ORIGINAL ARTICLE

Sickle Cell Disease: Prevalence, Clinical Presentation and Prognosis in Tribes; Current Concepts and Unanswered Question

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ABSTRACT

BACKGROUND: Sickle cell Disease is one of the most common severe monogenic disorder in the world. It is characterized by intermittent Vasoocclusive events and chronic Hemolytic Anemia. Patients clinically present with early and severe anemia requiring Blood Transfusion and Septicemia which are the most common complications. This review focuses on the recent initiatives to understand various phenotypes, role of immunization and Penicillin Prophylaxis, role of Hydroxyurea, awareness and central programs. Although more work is needed to develop effective treatment that specifically target pathophysiological changes and clinical complications of Sickle Cell Disease. **MATERIAL AND METHODS**: This is prospective study of 231 patients of Sickle Cell Disease conducted at Medical College, Vadodara during July 2014 to January 2017. All patients were subjected to personal biodata, detailed clinical history and examination with written consent. All were sent for routine blood investigations, and special investigations like sickling test, Hb electrophoresis, chest x ray PA view, ECG, PFT, CT Scan. **RESULTS**: In my study, most common age group was 12-30affecting males and female equally. In addition, persons from lower socioeconomic group had more complications. Most patients had positive family history with significant past history of pain crisis and blood transfusion. Painful vasoocclusive crisis and dactylitis are very common in Indian patients but chronic leg ulceration is rare. Few patients were put on Hydroxyurea therapy**. CONCLUSION**: Sickle cell disease is serious and life threatening disease. All should have thorough understanding of disease, its complications and treatment. Simple measures like vaccination in childhood, adequate oral fluid intake with electrolyte, during vasoocclusive crisis, and avoidance of extreme temperature reduce the number of patients with vasoocclusive crisis .Premarital counselling and prenatal diagnosis also help to reduce the morbidity and mortality related to disease. Although central and state government are now supporting the establishment of centers for the diagnosis of patients and comprehensive care.

Key words: Sickle Cell Disease, Prevalence, Clinical Presentation, Prognosis.

INTRODUCTION

Sickle cell disease is an Inherited Disorder of abnormal hemoglobin in the blood. It requires inheritance of two sickle cell genes. Virtually all of the major symptoms of sickle cell anemia are the direct result of abnormally shaped sickled red blood cells blocking the flow of blood.[1] sickle cell disease is especially common in areas in which malaria is endemic. Sickle cell disease is the most common structural Hemoglobinopathy, occurring in Heterozygous form in approximately 8% of African Americans and in homozygous form in 1 in 400 [2].Sickle cell anemia has high prevalence in India especially in central and western regions like Jharkhand, Bihar, Maharashtra and Madhypradesh and poses a considerable health burden. Sickle cell mutation was first observed in Nilgiri Hills of tribal population of south India in 1952.[3] India has large population being to scheduled tribes casts approximately 14.16 percentage of total population.[4] As per2011 census, population of Gujarat has crossed 6 crores.[5]14.79 percentage of total population of Gujarat is tribals. Out of total 26 Districts of Gujarat, more than half are Tribal Districts[6]. High prevalence of sickle gene has been demonstrated in various tribal population communities of Gujarat including bhil and dhodias of panchmahal ,dublas, nayaka, koli, gamit, vasava, baria, rathava, chaudhari etc. However the reason behind such huge number of patients in India is still

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unknown[7]. Our SSG Hospital is being in centre to Chhotaudepur, Dahod, Panchmahal ,Godhra, Surat, Halol, Bharuch and Narmada etc. districts. Most patients are coming from above tribal Districts.

MATERIAL AND METHODS

The present study was conducted at medicine department, medical college, Vadodara during July 2014 to January 2017. 231 cases of sickle cell disease were enrolled from OPD as well as indoor wards. Inclusion criteria were patients presented with signs and symptoms of sickle cell disease eg. fatigue, generalised weakness, pain in limb and joints, fever, cough, chest pain, pain in abdomen, jaundice, history of recurrent hemolysis with positive sickling test having age >12 yrs and its complications. The exclusion criteria were chronic pulmonary diseases, ischemic and hypertensive heart diseases, congenital and valvular heart diseases, acute and chronic liver diseases, pregnancy after ruling out other causes of acute and chronic hemolytic anemia. A proforma was prepared containing general bio data, clinical history including history of repeated pain episodes, blood transfusion and admission were kept in mind. All patients were screened for positive family history in siblings and parents, symptoms (fever, cough, chest pain, dyspnea, fatigue etc.) ,general examination (hemolytic face, anemia, jaundice, neck vein enlargement, oedema feet, leg ulcers).we studied systemic manifestations of sickle cell disease mainly pulmonary and cardiovascular system involvement keeping in mind about complications of diseases.IN addition to that per abdomen and central nervous system were also examined. With written consent of patient, general investigations (CBC, RBS, RFT, LFT, Urine examination) and special investigations like Reticulocyte count, sickling test, hb electrophoresis, ECG, CXR PAview, 2D Echocardiography, PFT and CT were sent of all patients. All Data were sent for analysis.

