

Original Paper

Evaluation of March Hemoglobinuria in Imam Al-Hussain Visitors Who are Going to Kerbala City

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Abstract

Background: March hemoglobinuria, also known as march hematuria, occurs when blood is seen in the urine after repetitive impacts on the body, particularly affecting the feet and hands (e.g. Candombe drumming). The word "march" is in reference to the condition arising in soldiers who have been marching for long periods; the condition was first documented in 1881. March hemoglobinuria usually is reported in young males, no doubt because of their more frequent participation in severe and prolonged exertion, but march hemoglobinuria also can be seen in women.

Aim of study: To assess the presence of hemoglobinuria in the visitors of Holy Kerbala regarding Imam Al-Hussain (peace on him) at the fortieth visiting.

Subjects and Methods: Those subjects underwent to the investigations for the detection of hemoglobinuria. Blood sample drawn with EDTA tube for laboratory processing with complete blood count by hematology auto-analyzer (Abbott) and blood film, urine sample processed for iron stain to detect hemosiderin (perl's stain). The results dealt with statistically by SPSS version 18.

Results: Twenty eight cases present with hemoglobinuria. Mean age is 32 years and the range is from 18-56 years. The mean distance that the subjects had walked was 193 kilometers with a range 108-524 kilometers apart from Holy Karbala. The mean hemoglobin is 12.6 g/dl. Thirty eight cases present with anemia (hemoglobin less than 12 g/dl) with fifteen cases have hemoglobin value less than 10 g/dl. Geographical distribution of subjects address all over Iraqi governorates, in which most of them(63 subjects) from Baghdad.

Conclusion: There is no significant relation between the distance and the pathology.

Introduction

Haemoglobinuria (HU) following running has been documented for about 100 years. Its origin is mechanical, with destruction of red cells occurring in the feet. It may be resolved by dressing lax shoes or running on easy ground. The condition may arise in runners and is nonthreatening except that it may lead to extensive invasive tests unless recognized. The blood smear does not display any red cell destruction or reliable defect. Sporadically, haemoglobinuria after running is go together with nausea, abdominal cramps and sore legs, and excited athletes with this condition may exhibit mild splenomegaly and jaundice⁽¹⁾.

The reasons of hemoglobinuria include : acute glomerulonephritis, burns, renal cancer, malaria, paroxysmal nocturnal hemoglobinuria, microangiopathies, e.g. hemolytic-uremic syndrome (HUS), thrombotic thrombocytopenic purpura (TTP), transfusion reactions, IgM autoimmune hemolytic anemia, pyelonephritis, sickle cell anemia, tuberculosis of the urinary tract, march hemoglobinuria secondary to repeated impacts on the body, usually the feet, athletic nephritis secondary to active exercise, and acute lead poisoning.

March hemoglobinuria, also known as march hematuria, happens when blood is seen in the urine after repetitive pressure on the body, particularly affecting the feet and hands (e.g Candombe drumming)

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(2). The word "march" is in reference to the disorder arising in soldiers who have been marching for long distances; the condition was first documented in 1881⁽³⁾. Fleischer first described a German soldier in whom hemoglobinuria was taken on by marching⁽⁴⁾. March hemoglobinuria usually is reported in young males, certainly because of their more frequent contribution in severe and prolonged exertion, but march hemoglobinuria also can be seen in women^(5,6). The presenting sign is passage of dark urine directly following physical effort in the upright position, infrequently accompanied by nausea, abdominal cramps, aching in the back or legs, or a burning feeling in the soles of the feet. Physical examination usually is unrevealing, although hepatosplenomegaly and transient jaundice have been rarely reported⁽⁷⁾.

