Original Article

Comparison of Efficacy of Different Chelation Therapies in Thalassemia Major Patients

Mukhtar Ahmad, Asma Akbar and Kiran Kanwal

ABSTRACT

Objective: This study was aimed to compare the efficacy of different chelation therapies in thalassemia major patients.

Study Design: Observational / prospective cohort.

Place and Duration of Study: This study was conducted at Thalassemia Department of Dera Ghazi Khan Medical College and Teaching Hospital, Dera Ghazi Khan from March 2018 to March 2019.

Materials and Methods: A total of sixty patients with Beta-thalassemia were enrolled. Out of the total, 30 of the patients were given oral iron chelatori.e. Deferiprone and put them in group I whereas the other remaining 30 were grouped into group II and given the injectable iron chelator i.e. deferoxamine. Patients with any renal or respiratory diseases or those who were using antibiotics for longer durations were excluded.

Results: The average age amongst all the patients was 19.6 ±5.5 years. Out of the total patients, 32 (53.3%) were male and 28 (46.7%) female. The average ferritin (ng/ml) among all the patients was 2600+1190.5 while 2455+1134 and 2745+1245 in group I and group II respectively (P value= 0.322). In terms of complications, Impaired glucose tolerance (IGT)was reported as 17.5%, diabetes mellitus (DM) 6.9%, hypothyroidism clinical and subclinical 18.05% and 26.45% respectively among all the Beta-thalassemia patients.

Conclusion: Both the therapies are equally effective in controlling the iron overload in beta-thalassemia patients.

Key Words: Hemoglobinopathy, Beta-thalassemia, iron chelators, Deferiprone

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INTRODUCTION

The Beta-thalassemia is the foremost hemoglobinopathy and it is just because of the Beta-globulin chain production flaw. The commonest disease expressions include the hepatosplenomegaly and anemia. The backbone of the management of Beta-thalassemia is usually the transfusion of blood yielding an overload of iron in certain organs including the heart, liver and certain glands like the endocrine.[1,2] The iron chelators for reduced iron load in the body is generally used in the two different means i) Oral and ii) Injectable.

The first option includes the Deferiprone is inserted soundly in the body cells to remove the iron and hence much effective than the injectable that comprises of Desferoxamine aiming to reduce the complications of the endocrine the iron overload of the heart.[3,4] The leading iron overload complication is the endocrinopathies with involvement of at least one endocrine organ among almost 60% of the patients.[5-7] Very fewer studies are available in literature that compare the iron chelator effectiveness orally and as injectable in Beta-thalassemia patients. In this study we compared certain endocrinopathies including the diabetes mellitus (DM), impaired glucose tolerance (IGT) and the hypothyroidism among the Beta-thalassemia patients receiving oral chelators against the injectable chelators.[6,7] The main aim of the study was to compare the efficacy of different chelation therapies in thalassemia major patients.

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MATERIALS AND METHODS

We opted an observational prospective cohort study design, where a total of sixty individuals were enrolled. Out of the total 30 of the patients were given with oral iron chelator i.e. Deferiprone and put them in group I where as the other remaining 30 patients were grouped into group II and given the injectable iron chelator i.e. deferoxamine. The venue of the study was Thalassemia department Dera Ghazi Khan Medical College and Teaching Hospital, Dera Ghazi Khan. The study duration was of one year starting from 1st March 2018 to 1st March 2019. All patients having Beta-thalassemia were included in this study while patients with any

renal or respiratory diseasesor those using long term antibiotic therapy were excluded. Demographic feature along with clinical and diagnostic findings were recorded. The plasma glucose levels while fasting was assessed and the IGT was calculated. The serum calcium and phosphate level and PTH were also assessed. The standard operating procedures were opted while practicing all operative and diagnostic or clinical procedures. Approval from institute's ethical committee was acquired for this study. Informed consent was taken from all the participants / attendants of the patients.

SPSS version 20.0 was used for data handling and analysis. Descriptive statistics were applied by calculating mean and standard deviation. Frequency distribution and percentages were performed for all qualitative variables. Chi square test was applied and P values less than 0.05 was considered statistically significant.

RESULTS

There were a total of 60 Beta-thalassemia patients; 30 in each group. The average age of the entire patients was 19.6 ±5.5. Out of the total patients 32 (53.3) were male and 28 (46.7%) were females. More on the distribution of patient age and sex was given in table 1.

The average ferritin (ng/ml) for the entire patients was 2600+1190.5 group wise it was observed as 2455+1134 and 2745+1245 in group I and group II respectively. We have not observed any significant difference among groups regarding the ferritin level (P value= 0.322).

Table No.1: The group wise age and sex distribution of patients.

	Group I	Group II
Average Age	18.9±4.6	20.3±6.5
Number of Male	12	20
Number of Female	18	10

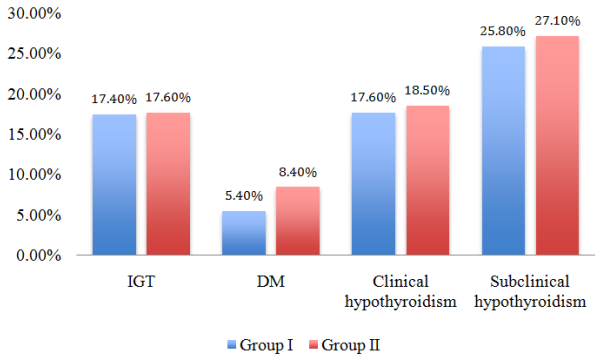

Figure No.1: The detailed view of group wise complication.

Additionally the observed complication among patients includes the IGT which was 17.5%, DM was 6.9%, hypothyroidism clinical and subclinical was 18.05% and 26.45% respectively among all the Beta-thalassemia patients. The group wise distribution is given in figure 1.

DISCUSSION

We not only assessed the efficacy but also highlighted the related complications for both the therapies. The only iron chelator available before 1987 was the desferoxamine.[8]There was a poorer compliance among the patients with this therapy due to discomfort of daily dose and the high price. On the other hand, the deferiprone accessibility bettered the treatment acceptance. Though the deferiprone is less effective than the deferoxamine for abolishing of iron from certain organs including liver.[9]Majority of our patients with Beta-thalassemia also had endocrine disorder where the subclinical hypothyroidism was the commonest complication in patients of both groups.[10]Similarly, the DM and clinical hypothyroidism was seen common in group II patients than the group I. The difference between both groups regarding the complications was not statistically significant. We also did not observed the ferritin level difference between both groups, hence it is high between both the groups, hence we cannot claim to any of the therapy to be superior than the other. Other published studies confirm our findings in literature.[5,11] We suggest using the oral therapy by taking the deferiprone and desferasirox as combination to be used to control the ferritin levels among patients. This falls the average ferritin levels among the patients.[12-14]This suggestion was already addressed in various publications including Farmaki et al.[13-20] The combination therapy appears to be more successful than each of these agent in seclusion. We also recommend the sample size should be large enough with the well-controlled design to demonstrate the efficacy and safety of the oral and injectable iron chelators in Beta-thalassemia patients.

CONCLUSION

Both the therapies are equally effective in controlling the iron overload in beta-thalassemia patients.

Author's Contribution:

Concept & Design of Study:	Mukhtar Ahmad
Drafting:	Asma Akbar
Data Analysis:	Kiran Kanwal
Revisiting Critically:	Mukhtar Ahmad, Asma Akbar
Final Approval of version:	Mukhtar Ahmad

Conflict of Interest: The study has no conflict of interest to declare by any author.

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