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THERAPEUTIC ROLE OF GOMED-MANDUR-KASISA BHASMA COMPOUND IN CLINICAL MANAGEMENT OF SICKLE CELL ANAEMIA

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ABSTRACT
Sickle cell anaemia a type of genetic hemoglobinopathy, is common in Africa, American blacks and aboriginal tribes in Central India. The present study was planned with a hope to provide better quality of life to the sickle cell patients. To find out a satisfactory solution through Ayurveda, a compound of Gomed, Kasisa and Mandur Bhasma was selected. All these Bhasmas are said to be haematinics and are effective in the management of anaemia in children. A randomized controlled study was performed in children of sickle cell anaemia with one group treated with Bhasma compound and other with folic acid. Compound of Gomed-Mandur-Kasisa Bhasma (GMK compound) was found significantly effective in the management of sickle cell anaemia.
Keywords: Sickle cell anaemia, Pandu, Gomed Bhasma, Mandur Bhasma, Kasis Bhasma, Ayurveda

INTRODUCTION

Sickle cell Anaemia was first reported in USA in 1910 by James Herrick[1]. The Sickle cell syndrome is caused by a mutation in the β-globin gene that changes the sixth amino acid from glutamic acid to valine[2]. Sickle Cell Disease (SCD) is a hereditary disorders characterized by transformation of red cell into sickle cell shape on deoxygenation produced due to single point mutation. This disease is clinically characterized by two major problems i.e. anaemia and vaso-occlusive complications[3]. In sickle cell there is intravascular hemolysis resulting in iron loss which leads to iron deficiency, iron deficiency is more common than suspected[4]. Mohanty and Mukherjee reported that the symptoms like jaundice, fever, gall stones, epistaxis, priapism and leg ulcers are not common in India[5]. Sickle cell anaemia is common in Africa, American blacks and aboriginal tribes in Central India (Nagpur, MP, extending to Orissa, India). Nearly 20 million people are affected by sickle cell anaemia in India[6]. In India, SCD has proved fatal in nature and contributes to infant mortality. The symptoms of SCD resemble the symptoms of Pandu described in Ayurveda[7]. There is no curative therapy for SCD in modern medicine. Keeping all these views in mind it was supposed that Ayurved may provide possible remedy to prevent the complications and maintain the health. The present study was intended to analyze the therapeutic role of Gomed-Mandur-Kasis Bhasma (GMK) compound in sickle cell anaemia in comparison to control group of folic acid. The contents of GMK compound are mainly useful in anaemia[8].

MATERIAL AND METHODS

Selection of Cases

The patients were selected from outdoor and indoor department. A written consent was taken from every patient/parent to become a part of present study. Total 22 patients were selected for the study; male and female children below the age of 16 years were selected and divided in two groups with 11 patients in group A and 11 in group B randomly. For the study, patients were distributed in to various groups according to age, sex and socio economic status. The institutional Research committee approved the protocols for the trial in Nov. 1999. Patients who were previously diagnosed with homozygous and heterozygous sickle cell pattern by electrophoresis and possessed reliable reports were chosen for study. The total 22 selected patients were divided into two groups.

n=11 in each group

Group I- GMK compound: 125-250 mg per day in two divided doses before meal with honey

Group II- Control group treated with Folic acid; 2.5-5 mg per day after meal with water

Criteria for exclusion of Patients

Patients in acute crisis (splenic sequestration, vaso occlusive, aplastic crises) at the time of starting the treatment, patients having Hb less than 5 g%, acute chest syndrome (pulmonary infarction often associated with pneumonitis or fat emboli from bone marrow) were not included in the study. Total duration of research study was of two years. Patients were treated for 3 months and follow up was done every 15 days; the sign and symptoms along with investigations were assessed at the end of every month.

Assessment of Symptoms

Assessment of response to the drug was based on improvement in signs and symptoms of the patient. While assessing the symptoms, the references like Agnimandya i.e. patient's appetite, Daurbalya in terms of exercise tolerance and relation to the physical activity has been included in study.

Grading of Signs

All signs and symptoms were graded according to the severity of disease, Many symptoms have been taken into consideration; some of important symptoms with grading have been summarized in Table 1.

Statistical Analysis

Data are expressed as means ± SD. The data analysed by using Kruskal-Wallis statistic with Dunn's Multiple

Comparison Test and compared two groups with unpaired t test by using Graph pad prism -4 software. P value of 0.05 was considered significant.

