present study included 147 patients with history, symptoms and signs suggestive of unilateral or bilateral TOS, 90% were females and 10% were males (female : male Ratio 9:1), other studies indicated that female : male ratio is 3-4:1.^{13,14} This higher ratio among females might be related to extraordinary duties of females in this locality including indoors and outdoors activities. It has been reported that cumulative occupational trauma and poor posture with sagging shoulders is a culprit.¹⁴

About 80% of patients were between 20-49 years, Hooper et al indicated that majority of TOS cases are diagnosed between ages 20-50 years,¹³ patients who

develop TOS usually are middle age and they have led an active life without symptoms until certain job activities or trauma-induced upper extremity pain, numbness or weakness.¹⁵ Eleven (7.5%) of patients were between 10-19 years, TOS can occur in teenagers and more rarely in pediatric patients,¹³ indicating that all ages are prone to TOS.

Pain was the major symptom that was described by all patients (100%) and it is highly consistent with the finding of Molina et al.¹⁶ upper limb and shoulder pain were reported in 83.7% and neck pain in 13.6%, in contrast Hooper and his co worker¹³ indicated that neck pain can be seen 88% of patients and TOS is a controversial clinical condition. Results of the present work suggest that presence of neck pain is not mandatory to be present in patients with TOS; however, shoulder and upper limb pain should be taken into consideration in suspected cases. Moreover, in 50.3% of patients the pain was radiating to the neck and shoulder; therefore proper history is essential and indicates that neck pain in patients with TOS is probably a referred pain and not originated from the neck itself.

In the present study numbness, parasthesia and weakness of upper limb were reported as associated symptoms. Most patients (64.6%) had more than one associated; however, the percentages of only one associated symptom were low. Other studies reported parasthesia and numbness in about 85% of cases,^{15,16} but none of these studies took into account the percentage of more than one associated symptom.

About two thirds of patients (64.6%) had symptoms for less than one year, which suggest that pain of TOS is usually severe and render the patient to seek for management.

Regarding clinical tests used for diagnosis of TOS, present study showed that three minutes stress test was of highest positivity (93.2%); similarly Azandaryani and his colleges¹⁷ concluded that elevated

stress arm test showed the highest sensitivity with 98%. Moreover, tenderness over the scalenus muscles was positive in 77.6% of cases. Repetitive micro trauma results in hypertrophy, hemorrhage and edema in anterior and middle scalenus muscles followed by fibrosis, scarring, spasm and compression of brachial plexus.¹⁸

Although provocative tests that employ a vascular sign are not reliable in the diagnosis of a neurologic condition,¹⁸ present study showed that 66% of patients had positive Adson test, others¹⁷ showed that Adson test was positive in 92%. Different tests have been used for diagnosis of TOS in this study; however, their sensitivity and specificity were not determined because we did not include a control group without TOS. The high positivity of Adson test indicates that great number of patients with neurogenic TOS have also vascular component of TOS, it was found that 51% of patients with neurogenic TOS had definite arterial occlusion.¹⁶

Cervical ribs are present in approximately 0.5-0.6 % of the population,¹⁴ 10-20% produce symptoms. In this study 58.5% of cases had normal postero-anterior cervical spine X-rays and 41.5% had unilateral or bilateral cervical ribs or long transverse process of C7, suggesting that majority of TOS cases are not due to cervical ribs.

5.4% showed abnormal lateral X-rays of cervical spine, this makes the diagnosis of TOS more challenging; therefore, in such cases the diagnosis is usually performed clinically, while imaging studies and electro physiologic tests are useful tools in the differential diagnosis to identify double crush syndrome in some cases.¹²

Electro diagnostic studies have been found useful in the diagnosis of neurogenic TOS.¹⁴ In 80.3% of patients NCS/EMG findings were suggestive of neurogenic TOS, but NCS/EMG may not be sensitive in patients with milder form of TOS.¹⁴

Moreover, it was reported that EMG was always negative in chronic cases and signs of denervation are usually present only in most severe form of TOS.¹² Positivity of NCS/EMG was higher in those without cervical ribs (44.2%) than those with cervical ribs (36.1%) indicating that abnormalities of scalenus muscles is the predominant cause of TOS among these patients.

Double crush syndrome was found in 21.1% of cases, it was reported that double crush syndrome may account for 44%¹². Patients with TOS are at risk for developing symptom profile that reflect both TOS and other irritation/entrapment, thus the clinician is encouraged to perform testing that is relevant both to TOS and peripheral nerves irritation/entrapment.¹³

About 80% of patients were managed successfully by conservative treatment within 1-3 months, majority of patients with neurogenic TOS improve with proper conservative treatment,¹⁹ which consist mainly of shoulder girdle elevator muscles strengthening and pectoral muscle stretching.¹² A review of¹³ studies published between 1983 and 2001 found that good or very good results were achieved on 76-100% of patients at short-term follow up (within a month) and 59-88% after at least one year.¹⁹

Surgery was performed for 31 cases; two of them operated upon urgently for arterial TOS, other 29 cases underwent elective surgical decompression of brachial plexus. The indications of surgery were failure of conservative therapy, patients with neurological symptoms such as weakness, wasting of hand muscles, and nerve conduction block at supraclavicular region.¹⁹

Supraclavicular approach was used, which provides good visualization of thoracic outlet, excellent exposure for arterial reconstruction if needed and shown good results in many studies.^{15,20} In addition, this approach allows performing intra operative maneuvers before and after decompression to identify the site of

compression and to verify the effectiveness of release. Moreover, it advocates to perform resection of first rib, cervical rib, and fibro cartilaginous band and scalene muscles.¹²

As in the study of Aljabri and Al-Omran;²⁰ excision of scalene muscles (scaleneotomy) done for all patients during surgical decompression. Aberrant insertion of middle scalene muscle can produce a "V" shape which elevate the neurovascular structure within the interscalene space; additionally, a "U" shaped sling can occur if insertion site of the middle scalene is closer to the anterior scalene insertion site and can force the lower plexus upward.¹⁴ Excision of cervical rib done in (48.4%) and removal of fibrous band in (25.6%) of cases. None of the patients was diagnosed as pure venous TOS, also Aljabri and Al-Omran²⁰ reported that 85% of patient involved in their study required cervical rib resection and attribute the lower number of venous TOS cases in their series to under diagnosis of such cases at referring centers.²⁰

In order to accurately evaluate the results, similar to other study,¹⁵ one surgeon did all the operations in order to fix the surgical technique adopted and to avoid different individual surgeon variation, fortunately surgical complications were not frequent and happened only in 3 (less than 10%) of cases and all were managed successfully without permanent disability.

No mortality or major morbidity complicate surgery in our study and very low recurrent rate 6.5 % which is compatible to largest study done in this field.²¹

The success rate was 93.5% postoperatively and it was consistent with the results of other studies.^{12,14,21}

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پوخته

کونیشانی دهره کی سنگی : پینج سال شاره زایی

پیشه کی و نارمانج: نه خوشیا دهره فتیا سنگی بشپوه کی سهره کی دهماران دگریت و خو دیاردکته وه ک ئیشان ، گه زینک ، بیهیزیا دهستان و کیمتر دگه ل نیشانی گرتنا خوینبه ران ب خوفه دگریت، نارمانج ژ فیه کولینئ هلسنگاندنا نه خوشان ژلایی کلینیکی فیه و شلوفه کرنئ دنا فیه را فیه دیتنئ کلینیکی ، تیشکی نه خشه کیشانا دهماران ویین نشته رگه ری و نرخاندنا دهره نه جامین نشته رگه ری.

ریکین فیه کولینئ: نه فیه کولینا چاوه روا نکراو (۱۴۷) نه خوش بخوفه گرتن (۱۳۲ می و ۱۵ نیر) دگه ل نیشانی نه خوشیا دهره فتیا سینگی ، پیزانین هاتنه کومکرن وه ک ژی، ره گه ز، نیشان، نیشانی کلینیکی، نه جامین تاقیکردنئ هاندر، نه جامین تیشکی، نه خشه کیشانا دهماران ویین نشته رگه ری و کردارین نشته رگه ری دگه ل نرخاندنا کلینیکی، تیشکی و نه خشه کیشانا دهماران پستی کردارین نشته رگه ری. پیزانین هاتنه کومکرن ژنه خوشخانا نازادی یافیرکرنئ و نه خوشخانا دهوک یا تایبته (باژیری دهوکی) ژه یفا کانونا دووی ۲۰۰۹ – کانونا دووی ۲۰۱۴ .

نه جام: ژ کوما (۱۴۷) نه خوشان، می پتر کارلیکراوبون (۹۰٪)، ئیشان نیشانا سهره کی بو، پهراسیا توئیکاری هه بو لجه م ۶۱ نه خوشان، کرداریا نشته رگه ری هاته نه جامدان بو ۳۱ نه خوشان، مفایا ته واهاته دهستفه ئینان لجه م ۹۳,۵٪ ژنه خوشین نشته رگه ری بو هاتیه نه جام دان، هیچ پاشمایین سهره کی یان ریژا مرنئ نه هاته تومارکرن .

دهره نه جام: دهسینشانکرن کومه له ژ نیشان و پشکینان . کردارا نشته رگه ری هیشتان پیئتقییه دگه له ک نه خوشاندنا .

الخلاصة

متلازمة المخرج الصدري: خبرة خمس سنوات

خلفية وأهداف البحث: متلازمة المخرج الصدري يصيب بشكل رئيسي الضفيرة العصبية، يعاني المريض غالباً من الألم، تخدر ووهن الطرف العلوي وبشكل أقل أعراض قصور الاوعية الدموية (الشرياني او الوريدي)، ألغاية من الدراسة هو لتقييم المرضى من الناحية السريرية وارتباط الاعراض السريرية، الشعاعية، الفسلجة الكهربائية مع المشاهدات خلال الجراحة وتقييم نتائج التدخل الجراحي.

طرق البحث: تم جمع معطيات المرضى المصابين بمتلازمة مخرج الصدر متضمنة العمر، الجنس، الاعراض، الفحص السريري، الفحص التحفيزي، المشاهدات الشعاعية والفسلجة الكهربائية، المشاهدات والاجراءات الجراحية والمتابعة العقابيل الجراحية من الفحص السريري، الشعاعي، الفسلجي الكهربائي، جمعت البيانات من مستشفى آزادي التعليمي ومستشفى دهوك الاهلي (مدينة دهوك) من تاريخ كانون الثاني ٢٠٠٩ ولغاية كانون الثاني ٢٠١٤.

النتائج: من ضمن مائة وسبعة واربعين مريضاً، نسبة الاناث هي الاكبر (٩٠%) وكان الألم هو العارض الرئيسي لجميع المرضى بنسبة ١٠٠%، وجد الضلع الرقبى في ٦١ مريض (٤١.٥%)، فحص الاجهاد لثلاث دقائق كان إيجابياً في ٩٣.٢% من المرضى. نتائج فحص الفسلجة الكهربائية كان إيجابياً عند ٨٠.٣%، العلاج التحفزي كان فعالياً في ٧٩% من المرضى: بينما أجريت عملية جراحية لـ ٣١ مريض (٢١%)، نتائج العملية كانت جيدة حيث تحسنت الاعراض في ٩٣.٥% من المرضى، لم تسجل تعقيدات كبيرة أو دائمة كما لم تسجل أي حالة وفاة.

الاستنتاجات: التشخيص يبنى على الاعراض والمشاهدات السريرية بالإضافة الى الفحوصات. لاتزال الجراحة مستطبة في العديد من الحالات، مع نتائج جراحية جيدة وبدون عوائق مستديمة.

CLINICAL STUDY OF MALIGNANT LYMPHOMAS IN DUHOK:
A CASE SERIES STUDY DURING 2007-2013

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Submitted 1 March 2014; accepted 6 Nov. 2014

ABSTRACT

Background and Objectives Earlier studies have addressed the pathological classification of malignant lymphomas in Duhok, while no studies have addressed the clinical aspects and outcome of treatment.

Aim to identify clinical features, diagnostic procedures, standard treatment and outcome of malignant lymphomas in Duhok

Material and Methods This is a case series study of 108 initially untreated patients with malignant lymphoma who were followed during the period 2007 to 2013.

Results The 108 enrolled patients included 61 patients with Non-Hodgkin's Lymphoma (NHL) and 47 with Hodgkin's Lymphoma (HL). The median age of patients with NHL was 52 (48.4 ± 22.5) years while that of patients with HL was 29 (34.4 ± 16.4) years. The principal clinical presentation was cervical lymphadenopathy; 38% in NHL and 70% in HL. B-symptoms were present in 20% of NHL patients and 32% of HL patients. The staging of patients with NHL showed that they were mostly in stages III and IV, while patients with HL were mostly in stage II. Bone marrow involvement was found in 35% of patients with NHL and in 3% of patients with HL. The standard treatment for NHL was protocol R-CHOP, given every 21 days; each patient received an average of 8 cycles. For HL, the standard treatment was the ABVD protocol given in an average of 6 cycles. Of all the patients with NHL, eight had relapse and were put on second line therapy (ICE protocol) while four died from infections. Of the patients with HL, two had relapsed and one died from infection.

Conclusion The NHL in the studied patients was characterized by a severe course and multiorgan involvement, and stage III and IV were the main presenting stages at diagnosis. The high rates of marrow involvement, extranodal involvement and advanced clinical stages in NHL as compared to HL, which are shared by previous studies worldwide, explain its less favourable outcomes as shown by the current study.

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Keywords: Malignant lymphomas, clinical aspects, Duhok

Malignant lymphomas are tumors of the immune system which represent a heterogeneous group of tumors with clinical courses ranging from very aggressive and rapidly fatal tumors to an indolent, well tolerated malignancies of man.¹⁻³

Malignant lymphoma can arise in any site. Organs with large concentration of lymphatic tissue for example lymph nodes, tonsils, spleen or bone marrow are principally involved.⁴ Monoclonal antibodies to cell surface antigens permit

the identification of B or T lymphocyte proliferation.⁵

Malignant lymphoma is the third most common reported malignancy in Iraq, but there are few published Iraqi studies on the subject.⁶⁻⁹

The main two components of malignant lymphomas are the Hodgkin Lymphoma (HL) and the Non-Hodgkin's lymphoma (NHL).

HL is a neoplasm of the lymphoid tissue that primarily affects the lymph nodes. The disease is localized initially to

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a single peripheral lymph node region and the mode of progression is by contiguity within the lymphatic system.¹⁰ The characteristic giant cell, the Reed Sternberg cell (RS) in the appropriate cytological framework is required for the diagnosis of HL.¹¹ HL can be classified histologically into classical HL and nodular lymphocyte predominant HL.

