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Research Article

LIPID PEROXIDATION IN PATIENTS OF THALASSAEMIA MAJOR

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ABSTRACT
Lipid peroxidation has been studied in twenty eight cases of transfusion dependent thalassaemia major and in fifteen matched healthy control following standard norms by the determination of the malondialdehyde as the marker of lipid peroxidation product (determined as thiobarbituric acid reactive species, TBARS). It has been found statistically significantly higher in transfusion dependent thalassaemia major cases in comparison to the matched healthy controls.

Keywords*: Transfusion Dependent Thalassaemia Major, MDA, Lipid Peroxidation*

INTRODUCTION
Thalassaemic syndromes are a heterogenous group of hereditary disorders characterized by the reduction of the either alpha or beta globin chain of haemoglobin. In case of alpha chain- called alphathalasaemia and incase of Beta chain – called beta thalasaemia (Cotran *et al.*, 1989). Beta one is more common than alpha. This disorder in characterized by anaemia, metabolic dysregulation, iron overload, chronic hypoxia and cell damage (Firkin *et al.*, 1990).
In case of Beta Thalasaemia major which is transfusion dependent is characterized by oxidative stress which is further characterized by excessive production of reactive oxygen species (ROS) and eventually cell membrane damage with the excessive production of Lipid peroxidation products (LPP) (Ghone *et al.*, 2008).
Typical treatment of B-thalasaemia major is regular blood transfusion – which can result in overload of iron and early introduction of iron chelating agents can combat iron overload and reduced ROS production and reduced LPP formation due to less cell wall damage (Bhagat *et al.*, 2012).
The aim of this study is to observe the oxidative stress in Beta Thalasaemia major and eventual role of iron chelation in cases of iron overload due to transfusion with the improvement of the thalassaemia major cases along with some antioxidants in the treatment of thalassaemia cases.

MATERIALS AND METHODS
Blood samples were taken from 28 Beta thalassaemia major cases (18 male and 10 female) of the age group (8 – 15 years). Simultaneously blood samples were taken from 15 healthy subjects (9 male & 6 female) as control. Blood samples were collected aspectically following the standard norms taking consent from the legal guardian. 5 ml blood was taken and was allowed to clot. Then centrifuged to separate the serum – both from cases and control subjects. Lipid peroxidation products (LPP) is produced by the damage of the cell membrane mainly by the free radical produced due to oxidative stress, so LPP can be considered as an important marker of oxidative stress (Pavlova *et al.*, 2007).
Malondialdehyde (MDA) was used as indicator of lipid peroxidation and was measured in terms of thiobarbituric acid reactive species (TBARS) by the method of Satoh (Arora *et al.*, 2009; Satoh, 1978).
Statistial analysis was done by student's paired 't' test and the data were expressed as Mean +/-SD and the 'p' value < 0.05 was considered as significant.

RESULTS AND DISCUSSION
Result & Analysis
Results show the mean+/-SD of the estimated value of malondialdehyde in healthy subjects of the same age group as control and the thalassaemia cases. There was a statistically significant increase in MDA levels in thalassaemia cases in comparison to control.

Table 1: Showing the MDA Level in Control and Cases of Thalassaemia

	Control (n-15)		Cases (n-28)	
MDA (n mol/ml)	**Male (n-9)**	**Female (n-6)**	**Male (n-18)**	**Female (n-10)**
(Mean ± SD)	1.64 ± 0.45	1.48 ± 0.36	5.26 ± 0.51	4.88 ± 0.49
		P value < 0.05		

Discussion

Thalassaemia major cases are transfusion dependent and there occur iron overload due to prolonged transfusion of packed red cells. Iron is deposited in various organs of the body like liver, kidney, eye etc. This iron is also responsible for different ill effects in thalassaemia cases including the formation of excess amount of free-radical and oxidative stress. Free radical can cause damage of lipid layer of the cell membrane by lipid peroxidation which can finally produce lipid peroxidation products (LPP) where malondialdalyde is the principal products and so used as the indicator of lipid peroxidation (Ghone *et al.*, 2008). These iron overload as well as oxidative stress resulting in free radical formation can cause various complications in transfusion dependent thalassaemia and also involvement of multiple systems of the body such as endocrine system, hepatobiliary system, genitourinary system etc (Firkin *et al.*, 1990).

Conclusion

It is evident from this study that iron overload is mainly responsible for oxidative stress and free-radical formation causing various complications in transfusion dependent thalassaemia cases. So, it is logistic to administer iron chelators in suitable dose depending on the level of ferritin and also to administer suitable antioxidant in the treatment of the thalassaemia cases. This is a pilot study and warrants long term prospective study to strengthen this view.

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