Table 1: Grading of Sign and Symptoms

Grade	Pain in abdomen	Fever	Dyspnoea	Exertion Dyspnoea:	Pallor (Hb g %)	Painful Swelling of Joints
4	Severe (worst)	Above 107^0 F	Moribund		5 to 7	Patient does not allow the joints to be touched
3	Moderate	$104 – 107^0$ F	Totally confined to chair or bed		7 to 9	Patient winces and withdraws the affected part
2	Mild to moderate	$101 – 104^0$ F	Confined to chair or bed and only to get up with great difficulty	Short of breath walking with other people of own age on level ground.	9 to 11	Patient winces
1	Mild	$99 – 101^0$ F	Able to do house work or job with difficulty	Troubled by shortness of breath when hurrying on level ground or walking up a slight hill.	11 to 12	Patient says the joint is tender when firm pressure is applied to the joint.
0	No Symptoms	$98 – 99^0$ F	No symptoms		Above 12	No Symptoms

Table 2: Group A (GMK Compound)

Symptom	BT			AT(3 months)			P value
symptom	MEAN	SD	SE	MEAN	SD	SE	
Agnimandya	1.364	0.5045	0.1521	0.2727	0.4671	0.1408	P < 0.001
Daurbalya	2	0	0	0.2727	0.4671	0.1408	P < 0.001
Gatra Shoola	1.909	0.3015	0.09091	0.09091	0.3015	0.09091	P < 0.001
Shwasa	1.273	0.4671	0.1408	0.09091	0.3015	0.09091	P < 0.001
Akshkoot Shotha	0.7273	0.4671	0.1408	0.1818	0.4045	0.122	P < 0.05*
Pindickodveshtana	1.909	0.3015	0.09091	0.1818	0.4045	0.122	P < 0.001
Pallor	1.364	0.5045	0.1521	0.3636	0.5045	0.1521	P < 0.001
Dactylitis	1.364	0.5045	0.1521	0.09091	0.3015	0.09091	P > 0.001
Spleenomegaly	0.6364	0.5045	0.1521	0.1818	0.4045	0.122	P > 0.05*
Hepatomegaly	0.1818	0.4045	0.122	0.09091	0.3015	0.09091	P > 0.05*
Abdominal pain	0.9091	0.3015	0.09091	0	0	0	P < 0.001

*P > 0.05 Not Significant

Table 3: Group B (Folic acid)

Symptom	BT			AT(3 months)			P Value
	MEAN	SD	SE	MEAN	SD	SE	
Agnimandya	1.636	0.5045	0.1521	0.8182	0.4045	0.122	P < 0.001
Daurbalya	1.273	0.4671	0.1408	0.6364	0.5045	0.1521	P < 0.01
Gatra Shoola	1.636	0.5045	0.1521	0.6364	0.5045	0.1521	P < 0.001
Shwasa	1.182	0.4045	0.122	0.6364	0.5045	0.1521	P < 0.05
Akshkoot Shotha	0.9091	0.5394	0.1626	0.3636	0.5045	0.1521	P > 0.05
Pindickodveshtana	1.455	0.5222	0.1575	0.5455	0.5222	0.1575	P < 0.001
Pallor	1.273	0.4671	0.1408	1.091	0.3015	0.09091	P > 0.05*
Dactylitis	1.455	0.5222	0.1575	0.6364	0.5045	0.1521	P < 0.01
Spleenomegaly	0.5455	0.8202	0.2473	0.4545	0.6876	0.2073	P > 0.05*
Hepatomegaly	0.2727	0.6467	0.195	0.1818	0.4045	0.122	P > 0.05*
Abdominal pain	1	0.6325	0.1907	0.4545	0.5222	0.1575	P < 0.05*

*P > 0.05 Not Significant

Table 4: Comparison between Group A and Group B

Symptom	Group A			Group B				P Value
	MEAN	SD	SE	MEAN	SD	SE		
Agnimandya	1.091	0.7006	0.2113	0.8182	0.4045	0.122	NS	P > 0.05*
Daurbalya	1.727	0.4671	0.1408	0.6364	0.6742	0.2033	***	P < 0.001
Gatra Shoola	1.818	0.603	0.1818	1	0.7746	0.2335	*	P < 0.05
Shwasa	1.182	0.603	0.1818	0.5455	0.6876	0.2073	*	P < 0.05
Akshkoot Shotha	0.5455	0.5222	0.1575	0.5455	0.5222	0.1575	ns	P > 0.05
Pindickodveshtana	1.727	0.4671	0.1408	0.9091	0.5394	0.1626	**	P < 0.01
Pallor	1	0.4472	0.1348	0.1818	0.4045	0.122	***	P > 0.05*
Dactylitis	1.273	0.4671	0.1408	0.8182	0.4045	0.122	*	P < 0.05
Splenomegaly	0.4545	0.5222	0.157	0.09091	0.3015	0.09091	Ns	P > 0.05*
Hepatomegaly	0.09091	0.3015	0.09091	0.09091	0.3015	0.09091	ns	P > 0.05*
Abdominal pain	0.9091	0.3015	0.09091	0.5455	0.5222	0.1575	Ns	P > 0.05*