NHL is the single largest group of tumors of the immune system, characterized by monoclonal expansion of malignant B or T cell. Non-Hodgkin's lymphoma may originate in any organ and shows disparate histological features, clinical behavior and prognosis.¹¹

The etiology of NHL remains unclear; however, there is evidence that some infectious agents like Epstein Barr and Human Immune deficiency viruses and *Helicobacter pylori*, are involved in the pathogenesis of some NHL.^{5, 11-13}

NHL forms about 5.9% of all cancers in Iraq and has the fourth place (6.3%) among the commonest ten cancer in males and the third place (5.4%) among the commonest ten cancer in females.¹⁴

The aim of this study is to identify the characteristic clinical features, diagnostic procedures, standard treatment and outcome of malignant lymphomas in Duhok governorate for the period 2007-2013.

METHODS

This case series study included 108 initially untreated patients with malignant lymphomas who were attending the Hematology-oncology Department at Azadi Teaching Hospital in Duhok, which provides services for Duhok governorate. They were evaluated retrospectively and prospectively using hospital records, over the period from 2007 to 2013.

The following data were recorded for the studied patients:

History: Included the age, sex, occupation, residence, date of presentation, history of other medical problems, family history of previous hematological

malignancies and/or immunodeficiency, history of exposure to chemicals or pesticides, history of celiac disease, presenting symptoms and presence of "B-symptoms" which are unexplained fever of more than 38.5°C, weight loss of more than 10% of body weight in the last 6 months and drenching night sweating.

Physical Examination: Full clinical examination was carried out.

Investigations: Hematological tests including full blood counts and morphology, and erythrocyte sedimentation rate (ESR), were done for all patients. Bone marrow aspirate and/or biopsy were done for some patients. Imaging investigations included chest X-ray, Computed tomography scan, Magnetic resonance imaging Ultrasound examination and PET scan whenever this was appropriate. The histopathological methods used to reach the histological diagnosis were pathological biopsy, fine needle aspiration, cytology, appropriate endoscopic techniques or through major surgical operation.

Clinical Staging: Staging was done for the patients according to Ann -Arbor classification for HL and NHL, as shown below:

Ann-Arbor Staging

Stage I	Involvement of a single lymph node region or single extra lymphatic site.
Stage II	Involvement of two or more lymph node regions on the same side of diaphragm. Localized contiguous involvement of only one extra lymphatic site and lymph node region(stage II E).
Stage III	Involvement of lymph node region or structures on both sides of the diaphragm.
Stage IV	Disseminated involvement of one or more extralymphatic organs with or without lymph node involvement.

A= If there are no B – symptoms, B= If there are B - symptoms

The standard treatment used in this study for NHL and HL is summarized below:

NHL = CHOP±R		HL =ABVD	
C	Cyclophosphamide	A	Doxorubicin Hydroxide
H	Doxorubicin Hydroxide	B	Bleomycin
O	Oncovin (Vincristine)	V	Vinblastine
P	Prednisolone	D	Dacarbazine
R	Rituximab		

RESULTS

This is a case series study of 108 patients with malignant lymphoma. It included 61 NHL patients with a median age of 52 (48.4 ± 22.5) years and 47 HL patients with a median age of 29 (34.4 ± 16.4) years (age range 13-75 years) as shown in figure 1.

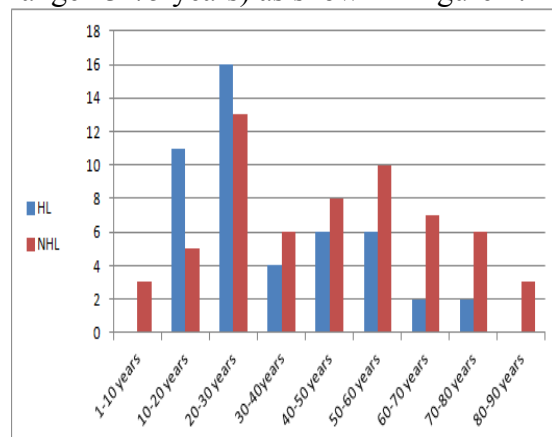


Figure 1. age distribution of enrolled Hodgkin's and non-Hodgkin's lymphoma patients

Table 1 demonstrates that cervical lymphadenopathy was encountered in 23 patients (38%) with NHL, while abdominal pain and distention were present in seven (11%) of them; features of intestinal obstruction was present in another three (5%). B-symptoms were present among 12 patients (20%) with NHL. Cervical lymphadenopathy was encountered in 33 patients (70%) with HL, while abdominal pain and distention were present in two (4%), none had features of intestinal obstruction. B-symptoms were present among 15 patients (32%) with HL.

The diagnostic procedures used for the studied patients are shown in Table 2. A positive pathological finding was obtained from lymph node biopsy in 30 patients (49%) and from laparotomy in 20 patients (33%), and the result of endoscopy was positive in three (5%) patients with NHL. On the other hand, HL patients had a positive pathological finding from lymph nodes in 43 of them (91%) and from laparotomy with splenectomy in two of them (4%).

The staging of patients with NHL is shown in Table 3. Twenty-nine patients (48%) had stage IV at diagnosis, while only three patients (5%) had stage I A, which was the least frequent. Table 4 shows the staging of patients with HL. Only two patients (4%) had stage IV at diagnosis, while 31 patients (66%) had stage II, which was the highest group.

Table 1: Clinical presentation of patients with NHL and HD

Clinical Presentation	NHL (N=61)		HD (N=47)	
	No.	%	No.	%
Cervical lymphadenopathy	23	38	33	70
Axillary lymphadenopathy	11	18	5	11
Inguinal lymphadenopathy	5	8	2	4
Tonsil	1	2	0	0
Abdominal pain and distention	7	11	2	4
Abdominal mass	5	8	2	4
Intestinal obstruction	3	5	0	0
Superior vena cava obstruction	2	3	0	0
Dyspnea	4	7	3	6
B-symptoms	12	20	15	32
Fever	10	16	8	17
Weight loss	7	11	5	11
Sweating	4	6	2	4
Bone marrow involvement	21	35	1	3

Table 2. Diagnostic procedures used in the studied patients

Diagnostic Procedures	NHL (N=61)		HL (N=47)	
	No.	%	No.	%
Lymph node biopsy	30	49	43	91
Fine needle aspiration	3	5	0	0
Laparotomy	20	33	0	0
Laparotomy with splenectomy	1	1.6	2	4
Endoscopy	3	5	0	0
Bronchoscopy	1	1.6	0	0
Tonsillectomy	1	1.6	0	0
Pleural biopsy	1	1.6	0	0
Thoracotomy	1	1.6	1	2
Lung biopsy	0	0	1	2

Table 3. Staging of 61 patients with NHL

Stage	IA	IB	IIA	IIB	IIIA	IIIB	IVA	IVB
No.	3	•	12	2	12	3	25	4
Total	3		14		15		29	
%	5		23		25		48	

Table 4. Staging of 47 patients with HL

Stage	IA	IB	IIA	IIB	IIIA	IIIB	IVA	IVB
No.	0	0	24	7	7	7	0	2
Total	0		31		14		2	
%	0		66		30		4	

DISCUSSION

This study shows that the age distribution of both HL and NHL patients had a peak in the third decades of life, and patients with NHL had a second peak in the six decades which is attributed to patients with low grade NHL. NHL was more frequent in the current series as compared to HL (1.3:1) and these findings are to some extent consistent with other studies,^{14,15}

though it is lower than previously reported from Iraq and from the USA where the ratios was 3:1 and 5:1 respectively^{9,16}

The clinical presentation in NHL patients involved various systems, which reflects its multicentric nature like cervical lymphadenopathy, abdominal pain and distention and intestinal obstruction. Bone marrow involvement amongst patients with NHL was high on initial presentation and forms up to 35% (compared to 3% in HL). This finding also affirms the aggressiveness and the severity of illness in the studied group and these results are consistent with other studies in the Middle East.^{6, 9, 17,18}

Owing to the fact that HL is a nodal disease, therefore the value of surgical biopsy in HL is evident (91%) in this study compared to its use in NHL (51%), where by the illness is multicentric and might require a variety of ways to confirm the diagnosis. Fine needle aspiration for the diagnosis of patients with malignant lymphoma contributed to 5%, which reflects its low use and unreliability as a sole diagnostic tool.

The staging of the patients with NHL showed that 48% had stage IV A and B, and only 5% had stage I A, which was the least. Such findings support the aggressive and severe nature of NHL, as well as its multicentric involvement in the studied group. This result was supported by a previous study in Iraq.⁶⁻⁹

The standard treatment for NHL was protocol R-CHOP, which is given every 21 days; each patient received eight cycles. For HL, the standard treatment was the ABVD protocol, which given six cycles (dose at day 1 and day 14, means one cycle).¹⁹

Of all the patients with NHL, eight had relapse and were put on second line therapy, (ICE protocol): ifosfamide 5 g/m² on day 2 plus carboplatin AUC 5 plus etoposide 100 mg/ m² daily on days 1-3; every 14 days, while four died from infections. Of the patients with HL,

two had relapsed and one died from infection after one year from the diagnosis.

The NHL in the studied patients was characterized by a severe course and multiorgan involvement and stage III and IV were the main presenting stages at diagnosis. The high rates of marrow involvement, extranodal involvement and advanced clinical stages in NHL as compared to HL, which are shared by previous studies worldwide, explain its less favorable outcomes as shown by the current study.

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پوخته

فەكۆلینه كا كلىنىكى لىدور په نهجه شیرا گریکین لمفی ل دهوك: شروقه کرنا زنجیره كا حاله تا ژ ۲۰۰۷-۲۰۱۳

پێشهکی وئارمانج: فەكۆلینێن هاتینه ئەنجامدان لىدور رێککێن دابه شکرنا جورین په نهجه شیرا لمفی، لى هیچ فەكۆلین نین لىدور نیشانیان نه خوشیی و ههروهسا ئەنجامین چاره سه ریی.

ئەنجامین فەكۆلین: دهستنیشانکرنا نیشانیان نه خوشیی و رێککێن دیارکرنا نه خوشیی چاره سه ریی و ئەنجامین چاره سه ریی، بو نه خوشیا په نهجه شیرا گریکین لمفی ل دهوكی.

النتائج: ژ سه رجه می (۱۰۸) نه خوشا (۶۱) كهس توشبوین جوری نه نهوچك لمفوما (NHL) بون، و (۴۷) كهس توشبوین جوری هوچك لمفوما (HL) بون. نافنجی ژى یی وان نه خوشین توشی نه نهوچك لمفوما بوین (۳۵) سال بون، به لى ئەوین توشی هوچك لمفوما بوین (۳۰) سال بون. جورى هه رى به ربه لافى شانین نه نهوچك لمفوما پله یا نافنجی بو وجورى هه ره به ربه لافى خانین مه زن و به لافى بون، به لى بو هوچك لمفوما خانین تیکه ل بون

رێککێن فەكۆلین: ئەف فەكۆلینه هاته ئەنجامدان ل سهر زنجیره كا نه خوشین توشبو ی ب نه خوشیا په نهجه شیرا گریکین لمفی، و ژمارا وان

ئەنجام: (۱۰۸) نه خوش بون، ل دهستپێکی به رى بینه چاره سه رکران. ل دیف چونا وان هاته کرن دماوی دناف به را سالین (۲۰۰۷-۲۰۱۳). نیشانیان سه ره کی وه رمینا گریکین لمفی یین ستوی ب ریزا ۳۰٪ بو نه نهوچك و ۷۰٪ بو هوچك بون. ونیشانیان B (B symptom) هه بین ب ۲۰٪ بونه خوشین نه نهوچك و ۳۲٪ بونه خوشین هوچك. پتریا نه خوشین نه نهوچك دقوناغا (۳) و (۴) دا بون، به لى نه خوشین هوچك پتریا وان دقوناغا (۲) دا بون. به لافبونا نه خوشی یی دناف مه ژى یی هه ستیدا ل دهف نه خوشین نه نهوچك لمفوما ۳۲٪ بو، و ل دهف نه خوشین هوچك لمفوما ب ریزا ۲٪ بو. چاره سه ریا سه ره کی بو نه نهوچك لمفوما (R-chop) (هه ر ۲۱ رۆژا ئیک قورچ و سه رجه می قورچا دبنه (۸) قورچ. به لى بو نه خوشین هوچك لمفوما چاره سه ریا سه ره کی (ABVD) دهست پێدکته، و (۶) خول هاتنه پیدان هه رخوله ک ژ (۲) قورچا پێک دهات، قورچه ک ل رۆژا ئیکى و قورژه ک ل رۆژا (۱۴) ی. دئه نجامدا (۸) نه خوشان نه نهوچك لمفوما نه خوشیا وان دووبارا زفری و ه چاره سه ریا دووی هاتنه پیدان، به لى (۴) نه خوشا گیانی خو ژده ستدا ژ ئەهه رى هه ودانین فەگر.

ههروهسا نه خوشیا (۲) نه هه خوشین هوچك لمفوما دووباره زفری و نه خوشه کی گیانی خو ژده ستدا.

دهره نه نجام: نه خوشین ژجورى نه نهوشکن لیمفوما نه خوشیا وان یا دژوار و گه له ک ئەندامین له شى فەگرته بون، و پرانیا وان ل قوناغین سى و چار بون یین نه خوشیی. ریزا زیده یا فەگرته مه ژیی هه ستیکی و ئەندامین دهرقه ی گریکین لمفی و دژواریا نه خوشیی ل جورى نه نهوشکن به راوردی دگه ل جورى هوشکن دیاردکته کو دهر ئەنجامین وی دخرابن، و ئەفه یا دیاره دقه کۆلینین دیدا.

الخلاصة

دراسة سريرية للمفوما الخبيثة في دهوك: دراسة حالات متتالية للفترة من ٢٠٠٧-٢٠١٣

خلفية وأهداف الدراسة: أجريت دراسات سابقة حول تقسيم أنواع المفوما الخبيثة في دهوك ولكن لا توجد دراسات حول الأعراض السريرية ونتائج العلاج. تهدف الدراسة إلى تحديد الأعراض السريرية وطرق التشخيص والعلاج ونتائج للمفوما الخبيثة في دهوك.

طرق البحث: هذه الدراسة أجريت على سلسلة من الحالات المرضية المصابة بسرطان الغدد اللمفاوية وعددهم ١٠٨ حالة من البداية قبل العلاج، تم متابعتهم خلال فترة ٢٠٠٧-٢٠١٣.

