Original Article

Complication and Causes of Hemolytic Anemia in Balochistan

1. Esaa KhanTareen 2. Haroon 3. Atif 4. Wasim Baig

1. Asstt. Prof. of Medicine, BMC, Quetta 2. PGR / MO of Medicine, BMC, Quetta 3. PGR / MO of Medicine, BMC, Quetta 4. Chief Pharmacist, Sandman Hospital, Quetta.

ABSTRACT

Objective: The aim of this study is to review the topic and to pick up cases of hemolytic anemia and to analyze their causes and complications.

Study Design: Observational and Investigative study.

Place and Duration of Study: This Study was conducted in the Dept. of Medicine, of Bolan Medical College, Quetta from March 2010 to June 2011.

Materials and Methods: 45 patients are included in our study .Their age ranged between 10 to 57 years with a mean age of 25 years. 33 were males and 12 females. About 62% of the patients turned out to have congenital hemoglobinopathies. Malaria was the predominant cause of hemolysis in acquired disease.

After initial evaluation by history and physical examination, the following diagnostic approaches were used. Evidence of hemolysis (Bilirubin, heptoglobin, hemoglobinuria), evidence of erythropoiesis (reticulocytosis,nucleated RBCs).The main causes of hemolysis were stress on peripheral film and RBC morphology. RBC morphology was the main test to suggest the further types of laboratory evaluation.

Results: About 42.2% cases turned out to have hemolysis due to congenital hemoglobinopathies. While pure beta thalassemia was seen in 20% and pure sickle cell disease in 6.6%, a combination of sickle/beta thalassemia was seen in 8.9%.In 4.4% sickle disease occurred in combination with HBc disease and 2.2% with HBD disease.G-6PD deficiency was seen in 17.8%.

Conclusion: Hemoglobinopathies contribute maximally as the cause of hemolytic anemia. HBs/Beta thalassemia, HBS/HBC from a significant percentage of congenital hemoglobinopathies.

Key Words: Hemolytic Anemia, Malaria

INTRODUCTION

Anemia is one of the most common health problem in world and Haemolytic anemia is form of anemia we often come across in our daily practice. A study was conducted to map at various causes of Haemolytic anemia in Balochistan and important causes were found to be hereditary spherocytosis, G-6PD deficiency. Autoimmune haemolytic anemia, Drugs and SLE. our main objective was not only to look into various causes of Haemolytis anemia in LOCAL population but to help physicians to be familiar with such diseases so that they not only manage them in better way but also open new door for them for future research.

MATERIALS AND METHODS

All the patients with anemia, hepatosplenomegaly, jaundice with or without fever were screened by the standard laboratory investigations all except hemolytic anemia were excluded from the study. After initial evaluation by history and physical examination, the following diagnostic approaches were used. Evidence of hemolysis (Bilirubin, heptoglobin, hemoglobinuria), evidence of erythropoiesis (reticulocytosis,nucleated RBCs).The main causes of hemolysis were stress on peripheral film and RBC morphology. RBC morphology was the main test to suggest the further types of laboratory evaluation.

i) Normal: Enzyme analysis (G-6PD status, blood film for malarial parasite, coomb's test, PNH screening.

ii) Microcytic, Hypochromic: Serum ferritin, TIBC, Hb electrophoresis.

iii) Sickle Cells: Sodium metabisulphite test, Hb electrophoresis.

iv) Spherocytes: Osmotic fragility test, comb's test.

v) Target Cells: Serum ferritin, TIBC,Liver function test,Hb electrophoresis.

vi) Schistocytes: Coagulation profile.

Other tests like liver function test, renal function test, ultra sound abdomin,immunologic assays,ECG,chest X-ray,X-ray s(spine, skill, hand),urine analysis, bone marrow examination, ,sigmoidoscopy /colonoscopy, echocardiography ,biopsy,L.D.H/heptoglobin,FDP/fibrinogen not done in all patients.

RESULTS

A total number of 45 cases were included in this study. They were admitted in Medical Unit IV of Sandeman Hospital Quetta from March 2010 to June 2011. Table 1. shows the age distribution of patients having hemolytic anemias, ranging from 10-57 years with a mean age of 25 years. Table 2 shows male and female

Table No.1: Age distribution with percentage.