*P > 0.05 Not Significant

RESULTS AND DISCUSSION

The results indicated that all the patients were only from 4 to 16 years. When patients were distributed according to sex, total 59.1 % were male (13 out of 22 patients) and 40.9 % patients were female (9 out of 22 patients). In the present study the SCD was found more common in male than female. Kamble *et al* reported male female ratio as 1.65:1[9]. When patients distributed according to their socio economic status, most of the patients were from lower income group (68.18 %) followed by middle income group (27.27 %). The data indicates the highest ratio of disease was observed in people with lower income group which shows the importance of education and creating awareness about disease, proper diet and nutrition. Since the nutrition value plays significant role in maintaining the health of the sufferers. Improvement in life style and dietary changes could be a key to reduction of morbidity and mortality of sickle cell patients[10]. The effects of GMK compound on major symptoms is depicted in Table 2. Daurbalya (physical strength) of SCD patients and patients complaining of body ache (Gatra shoola) significantly recovered faster when treated with Bhasmas while recovery was late in control group. Therapeutic potential of GMK compound was effective not only in above symptoms but also in Shwasa (dyspnoea), Akshikoota shotha (periorbital edema), Pindikodwestana (cramps), Udara shoola (pain in abdomen), these effects were faster and significant as compared to folic acid. The compound of three Bhasmas was highly effective in reducing Nakha - Netra Shwetata (pallor) as increase in Hb level was observed in the patients after treatment with GMK compound. The significant changes in many of the symptoms were observed at the end of three months of treatment with GMK compound. There were no significant results ($p > 0.05$) found in symptoms like hepatomegaly, spleenomegaly and dactylitis and pallor in the control group. The result of the control group is depicted in Table 3. Table 4 indicates the comparison between GMK and control groups. The subjects did not encounter acute crises during treatment period. No adverse effects of GMK compound were observed in the present study. As SCD was reported in 19th century, there is no specific description in Ayurvedic text, the disease with similar signs and symptoms called Pandu Roga which is well described in Ayurvedic text may be named as Sahaja Pandu[11]. Keeping this in mind, present study was designed to see the therapeutic effect of Ayurvedic drug in SCD. Folic acid has been treatment of choice in many blood related disease like anaemia, sickle cell anaemia etc[12,13]. The Mandura And Kasisa Bhasmas are good sources of iron as their assay for iron are 30 to 60 % and 35 to 55 % respectively[14,15]. During neonatal and childhood growth spurts iron requirements of body tissue is increased[16]. Approximately 80 % of total body iron is ultimately incorporated into red cell haemoglobin. Research studies suggest that many other heavy metals are helpful in the iron intestinal absorption pathway[17]. Hence combination of three Bhasmas may be helpful in the treatment. In Rasa Tarangini, it is reported that Gomeda Bhasma promotes the appetite, digestion and strength and it is good tonic to the brain[8]. As it is Kapha Pitta Shamaka, the compound was found effective in symptoms like Agnimandya (loss of appetite), anemia and dyspnoea. Kasisa Bhasma was reported to be effective in Pandu (anaemia), spleen disease, Daurbalya (weakness), Kamla (Jaundice), Vrana (Ulcers)[8]. Mandura Bhasma is reported as effective in anemia and jaundice. It cures the disorders of liver and spleen; it is beneficial in jaundice and Tridoshaja shoola (pain)[8]. Therefore GMK compound has been effective in Gatrashoola (body ache). In the present study though hepatomegaly and splenomegaly were not significantly reduced but with the help of other findings it can be said that drug may work on liver and spleen. Kanse *et al* reported the hepatocurative potency of Mandur Bhasma[18]. In the study conducted by Kanse A *et al*, effect of Mandura Bhasma was assessed and found marked recoveries of liver and kidney within a week while total recoveries were noticed after two weeks. Histology and biochemical parameters of liver and kidney showed marked curative alteration[17] which supports the role of GMK compound. Though there are number of research works going on, the exact mechanism of iron absorption and transport is not yet understood. The study reveals that iron absorption is enhanced in people who are iron deficient[15]. Approximately 10 % of the elemental iron entering the duodenum is absorbed. However, this value increases markedly with iron deficiency (Finch, 1994)[19]. This clears the absorption of GMK compound.

CONCLUSION

Thus present study provides an important data about the efficacy of GMK Compound in patients with sickle cell anaemia disease. The study checked the comparative therapeutic efficacy of this drug with folic acid and observed very significant results in terms of faster recovery from symptoms than control group. The data from present study also support the properties of each ingredient present in GMK Compound. As per our knowledge there is no treatment available that provides quick and significant recovery in sickle cell anaemic patients. In this context, the data of present study shows the importance of this drug as supportive treatment for SCD patients.

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