النتائج: أظهرت دراسة (١٠٨) حالة من المفوما الخبيثة وجود ٦١ حالة كانوا مصابين بـ(ننهوجكن لمفوما) (NHL) و ٤٧ حالة مصابين بهوجكن لمفوما (HL). معدل العمر لننهوجكن لمفوما هو ٣٥ سنة ولكن لمرضى هوجكن لمفوما هو ٣٠ سنة. النوع الأكثر شائع النسيجي لننهوجكن لمفوما هو الدرجة الوسطية والأكثر شائع هو الخلايا الكبيرة المنتشرة ولكن لهوجكن لمفوما هو الخلايا المختلطة. الأعراض الرئيسية هو تضخم العقد اللمفاوية العنقية بنسبة ٣٨% لننهوجكن و ٧٠% لهوجكن لمفوما. الأعراض (B-SYMPTOM) موجودة بنسبة ٢٠% لمرضى ننهوجكن و ٣٢% لمرضى هوجكن لمفوما. مراحل مرضى ننهوجكن لمفوما على الأكثر كانوا في المرحلة الثالثة والرابعة ولكن مرضى هوجكن لمفوما على الأكثر في المرحلة الثانية. انتشار المرض في النخاع العظمي لمرضى ننهوجكن لمفوما ٣٢% ولكن لمرضى هوجكن كان بنسبة ٣%. العلاج الرئيسي لمرض ننهوجكن لمفوما بدأت (R-CHOP)، كل ٢١ يوما جرعة وعدد الجرعات الكلية ٨ جرعة. ولكن لمرضى هوجكن لمفوما العلاج الاساسي بدأت (ABVD) وأعطيت ٦ دورات وكل دورة جرعتان، جرعة في اليوم الاول وجرعة في اليوم الرابع عشر. كانت النتيجة ٨ مرضى ننهوجكن، المرض عاد واعطيت علاج ثاني ولكن ٤ مرضى توفى نتيجة الالتهابات المعدية. أما مرضى هوجكن، عاد المرض في حالتين، واحد المرضى منهم توفى نتيجة الالتهابات.

الاستنتاجات: إن مرضى الـ(ننهوجكن لمفوما) كانوا يعانون من شدة المرض ومن إصابة عدة أعضاء وكانت لدرجة الثالثة والرابعة أكثر الدرجات شيوعاً لدى التشخيص. إن النسبة العالية لإصابة نخاع العظم وإصابات خارج الغدد والأعراض السريرية الشديدة في مرضى الـ(ننهوجكن) مقارنة بمرضى الهوجكن كانت السبب في النتائج غير الواعدة وكما ظهر في دراسات مشابهة أخرى.

**INTRAPERITONEAL INSTILLATION OF NORMAL SALINE TO DECREASE
SHOULDER PAIN FOLLOWING LAPAROSCOPIC CHOLECYSTECTOMY**

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ABSTRACT

Background and Objectives Although laparoscopic cholecystectomy (LC) significantly reduces postoperative pain and provides satisfaction for both the patient and the surgeon, still there is some discomfort which is experienced by some patients either as shoulder pain or abdominal pain. The aim was to measure the efficacy of intraperitoneal instillation of the normal saline in reducing shoulder pain.

Methods This is a prospective study, 120 patients who underwent laparoscopic cholecystectomy were randomly divided to four groups. In the group A: no intraperitoneal instillation of normal saline was used and no drain was left in a subhepatic region. In the second group B: no intraperitoneal instillation of normal saline was used but a sub hepatic drain was left for 24 hours. In the group C :intraperitoneal instillation of normal saline under the right hemidiaphragm and beneath the liver intraoperatively with aspiration at the end of operation. In the group D: the same steps of group C were used but a sub hepatic drain left for 24 hours. Postoperatively shoulder pain score was recorded on a visual analogue scale during 2,6,12,24,48,72 hours postoperatively and any additional analgesic requirements were recorded.

Results Shoulder pain score revealed a significant decrease in group C and D versus controls A and B at 2,6,12,24,48,72 hours postoperatively .(p value = 0.01) also Analgesic requirements for shoulder pain were less in groups C and D after surgery compared to that in group A and B.

Conclusion: Intraperitoneal instillation of normal saline can reduce postoperative shoulder pain after laparoscopic cholecystectomy.

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Keywords: Laparoscopy , shoulder pain , intraperitoneal.

Laparoscopic procedures, compared with laparotomies, are associated with lower morbidity, shorter hospitalizations, smaller incisions, earlier return to normal activity, and less postoperative pain. For the patients benefit, reduced postoperative pain is one of the greatest advantages of laparoscopy compared with open surgery^{1,2}

Although pain at the surgical site is

reduced and hastens recovery, still the pain is not completely abolished after laparoscopy and the patient frequently describes right upper abdominal pain and shoulder pain in addition to the discomfort of port-site incisions. Some authors reported that 80% of patients require opioid analgesia after laparoscopic surgery^{3,4}

It is commonly believed that reduced

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postoperative pain after laparoscopy comes from smaller size of incisions. However, there is evidence to suggest that the main source of pain after laparoscopy is from the peritoneum rather than skin or abdominal wall and the surgeon's perception of post laparoscopy pain may be masked by the current tendency for the patients to be discharged after a short hospital stay.⁵

Pain after laparoscopic cholecystectomy (LC) may be moderate or even severe for some patients. The incidence of shoulder pain after laparoscopic cholecystectomy is about (35%-60%)⁵. The proposed etiology for post laparoscopy pain is multifactorial and treatment of any factor separately may not achieve the desired result. However, the surgeon is in a unique position to manage many of the causes by relatively minor changes in the technique, with corresponding additive improvements in outcome.

The proposed causes include^{2,5,6}:

1. Distension of abdomen will induce neuropraxia, damage irritation of the phrenic nerves.
2. Irritation of peritoneum and diaphragm due to pus or blood in the peritoneal cavity may lead to pain.
3. The excessive traction of the triangular ligament during the operation.
4. High pressure pneumoperitoneum.
5. Humidity (dry gas will cause more pain) and the volume of the insufflated gas (larger volume will cause more pain).
6. Residual intra-abdominal gas after laparoscopy.
7. Sociocultural and individual factors.

A number of studies have looked at methods to reduce the incidence and severity of shoulder pain following laparoscopic surgery. Methods used include: pre-operative non-steroidal anti-inflammatory medication^{7, 8} low-pressure insufflation, slow rate of insufflation⁹, no CO₂ insufflation (gasless laparoscopy) by using device to lift the abdominal wall, warmed gas and different gas as CO₂ and nitrogen oxide (N₂O)¹⁰, sub

diaphragmatic local anesthetic irrigation¹¹, removal of CO₂ by means of Trendelenburg position (30 degrees)⁽¹²⁾ and a pulmonary recruitment maneuver consisting of five manual inflations of the lung¹³, infiltration of local anesthetics into the periportal parietal peritoneum, instillation into the gallbladder bed¹⁴, postoperative sub diaphragmatic suction¹⁵.

Aims of the study:

To know the efficacy of normal saline instillation intraperitoneally in reducing postoperative shoulder pain.

METHODS

This is prospective study that was held in Azadi teaching Hospital between January 2010 to 1st January 2011. It includes adult patients underwent an elective LC for symptomatic gall stones gave their consent to participate in this study. Patients were excluded only if they had acute cholecystitis or need exploration of common bile duct or if the operation was converted to an open procedure.

All LCs were performed by one surgeon. The patients were randomly assigned to one of four groups of 30 patients each:

Group A: served as a control and no intraperitoneal instillation of normal saline or a subhepatic drain was applied.

Group B: no intraperitoneal instillation of normal saline was used but a sub hepatic drain was left for 24 hours.

Group C: After retrieval of gall bladder from abdomen intraperitoneal normal saline 1500 c c at a temperature of 37C° instilled under the right diaphragm and the liver was submerged with the patient in a 30 degree Trendelenburg position for 5 minutes then the fluid was aspirated after the CO₂ deflation.

Group D: normal saline was used as in group C, but a subhepatic drain was left for 24 hours.

The operations were done under general anesthesia and establishment of CO₂ pneumoperitoneum by closed method through insertion of a Verres needle; four

incisions were made for trocars insertion ; two were 10mm and two were 5mm. Intrabdominal pressure was automatically maintained at 12 mmHg by a CO2 insufflator. CO2 was evacuated at end of operation and then the procedures applied according to group of the patients A,B,C,D and trocar sites are closed. No local infiltration of the wound by local anaesthetic agent was done and the operative time was recorded.

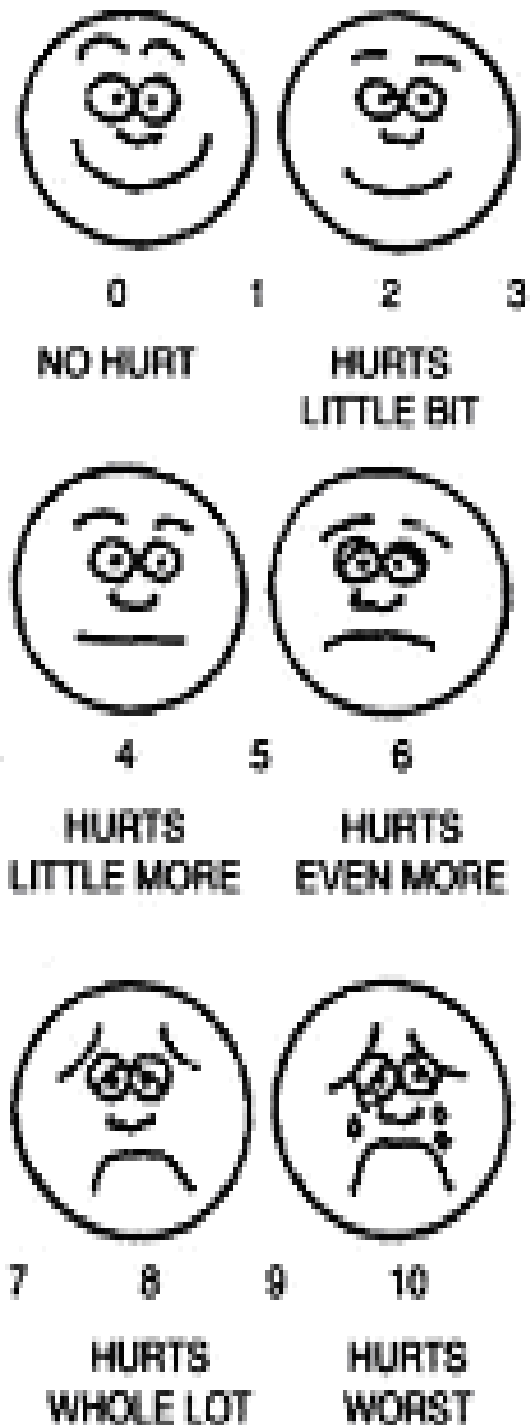
Every patient received acetaminophen (paracetamol) 500mg I.V. at induction of anesthesia. All patients received analgesics according to a standard postoperative protocol with paracetamol intravenously (I.V.). One hour postoperatively and in the evening of the same day for the first 24 hours. Any additional analgesia like Diclofenac 75mg intramuscularly (I.M.) or Tramadol hydrochloride ampule 50mg (I.M.) given on patients need in the ward were recorded. Patients routinely use acetaminophen (paracetamol) tab. 500mg three times/day for the first three postoperative days.

Postoperatively all patients were assessed by the same data collector, the assessor recorded 1. shoulder pain scores during hospitalization and after discharge at 2,6,12,24,48,72 hours 2. the analgesic medication usage postoperatively 3. nausea and vomiting postoperatively 4. bleeding at operation 5 . hospital stay .

The data after discharge were collected by telephone. The pain score were recorded according to a horizontal 10 cm. visual analogue scale (VAS) which had been introduced preoperatively to the patients as shown below*, were at 0 there is no pain, pain intensity score from 1-2 grade there is mild pain, from a 3-7 there is a moderate pain(which described as discomforting or distressing pain) and from 8-10 there is severe pain (which describe as a horrible or excruciating pain).

* visual analogue scale (Wong Baker Face Scale):

Wong Baker Face Scale



All data were shown, mean and standard deviation, were analyzed using paired t-test and a P-value less than 0.05 was selected as the limit for significance.

RESULTS

Demographic data were comparable between four groups of patients (table 1) the mean of age, height, weight, sex and length of a hospital stay were not

significantly different statistically. . The mean operative time was more in group D (40.2min) while it was not so different in group B and C.

Table 1. Demographic data and operative variables (mean)

	Group			
	A	B	C	D
Age (years)	46.4	46.56	40.93	42.5
Sex ratio (M:F)	5/25	7/23	5/25	2/28
Weight (kg)	74.2	78.9	75	74.46
Height (cm)	161.03	162.5	161.33	153.23
Operative time (min)	28.43	34.26	32.33	40.2
Previous abdominal scar	5(16.6%)	6(20%)	4(13.3%)	6(20%)
Bleeding (intraoperatively)	2 (6%)	2(6%)	1(3.3%)	4(13.3%)

Patients who had bleeding from gall bladder bed; their shoulder pain scores were more than other patients.

Two- sample (paired) T-test

P-value =0.01 for group C versus group A

, P-value =0.01 for group B versus A

P-value =0.01 for group D versus group A

Shoulder pain after LC is significantly decreased in groups C and D versus

group A (P-value revealed very high significant for group C and D versus A) during 2,6, 12, 24 and 72 hours postoperatively.

Shoulder pain show high significant difference for group B versus A (P-value 0.01 for group B versus group A). (table 2).

Table 2: VAS* shoulder pain score (mean and standard deviation) post operative period

Group (no.)	Post operative period					
	2h	6h	12h	24h	48h	72h
A (30)	1.4(2.7)	2.3(3.2)	4(3.3)	3.2(2.8)	2.4(2)	3.8(2.7)
B (30)	0.1(2.2)	1(2.4)	2.2(2.9)	2.9(3)	2.3(2.3)	2.5(2.7)
C (30)	0.8(2)	1(2.4)	1(2.4)	1.2(2.3)	0.3(1)	0.7(1.5)
D (30)	1(2.4)	1.6(2.7)	1.3(2.3)	1.2(2)	1.2(1.6)	0.5(0.8)

*VAS(visual analogue scale)

Shoulder pain score (mean) are shown at different postoperative intervals for each group. Shoulder pain score were significantly lower in group (C and D), Figure 1.

INTRAPERITONEAL INSTILLATION OF NORMAL SALINE TO DECREASE..

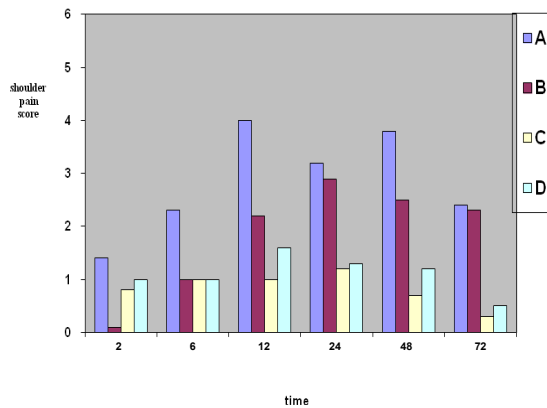


Figure 1. Shoulder pain score (mean) are shown at different postoperative interval for each group. Nausea and vomiting occurred in all groups but it was significantly higher for the group A. A lowest incidence of

vomiting was observed in group D 4 patients (13.3%) as shown in (table 3) .