Age in years	Total numbers	%age
10-20	15	33.3
20-30	22	48.9
30-40	07	15.6
>40	01	2.2
Mean Age Of 25 Years		

Table No.2: Sex distribution with percentage.

Sex Incidence	Total Number	%age
Males	33	73.3
Females	12	26.7

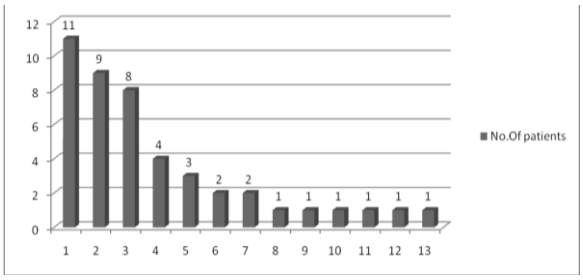

Figure No.1: frequency of various Haemolytic Anemia.

Table No.3: Percentage of 45 Patients with different Haemolytic Diseases.

Nature of Haemolytic Disease	Numbers of Patients	% age
1.Malaria	11	24.4
2.Beta Thalassaemia	09	20.0
3.G-6PD Deficiency	08	17.8
4.Sickle/ Beta Thalassaemia	04	8.9
5.Sickle/HBC	03	6.6
6.Sickle cell Disease	02	4.4
7.Comb's Negative Heamolytic Anemia	02	4.4
8.Sickle/HBD	01	2.2
9.Hereditory Spherocytosis	01	2.2
10.Hodgkin Lymphoma	01	2.2
11.Non Hodgkin Lymphoma	01	2.2
12.SLE	01	2.2
13.Snake Bite	01	2.2

ratio. Table 3 shows the frequency of various types of hemolytic anemia seen in this study. This is further illustrated by the figure 1. Hereditory hemolytic a disorder constitutes the major causes (62.2%) of hemolytic disorders. About 42.2% cases turned out to have hemolysis due to congenital hemoglobinopathies. While pure beta thalassemia was seen in 20% and pure sickle cell disease in 6.6%, a combination of sickle/beta thalassemia was seen in 8.9%.In 4.4% sickle disease occurred in combination with HBc disease and 2.2% with HBD disease.G-6PD deficiency was seen in 17.8%.Among the congenital causes hemolysis due to defect in RBC morphology (spherocytosis) was seen in one patient (2.2%). Malaria (24.4%) was the predominant cause of hemolysis in acquired disease. Lymphoma, Hodgekin's and SLE were about 7%.One patient (2.2%) admitted with history of snake bite.

DISCUSSION

Different diseases like Malaria, Thalesmia, Spherocytosis, G-6PD deficiency. Autoimmune haemolytic anemia, Drugs, SLE and its complications can cause the hemolytic anemia. In our study 45 patients were taken of different diseases.

Malaria

Their ages ranged between 12-40 years with a mean age of 27 years. Two were females with a male/ female ratio of 5.5:1.Five were coal mines labourers. All patients presented with fever ranging from five to twenty five days, three with altered consciousness. They were examined clinically and their complete blood count, Hb, reticulocyte count, liver function test including serum proteins and prothrombin time, renal function tests and electrolytes were done. Blood was also examined for malarial parasites both by thick and thin smears. Eight patients were given intravenous quinine, three with chloroquine. Five patients need blood transfusion.

Thalessmia

The diagnosis was based on clinical and laboratory investigations before the first blood transfusion. Diagnostic tests was taken before blood transfusion were given (hemoglobin level, reticulocyte percentage, MCV and MCH, peripheral blood smear, hemoglobin electrophoresis).A detailed history was taken especially family history. History of repeated blood transfusion and attacks of jaundice in the past. The ages of the patients were between 10-24 years with mean age of 18 years. Three patients were females with a male/female ratio 3:1.Fresh blood was taken on the first visit and blood smear were prepared for cell morphology examination, heamatological parameters were estimated and red cell indices were calculated. Heamoglobin electrophoresis was carried out both in alkaline and acid PH of 8.6 and 6.8 respectively. Follow up was made by clinically examination, Hb level, liver function tests, chest X-ray, ECG, Echocardiography and serum ferritin. all were advised to avoid iron supplements.

