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A Glance at the Cost of Chelation Therapy with Desferal and Exjade in Iran

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Abstract

Background: Thalassemia is a series of hemoglobinopathies in which the production of perfect hemoglobin is completely or partially suppressed. Using injectable iron chelators have been dominating treatment for the iron overload caused by recurrent blood transfusions in thalassemic patients, however, a new oral iron chelating drug (Exjade) have been recently introduced and might be cost effective compared to previous treatment methods. This study was undertaken to evaluate the cost of Exjade in comparison with injectable iron chelators.

Patients and Methods: In this retrospective study, we calculated the cost of iron chelation with Deferoxamine mesylate; or Desferal in three groups of patients including those with optimum moderate and poor compliance. Afterwards, we compared the cost with the cost of iron chelation using Exjade. The cost of drugs and treatment for complications caused by iron overload were both taken into account.

Results: The average cost of treatment per year with Deferoxamine mesylate was 85601032 Rials for patients with poor compliance, 62739714 Rials for patients with moderate compliance, and 50118376 Rials for patients with optimum compliance. In addition, according to the latest price of Exjade in Iranian market, we found out a regular oral iron chelation therapy using Exjade, with a dose of 20 mg/kg, to cost 76650000 Rials per year.

Conclusion: Our findings indicate that using Exjade is cost-effective for those patients who have poor compliance to parenteral treatment. More investigations should be implemented to find the social and economic impact of Exjade therapy on quality of life among patients needing iron chelation therapy.

Keywords: Thalassemia, hemoglobinopathies, iron chelating agents, deferasirox, deferoxamine

Introduction

Thalassemia is a series of genetic haemoglobin disorders in which the production of effective haemoglobin is partly or completely suppressed. Blood Transfusion Therapy is the first step to maintain a steady level of haemoglobin in the majority of patients. Because of continuous blood transfusion, iron is overloaded in patients' body; therefore, chelation therapy is the second and a vital step of the patients' treatment [1]. With modern medical treatment, mortality and morbidity related to thalassemia has decreased dramatically. Hence, the quality of life has lately become one of the most highlighted issues in thalassemia [2]. The relation between the quality of life and the optimum Iron chelation therapy using Deferoxamine (Desferal) has been studied [3]. The inconvenient and painful Deferoxamine therapy can decrease patients' compliance with this method of treatment; [4] therefore; the necessity of finding a single dose oral iron chelator had been evident. To foster the quality of life among patients with Thalassemia, ApoPharma Company introduced Deferiprone (Ferriperox) which should be taken in three divided doses per day. Though Deferiprone has played a role to enhance quality of life especially among those patients who have cardiac problems [5], studies do not show that it increases patient compliance with Iron chelation [6]. To solve the problem, Novartis Pharmaceutical Company offered a new oral iron chelator called Deferasirox (Exjade) in 2005 [7]. The new oral chelator has been able to increase patients' compliance with iron chelation therapy [8]. There are some restrictions in making the new medicine accessible for all patients namely decision makers' concern about its price. Several studies have demonstrated that Iron chelation with Exjade

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is more economical than with Desferal [9, 10, 11], however the authors of such articles persist in repeating such a comparison in different countries due to differences in economic and social factors. In this study we aimed to compare Desferal and Exjade therapy considering their cost effectiveness.

Materials and Methods

In this retrospective study, we calculated the cost of oral chelation using Exjade and compared it with Desferal injection. To find the total price of treatment using Desferal, three related items including the cost of Desferal vials, cost of equipment, and cost of complications related to iron overload were taken into account.

Data were gathered from Jan. 2006 to Feb. 2008 in a group of adult Thalassemia patients including 28 males and 34 females. The age range of the patients was from 19 to 34 years (Mean 24).

Compliance for each patient was calculated based on the formula presented below:

Compliance = Number of patients' Desferal injections per year/ Number of Desferal (DFO) injections for the individual patient prescribed by physician * 100

According to their compliance, the patients were divided into three different groups; poor compliance (less than 40%), moderate compliance (40-80%), and optimum compliance (more than 80%).