RESULTS

Sickle cell disease is the most common structural Haemoglobinopathies. In India, the highest prevalence is in Odisha 1-44% while the prevalence in Gujarat is 1-31.4% among tribes. In present study the Prevalence of Sickle Cell Disease is 29% in Tribal People.

Table 1: Sex distribution in cases of Sickle cell disease

Sex	No. Of Patients	Percentage
MALE	119	51.5%
FEMALE	112	48.5%
M:F RATIO	1.06:1	100%

During the study, males and females were almost equally affected corresponding M:F ratio of 1.06:1.

Table 2: Tribal sub caste wise Distribution of Sickle cell Disease cases

Subcaste	No. of patients	Percentage
Parmar	15	6.4%
Bariya	33	14.2%
Rathod	09	3.8%
Vasava	16	6.9%
Solanki	08	3.4%
Rathwa	41	17.7%

In present study, maximum number of patients were coming from Rathwa community(17.7%) followed by Bariya community(14.2%).While Vasava, Parmar, Rathod and Solanki patients were found in 6.9%,6.4%,3.8% and 3.4% respectively.

Table 3: Marital Status among Sickle cell Disease Patients

Marital Status	No. of Patients	Knowledge about Disease	No Knowledge about Disease
Married	88(38%)	55(62.5%)	33(37.5%)
Unmarried	143(62%)	51(35.6%)	92(64.4%)

In the study, majority of patients were unmarried (n=143).Amongst unmarried people, only 51 patients were having knowledge about sickle cell Disease while 92 patients were unaware about disease severity .While in married patients, 55 patients were having knowledge but 33 were not knowing about diasease.so the Premarital councelling is the only way to prevent Sickle Cell Disease birth cohort..

Table 4: Distribution according to socioeconomic status in Sickle cell disease cases

Socioeconomic Status	No. Of Patients	Percentage
Higher Class	16	7%
Middle Class	35	15%
Lower Class	180	78%

In present study, maximum number of patients (n=180) were belonging to lower socioeconomic group, being next was belonging to middle socioeconomic class (n=35) while very few (n=16) were coming from higher socioeconomic class.

Table 5: Severity of Disease Pain Crisis (within past year)

Pain crisis	No. of Patients	Percentage
No crisis	51	22.1%
1-2 crisis	167	72.2%
>3 crisis	13	5.7%

Table 6: Coverage of History of Hospitalization, Blood Transfusion and Drug therapy in Sickle Cell Disease patients

Intervention	No. of patients	Percentage
More than one blood transfusion(in past year)	81	35%
More than one hospitalization	119	51.5%
Received folic acid supplementation	208	90%
Taking Hydroxyurea	13	5.7%

Table 7: Screening in Family of Sickle Cell Disease Patients

Family Members	No .of Patients	Percentage
Parents	192	83%
Siblings	124	54%

Table 8: Clinical presentation with sickle cell disease cases

No	Symptoms	No. Of Patients	Percentage
1	Generalised Weakness	65	65%
2	Fatigue	62	62%
3	Joint pain	64	64%
4	Jaundice	35	35%
5	Fever	28	28%
6	Cough	8	8%
7	Dyspnea	55	55%
8	Chest pain	3	3%
9	Abdominal pain	7	7%
10	Edema feet	12	12%

Generalized weakness and Fatigue are the most common symptoms (65% and 62% respectively) present in patient with Sickle Cell Disease as disease causes chronic form of anemia which lead to fatigue. The next symptoms were joint pain (64%) and Dyspnea (55%) The sickled red blood cells are prone to breakage(hemolysis) causing jaundice comprising only 35%.while fever(28%),cough(8%),abdominal pain(7%) and chest pain(3%) were found in few cases.