G-6PD Deficiency

The age ranged between 12-17 years with a mean age of 25 years. Three of the patients had similar episodes in the past. Two patients were developed jaundice after ingestion of Favabeans with similar attacks in the past. Four gave the history of intake of Metronidazole, Quinine and chloroquine.Of the two patients with the history of favabean ingestion, one patient was female. In all patients, peripheral smear for malarial parasite, liver function test and G-6PD status was performed.

HBSS and Sickle / Thalassaemia, Sickle / HBC Disease

Patients with sickle cell and sickle/hemoglobinopathies, five were males and five were females with a male/female ratio of 1:1.Their age ranged between 10-40 years with a mean age of 19 years. Patients were diagnosed by history, clinical and laboratory investigations including slide cover slip, sodium metabisulphate test and hemoglobin electrophoresis. Fundoscopy was done in all cases and ultrasound abdomen for gall stones. Six patients were presented with chronic pallor and splenomegaly, four patients with pain crisis and one with jaundice had the history of repeated attacks of jaundice, and one had psychiatric symptoms. patients with anemia were transfused and those with pain crisis were treated with NSAIDS and two of them needed pentazocine injections. All were well hydrated and advised to avoid dehydration and iron supplements.

Coomb's Negative Heamolytic Anemia

Two patients presented with chronic anemia, jaundice and moderate splenomegaly.Heamoglobin level, peripheral smear, reticulocyte count, G-6PD status,ANA ,anti DNA,coomb's test and Hb electrophoresis were done.

Heriditory Spherocytosis

One male patient aged 18 years presented with chronic pallor and splenomegaly of 5cm below costal margin. His blood was taken for complete blood count, peripheral smear which showed spherocytes. Patient underwent splenectomy and was advised to take penicillin V 250mg twice daily for two years.

Lymphoma

Two patients, one male aged 57 years was diagnosed to have Hodgkin's disease by lymph node and bone marrow biopsy, other male aged 16 years presented with hepatosplenomegaly and pallor was diagnosed to have non Hodgkin's lymphoma. Comb's test was performed in both and was treated with standard chemotherapeutic agents and steroids but both expired.

S.L.E

A female patient, 26 years of age, presented with the history of fever, pallor and arthralgia for a period of two months. She was diagnosed by complete blood count, immunoassay and coomb's test. She was treated with prednisolone 1mg/kg/day, then pulse therapy and blood transfusion.

Snake Bite

One patient male aged 23 years presented with the history of snake bite on his right foot. He came to hospital within six hours.His complete blood count, prothrombin time, partial thromboplastin time, FDP, urine analysis was done. He was treated with anti-tetanus, antibiotics and antivenins and the patient improved.

CONCLUSION

Hemoglobinopathies contribute maximally as the cause of hemolytic anemia. HBs/Beta thalassemia, HBS/HBC from a significant percentage of congenital hemoglobinopathies.

REFERENCES

1. Adikile Ad, Mc kie KM, Adeodu OO, et al. Spleen in sickle cell anemia. Comparative studies of Nigerian and US patients. AMJ Hemotol 1993;42(3):316-321.
2. Akbar MM, Krausz Y, Atlan H, et al. Hemoglobinopathies and Glucose-6 phosphate Dehydrogenase deficiency in hospital births in Behrain.Annals of Saudi medicine 1992; 12(60):536-539.
3. Beutler E. Glucose-6-phosphate dehydrogenase deficiency. N Engl J Med 1991;324:169-74.
4. Quak SH, Saha N, Tay JSH. Glucose-6-phosphate dehydrogenase deficiency in Singapore. Ann Acad Med Singapore 1996;25:45-8.
5. Cayanis E, Gomperts ED, Balinsky D, Disler P, Myers A. G6PD Hillbrow: a new variant of glucose-6-phosphate dehydrogenase associated with drug-induced haemolytic anaemia. Br J Haematol 1975;30:343-50.
6. Al-dabbous IA, Al-Jama AH. Priapism in sickle cell disease in Qatif central hospital, Saudi Arabia. Saudi Med J 1993;14(50):440-442.
7. Tabbara IA; Hemolytic anemias. Diagnosis and management. Med Clin North Am 1992;76(3): 649-68.
8. Shah A. Acquired hemolytic anemia. Indian J Med Sci. 2004 Dec;58(12):533-6.
9. Powers A, Silberstein LE. Autoimmune hemolytic anemia. In: Hoffman R, Benz EJ, Shattil SS, et al, editors. Hematology: Basic Principles and Practice. 5th ed. Philadelphia: Pa: Elsevier Churchill Livingstone;2008.p.47.
10. Asma IR, Siraj QH, Waqar A, et al. Pattern in Cr^{51} red cell survival and sequestration studies. JPMA 1990;40:283-284.
11. Bartlett AN, Hoffbrand AV, Konoroghiorgehes GJK. Long term trial with oral iron chelator 1,2 Br J Hematol 1990;76(2):P301-304.
12. Beskovtich M, Laxer RM, Inam R, at el. Arthropathy in thalassemia patients receiving deferiprone. Lancet 1994 23;344 (8917): 262-63.
13. Bassman JD, Glimer PR, Gardner PH. Improved Classification of anemia, MCV and RDW Am J Clin Path 1983; 80:322-26.
14. Brgitte C, Chantalh Alina F, et al. Desferroxamin improves neutrophil phagocytosis in thalesemia major. Am J hematol 1990;35:13-71.

