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A Study on Prevalence of Sickle Cell Disease among Pregnant Women and Its Outcome

Dr. Khileshwar Singh, Associate professor Department of general medicine

LTBRKM Government Medical College Jagdalpur

Dr. Sitalakshmi Vuppu, Associate professor, Department of Obs & Gynae, Narayan medical college, Nellore

Dr. Nirmalabanothu, DNB resident, Dept of Obs and Gynae, LTBRKM Government Medical College Jagdalpur

Correspondence Author: Dr. Sitalakshmi Vuppu, Associate professor, Department of Obs & Gynae, Narayan medical college, Nellore, India.

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Abstract

Background: Medical experts for many years have daunted the occurrence of pregnancy in homozygote sickle cell patients. This is because of associated high risk for mother and fetus.

The aim of his study is to determine the prevalence and maternal and fetal outcome of pregnant mothers with sickle cell disease in maharani hospital, jagdalpur,C.G.

Materials And Methods: this is a hospital based cross sectional study of all booked pregnant mothers who attended the antenatal clinic of the hospital from 2016 to 2017. The parameters extracted from the folders included :age ,hemoglobin genotype, full blood count , complications of pregnancy,APGAR score ,and birth weight.

Results: A total of 180 cases were booked for antenatal care, 142patients (78.89%) were heterozygous (HbAs) and 38 cases (21.11%) were homozygous (HbSS). Age distribution of women ranged from 18 to 43 year of age with mean of 24.39+4.12 year in HbAs group and 23.47 +3.24 year in HbSS group. Out of 173 deliveries 84.39% were vaginal and 15.60% were LSCS.Cesarean section required in 17.99% of cases in HbAS and 5.88% of cases in HbSS group. In HbAS group 82.01% of cases delivered vaginally and 94.12% in HbSS. Out of 139 births in HbSS and 34 births in HbAS, intrauterine death seen in 39.47% and 9.15% cases respectively. Perinatal mortaliy was significantly higher in HbSS group compared to HbAS group 44.74% vs 16.2 %;($p<0.05\%$)

CONCLUSION: It was found that women with sickle cell disease have a higher risk for maternal morbidity and perinataladverse outcomes when compared with carriers of sickle cell trait.

Keywords: sickle cell disease, pregnancy, maternaloutcome and fetal outcome.

Introduction

Sickle –cell disease (SCD), alsoknown as sickle cell anemia (SCA) and drepanocytosis, is a hereditary blood disorder, characterized by an abnormality in the oxygen-carrying haemonglobin molecule in red blood cells .sickle cell disease is a term for a group of genetically inherited disorder characterized by production of an abnormalhemoglobinHemoglobin S HB ‘’S’’result from point mutation in the beta genes. The molecular basis for sickle cell disease is an A to T transversion in the 6th codon of the human beta globin gene [(1)]. This simple trans version changes a polar glutamic acid residue ton a non – polar valine in the hemoglobin polypeptide that result in reduction of solubility of this sickle hemoglobin [(2)]. The term sickle cell anemia is reserved for homozygousstate for sickle cell gene while sickle cell trait, which has never been considered a disease, has one abnormal gene[(3)].

Sickle cell disease is responsible for considerable morbidity and mortality [4]. until 1970's , The management of sickle cell patients was poor and pregnancy was associated with high maternal and fetal mortality[5].SCD has high prevalence in India, especially in the central and western regions, and poses a considerable health burden[5]. Sickle hemoglobin was first discovered in India among a tribal population of Nilgiri hills on south India in 1952 Higher in tribal populations of central India Madhya Pradesh and Chhattisgarh.

Hence this study was undertaken to identity the pregnant women with SCD and to assess the pregnancy outcome.

Material and Methods

The present study entitled "Pregnancy out come in women with sickle cell hemoglobinopathy" was conducted in OBG at late BRKM Govt. medical college and associated maharani hospital jagdalpur. It is a hospital based cross sectional analytical study. The study to be carried out from 2016 to 2017 all the pregnant women attended ANC OPD (or) obstetricc ward Were screened in SCD by sickling test. Inclusion criteria. Pregnant women at any gestinal age any growide and early postnatal cases (<7 days) and with sickling positive.Exclusion criteria – women < 18 years of age, non singleton pregnant pregnancies with other medical and surgical disease.

A detailed history of patient with sickling positive enquiring age, providing parity period of amenorrhea, previous pregnancy outcome, menstrual history, previous history sickling status and medical and surgical status.

Results

The present study was conducted at late BRKM Govt. medical college Jagdalpur (CG). The study comprises of 180 case of SCD in pregnancy from 2016 to 2017, out of 180 cases , there were 3 antepartum mortalities and 4 abortions. The following observations were noted to find the implications of sickle cell disease on pregnancy.

Table-1 HB Electrophoresisb pattern

S NO	HB ELECTROPHORESIS PATTERN	NO OF CASES	%
1	Sickle cell trait(HbAS)	142	78.89
2	Sickle cell anemia (HbSS)	38	21.11

In present study out of 180 SCD patients 142 patients (78.89%)were heterozygous (HbAs)and 38 cases (21.11%)were homozygous (HbSS).