Davidson proved definitively in 1969 that march hemoglobinuria may be caused by red cell trauma within the vessels of the soles of the feet, and its severity is predisposed by the stiffness of the running surface, the distance run, the bulk of the athlete's stride, and the protective suitability of the athletic footwear⁽⁷⁾. Davidson also presented that the disorder could be prohibited by using padded insoles, a finding later substantiated by other researchers^(8,9). Stimulatingly, however, hemoglobinuria also has been realized following other kinds of trauma in activities as diverse and repetitive hitting of the forehead⁽¹⁰⁾, karate exercises⁽¹¹⁾, playing basketball, beating on congo drums⁽¹²⁾, and kendo (a Japanese martial art where deeply padded participants strike each other repeatedly with bamboo swords)⁽⁵⁾.

Because the estimated measure of blood hemolyzed in an average paroxysm is only 6 to 40 ml, anemia is uncommon; if present, the anemia usually is mild⁽⁷⁾. Morphologic evidence of red cell destruction typically is not seen, although one patient had poikilocytes and occasional "four-leaf clover" cells after

exercise⁽¹³⁾. Renal injury is uncommon, but cases of acute tubular necrosis and subsequent acute renal insufficiency have been demonstrated⁽¹⁴⁻¹⁷⁾.

The repetitive nature of these sorts of actions cause mechanical trauma to the red blood cells leading to hemolysis. Free haemoglobin released from destructured red blood cells is filtered into the urine. Defects in red blood cell membrane proteins have been recognized in several patients⁽¹⁸⁾. The dead RBC's are filtered by the glomerulus and are excreted from the body. Due to damage of a large number of RBC's, a large number of injured blood cells are filtered out of the body at the same time, making the urine have noticeable amounts of hemoglobin in solution. The condition usually persists for a day or two. No particular medication is required. This disorder usually goes unnoticed, except by those with a history of hematuria. March haemoglobinuria is usually a benign condition.

Several millions people came to Holy Karbla on foot and some of them walking for hundreds of kilometers from different cities to meet the sole of Imam Al-Hussain (peace on him) and his partners whose killed in the ancient "Alteff Battle at 61 A.H." which occurred more than 1375 years ago. They think that travelling on foot from their apart cities to reach Holy Karbala will obey the orders of the GOD (ALLAH, holy biggest great) and his prophet Mohammed (peace and praying on him) who say that "who like Hussain will like me, and who like me will like ALLAH". Another grateful thing regarding visitors when arrive to Holy Karbala; Some of those donate blood to the portable units of blood donation which supervised by the national center of blood transfusion, at this point the research sample has been collected.

Aim of the study include

- 1- To assess the presence of hemoglobinuria in the visitors of Holy

Karbala regarding Imam Al-Hussain (peace on him) at the fortieth visiting.

- Evaluate the correlation between incidence of this condition and the distance that each subject walk through.

Subjects and Methods

Prospective study included 108 subjects; those were visitors of Holy Karbala regarding Imam Al-Hussain (peace on him) at the fortieth visiting which is one of the major sadly intimating religious celebrates of the Muslims in the middle east. It is important to notice that this appointment (fortieth visiting) included many millions of people who had arrived to Holy Karbala through few days and this make it so difficult to control and serve them and later on to satisfy the blood donor visitor, who is very tired, to follow the instructions of sample collection and the subject should be followed carefully to the very crowded water cycles to take urine sample. Those subjects underwent to the investigations for the detection of

hemoglobinurea. Blood sample drawn with EDTA tube for laboratory processing with complete blood count by hematology auto-analyzer (Abbott) and blood film, urine sample processed for iron stain to detect hemosiderin (perl's stain). The results dealt with statistically by SPSS version 18.

Results

Twenty eight of cases present with hemoglobinurea. Mean age is **(32 ±8.9)** years and the range is from 18-56 years. The mean distance that the subjects had walked was 193 kilometers with a range 108-524 kilometers apart from Holy Karbala. The mean hemoglobin is **(12.6 ±4.1)** g/dl. Thirty eight cases present with anemia (hemoglobin less than 12 g/dl) with fifteen cases have hemoglobin level less than 10 g/dl. Geographical distribution of subjects address all over Iraqi governorates also presented here by figure.3, in which most of them (63 subjects) were from Baghdad.

