
The effect of transfusion on pulmonary function tests in patients with thalassemia

Duran CANATAN¹, Necati KOÇ²

¹ Department of Pediatric Hematology, Süleyman Demirel University Medical Faculty, Isparta,
² Division of Respiratory Diseases, Antalya State Hospital, Antalya, TURKEY

Turk J Haematol 2004;21(3): 137-139

Received: 31.03.2004 **Accepted:** 17.06.2004

ABSTRACT

Our aim in this study was to investigate the effects of transfusion on pulmonary function tests (PFT) in patients with thalassemia. A total of 43 patients (34 major, 6 intermedia and 3 S/B thalasseemics), 21 females and 22 males aged 6 to 29 (mean \pm SD: 13.82 \pm 4.96) years participated. PFT was performed using a spirometry (ST-250) programmed with European Community for Coal and a Steel (ECCS) equations. Transfusion did not effect the PFT parameters at the pre- and posttransfusion period and but the type of pulmonary function disorders partially changed after transfusion in our patients.

Key Words: Transfusion, Pulmonary function test, Thalassemia.

ÖZET

Talasemili hastalarda transfüzyonun solunum fonksiyon testlerine etkisi

Bu çalışmada amacımız talasemili hastalarda transfüzyonun solunum fonksiyon testlerine (SFT) etkisini saptamaktı. Kırküç olgu (34 majör, 6 intermedia ve 2 S/B talasemili hasta, çalışmaya alındı. Yirmibir kadın ve 22 erkek hasta 6-29 yaşlarında idi (ortalama \pm SD: 13.82 \pm 4.96 yıl). SFT, ECCS ile programlı ST-250 spirometre ile yapıldı. Transfüzyon genelde pre- ve posttransfüzyon SFT'yi etkilemese de bozuk olan pulmoner fonksiyonun tipinde transfüzyondan sonra kısmi değişiklikler gözlemlendi.

Anahtar Kelimeler: Transfüzyon, Solunum fonksiyon testi, Talasemi.

INTRODUCTION

Thalassemic patients have chronic ventilatory and cardiocirculatory abnormalities^[1]. Progressive tissue iron deposition from multiple blood transfusions is common in thalassemia and pulmonary iron deposition may result in parenchymal damage^[2]. It has been noted by Keens in 1980 that patients with thalassemia have obstructive type of pulmonary function abnormality. Subsequently, both restrictive and obstructive patterns have been reported^[3]. Pulmonary function parameters were not correlated with age, cumulative volume of transfusion or serum ferritin levels^[4,5]. This study was to investigate the effects of transfusion on pulmonary function tests (PFT) in patients with thalassemia.

MATERIALS and METHODS

A total of 43 patients (34 major, 6 intermedia and 3 S/B thalassemics), 21 female and 22 males aged 6 to 29 (mean \pm SD: 13.82 \pm 4.96) years participated. There was no history of asthma, recurrent or recent respiratory tract infections or family history of lung disease.

PFT was performed just before transfusion and 1 hour after transfusion by using a spirometry (ST-250) programmed with European Community for Coal and a Steal (ECCS) equations. It calculates all predicted equations for age, height and weight. Forced vital capacity (FVC), forced expiratory volume in first and third second (FEV₁ and FEV₃), maximal mid-expiratory flow (MMEF) and peak expiratory flow rate (PEF) were measured but MMEF, FVC and FEV₁ were used as criteria for diagnosis.

RESULTS

PFT levels of patients at the pre- and post transfusion period were shown in Table 1. There is no statistically difference between pre- and posttransfusion. In pretransfusion period, the type of pulmonary function disorders were obstructive type in 5 (11.6%), restrictive type in 13 (30.2%) combined type in

Table 1. Pulmonary function tests at the pre- and posttransfusion period in thalassemia

Pulmonary function tests	Pretransfusion (mean \pm SD)%	Posttransfusion (mean \pm SD)%
FVC	66.5 \pm 13.6	65.9 \pm 15.3
FEV ₁	66.3 \pm 15.1	69.1 \pm 13.0
MMEF	62.4 \pm 37.7	70.9 \pm 35.5

14 (32.5%) and normal in 11 (25.6%) patients. In posttransfusion period, there was no obstructive type (0%), but restrictive type in 13 (30.2%) and combined type in 12 (27.9%) and normal in 18 (41.9%) patients.

DISCUSSION

Pulmonary function disorders such as the obstructive type in thalassemic patients may be due to recurrent pulmonary infections, hemosiderosis, widening of rib, extramedullary hematopoiesis and small airway obstruction and hyperinflation, while restrictive type occurs with increased lung fibrous tissue, cardiac failure and hepatosplenomegaly^[1-4]. Both restrictive and obstruction type seen in our patients were probably due to all causes.

It has been published that no pulmonary function parameters correlated with age, the number of transfusion or serum ferritin levels^[1-3]. Factor et al showed that there was an inverse significant correlation between total lung capacity and age, transfusional iron burden and desferrioxamine therapy^[5]. We could not find any correlation between these parameters and PFT.

In thalassemic patients with a restrictive pattern, the effect of diuresis on the pulmonary function has been studied and not found to change with diuretic^[4]. Bacalo et al showed a significant drop at arterial oxygen tension and FVC following transfusion^[6]. There was no statistical difference at the FVC, FEV₁ and MMEF following transfusion in our patients. The number of restrictive and

combined pattern in our patients did not change in pre- and posttransfusion period.

As conclusion, there was no change in PFT parameters at the pre- and posttransfusion but the type of pulmonary function disorders partially change after transfusion.

REFERENCES

1. Tai DY, Wang YT, Lou J, Wang WY, Mak KH, Cheng HK. Lung in thalassemia major patients receiving regular transfusion. *Eur Respir J* 1996;9:1389-94.
2. Luyt DK, Richards GA, Roode H, Dowdeswell RJ, Van Rensburg AJ, Reinach SG. Thalassemia: lung function with reference to iron studies and reactive oxidant status. *Ped Hematol Oncol* 1993;10:143-23.
3. Vergin C, Ersoy B, Güçlü S, Orhan Ö, Bak M, Eryılmaz N. Pulmonary function in thalassemia major. *Medical Journal Ege University* 1993:117-20.
4. Lands LC, Woods S, Katsardis C, Desmond K, Coates AL. The effects of diuresis and transfusion on pulmonary function in children with thalassemia major. *Pediatr Pulmonol* 1991;11:340-4.
5. Factor JM, Pottipati SR, Rappoport I, Rosner IK, Lesser MI, Giardiana PJ. Pulmonary function abnormalities in thalassemia major and role of iron overload. *Am J Resp Crit Care Med* 1994;149:1570-4.
6. Bacalo A, Kivity S, Heno N, Greif J, Topilsky M. Blood transfusion and lung function in children with thalassemia major. *Chest* 1992;101:362-5.

Address for Correspondence:

Duran CANATAN, MD

Department of Pediatric Hematology
Süleyman Demirel University Medical Faculty
Isparta, TURKEY