Table 3. Number of patients with nausea and vomiting and their percentage.

Parameter	Group A	B	C	D
Nausea positive	26 (86.6%)	19 (63%)	14 (46.6%)	13 (43.3%)
Vomiting positive	20 (66.6%)	11 (36.6%)	5 (16.6%)	4 (13.3%)

The number of patients who did not need additional analgesia were more in group C and D, (table 4).

Table 4. Number of patients who did not need additional analgesia and their shoulder pain score range.

Parameter	Group A	B	C	D
No. of patients who did not need additional analgesia	8(26.6%)	14(46.6%)	21(70%)	23(76.6%)
Shoulder pain score range (Visual analogue score)	0-5	0-4	0-3	0-3

Other findings;

Three patients had a polyp of gall bladder and 2 of them had also gall stone, one young female patient from group C had a haemoperitoneum from the preoperative rupture of right sided ovarian cyst in which haemostasis done to her during laparoscopic cholecystectomy.

postoperative complications:

Two patients developed haematomas of the 5mm port site wounds (one in group B and other in D) and treated conservatively.

All patients were discharged home in the next day, one patient was readmitted to hospital after 72 hour due to repeated vomiting and she had been treated conservatively.

DISCUSSION

Shoulder pain after laparoscopy persist in many cases for 3 days or more, After laparoscopy CO₂ gas remains within the peritoneal cavity for few days (2-3days)

commonly causing pain during this period, particularly soon after starting of activities and ambulation^{4,16,17}. The result of our study confirmed those of previous studies. The pain thought to be due to peritoneal irritation by carbonic acid and creation of space between liver and the diaphragm leading to loss of suction support of the heavy liver.^{4,16-18}

Perry and Trombello¹⁷ the first who found that intraperitoneal infusion of normal saline could reduce postoperative shoulder pain. In this study we infuse certain amount of normal saline into right hemidiaphragmatic area in order to replace and reduce CO₂ between liver and the diaphragm then aspiration of fluid reduces the space between the liver and the diaphragm for complete return of liver to be in contact with the diaphragm. We place the patients at 30 degree Trendelenburg position as in other studies^{4,16,17} in order to allow minimum

amount of normal saline to eliminate gas space between liver and diaphragm.

The operative time was longer in group B,C and D as in other studies^{4,16} due to requirement of additional procedure including 1-infusion and suction of intraperitoneal normal saline 2-changing in patient body position 3-insertion of a subhepatic drain.

Ridell and Semn¹⁸ showed that the CO₂ gas was present in a sub diaphragmatic region after laparoscopy and it remain more than 24 hours. There is individual variation regarding the size and shape of the liver although we use same amount of normal saline in all groups to submerge the liver. In this study shoulder pain started to increase at the period of 12, 24 hours postoperatively while in other study¹⁶ shoulder pain started to increase in the period 2,6,12 hours postoperatively, we believe that mobilization increases traction on the peritoneal reflections of the heavy viscera, which loss suction support for their weight owing to the creation of peritoneal spaces by gas thereby delay absorption of the peritoneal gas¹⁶.

In this study normal saline infusion significantly reduced shoulder pain as in other studies^{4,16,17}. In this study the percentage of patients in groups C and D who did not need additional analgesia were the same as in other study¹⁶.

During this study we observed that nausea and vomiting were reduced postoperatively by normal saline irrigation which was not studied in other articles.

The study concluded that sub diaphragmatic instillation of normal saline leads to a significant decrease in postoperative shoulder pain and decreasing requirement of analgesic medication for shoulder pain and increase the patients satisfaction.

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پوخته

تەركرنا شىناڧدايا چەرمى بەتەنى زەكى ب شلەمەنىيى خوي ژبو كيم كرنا ئيش و ئازاريت مىلى نەخوشى پىشتى نشتەرگەرييا راكرنا زرافى ب نازورئ

پيشەكى و ئارمانج:

سەرەراي كۆ نشتەرگەرييا راكرنا كيسكى زرافى ب نازورئ برىژهيه كا مەزن ئيشانى كيم دكەتن پىشتى ئە نجام دانا نشتەرگەرييى دگەل دروستكرنا رازىبونى تى لدهف نوژدارئ نشتەرگەر و وهروهسا لدهف نەخوشى ژى، لى ھەر دى پىچەكا ئيشانى ل دەرەرا مىلى و زكى نەخوشى مينيتن. دئەفى قەكولينى دا دى ھەولدهى چەنداتيا كارتىكرنا تەركرنا شىناڧدايا چەرمى بەتەنى زەكى يىكو دبىژنى (الغشاء البريتونى) ب شلەمەنىيى خوي ئانكو (نورمال سلاين) ژبو كيم كرنا ئيش و ئازاريت مىلى نەخوشى.

رېكئەن قەكولينى:

ئە قەكولينە ل دھوكى ھاتە ئە نجام دان بۆ ماوى سالاكى دماوى دناڧبەرا كانينا دووى ياسالا ۲۰۱۰ ى، و تاكو كانينا دووى ياسالا ۲۰۱۱. ۱۲۰ نەخوشين نەخوشيا خو ژ ئيشنا بەركيت زرافى دبىن ھاتنە ژيگرتن يىكو لبرە نشتەرگەرييا راكرنا زرافى ب نازورئ بۆ وان بەيتە ئە نجام دان. ھاتنە دابەشكرن ب شىوازەكى بەرەلا ئانكو (عشوائى) بۆ چوار كۆمەلان:

كۆمەلا A: ياپىكھاتى بوو ژ ئەوان نەخوشان يىكو نشتەرگەري ب شىوازەكى كلاسيكى بۆ وان ھاتىە ئە نجام دان.
كۆمەلا B: ياپىكھاتىيە ژ ئەوان نەخوشان يىكو نشتەرگەري ب شىوازەكى كلاسيكى و وان ھاتىە ئە نجام دان، دگەل دانانا پاپىيەكى دەرنازكرنى ئانكو (انبوب التصريف)

ل بن مىلاكا رەش بۆ ماوى ۲۴ دەمژميران وپاش ھاتە راكرن.

كۆمەلا C: ياپىكھاتىيە ژ ئەوان نەخوشان يىكو نشتەرگەري ب ھەمان شىوازي بەرى نوکە بۆ وان ھاتىە ئە نجام دان، ولدو ماھىكا نشتەرگەرييى چەرمى بەتەنى يىكو دبىژنى (الغشاء البريتونى) يى پەردا (الحجاب الحاجز) ى، و دبن مىلاكا رەش داھاتە تەركرن كرن ب شلەمەنىيى خوي ب رىژەيا (۱۵۰۰) مللتر وپىشتى دو ماھىكا نشتەرگەرييى ھاتە كيشان كرن.

كۆمەلا D: ياپىكھاتىيە ژ ئەوان نەخوشان يىكو نشتەرگەري ب ھەمان شىوازي كۆمەلا C بۆ وان ھاتىە ئە نجام دان، دگەل دانانا پاپىيەكى دەرنازكرنى ل بن مىلاكا رەش پىشتى ئە نجام دان نشتەرگەرييى بۆ ماوى ۲۴ دەمژميران .

ئيشا مىلى ھاتە ھەلسەنگاندن لدويف خشتەيى سىرا چاقان ئانكو (حسب الجدول البصرى) يى پىڧەرنا ئيشانى دناڧبەرا دەمژميرن ۲، ۶، ۱۲، ۲۴، ۴۸، ۷۲ پىشتى نشتەرگەرييى، دگەل تو ماركرنا ھەر دەرمانەكى ئيش كيمكرنى يىكو دھينەدان بۆ نەخوشى دئەفى ماوھى دا.

ئە نجام:

لدويف خشتەيى سىرا چاقان (حسب الجدول البصرى) يى پىڧەرنا ئيشانا مىلى. دياربوو كۆ رىژەيه كا مەزنا ئيشانى ھاتە كيم كرن لدهف نەخوشين كۆمەلەيىن D و C بەراوورد دگەل كۆمەلەيىن A و B دناڧبەرا ماوھيىن ۲، ۶، ۱۲، ۲۴، ۴۸، ۷۲ دەمژميران دا پىشتى نشتەرگەرييى. دەرمانەكى ئيش كيمكرنى يىكو دھينەدان بۆ نەخوشى كيم ترن لدهف نەخوشين كۆمەلەيىن D و C بەراوورد دگەل كۆمەلەيىن A و B.

دەرئە نجام :

تەركرنا چەرمى بەتەنى يىكو دبىژنى (الغشاء البريتونى) يى زكى ب شلەمەنىيى خوي ئانكو (نورمال سلاين) برىژهيه كا مەزن ئيشا مىلى كيم دكەتن دناڧبەرا ماوھيىن ۲، ۶، ۱۲، ۲۴، ۴۸، ۷۲ دەمژميران دا، پىشتى نشتەرگەرييا راكرنا زرافى ب نازورئ.

الخلاصة

تأثير تنقيع المحلول الملحي (نورمال سالين) داخل الغشاء البريتوني للبطن في تقليل الم الكتف بعد عملية رفع كيس المرارة بالناظور

على الرغم من ان عملية رفع كيس المرارة بالناظور يقلل بدرجة كبيرة من الالم بعد اجراء العملية مع اعطاء القنعة لكل من الجراح والمريض الا انه يبقى هناك بعض الالم في منطقة الكتف والبطن. في هذه الدراسة نحاول ان نعلم مدى تأثير تنقيع المحلول الملحي (نورمال سالين) داخل الغشاء البريتوني للبطن في تقليل الم الكتف.

طريقة البحث:

اجريت هذه الدراسة في مدينة دهوك لمدة سنة واحدة للفترة من بين كانون الثاني ٢٠١٠ حتى كانون الثاني ٢٠١١. تم اختيار ١٢٠ مريضاً يعانون من حصة المرارة ممن ستجرى لهم عملية رفع المرارة بالناظور. حيث تم تقسيمهم بطريقة عشوائية إلى أربع مجاميع:

مجموعة A تضم المرضى الذين تم إجراء العملية لهم بطريقة كلاسيكية.
مجموعة B تضم المرضى الذين تم إجراء العملية لهم بطريقة كلاسيكية مع وضع انبوب تصريف تحت الكبد لمدة ٢٤ ساعة ثم رفعه.

مجموعة C تضم المرضى الذين أجريت لهم العملية بنفس الطريقة السابقة وفي نهاية العملية تم تنقيع الغشاء البريتوني للحجاب الحاجز وتحت الكبد بالمحلول الملحي (نورمال سالين) بمقدار ١٥٠٠ مللتر ثم سحبه في نهاية العملية.
مجموعة D تضم المرضى الذين تم إجراء العملية لهم بنفس طريقة مجموعة C مع وضع انبوب تصريف تحت الكبد بعد العملية لمدة ٢٤ ساعة.

تم تقييم الم الكتف حسب الجدول البصري لقياس الالم خلال الساعات ٢، ٦، ١٢، ٢٤، ٤٨، ٧٢ بعد العملية مع تسجيل اي ادوية مسكنة اضافية اعطيت للمريض خلال هذه الفترة.

النتائج:

حسب الجدول البصري لقياس الم الكتف هناك تقليل كبير لنسبة الالم للمجموع D و C بالمقارنة مع المجموع A و B خلال الفترات ٢، ٦، ١٢، ٢٤، ٤٨، ٧٢ ساعة بعد العملية. وكذلك كمية الادوية المسكنة المعطاة للمرضى في المجموع C و D اقل بنسبة كبيرة بالمقارنة مع المجموع A و B.

الاستنتاجات:

تنقيع الغشاء البريتوني للبطن بالمحلول الملحي (نورمال سالين) يقلل بدرجة كبيرة من الم الكتف خلال الفترات ٢، ٦، ١٢، ٢٤، ٤٨، ٧٢ ساعة بعد عملية رفع المرارة بالناظور.

ROAD TRAFFIC INJURIES IN DUHOK TYPES AND OUTCOMES

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ABSTRACT

Background and Objectives Road traffic accident (RTA) is a significant, but preventable causes of death, disability, and economic loss in developing countries among persons of economically active age group. The objective of the study to determine the prevalence and causes of death from road traffic accident and injuries in Duhok governorate, Kurdistan, Iraq.

Methods All road traffic accident and road traffic injuries (wounded and dead persons) were studied during period of four years (2005-2008), data were collected from report of Medico Legal Department (Duhok-Forensic medicine) and case sheets of injured persons who had been hospitalized in various Duhok governorate hospitals.

Results There were 676 dead cases fatality rate was 12.3%, the predominant number of cases was males (78.5%). The frequency among pedestrians was 44%, drivers 37% and passengers 18%. Majority of died cases (42%) were in the age group 21-50 years. The great majority of cases found to have head injury. Fatal cases (94.8%) occurred before arriving to hospital.

Conclusion Death from RTA in Duhok is the first major preventable cause of all death recorded in Duhok Forensic Department. It is most common in male with active economically age group and pedestrian.

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Key words:

Road traffic accidents (RTAs) are a significant, but preventable cause of death, disability and economic loss in developing countries^{1,2}. Among the males of the economically active age group, motor vehicle injuries are the third most common cause of death in these countries. It is projected that RTAs will be the second most common cause of disability-adjusted life years in developing countries in the year 2020.³

Globally, road traffic crashes claim the lives of some 1.2 million people every year and about 20 to 50 million people are injured or disabled. They account for 2.6% of all disability, adjusted life-years lost, and 2.1% of global mortality⁴.

In order to improve traffic safety, traffic accidents need to be analyzed to identify possible risk factors and their effects on

injury severity levels⁵.

The present study was carried out to study the various epidemiological aspects of vehicular accidents in Duhok governorate/ Kurdistan, Iraq, attempting to establish various causative factors, patterns and distribution of injuries and thereby plan successful measures against it and to evaluate the magnitude of the problem.

The study aims to assess road traffic accidents

- 1- Age, gender, nature, type, site, distribution and category of road user.
- 2- Traffic mortality rate (TMR).
- 3- Differential causes of death.

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METHODS

This cross sectional study was conducted at Duhok Forensic Medicine Department (DFMD), the only referral center in the governorate, to which all dead cases are referred for registration and autopsy. Included data pertains to the period extending from January 2005 to December 2008.

Inclusion criteria:

- 1- Fatal cases registered at the DFMD whether dying on the spot or in hospital.
- 2- Non-fatal cases registered at Duhok Accident and Emergency Hospital, Azadi Teaching Hospital as well as the hospitals in Zakho, Akre, and Amedy.