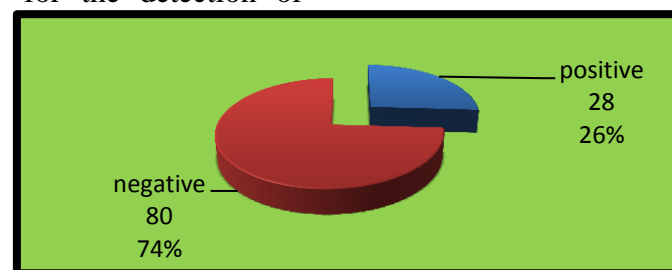


Figure 1. Pie chart represent distribution of cases with hemoglobinuria

Table 1. Mean of age at negative and positive cases for hemoglobinuria.

Parameter	Negative (n = 80)		Positive (n = 28)		P
	Mean	SE	Mean	SE	
Age	31.91	1.01	34.11	1.85	0.280

Table 2. Mean of distance at negative and positive cases for hemoglobinuria.

Parameter	Negative (n = 80)		Positive (n = 28)		P
	Mean	SE	Mean	SE	
Distance	198.18	15.85	179.00	26.54	0.538

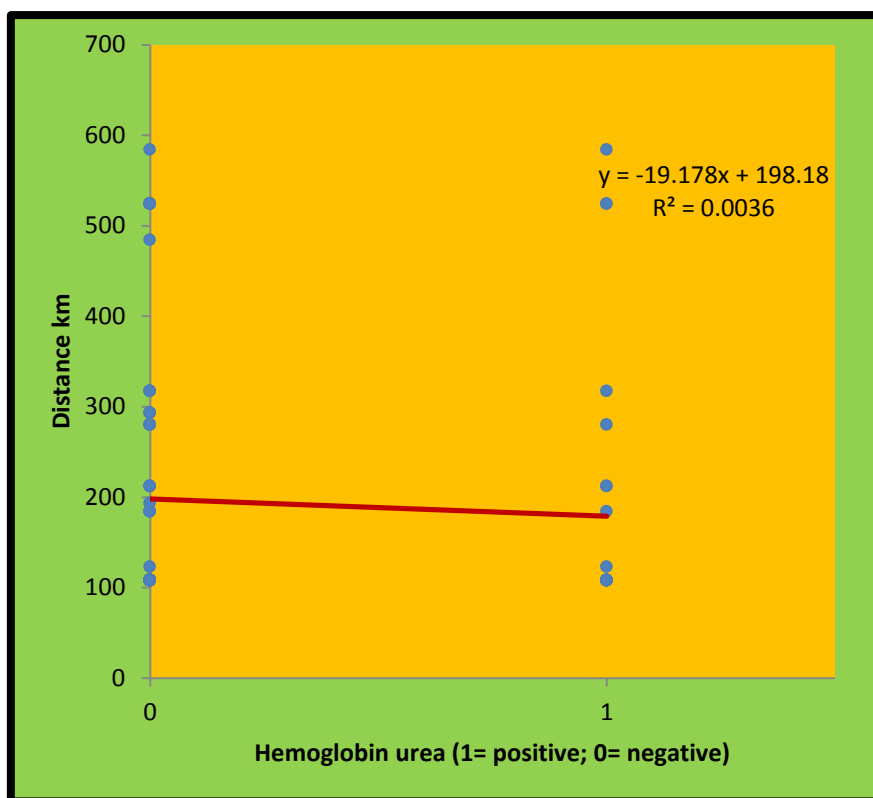


Figure 2. Correlation between distance and hemoglobinuria ($r = -0.073$, $p = 0.455$)

Table 3. Represent mean values of hematological indices at negative and positive cases for hemoglobinuria.