The complications related to iron overload included diabetes, heart failure, Hypogonadism, Hypoparathyroidism, and Hypothyroidism.

The cost of Desferal vials and other medicines used to treat complications was calculated based on information obtained from the Deputy of Food and Drug, Iranian Ministry of Health and Medical Education. The cost of equipment was calculated based on the average price in Iranian market and the cost of treating the complications was calculated based on information supplied by insurance companies' official sources and Deputy of Health, Iranian Ministry of Health and Medical Education. The total cost of treatment was calculated by adding the cost the cost of drug, the cost of treating complications, and the cost of injection equipment. We did not use any patients' information in the current investigation without their informed consent.

Results

Sixteen (25.8%) of patients had poor compliance and injected DFO 88±14 times annually. Twenty one (33.8%) of patients were categorized in moderate compliance group who injected DFO 186±23 times annually, and finally 25 (40.4%) of patients had optimum compliance with 229±9 times DFO injections annually.

The cost of equipment for the three groups was equal because all groups had received a complete package of equipment per month. Furthermore, all patients had received pump for injection regardless of their compliance. Our findings show that the cost of equipment for every patient was 2777200 Rials per year.

The average cost of Desferal for each patient in poor compliance group, moderate compliance group, and optimum compliance group was 14944512 Rials, 31587274 Rials and 38889696 Rials, respectively.

The rate of specific risk for complications of iron overload was different across the three groups. (Tab1). The estimated cost of every complication of iron overload, calculated according to official data

Table1: The estimated cost of every complication of iron overload

Complications	Rate of Complications in three Groups %			The cost of management and Treatment per month	Rate of Hospitalization Per year for complications			Cost of Hospitalization For each time
	Poor	Moderate	Optimum		Poor	Moderate	Optimum	
Cardiac Problems	81.3	52.4	12	2060000	2.0	0.52	0.04	13047000
Diabetes	43.7	23.8	16	980000	0.68	0.12	0.0	4320000
Hypogonadism	68.7	57.1	24.0	1070000	0	0	0	0
Hypoparathyroidism	6.2	4.7	0	540000	0	0	0	0
Hypothyroidism	18.7	4.7	0	360000	0	0	0	0

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and Iranian Guidelines for Thalassemia treatment [12], can be found in table 1.

The average cost of complications per year related to iron overload in patients with poor compliance, moderate compliance, and optimum compliance were 67879320 Rials, 28375240 Rials, and 8451480 Rials, respectively (Figure 1).

The average total cost of treatment per year (the cost of drug plus the cost of treating complications plus the cost of injection equipment) with Deferoxamine for patients with poor compliance was 85601032 Rials, with moderate compliance 62739714 Rials, and with optimum compliance 50118376 Rials.

In addition, according to the latest price of Exjade in Iranian market, we found out a regular oral iron chelation therapy using Exjade, with a dose of 20 mg/kg, to cost 76650000 Rials per year.

Figure 2 compares the average total cost of treatment for patients in three groups and the cost of iron chelation with Exjade in Iran.

Discussion

Our findings show that a regular, effective and optimal treatment can decrease not only the rate of complications related to iron overload but also the cost of patients' treatment. Considering the cost among patients with poor compliance, we can point out that switching these patients from DFO to Exjade is a cost-effective plan. In our study the cost of education for nurses and patients to use DFO was not calculated because there was no accessible data in this regard. Moreover, we calculated the average cost of DFO based on the number of injections; but, it is a fact that many patients receive the amount of DFO prescribed by the physician and many DFO vials will be stocked in patients' homes without actually being used. Considering that the aforementioned cost was not calculated in our study, Exjade therapy might be a cost effective method for chelation therapy even among thalassemic patients with moderate compliance or optimum compliance. Our results are compatible with the result of a study conducted by Delea et al.[11].