Exclusion criteria:

- 1- Non-vehicular casualties e.g. a person slipping and falling on the road
- 2- Casualties involving a stationary vehicle e.g. occurring during washing or loading of a vehicle.
- 3- Motor cycle and bicycle accidents

Data were collected from two sources, namely:

- 1- Medico-legal records in DFMD.
- 2- Patient case sheets from hospitals for collecting additional information and - where necessary - for cross checking.

A specially designed data sheet was used to accommodate the required data. All data were entered and analyzed by Windows Microsoft Excel program

All postmortem records were scrutinized for:

- 1- Presence of external and internal injuries including bones and joints.
- 2- Characteristics of injuries regarding nature, type, site and distribution.
- 3- Place and time of death.

The data sheet included demographics including age, gender, date and time of accident, date and place of death for fatal cases, accident specifications regarding type of accident and category of road user and injury specifications regarding type,

anatomical site and postmortem diagnosis (cause of death)

The TMR was calculated according to the following formula:

$$\text{TMR} = (\text{no. of deaths due RTAs} / \text{no. of persons injured by the same RTAs}) \times 100.$$

RESULTS

The total number of RTAs registered between January 2005 and December 2008 amounted to 5473 with an overall TMR of 12.3% (Figure 1).

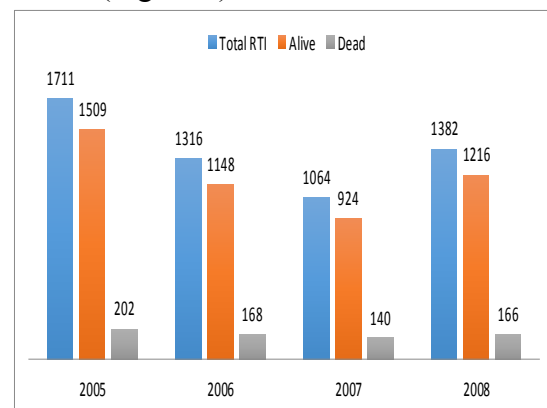


Figure 1. Distribution of RTAs by Years and Outcome.

The total number of RTAs registered between January 2005 and December 2008 amounted to 5473 with an overall TMR of 12.3% (Figure 1).

Pedestrians were the most common victims of RTAs followed by drivers and passengers (302 (44.8%), 252 (37.2 %), and 122 (18 %), respectively (Figure 2).

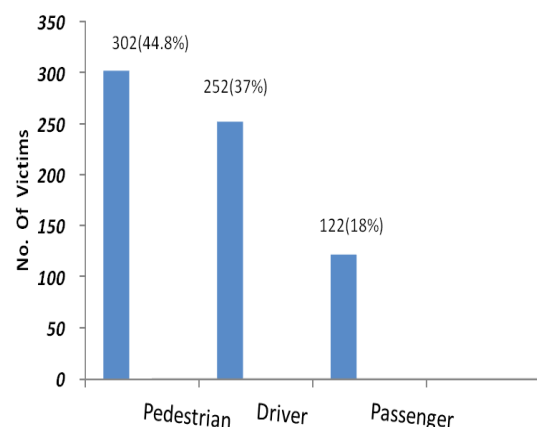


Figure 2. Distribution of RTA Victims by Category of Road User

As to age distribution, those below 10 years of age were the most common victims 171 (25.3%) with 80% of them being pedestrians. Victims between ages 21 and 50 constituted 40.4% of the total. Those over 60 years of age amounted to 71 (10.5%) with pedestrians constituting 58 (81.7%) of them (Table 1)

Table 1. Distribution of RTA Victims by Category of Road User and Age

Total	Pedestrian	Passenger	Driver	Ages (years)
171	137	34	0	0-10
101	53	23	25	11-20
138	15	34	89	21-30
90	13	12	65	31-40
62	11	13	38	41-50
43	15	2	26	51-60
71	58	4	9	≥ 61
676	302	122	252	Total

Out of 676 dead cases resulting from RTAs, 531 (78.6%) were males and 145 (21.4%) were females. All driver victims were males except for one female victim (0.4% of all driver victims) (Figure 3).

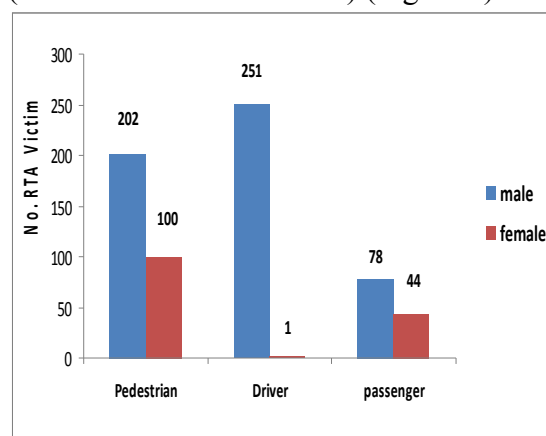


Figure 3. Distribution of RTA Victims by Category of Road User and Gender

Three hundred two (44.6%) of the total 676 deceased cases were pedestrians, while 185 (27.3%) and 189 (27.9%) died from rollovers and car collisions, respectively (Table 2 and Figure 4).

Table 2. Death from RTAs by Type of Accident and Year of Occurrence.

RTA type Year	Car Collision		Rollover		Pedestrians		Total	
	No.	%	No.	%	No.	%	No.	%
2005	55	30.5	61	32.9	83	27.6	199	29.8
2006	59	32.7	35	18.9	74	23.7	168	24.8
2007	33	22.1	41	27	75	50.3	149	20.71
2008	38	21.1	52	28.1	70	24.4	160	24.5
Total	185	27.3	189	27.9	302	44.6	676	100%

Three hundred two (44.6%) of the total 676 deceased cases were pedestrians, while 185 (27.3%) and 189 (27.9%) died from rollovers and car collisions, respectively (Table 2 and Figure 4).

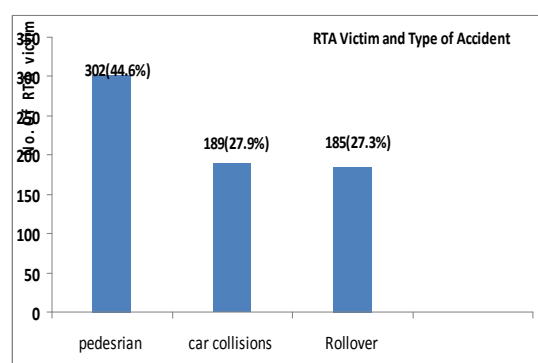


Figure 4. (Distribution of RTA Victims by type of accident

ROAD TRAFFIC INJURIES IN DUHOK TYPES AND OUTCOMES..

Most fatal accidents, 568 (84%), occurred during the day time from 7 am to 7 pm while only 108 (16%) happened during the night hours from 7 pm to 7 am (Figure 5)

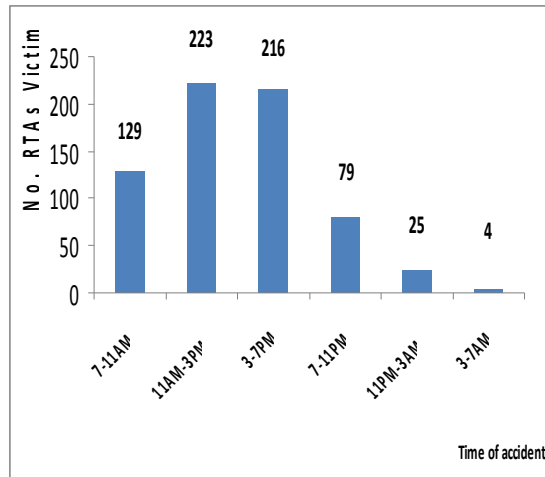


Figure 5. Distribution of Fatal numbers of RTAs by Time of Occurrence.

Six hundred fifty one (96.3%) of all fatal RTA victims suffered head injury with or without skull fractures. Two third of the victims, 448 (66.3%), sustained limb fractures. Other types of injuries were less common and included trauma to the abdomen and the chest as well as pelvis

and spine fractures (49.3%, 19.1%, 13.4% and 13.2%, respectively) (Figure6).

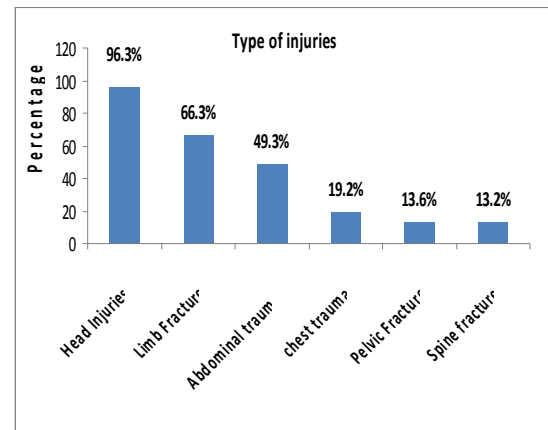


Figure 6. *Each case may have more than one type of injury.

Figure 6. Distribution of Fatal Outcomes by Type of Injury.

Almost all RTA victims who died, passengers, pedestrians, and drivers, suffered head injuries (98.4%, 96.7%, and 94.8%, respectively). About two thirds sustained limb fractures (58.2%, 67.9%, and 68.3%, respectively), and half of the victims suffered chest trauma (50.8%, 45%, and 53.6%, respectively). (Table 3).

Type of Injury	Category of Road Users					
	Drivers*		Passengers*		Pedestrians*	
	No.	(%)	No.	(%)	No.	(%)
Head injury	239	(94.8)	120	(98.4)	292	(96.7)
Limb Fracture	172	(68.3)	71	(58.2)	205	(67.9)
Spine Fracture	42	(16.7)	12	(9.8)	35	(11.6)
Chest Injury	135	(53.6)	62	(50.8)	136	(45.0)
Abdominal Injury	44	(17.5)	17	(13.9)	69	(22.8)
Pelvic Injury	27	(10.7)	14	(11.5)	51	(16.9)
Total*	252	(100)	122	(100)	302	(100)

Table 3. Distribution of Injuries to Fatal RTA Victims by Category of Road User.

* The total number of drivers, passengers, and pedestrians denotes the number of cases. Each RTA victim, however, may have multiple injuries.

Immediate death at the accident site constituted 641 (94.8%) of all fatal RTA victims; only 35 cases (5.2%) died a few

hours or more after arriving to the hospital. Intracranial hemorrhage (ICH) and brain laceration is the cause of 544 cases of

immediate death (84.8%) whereas it caused death in only 15 cases (42.8%) of those who died at the hospital. Shock, lung contusion, and spinal cord transaction were much rarer causes of immediate death (each less than 7%) whereas lung

contusion was the cause of in-hospital death for more than 37% of cases. Only one person died of pulmonary embolism at the hospital (Table 4).

Cause of Death \ Survival Period	Immediate Death		In-Hospital Death		Total	
	No.	(%)	No.	(%)	No.	(%)
ICH + Brain Laceration	544	(84.9)	15	(42.9)	559	(82.7)
Hypovolemic Shock	44	(6.9)	6	(17.1)	50	(7.4)
Lung Contusion	33	(5.1)	13	(37.1)	46	(6.8)
Spinal Cord Transaction	20	(3.1)	0	(0)	20	(3)
Pulmonary Embolism	0	(0)	1	(2.9)	1	(0.1)
Total	641	(100)	35	(100)	676	(100)

Table 4. Fatal Outcomes by Cause and Survival Period.

DISCUSSION

The results of various studies performed all over the world showed that the main causes of mortality in the age group 5-14 and 15-29 years of age are injuries due to road traffic accidents. Generally, 30-86% of all trauma hospital admissions in poor and developing countries are due to motor vehicle accidents⁶.

RTAs have become the most serious problem facing this century whether measured in dollars costs, physician contacts, deaths, or loss of productive years of life. One of the main reasons for increase in the number of RTAs worldwide is the daily increase in the number of vehicles⁷.

The population of Duhok governorate was 906,308 and 1,019,462 in 2005 and 2008, respectively. During the last years, Duhok, underwent an enormous and rapid growth in road construction, number of vehicles whether used or new⁸, and the emergence of high risk road user behavior. These factors might be the cause of the dramatic increase in the number of road traffic accidents, presently constituting the third cause of death in Duhok after

cardiovascular and respiratory diseases and the first cause of death reported in the DFMD⁹.

Although it is well known that alcohol is a culprit for impaired driving ability¹⁰ this study did not explore the role of alcohol in fatal RTAs because in Duhok Governorate, victims of RTAs are not screened for alcohol levels in their blood and/or urine. To date no definite legal alcohol blood level has been set to consider a driver to be drunk, a situation which is probably similar in other developing countries.

A total of 5473 RTA victims were registered during the study period, of which 676 (12.3%) died while the remaining 4797 (87.7%) survived. Due to certain limitations of information, it was decided to restrict the study to the 676 deceased cases.

The current study, which spanned the assigned 4 years, documented an overall TMR of 12.3%.

The highest percentage of RTA victims was 31.2% registered during 2005 while the lowest percentage was that of 2007 (20.7%).

Regarding age distribution, the highest percentage of fatalities was 25.3% among those younger than 10 years, 80% of whom were pedestrians. The less frequent victims in those over 60 years of age (10.5%) also exhibited a high percentage of pedestrians (almost 82%). These findings in the two extremes of age might be attributed to their low awareness about the dangers of road traffic accidents and the lack of footpaths alongside our roads that enable them to use the roads safely. The present study also found that victims between the ages of 21 and 50, the most productive age group, constituted 40.4% of the total, a state that imposes a serious economic loss to the community. These results agreed with observations made by¹¹.

The results revealed that the majority of drivers (61%) were in the age group 21-40 years and 9.9% in the age group 11-20 years. This might be due to driver behaviors and non-licensed drivers. Children below 10 years of age were the most common victims among pedestrians (45.3%); similar findings were obtained by¹².

The results showed that most fatal RTA victims were males (78.5%), contrasting the lower female percentage of 21.5%, resulting in a male-female ratio of RTA fatalities of 3.6:1. This ratio is in agreement with the findings seen by Roudsari et al. (2004) and lower than that found in a survey in Saudi Arabia of about 9:1¹³.

In the present study, the highest number of RTA victims were registered in the summer months July (11.8%), August (10.2%), and September (10%). Interestingly, there was a peak of 10% in April as well, which might be attributed to holidays where people go for picnics, overcrowding the roads. However, one would expect a peak in March during the Newroz celebrations where literally thousands of vehicles clog the roads for three consecutive days (March 21-23). Yet, with 5.8%, March has the third lowest

number RTAs. Nilambar et al. showed that the RTA accidents occurred mostly during the rainy winter months¹¹.