15. Bronspriegel WN, Olivier NF, Tyler B, et al. Effects of age at the start of iron chelation therapy on gonadal function in beta thalassemia major. N-Eng J Med 1990;13;71-719.
16. Castro O, Haddy TB. Improved survival of patients with sickle cell erythrocytes. N Eng J Medicine 1983;308-527.
17. Christakis J, Vavatsi N. Hassapopoulou H, et al. Comparison of homozygous sickle cell disease in northern Greece and jamica. Lancet 1990;335:637-640.
18. Eldor A, Krausz Y, Atlan H, et al. Platelet survival in patients with beta thalassaemia American J of Hemotol 1989;32:94-99.
19. Elliot P, Helga F, Oswaldo C, et al. Enhancement of pain control with ketorolac tromethaminen in patients with sickle cell vaso-occlusive crisis. Am J Hemotol 1994; 46:43-47.
20. Elizabeth HD, David WL, Jhon WH. Inhibition of heamoglobin S Polymerization by N-terminal Band 3 peptides: New class of inhibitors :Solubility studies. Am J of Heamotol 1994;47:106-112.
21. Foster S. Economic prospectus for a new antimalarial drug. Cited in Trans R. Soc trop med Hyg 1994:88.S1:55-56.
22. George P. hartmen J, Antoine KV, et al. Regulation of tissue plasminogen activator in sickle cell anemia. Am J of Hemotol 1990;35:167-170.
23. Chaves PH, Carlson MC, Ferrucci L, Guralnik JM, Semba R, Fried LP. Association between mild anemia and executive function impairment in community-dwelling older women: The Women's Health and Aging Study II. Am J Geriatr Soc 2006;54(9):1429-35.
24. Drueke TB, Locatelli F, Clyne N, Eckardt KU, Macdougall IC, Tsakiris D, et al. Normalization of hemoglobin Level in patients with chronic kidney disease and anemia. N Engl J Med 2006 16;355(20):2071-84.
25. Oepkes D, Seaward PG, Vandenbussche FP, Windrim R, Kingdom J, Beyene J, et al. Doppler ultrasonography versus amniocentesis to predict fetal anemia. N Engl J Med 2006 13;355(2): 156-64.
26. Gallagher PG, Forget BG (December 1998). "Hematologically important mutations: spectrin and ankyrin variants in hereditary spherocytosis". Blood Cells Mol Dis 24 (4): 539–43.
27. Bolton-Maggs PH, Stevens RF, Dodd NJ, Lamont G, Tittensor P, King MJ (August 2004). "Guidelines for the diagnosis and management of hereditary spherocytosis". Br J Haematol 126 (4): 455–74.
28. An X, Mohandas N. "Disorders of red cell membrane". Br J of Haematol 2008:141 (3): 367–75.
29. Herrick JB. "Peculiar elongated and sickle-shaped red blood corpuscles in a case of severe anemia". Arch Int Med 1910;5 (3):517–521.
30. Ingram VM. "Abnormal human haemoglobins. III. The chemical difference between normal and sickle cell hemoglobin's". Biochim Biophys Acta 1959;36: 402–411.

Address for Corresponding Author:
Dr. Esaa KhanTareen
Asstt. Prof. of Medicine, BMC, Quetta.
E.Mail: dr.essakhan @yahoo.com
Cell No.0333-7816475