Kim et al. have reported Exjade to be more cost effective compared to DFO [13].

Although Luangasanatip et al.[14] have reported using Deferiprone (DFP) as a cost saving plan among Thai patients, our study did not compare DFP with Exjade and DFO.

There are a few articles similar with our method in which the cost effectiveness has been calculated based on compliance rate among patients. To show the importance of compliance among patient undergoing iron overload therapy in saving cost, Delea et al. designed a model-based study which estimated the lifetime costs of inadequate compliance with Deferoxamine to be $33,142 [15]. Imran et al. believe that higher acquisition cost of Exjade could be compensated by saving administration cost of complications especially in noncompliance with therapy attributable to the parenteral mode of administration [16]. Karnon et al. showed Exjade to be the drug of choice for all patients in comparison with DFO as far as the quality of life is concerned [17]. Finally Delea et al. have reported oral iron chelation with Exjade to be

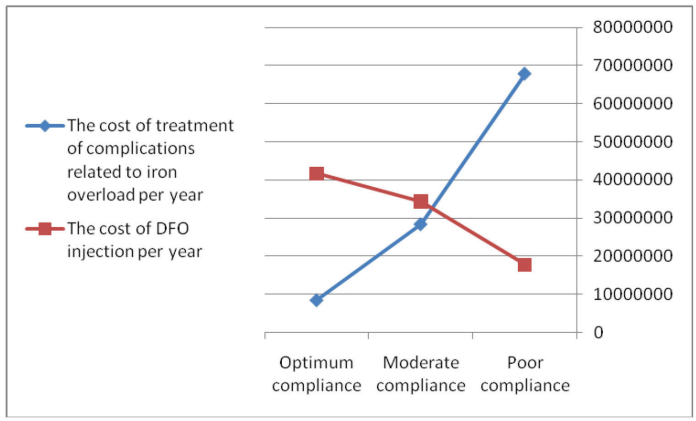

Figure1: The cost of treatment for complications related to iron overload and the cost of DFO injection in patients with poor, moderate, and optimum compliance

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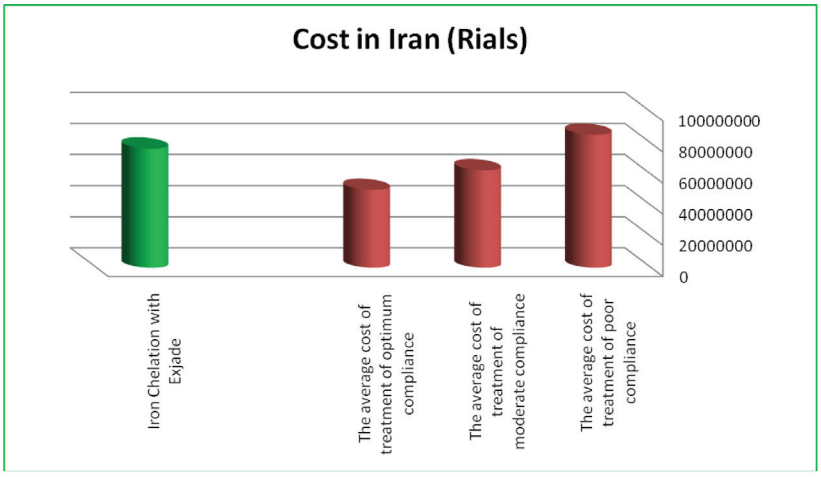

Figure2: The cost of chelation therapy with Exjade and DFO considering the impact of compliance in the cost of chelation therapy with DFO

a cost effective method compared with infusion of DFO [18].

The issues of quality of life were not studied in our evaluation.

Conclusion

Using Exjade is cost-effective for those patients who have poor compliance to parenteral treatment. More investigations should be implemented to find the social and economic impact of Exjade therapy on quality of life among patients needing iron chelation

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