This study also showed that the peak time for fatal road traffic accidents was between 11 am and 3 pm (32.9%) and also between 3 pm and 7 pm (31.9%). These hours are the busiest as commuters go to and return back from schools, offices, and business places. More than 80% of fatal car accidents took place during the day time (7 am to 7 pm) these hours coincide with the period when the people are more active and mobile. Similar results were observed in South India¹¹.

The study also revealed that 44.6% of cases involved were pedestrians, followed by drivers 37.2% and passengers (occupants) (18%). These findings are similar to those reported by Chaudhary et al.¹⁴ (with 44% pedestrians, 32.9% drivers and 23.2% passengers). Tirpde et al. (1998), however, published similar numbers for pedestrians (46.4%), yet, the distribution for occupants was with 33% significantly higher and resulting in a lower percentage (18.8%) for drivers¹⁵.

The high number of pedestrian victims can be explained by the lack of proper footpaths while the low number of passenger victims might be attributed to low numbers of public vehicles in Duhok, resulting to low relative numbers of occupant victims per accident. The relatively low number of fatal driver accidents reported by Tirpude et al. is possibly the result of drivers wearing a seatbelt, which was not enforced in Duhok until 2009.

Among all road users, the most common type of injury was found to be head injury (96.3%), followed by limb fractures, both upper and lower, in 66.3% and chest injuries 49.3%. Similar frequency of injuries was found in a study conducted in Duhok⁸.

The most common cause of death from RTAs was found to be from intracranial hemorrhage with brain tissue contusion and lacerations (82.7%). Hypovolemic

shock caused by bleeding from internal organs, such as spleen, liver, or vascular injuries constituted 7.4%, followed by lung contusions (6.8%), spinal cord transection (3%) and pulmonary embolism 0.1% as causes of death after RTAs. The results are in agreement with the findings seen by Sharma et al.¹⁶.

Multiple visceral injuries were quite common following RTAs. Table 3 depicts various visceral organs involved in accidents. In the majority of cases, the brain has been chiefly injured followed by lungs, heart and vessels, spleen, and liver, respectively. A high incidence of brain injuries has also been reported by other colleagues^{17,18}.

Pedestrians were found to be the most common victims of RTAs (45%), almost 97% had sustained head injuries. The second most common victims were drivers (37%) with almost 95% having sustained a head injury. While passengers were least likely to be injured fatally (18%), more than 98% of those fatally wounded victims had sustained head injuries. Other study reported the incidence of head injury to be most common in pedestrians¹⁶.

The majority of victims (94.8%) died on the spot, with the remaining 5.2% died after arriving to the hospitals for varying time periods, even up to months. Most of the victims who had died immediately (85%) died from intracranial hemorrhage and brain tissue lacerations while less than half (43%) of those who died in the hospital, died from that cause. Whereas more than 37% of the delayed fatalities died from lung contusion, only 17% were due to shock because of internal organ bleeding. These findings agree with those observed by others¹⁹.

The TMR during the four studied years was 12.3% where most deaths occurred in the pre-hospital period. Most victims were males in the age group of 21 to 50 years with a male to female ratio of 3.6:1. Pedestrians were the most common victims, with head injuries being the most frequent cause of death.

The study recommended that immediate measures should be put in action to achieve enhanced road safety such as road spaces for pedestrians and promotion of separate movement tracks and certification system for vehicles. The long term goals should include planning an effective national road safety strategy. Adoption of proper public educational programs stressing correct road user behavior, effective speed control and compliance with traffic safety laws. Education of children at an early age about behavior in the street and dangers on the road. Supporting the emergency service system to help it provide quick and effective high-standard first-aid services. More elaborate studies are needed to further delineate causes and proper preventive measures to restrict RTIs and decrease resulting deaths.

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پوخته

رویدانیت هاتن وچوونی ل دهوکی: جور و نه نجام

پیشەکی و ئارمانج: ڤوداوی هاتوچۆ هۆکاری سهرکی مردن و پهککهوتن و لهدهست دانی ئابوری یه ل وهلاتانی بهرمو پیشکهوتن دا له نیوان نهو کهساندا که له ڤووی ئابوری یهوه چالاکن، بهلام له ههمان کاتدا هۆکاری نههیلان باره.

نامانجی لیکولینهوه: بۆ دیارکردنی هۆکاری مردن به ڤوداوی هاتوچوو له پارێزگای دهوک دا.

رێکێن فهکولینی: بو دهستنیشتانکردنی مردن بههوی ڤوداوی هاتوچوو له پارێزگای دهوک، 676 مردوو لیکولینهومیان له سهر کرا له ماوی نیوان چوار سالدا (2005-2008). زانیاریهکان کۆکراوه له رێی ڤاپورتی پزیشکی دادمهوه (بهریوبهراتی پزیشکی داد- دهوک) ههروهها له رێی فۆرمی تایبهتی نهخوشهکانهوه به بکههینانی پروگرامی (Microsoft excel) داتاكان شیکرانمه.

نهانجام: رێژهی مرنی کهسی (case fatality rate) 12.3% بو. وه رێژهی مردنی تایبهتی (specific deathrate) 22.2% بو. هه 100000 کهس بۆ سالی 2005، زوربهی مردنهکان له رهگهزی نیر بوون 78.5%، وه رێژهی نیر ومی (1:3.7) بو. رێژهی مردن له پیادهرمهکاندا 45% بو، وه له نیوان شۆفیرمهکاندا 37% بو. وه بۆ گهشتیارمهکان 25% بو. زۆرتیرین قوربانیاکی ڤوداوی هاتوچۆ به رێژهی 42.9% که تهمهنیان له نیوان 21-50 سال بو. له 94.8% قوربانیاکی ڤوداوی هاتوچۆ مردبوون پیش گهیشتنیان بۆ نهخوشخانه. زۆرینهی مردوو مهکان به هۆی زهبری دهرکی سهر وه بو رێژهی 45.1%، شکانی سهر له چهند جێگایهکی جیاوازا ببنرا ل 34.2% وه هۆکاری مردن بههۆی خوینپژانی ناسهر و پچرانی شانهکانی مێشکهوه به رێژهی 82.6% بو.

دهرنهانجام: ڤوداوی هاتوچوو له پارێزگای دهوک بهیهکهمین هۆکاری مردن دادهنریت له نیوان نهو مردووانهی که تۆمارکراوون له بهریبهرایهتی پزیشکی دادمهوهی له پارێزگای دهوک. زۆرتیرینی مردوو مهکان دهبنریت له پیادهرمهکان و له رهگهزی نیردا که له ڤووی ئابوری یهوه چالاکن.

الخلاصة

إصابات السير المرورية في دهوك: أنواعها ونتائجها

خلفية وأهداف البحث: حوادث السير المرورية هي من العوامل المهمة المتجنبة للموت والعجز والخسائر الاقتصادية في الدول النامية خاصة والتي تؤدي إلى خسائر في الأعمار الناشطة اقتصادياً.

الهدف معرفة اسباب الوفاة من حوادث السير المرورية في محافظة دهوك/ إقليم كردستان العراق
طرق البحث: لدراسة الوفاة من حوادث السير المرورية أخذت (٦٧٦) من الحالات المتوفية والمسجلة في مديرية الطبابة العدلية/ دهوك. للفترة من بداية ٢٠٠٥ إلى نهاية ٢٠٠٨ (أربع سنوات).

النتائج

أثناء فترة الدراسة كانت هنالك ٦٧٦ حالة وفاة. معدل الوفيات ١٢.٣% ومعدل الوفيات الخاصة كانت ٢٢,٢% لكل ١٠٠ ألف شخص في محافظة دهوك. نسبة الذكور ٧٨.٥%. نسبة الوفاة للمشاة ٤٤% والسواق ٣٧% وللركاب ١٨%. معظم الوفيات كانت في الفئة العمرية ٢١-٥٠ سنة. نسبة الوفيات من الضحايا ماتوا قبل الوصول الى المستشفى ومعظم الإصابات كانت لديهم جروح وإصابات الرأس (٩٦%).

الاستنتاجات:

حوادث السير المرورية في محافظة دهوك هي من العوامل الرئيسية للوفاة المسجلة في مديرية الطبابة العدلية في دهوك. السبب الرئيسي للوفاة كان إصابات الرأس.

REPRODUCIBILITY OF CENTRIC JAW RELATION RECORD FOR EDENTULOUS PATIENTS

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ABSTRACT

Background and objectives Centric jaw relation still remains one of the controversial issues in prosthodontics. The aim of this study was to measure the variability of centric relation records utilizing three clinically accepted methods: Swallowing, chin point guidance and bimanual manipulation.

Methods 30 edentulous (45-65) aged patients were participated in this study and divided into 3 groups, 10 for each method. The centric jaw relation was recorded by unguided swallowing and a midline was marked on graph paper fixed on the anterior and lateral sections of the bite section rims. 5 records were obtained from each patient per method. The deviation of midline in the medio-lateral axis were measured by the digital Vernier to the nearest 0.01mm and magnifier mounted on fixed distance from using the articulator. Data were extracted and analyzed statistically using SPSS version.

Results Variability within subjects ranged from 0.5mm for the swallowing method to 1.5mm of the chin point guidance. There was no statistically difference ($p > 0.05$) among the three methods for measuring lateral displacement. The bimanual manipulation showed the most reproducible method ($P < 0.05$).

Conclusion based on the results of this study, it may be concluded that the studied techniques demonstrated different variability degrees. The bimanual manipulation method can be considered the most reproducible from the three methods.

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Keywords: Centric relation, swallowing method. Chin point guidance, bimanual manipulation.

The centric relation or retruded contact position is an important maxilla-mandibular relation in restorative dentistry for dentulous and edentulous patients, and from a small occlusal restoration to a full mouth rehabilitation the occlusion is affected to greater or lesser extent.¹

It has been suggested that centric relation is attainable during mastication and deglutition,² and restoring patient to this position may result in enhanced masticatory efficiency and stability.³

A variety of clinical techniques have

been suggested to achieve accurate and reproducible inter occlusal record of centric relation position.⁴⁻⁸ The unguided or the swallowing method^{4, 8} and the operator guided method described by McCollum where the mandible is guided into hinge axis closure by the thumb and index finger of the operator, this is known as chin point guidance method. To make centric relation record more accurate an auxiliary apparatus was developed by Lucia⁵ and the leaf gauge introduced by Long,⁶ they were designed to diminish proprioceptive activity, promote muscular

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relaxation and as a result facilitate jaw manipulation.

The bimanual manipulation described by Dawson⁷ and widely used by many researcher⁹⁻¹² places bilateral pressure on the mandible, the operator thumb apply force on the chin in a downward direction and the four fingers of each side hand around the gonial angle pushing the condyles to an antero-superior position.

The aim of the present study was to compare the reproducibility of centric relation obtained using the jaw manipulation methods (chin point guidance and bimanual manipulation) with the unguided patient method.

METHODS

A total of thirty edentulous patients from Duhok dental school (Prosthodontics clinic) with the age range of 45–65 years, irrespective of sex were selected according to the exclusion and inclusion criteria. Patients with well healed and rounded ridges having firm, resilient mucosa, class I jaw relation, with no pain/discomfort in any part of the stomatognathic system or any neuromuscular disorder like Parkinsonism, epilepsy or any disorder of the temporomandibular joint (TMJ) and who had no previous experience of complete dentures were selected. These patients were randomly divided in three groups according to the method of recording centric relation.

Before starting the treatment, complete procedure was explained to the patient and all patient signed an informed consent to the research procedures. Approval for the research procedures was obtained from the ethics committee of the university of Duhok.

For each patient upper & lower record bases were constructed to record the jaw relation records for the three methods mentioned before. After registering vertical dimension of occlusion, graphic paper was fixed on the upper and lower bite rims In order to mark the deviation to

the left or to the right from the mid line which was marked when the patient unguided close in centric relation in the swallowing method.

In the patient guided or the chin point guidance the thumb is placed onto the antero-inferior portion of the chin and the index bilaterally on the buccal flanges of the lower record rim and guide the mandible into centric relation.

For the bimanual manipulation places bilateral pressure on the mandible. The operators thumbs apply force on the chin in a downward direction while the four other fingers of each hand around the gonial angle pushing the condyles to an antero-superior position. 5 centric relation were obtained for each subject and per each method. For each centric relation, the upper and lower record bases were mounted on a free plane articulator (MEDESY Italy).

The deviation of mid line in the Medio-lateral axis were measured by the digital Vernier to the nearest 0.01mm and magnifier (Straight shaft glass CHINA) mounted on fixed distance from the articulator. Data were extracted and analyzed statistically using SPSS version.

RESULTS

The descriptive statistics for the three methods of recording centric relation is presented in Table 1 and Fig 1.

Table 1. Mean, Standard deviation and confidence interval.

Group	Mean (SD)*	95% C.I.**
Swallowing	0.59 (0.24)	0.41, 0.76
Chin Point	0.64 (0.35)	0.38, 0.89
Bimanual	0.69 (0.22)	0.53, 0.85

*standard deviation

**95% confidence interval

There was no significant different in the mean of the different methods [Swallowing method (mean= 0.59), Chin Point method (mean= 0.64), Bimanual

method (mean= 0.69)] with $F(2, 27) = 0.732$, $p\text{-value} > 0.05$. Table (2) represent ANOVA test of the three methods.

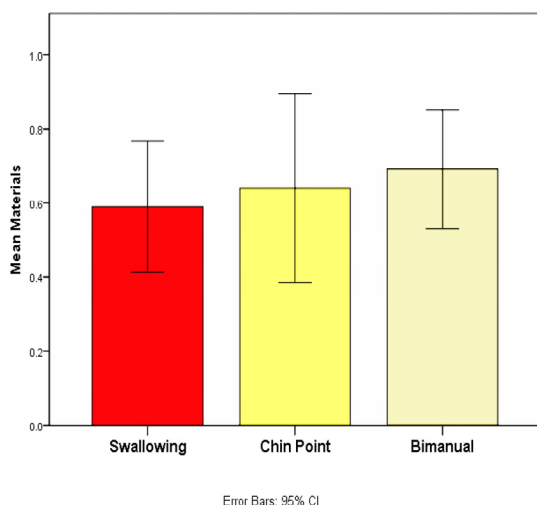


Fig 1. demonstrates the mean of different methods groups with the highest mean of bimanual group and lowest for swallowing group. 95% confidence interval shows that there is overlapping with each other. This may indicate that there is no significance difference in the means among all the methods.