Parameter	Negative (n=80)		Positive (n = 28)		P
	Mean	SE	Mean	SE	
WBC $\times 10^9/L$	8.49	0.26	8.39	0.77	0.897
Lymphocyte %	26.88	0.78	27.28	1.80	0.814
Mid	11.44	0.31	11.42	0.54	0.972
Granulocyte %	60.08	0.89	60.19	1.98	0.951
RBC $\times 10^{12}/L$	3.85	0.13	3.68	0.21	0.498
HB g/dl	12.91	0.43	12.05	0.67	0.300
HCT	39.94	1.13	38.01	1.91	0.387
MCV fl	93.92	0.48	93.95	1.30	0.976
MCH g/dl	30.08	0.16	30.05	0.45	0.932
MCHC g/dl	31.94	0.12	31.80	0.24	0.584
RDW	12.34	0.08	12.53	0.20	0.288
Platelet $\times 10^3/ml$	233.80	8.79	247.61	20.59	0.473

Discussion

Although there is twenty eight cases of hemoglobinuria (HU) in between the sample size, this value is near to the results of Gilligan et al study, in which there are four of twenty two subjects present with HU.¹⁹In this study there is no significant correlation between incidence of

hemoglobinuria and other parameters such as the age, hematological indices and the distance that the subjects pass through this event ,this is inversely related to Gilligan et al study; which demonstrate the positive correlation between the distance and incidence of HU.¹⁹ The ordinary impression about this point is how long the distance there will be more effective

pathology, but the surprising fact here. There may be other factors that cause HU rather than marching as mentioned through the causes of HU, such as many causes have significant incidence in Iraq in addition that fifteen cases have anemia (hemoglobin less than 10g/dl) which is not indication for march HU which has a mild

anemia⁽⁷⁾. whoever, the severity of march HU is influenced by the hardness of the running surface, the distance run, the heaviness of the athlete's stride, and the protective adequacy of the athletic footwear.⁷ Here the subjects pass this distance by walking which is softer motion than running.

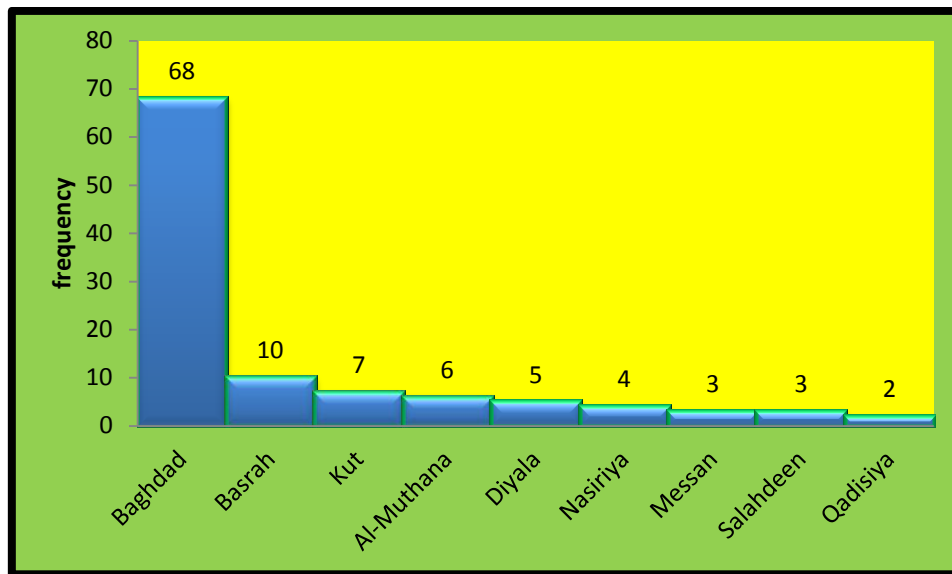


Figure 3. Represent geographical distribution of subjects address all over Iraqi governorates.

Conclusions

1. There is significant incidence of HU in Alimam Alhussain visitors.
2. With this event we conclude that the long walking distance not certainly aggravate the condition (HU).
3. No significant correlation between HU and the incidence of anemia.

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