Table – 2Age distribution

Age	HABAS group		HBBS group		P value
	No.	%	No.	%	
<20	6	4.23	4	10.53	0.13
<20-30	128	90.14	34	89.47	0.90
31-40	7	4.93	0		0.16
>40 YEARS	1	0.7			0.60
Mean ±SD	24.39±4.12		23.47±3.24		0.02

Age distribution of women ranged from 18to 43 years of age with mean of 24.47+4.12 year in Hbss group. Thisdifference, although small, wasstatically significant ($p<0.05$).

Table 3Gravida distribution

GRAVIDA	HbAs group		Hbss group		P value
	N0.	%	NO.	%	
PRIMI	61	42.96	25	67.57	0.012
GRAVIDA2	48	33.8	4	10.81	0.004
GRAVIDA3	20	14.08	5	13.51	0.88
GRAVIDA>4	9	6.34	1	2.7	0.37
POSTPARTUM	4	2.82	3	8.11	0.15

It is observed that in HbAs and HbSS group the percentage of primi gravid sere 42.96% and 67.57% respectively .it is noted that majority of HbSS group were primigravida.

Table-4 Heamoglobin Levels.

HB LEVEL(g/dl)	HBAS GROUP		HBSS GROUP		P VALUE
	NO.	%	NO.	%	
<8	43	30.28	33	86.84	<0.0001
8-10	52	36.62	5	13.15	<0.0057
>10	47	33.1	0		<0.0001
Means±SD	8.5±1.84		5.26±1.89		<0.0001

It is seen that majority of women in HbSS group (86.84%) has hemoglobin level <8than HbAs group which is statistically significant (p<0.05).

Table 5-Blood Transfusion

S.NO	No. of blood transfusion	HBAS GROUP		HBBS GROUP		P VALUE
1		NO.	%	NO.	%	
2	<3	46	32.39	5	13.16	0.019
3	<3	24	16.9	14	36.84	0.007
4	>3	17	11.97	17	44.74	0.00001

From above data it is seen that requirement of >3 blood transfusion was significantly higher Hbss group (44.74% vs 11.97%;p<0.05) which is justifiable as mean hemoglobin levels is 5.26 +1.89 g/dl in Hbss group and 8.5+1.84 g/dl in Hbas group as started in table 4.

Table 6-Mode of Delivery

SNO	MOD	HbAs		HbSS		N	%	P VALUE
		N	%	N	%			
1	Vaginal	114	82.01	32	94.12	146	84.39	0.58
2	LSCS	25	17.99	2	5.88	27	15.60	0.12
	TOTAL	139	100	34	100	173	100	

Out of 173 deliveries 84.39 % were vaginal and 15.60% were LSCS. Cesarean section was required in 17.995 of case in Hbas and 5.88% of cases in HBss

Table 7-Newborn Requiring NICU

SNO.	NICU GROUP	HBAS group		HBSS GROUP		P VALUE
1		No.	%	No.	%	
2	<24hour	0		0	0	
3	<24 hr to 7 days	41	32.54	11	57.89	0.75
4	>7 days	8	6.35	3	15.79	0.51

Out of19 livingbirths in HBSS group, 57.895 required specialized care for > 24 hrs. (<7 days.). NICU admission rate was higher among new borns of HBSS group compared to HBAS group.

Table-8 Fetal Outcome

SNO.	FETAL OUTCOME	HbSS GROUP		HbSS GROUP		P VALUE
		NO.	%	NO.	%	
1	LIVE BIRTH(LB)	126	88.73	19	50	<0.0001
2	IUD	13	9.15	15	39.47	<0.0001
3	NEONATAL DEATH	10	7.04	2	5.26	0.69
4	LOW BIRTH WEIGHT	53	38.13	32	2.94	<0.0001
5	LUGR	7	4.93	2	5.26	0.93
6	LOW 5 MIN APGAR(<7)	16(126	12.69	8(19)*	42.10	0.003
7	PERINANTAL MORTALITY	23	16.2	17	44.74	0.0001

Out of 139 births in HBSS and 34 births in HBAS, intra uterine death was seen in 39.47 % and 9.15% cases respectively. This difference is statistically significant (p<0.05).perinatal mortality was significantly higher in HBSS group compared to HBAS group (44.74%vs 16.2%;p<0.05).

Discussion

This study was carried out at late BRKM Government medical college; Jagdalpur C.G. During the study period from June 2016 to July 2017, 180 cases of sample was taken.

In table 1 Hb electrophoresis pattern, Kale Ashish (2008) HbAs% is 77.67% and Hbss is 22.32 %.[6]

Zia et al (2013) HbAs is 40.10% and 50.89%, in Patel et al were 69.15% and 30. 85% respectively [7].

In our study the percentage of HbAs and Hbss was 78.89%.and 21.11% respectively. Studies showed that incidence of sickle cell trait (HbAs0 is more than homozygous sickle cell disease (Hbss).