Table 2. One-Way ANOVA test for Different methods

Group	Mean (SD)*	95% C. I**	F value	P value	Significance
Swallowing	0.59 (0.24)	0.41, 0.76	0.315	0.732	non-significant
Chin Point	0.64 (0.35)	0.38, 0.89			
Bimanual	0.69 (0.22)	0.53, 0.85			

*standard deviation

**95% confidence interval

By measuring the range of variation of centric relation among the three methods, the bimanual manipulation showed the least variations or the most repeatable. Figure (2, 3, and 4)

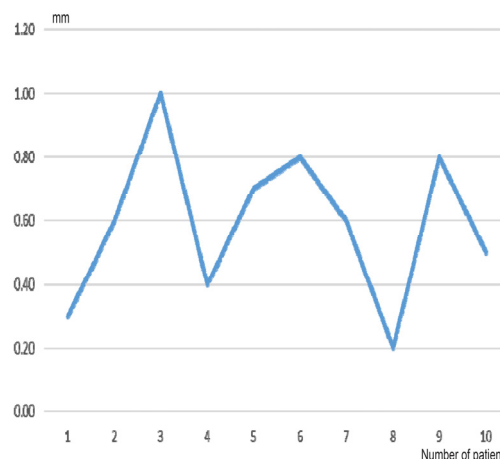


Fig 2. Range of measures for each Patient (Swallowing)

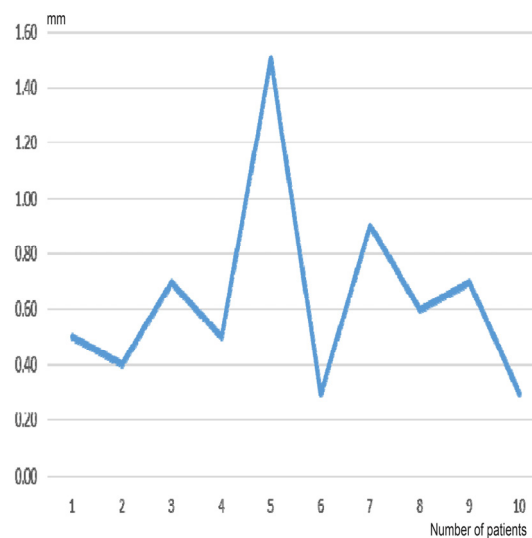


Fig 3. Range of measures for each Patient (Chin point)

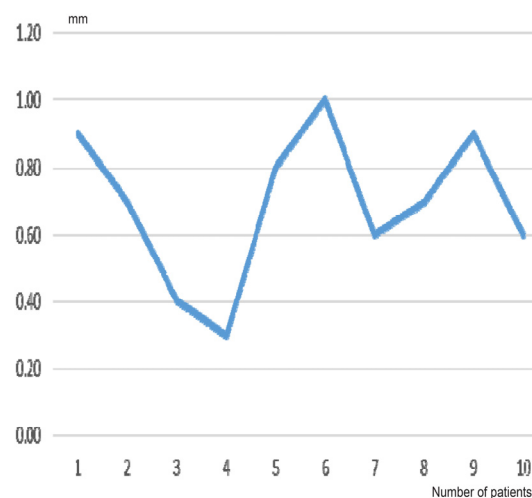


Fig 4. Range of measures for each Patient (Bimanual)

From the range of recordings of centric relation, the results indicated that the Bimanual manipulation was the most reproducible method and this was represent in Table (3).

Table (3) the ranges of the three methods of centric relation

Group	Median (range)	Min., Max.
Swallowing	0.6 (0.8)	0.2, 1.0
Chin Point	0.55 (1.2)	0.3, 1.5
Bimanual	0.7 (0.7)	0.3, 1.0

DISCUSSION

Centric relation is maxillo-mandibular relationships in which the condyles articulate with the thinnest avascular portion of their respective disks with the condyle disc complex in the anterior-superior position against articular eminences. It is used as a repeatable reference position for mounting casts in an articulator.

Although the results of the present study showed no statistically differences among the three methods of recording centric relation, but the range of the variability of reading indicated that the Bimanual manipulation method showed the least range of variations and gave a more reproducible recordings among the three methods tested. This result is in agreement with Keshvad and Winstanley,² and Helkimo.¹⁶ The unguided (swallowing) method is simple, but it allows some slide of the record rims after recording as it is unguided by the operator.

The chin point guidance exert pressure on the chin of the patient and this may lead to a retruded position of the condyle over its physiological limit. This position may cause compression on the retrodiscal region as described by Weinbery¹³ and non-physiological location.

Several authors,^{7,14,15} advocated an anterior-superior condylar position as a more adequate definition of centric relation.

Many factors can influence the accuracy of reproducibility of the recording including the patient cooperation, operator skill, the method employed and the material used for recording. Guiding the patient into retruded position has been shown to give more consistent results than the patient-guided techniques in the previous study,¹ still others¹⁷ suggested that reproducibility is unachievable regardless of the techniques.

The Bimanual manipulation is a complicated technique and need an experience operator, but it seat the condyle in an anterior-superior position in the fossa and this considered the terminal hinge position and the most repeatable or reproducible method.

The study concluded that the centric relation techniques tested in this clinical study were reproducible and produce insignificant differences. Bimanual manipulation technique exhibited the most superior in reproducibility.

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پوخته

مه‌ودایی دوباره‌بوونا په‌یوه‌ندیا نافیین یا نه‌خوشی بی ددان بکارئینانا داخستنا سروشتی
و ب هاریکاریا ده‌ستی نوژداری ددانا

پیشه‌کی و ئارمانج:

دانا سهرئیکا نافیینا نه‌خوشی بی ددان هیشتا بابه‌تی دانوستاندنایه. پیفانا جیاوازی د دانا سهرئیکا نافیین بکارئینانا سی ریکئین په‌سندکری یین ته‌خته‌بند. ئو جیاوازی ژی ئه‌فه‌نه: داعیران، خالا ئه‌رزنگی، و ب هاریکاریا هه‌ردوو ده‌ستان.

ریکئین فه‌کولینی:

۳۰ نه‌خوشی بی ددان ب ژیی (۴۵ – ۶۵) سالی پشکداری کرن. ئو ژماره بو سی کومه‌لا هاته دابه‌شکرن، بو هه‌ر گروپه‌کی ۱۰ که‌س. پیفانا ددانا سهرئیکا نافیین یا سروشتی هاته‌کرن و هیلا نافه‌ند لسه‌ر کاغه‌زا رونکرنی هاته ده‌ستنیشانکرن. ۵ پیفان بو هه‌ر نه‌خوشه‌کی هاته وه‌رگرتن پاشی پیفانا قاریبوننی ژ هیلا نافه‌ند ب ریکا (Vernia) بو ۰.۰۱ ژ ملیمه‌تری. ئه‌نجام هاتنه شروقه‌کرن بکارئینانا به‌رنامی (SPSS).

ئه‌نجام:

قاریبون ژ هیلا نافه‌ند دناقه‌را (۰.۵) ژ ملیمه‌تری بو ریکا داعیرانی و (۱.۰) بو ریکا ئه‌رزنگی. چ جیاوازیین دیار ($P > 0.5$) بو هه‌رسی ریکئین بکارهاتی نه‌بوون. ریکا بکارئینانا هه‌ردوو ده‌ستان پتر ژ دوباره‌کرنا خواندنا ژ ($P > 0.05$) دا.

ده‌ره‌نجه‌نجام:

له‌په‌ی ئو ئه‌نجامین هاتینه کومکرن ده‌ره‌نجه‌نجام ئه‌بوون کو جیاوازیین نه‌دیار هه‌نه دناقه‌را هه‌رسی ریکان، لی ریکا بکارئینانا هه‌ردوو ده‌ستان یا نوژداری ددانا بواری داخستنا نافیین باشترین ریک بوو و پتر ژ هه‌می ریکا ئه‌نجامین دوباره‌کری دان.

الخلاصة

مدى تكرار العلاقة المركزية للمريض الأدرج باستعمال الغلق الكيفي وبواسطة يد طبيب الأسنان

خلفية وأهداف البحث:

ان الاطباق المركزي للمريض الأدرج كان ولا يزال موضوع مناقشة. وهو قياس الفروقات في الاطباق المركزي باستعمال ثلاث طرق مقبولة سريرياً وهذه الطرق هي: البلع، نقطة الذقن، وبواسطة اليدين.

الطريقة:

تم اشراك ٣٠ مريض ادرج بعمر (٤٥-٦٥) سنة، وقسم العدد الى ٣ مجاميع (١٠) لكل طريقة. تم قياس الاطباق المركزي الكيفي وحدد خط الوسط على ورق بياني، وأخذ (٥) قياسات لكل مريض. تم قياس الانحراف عن الخط الوسطي بواسطة (Vernia) الى ٠,٠١ من المليمتر، تم تحليل النتائج باستعمال برنامج (SPSS).

النتائج:

كانت الانحرافات عن الخط الوسطي تتراوح بين (٠,٥) من المليمتر لطريقة البلع و (١,٠) مليمتر لطريقة الذقن، لم يكن هناك فرق معنوي ($P > 05$) للطرق الثلاثة المستعملة. طريقة استعمال اليدين أعطت أكثر تكرار للقراءات عن ($P > 0.05$).

الاستنتاجات:

بناءً على النتائج التي جمعت استنتج ان هناك فروقات غير معنوية بين الطرق الثلاثة ولكن طريقة استعمال اليدين لطبيب الأسنان في حالة الغلق المركزي هي أحسن الطرق وأكثر طريقة اعطت نتائج متكررة.

CUTIS VERTICIS GYRATA AND NEUROFIBROMA; A CASE REPORT

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SUMMARY

Cutis verticis gyrata is a rare long lasting and progressive medical condition characterized by folds and deep furrows of the scalp giving it a cerebriform pattern. Primary lesions mainly affect males after puberty; they are rare among females. We report a case of cutis verticis gyrata in a middle aged Kurdish female having multiple neurofibromas, and we suggest the possibility of genetic association between both lesions, possibly related to mutations in the neurofibromatosis gene 1 or 2 (NF-1, NF-2).

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Keywords: Cutis verticis gyrata, Neurofibroma, Female

Cutis gyrata is a long lasting and progressive medical condition characterized by folds and deep furrows of the scalp giving it a cerebriform pattern. The folds are soft and spongy and cannot be corrected by pressure or traction.¹ The condition variably involves the scalp, forehead, face, preauricular area, neck, trunk, hands and feet. Typically it affects the vertex, so called "Cutis verticis gyrata (CVG)". Although Alibert first mentioned it, Robert described the condition in 1843 and Unna termed it "cutis verticis gyrate" in 1907.^{1,2} Based on its causes, CVG is categorized into primary (essential and non-essential) and secondary. In the primary essential cutis verticis gyrate (rare), no other abnormality could be found, while the primary nonessential form can be associated with any combination of cranial, neurologic, hearing and ophthalmologic abnormalities. In both forms, the cause is unknown although genetic and endocrinologic factors are suspected to participate in the etiology.¹⁻⁸ Primary CVG mainly affects males after puberty with 5:1 male to female ratio. The frequency varies from 0.71% to 11.4% among mentally retarded males.^{1,2,3}

Secondary cases of CVG are described associated with underlying inflammatory dermatoses, nevoid abnormalities, metabolic disorders, malignancy and trauma.³⁻⁶

We report a case of cutis verticis gyrata in a middle aged Kurdish female having multiple neurofibromas, and we suggest the possibility of genetic association between both lesions, possibly related to mutations in the neurofibromatosis gene 1 or 2 (NF-1, NF-2).

CASE REPORT:

A 45 Kurdish female, from Duhok-Iraq, was admitted to the hospital complaining of coarse scalp folds over her occipitalis, in addition to multiple subcutaneous nodules in her body for the last 30 years. Clinically, the patient appeared healthy; with 10 scalp folds distributed as transverse superiorly and vertical inferiorly. The skin showed unchanged color and it was covered by a short hair all over the folds and furrows (Figures 1).

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A

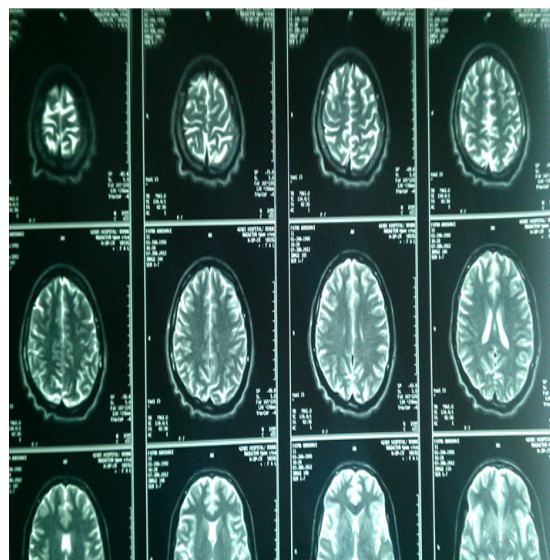


B

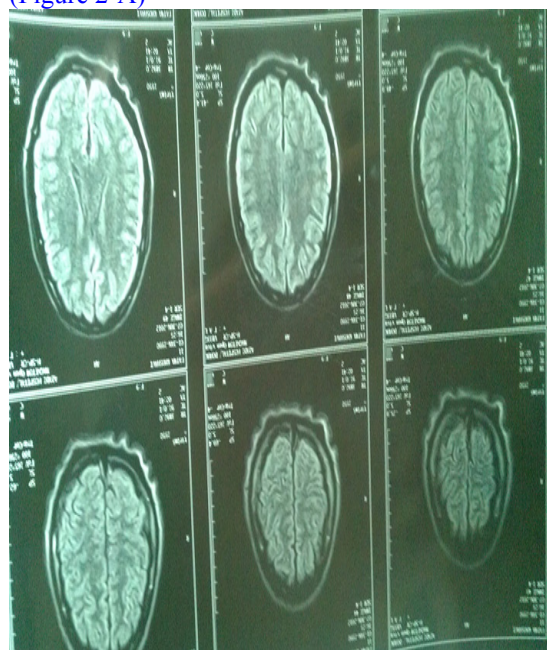


Figure 1. (A-Horizontal, B-Vertical) skin folds and furrows on the scalp covered by a short hair.

No abnormal test was noted in relation to the renal function, liver function and endocrine system (thyroid, pituitary and gonadal function as well as insulin level). Both chest and head X-rays were normal. The MRI, apart from folded skin, was unremarkable (Figure 2).