DISCUSSION

Sickle cell study in eastern part of Gujarat state indicated that homozygous SCD is similar to that in Orissa state of India as well as eastern provinence of soudi arabia and is very different from that in population of west African origin.[8]In present study, the prevalence rate of Sickle cell disease is 29%, which is comparable to Ocufemi o and A Kinyanju et.al study. [9] So each patient of sickle cell disease should be properly investigated and treated to prevent the complications. In my study the common age group of sickle cell disease was 12-30yrs, which is comparable to Sayward E et al [10], Abubakar A and Opate M.O et.al[11] and Winfred Wang et al[12].In present study of sickle cell disease, males and females are equally affected carrying a ratio of 1:1 which correlates well with Sayward E .Harrison et.al study[10], Abubakar A and Opate M. O et.al[11],and less comparable to Amber Lyncett Daigre et.al[13] being ratio of 3:2.the difference between two study can be attributed to number of patients enrolled in later study group was 15 only. In this study, most patients were from parmar, bariya, rathod, vasava, Solanki and rathwa community which is nearly comparable to D.Neena et al study [14] where majority of patients were from Rathod(71.4%) and Vasava(21.4%) community. This study was supported by Mihir Rupani et al[15] showed that vasava and rathwa and Chaudhary are having more no. of patients suffering from disease compared to other caste. While screening for marital status, 62.5 % married were having knowledge about sickle cell disease inheritance which correlates with B.Vasava et al study[7] in which 46.2% patients were aware of disease and 76.9% taken care of during marriage of carrier while very few(16%) patients holding knowledge about Disease in C Gamit et al study[16] . Another important finding in study was maximum

number of patients were from lower socioeconomic group which is comparable to Model B and Darlison M et.al[17] .History of Pain crisis in last year contribute to major risk of complications. Majority of patients were having history of 1-2 pain crisis(72.2%) while only few (5.7%)presented with more than 3 crisis per year which correlates with Desai et al study[18] While studying on Blood transfusion, hospitalization and drug therapy ,we found 35% and 51% had more than one hospitalization and history of blood transfusion in past year which is comparable to 26.2% and 35.9% respectively in Desai et al study[18] .While in study of Wang WC et al.[19] they found that chronic transfusion is effective in preventing stroke in sickle cell disease which carries immediate and accumulative risk with regards to iron overload. Hydroxyurea was started in 13 patients who met criteria (more than 3 pain crisis with more than 1 transfusion per year). Hydroxyurea is the only drug approved by USFDA[20]. Hydroxyurea can ameliorate the clinical course of sickle cell anemia in adults with more than 3 pain crisis as sconcluded by Samuel et al[21].· In family screening ,most patients were having positive history of sickle cell disease which is comparable to Ayman AB et al.[22] In study course, the most common presentation was symptoms of anemia which is comparable to Ibidapo et al(88). The second common feature was joint pain, painful crisis- vasoocclusion and Dactylitis are common Indian patients which correlates well with B.C.Kar et al study [8] and Chiang E T and Frenette et.al study [23] and Jain D et al[24]. Because Sickle Cell Disease is lifelong Disease, Prognosis is guarded. Previously median survival in US for those with Sickle Cell Disease was 42 years for men and 48 for women(platt et al.1994)[25] .However survival of subset of individual with Sickle Cell Disease beyond age 55 or 60 years has been described though morbidity remains high(serjeant et .al 2013,wierenga et al.2001). Children have high rates of death from infection and sequestration crisis whereas adult mortality is related to chronic end organ dysfunction, thrombotic disease and treatment related complications.

CONCLUSION

Despite high Prevalence of Sickle Cell Disease, there is little awareness about this blood disorders in India though many children and adults alike are currently bottling it. In fact, doctors say one can live normal life if it's detected early as late diagnosis can make it an extremely debilitating and painful disease to live with. Families should be educated about importance of hydration, diet, outpatient medication and immunization protocol. Aggressive education on management of fevers, prophylactic antibiotic including penicillin in children, upto date immunization, iron chelation therapy for those with iron overload, periodic comprehensive medical evaluation and finally genetic counselling can help reduce morbidity and mortality related to disease. Sickle Cell Disease is generally noncurable but it can be prevented by Population screening, premarital counselling and Prenatal Diagnosis. Recently Stem Cell Transplantation is the emerging modality for treatment of Sickle Cell Disease under clinical Trial.

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