In table2 mean age group of homozygous HbSS group was reported to be 26. 18 +3.38 year in Zia et al, 24.93 +3.565 year in Patel et al. In sickle cell trait HbAs group mean age reported to be 28. 67 +4.99 year in Zia et al, 24.29 +4.205 year in Patel et al. [8]

In present study, the mean age group was 24. 39 +4.12 year in HbAS vs group and 23.47 +3.24 year in HbSS group which is almost similar to above studies.

In Table 3 Gravida Distribution ,In Zia et al HbAs 5.05 3.51 and 3.2+2.75 In hbss 2.89b+1.36 and 1.66 +0.96 .in Patel et al HbAs 1.96 and 0.88 ,1.58 and 0.51 . In present study 1.854+0.98and 1.513 +0.901 in Hbas .1.486 +0.85 and 1.615 +0.65 in HbSS respectively.We found in study that women with Hbss were significantly of low parity which is supported by above studies shown in table and in some other studies.

In table 4 hemoglobin level Zia et al 2013 is 9.96+1,20 and 8.35 +1.12, in Nomura et al 2010 11.4+1.4 and 7.9 +1.3[9],in present study 8.5 +1.84 and 5.26 +1.89 respectively . From abovestudies it is seen that mean hemoglobin level among HbSs group which is most severe genotype is lower than HbAs group.

In table 5 Blood transfusion 44.74%of cases among Hbssgroup required >Blood transfusion which is significantly higher than HbAs group. women with SCD requiring blood transfusion during pregnancy reported to be 38.65 in hbss and 5.545 in HbAs by Zia et al ,33.35 in hbss and 5.4% in HbAs by Nomura et al .(9)

In table 6 Mode of delivery, in present study 84.39% of cases delivered vaginally and 15.60% delivered by cesarean section was required in 5.88 % cases in HbSS group 17.99% cases in HbAs group. in other studies the cesarean section rate was reported to be 14.6% by Idrisa et al 29.7% by Dare et al ,48.7% by Wilson et al .(10)

In table 7 Newborn requiring NICU ,in present study out of 19 live births in Hbss group , 11(57.89%)required specialized care for >24 hrs <7 days .NICU admission rate was higher among HbSS group compared to HbAs group .similar findings have been reported by kale ashish et al stating out of 2 newborns of SS mothers ,10 (45.455 0 babies required specialized care for more than 24 hrs whereas 17 (20. 84%) babies o f AS group required NICU for more than 24 hrs . study by Patel et a states that NICU admission (46. 2%(SSD) ,21.8%(SST) were significantly higher in the SSD group as compared to the SST group(7) . Higher rate o f NICU admission rate among newborns of HbSS mother is because of more fetal complication in them which include higher rate of LBW babies , higher risk of IUGR , higher risk of preterm deliveries which in turn results in higher perinatal morbidity and mortality , and a higher infant mortality rate.

In table 8 in present study, it was recorded 34 births in HbSS group and 139 births in HbAs group .it has been noticed more deaths in deaths in utero for HbSS group than HbAs group (39.47% vs 9.15%).percentage of IUFD in HbSS group is quiet high in present study .rate of IUFD I other studies reported to be 11.8% in HbSS and 1.82% in HbAs by Nomura et al, 17.855 in SS and 3.12% in AS by Patel et al.

In present study , perinatal mortality was significantly higher In Hbss group compared to HbAs group 44.74%vs 16.2%;p<0.05).perinatal mortality was high in present study than other studies as there washigh number of IUD. Nomura et al reported perinatal death to be 11.8% in SS and 1.8% in AS group [9]. Kale Ashish et al reported perinatal mortality in 20% among SS and 8.04% among AS group [6]

Conclusion

SCD is achronic anemic state most common complication is anemia .mean age of pregnant women was 24.39+4.12 year in HbAs group and 23.47+3.24year in HbSS group .Mean age of HbAs and HbSS group of women were 1.854 +0.98 and 1.486 +0.85 respectively .out of 180 cases of pregnant women with sickle cell hemoglobinopathy, there were mortalities 1.67%, 1 in hbAs and 2 in hbSS group (both antenatal). Requirement

of >3 blood transfusion wassignificantly higher in HbSS group than HbAs group (44.74% Vs 11.79%;P<0.05)

Out of 173 deliveries 84.39% were vaginal and 15.60% were LSCS. Cesarean section was required in 17.99% of cases in HbAs and 5, 88% of cases in HbSS group. Fetal distress was major indication for cesarean sections in patients ofNICU admission rate was higher among newborns of HbSS group compared to HbAs group.

Out 139 births in HbSS and 34 births inHbAs ,intrauterine death was seen in 39.475 and9.15% cases respectively .

Perinatal mortality was significantly higher in HbSs group compared to HbAs group 44.74% vs 16.2% ;p< 0.05). Inconclusion, on analysis of the above data, it was found that women with sickle cell disease have a higher risk for maternal morbidity and perinatal adverse outcomes when compared with carrier of sickle cell trait.

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