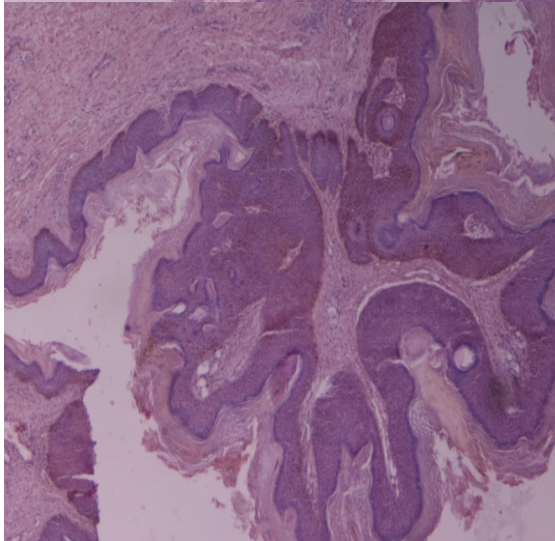
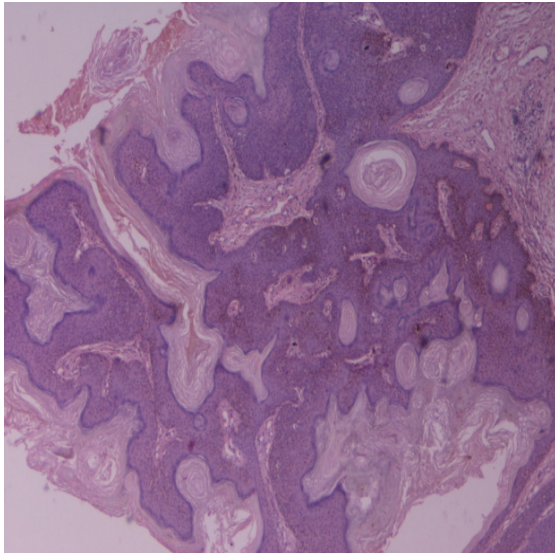
(Figure 2-A)



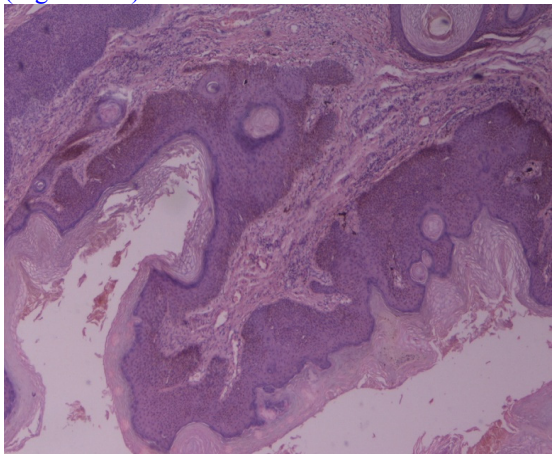
(Figure 2-B)

Figure 2. (A and B). MRI finding of the patient's scalp showing folded skin posteriorly with no abnormal bony lesion.

Histologically, there was evidence of increased skin folding, acanthosis & hyperpigmented epidermis. No abnormal findings in the dermis and piloerector muscle were observed from the biopsy executed in the fold and furrow regions (Figure 3).



(Figure 3-A)



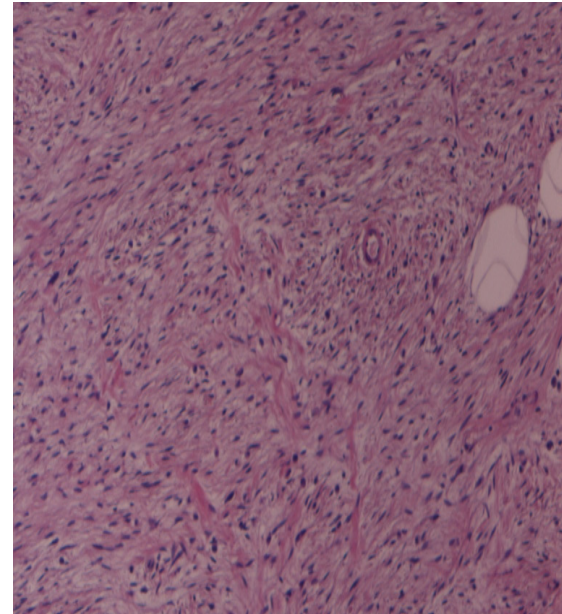
(Figure 3-B)

Figure 3. Different histologic sections of the skin demonstrating increased skin folding and deep furrows, acanthosis and hyperpigmented epidermis (H&E stain, A $\times 100$; B $\times 250$).

Two subcutaneous nodules were removed and proved to be neurofibromas on histopathology (Figure 4) and on

immunohistochemical (IHC) bases using, neuron specific enolase (NSE) and neurofilament protein (NFP) markers (Figure 5). The patient, therefore, was diagnosed as having essential primary cutis verticis gyrata with multiple neurofibromatosis. Successful surgical removal with correction of the scalp folds was achieved (Figure 6-8), but unfortunately the patient refused further evaluation for gene characterization because of the high cost, and she is not presently under treatment for her multiple neurofibromas.

A



B

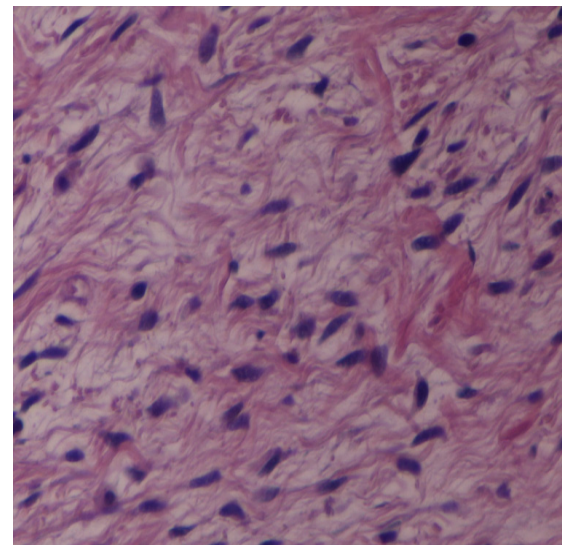


Figure 4. Histologic section of two subcutaneous nodules showing features of neurofibroma (H&E stain, A $\times 100$; B $\times 400$)

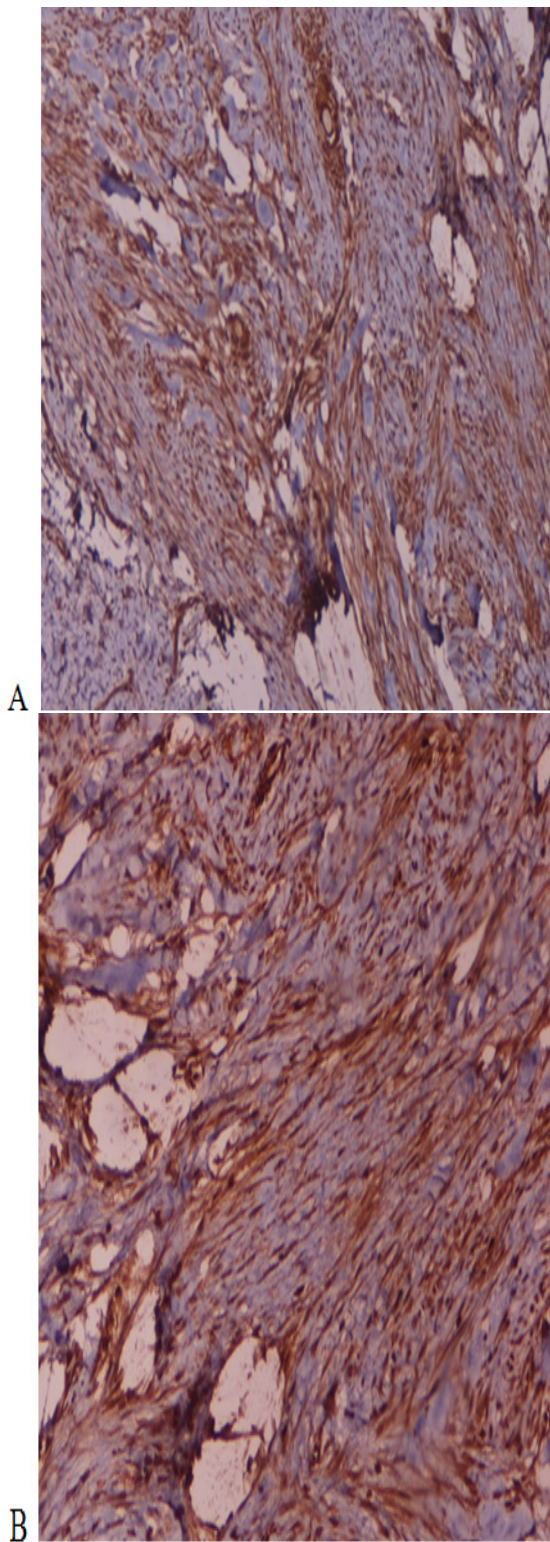


Figure 5. A positive immunostaining for NSE (A) and NFP (B) in tissue sections taken from the subcutaneous nodules (IHC, $\times 400$)

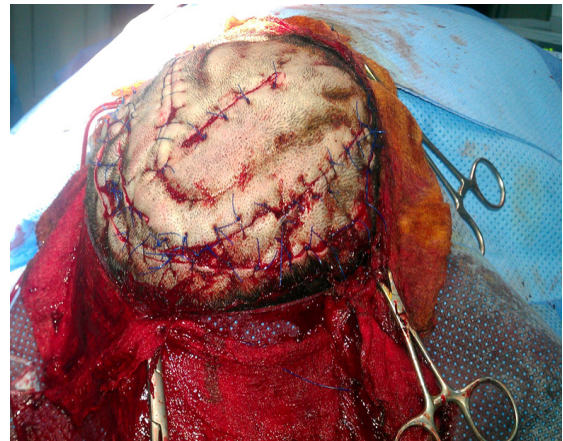


Figure 6. Surgical removal and correction of the patient's scalp folds (superior view).

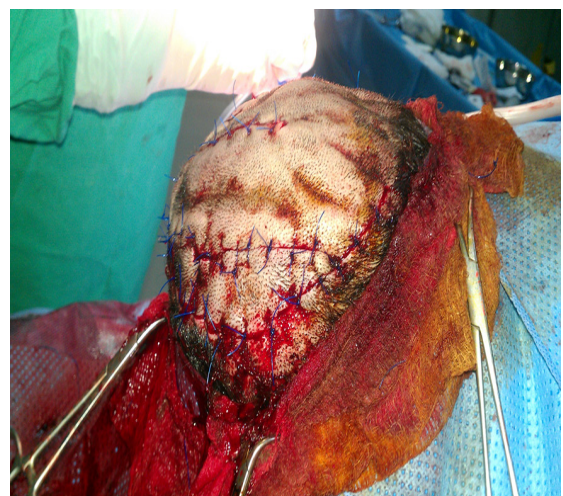


Figure 7. Surgical removal and correction of the patient's scalp folds (lateral view).



Figure 8. A successful correction of the patient's scalp 2 months after surgery.

DISCUSSION

Cutis verticis gyrata mainly affects males (rarely females). The lower incidence among women may be related partly to the longer hair which may camouflage the condition.^{1,2,6,7} Our patient was a middle aged female who was suffering from the CVG and multiple subcutaneous nodules (neurofibromas) for the last 30 years, but she was shy to expose her head and body to the doctor, because of the local beliefs, until the condition became intolerable. Clinically, the scalp folds were symmetric similar to those described in the primary CVG, but opposite to those of the secondary form which are usually asymmetric.¹⁻³ In most reported cases, the direction of the folds is anterior to posterior, but it may be transverse in the occipital region.^{1,2,6} In our case, the folds were occipital in location; they were transverse superiorly and longitudinal inferiorly. The number of folds¹⁰ fall within the range rates reported in the literature (2-12).¹⁻⁷ The skin color was unchanged, and the hair was sparse all over the folds and furrows. Other investigators demonstrated a sparse hair over the folds, but normal in the furrows.^{1,2} All blood and endocrine tests were within normal limits in our patient. However, a low free testosterone levels have been observed in some patients with primary cutis verticis gyrata.⁸ Disappearance of the condition after castration emphasizes the endocrinal impact in etiology.³

Histologic changes of the folds and furrows, apart from exaggerated folding and furrows of the scalp skin were minimal-like acanthosis and pigmented epidermis. Most authors advise a skin biopsy of the affected area as an essential step for categorization of CVG. Despite a normal histologic appearance in most cases of the primary form, some cases revealed dermal collagen thickening, hypertrophy of the pilosebaceous structures with abnormalities in sweat glands and ducts.^{11,12} In the secondary form, the morphology depends on the

underlying disease.¹⁻³ As well, chromosomal analysis is mandatory to exclude associated genetically determined syndromes.^{1-3,7-12}

Regarding the clinical outcome, although cutis verticis gyrata alone does not regress without surgical intervention, the prognosis is good and most cases are unacceptable either because of cosmetic reasons or its association with clinical signs and symptoms of other pathology, like neurofibromatosis in our patient. However, in few cases of CVG, malignant transformation may be observed.^{5,10} Thus properly establishing the diagnosis is very important to treat any underlying process if present. As well, a long-term clinical follow-up is recommended in order to detect early malignant transformation. The condition of our patient was slowly progressing for the last 30 years with increasing scalp folds and her neurofibromas and in spite of successful surgical correction of the scalp folds was achieved, no treatment was applied for her neurofibromatosis.

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پوخته

هه مه جوریا گروپین خوینی ژ جورئ ABO و Rh ل دهف کوردیت دهوکی/عراق

فکولینین بهربه لاف و بشپوهیهکی بهرفره هاتینه نه نامدان لسه دابه شبونا جورین خوینی ژ جورئ ABO و Rh دناقبه را گه لین جیهانی دا، به لی پا سه بارهت کوردین ئاکنجییت پاریزگه ها دهوکی لکوردستانا عیراقی هیچ داتایهک لبه دهست نینه . ژ بهر ئه فی چه ندی ئه فقه کولینه هاته نه نامدان بو دیارکنا به لافبونا جورین گروپین خوینی ژ جورئ ABO و Rh ل دهف کوردین ئاکنجییت پاریزگه ها دهوکی لکوردستانا عیراقی.

الخلاصة

تقرير حالة - جلد فروة الرأس الملفوف مع الورم الليفي العصبي المتعدد

جلد فروة الرأس الملفوف هو حالة طبية نادرة طويلة الأمد تتميز بتكوين طيات وشقوق عميقة من فروة الرأس وتبرز خارجيا على نمط ملفوف مخي. الحالات الأولية تؤثر أساسا الذكور بعد سن البلوغ؛ فهي نادرة بين الإناث. نحن نسجل عن حالة جلدي تلفيفية سارية في انثى كردية في منتصف العمر مع وجود أورام ليفية عصبية متعددة، ونتوقع إمكانية تكوين طفرات وراثية ذات صلة في جين الورم العصبي الليفي ١ أو ٢.

خزیران ۲۰۱۴

پهربه‌ندا ۸ ژماره ۱



زانکویا دهوک
کولیژا پزیشکی

گوڤارا پزیشکی یا دهوکی

گوڤارا فهرمی یا کولیژا پزیشکی یا دهوکی