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Journal of Hematology & Transfusion

Short Communication

Thalassemia Screening from Highland to Seaside: Malaria Hypothesis in South of Turkey

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Submitted: 20 March 2017

Accepted: 17 April 2017

Published: 19 April 2017

ISSN: 2333-6684

Keywords

- Thalassemia
- Screening
- Malariahypothesis

Abstract

The concurrence of malaria and hemoglobinopathies, observed in malaria endemic regions, reflects the phenomenon of natural selection. The incidence of alpha and beta Thalassemia is very high at the seaside locations related with malaria in the worldwide. The aim of this study is to investigate the distribution of thalassemia from highland to seaside and show due to malaria hypothesis in Turkey. While theincidence of thalassemia is 3.3% in highland, itis 12.3% in seaside. This study isfirst screening for supporting malaria hypotesis because the immigration roads from to seaside was screened for beta-thalassemia in South of Turkey.

INTRODUCTION

Haemoglobinopathies constitute the common estrecessive monogenic disorders worldwide. There is a high incidence in populations from the Mediterranean basin, throughout the Middle East, the Indian subcontinent, Southeast Asia, and Melanesia to the Pacific Islands [1]. Hemoglobinopathies and malaria coincides overlapping geographic distribution. According to Haldane hypothesis, the height of the prevalence of thalassemia in populations living in the Mediterranean region is explained by the fact that heterozygotes resistant Plasmodium falciparuma [2].

The aim of this study is to investigate the distribution of Thalassemia from highland to seaside and show decreasing the incidence of thalassemia due to malaria hypothesis.

MATERIAL AND METHODS

Köprüçay River that is famous river for rafting between Antalya and Isparta was selected for this project because the source of Köprüçay River starts from highland (about 1200 meter) flows Mediterranean Sea. Çaltepe, Yeşilbağ, Değirmenözü and Beşkonak village sare located at highland and Kumköy village at seaside. The highland population including four villages was about 800 while the seaside population including one villlage is about 400. A total 1200 persons are living who we screened 490 persons thus the sample size is representative of people staying in these regions.

The study was carried out in accordance with the ethical standards laid down in the World Medical Association Declaration of Helsinki. Screening team explained about thalassemia to all villagers once again and randomly obtained blood samples from a person from each family. A total 490 blood samples were picked up and 60 out of in Yeşilbağ, 64 in Değirmenöz , 72 in Çaltepe, 140 in Beşkonak and 154 in Kumköy. Peripheral blood was taken into an EDTA tube and the complete blood count and red blood cell indices were measured by a Coulte automated cell counter. Electrophoresis was done by High performance liquid chromatography (HPLC) method. The persons with high hemoglobin A2 (> 3.5%) have been elevated as beta-thalassemia carrier.

RESULTS

The mean of Hb level an dthe incidence of micrositer anemia were found as 12.56 + 1.62g/dl and 7.14 % (n:24) respectively in 336 samples from highland villages, Yeşilbağ, Değirmenözü, Çaltepe and Beşkonak. However, 154 samples were analysed in Kumköy that is a seaside village, and the mean of Hb level and micrositer anemia were found as 11.48 + 1.82g/dl and 33.7% (n: 52). A total 32 (6.5%) of 490 villagers were detected as beta-thalassemia carrier.The incidence of beta-thalassemia carrier has been increased from highland toward to seaside,while the mean of thalassemia trait in highland villages is 3.7%, in seaside villages is 12.3% (Table 1).

DISCUSSION

Malaria is one of the most wide spread infectious diseases of our time in the World. The concurrence of malaria and hemoglobinopathies, observed in malaria endemic regions, reflects the phenomenon of natural selection. The genetic resistance to malarial infection, particularly falciparum malaria, associated with the hemoglobinopathies [3,4].

First screening studies on thalassemia were performed by Aksoy in Turkey [5] but there is no study to explain malaria hypothesis in our country. Since ancients times, every year,

Table 1: The incidence of micrositer anemia and beta thalassemia trait.

Place	Mean Hb Level (g/dl)	Anemia n (%)	Beta thalassemia trait n (%)
Highland villages (n: 336)	12.56 ± 1.62	24 (7.14)	11 (3.27)
Seaside villages (n: 154)	12.56 ± 1.62	52 (33.76)	19 (12.33)

thousand of people from seaside of Antalya to the highlands of Isparta migrate between May and October. Thus, they escape from the mosquito and malaria.

The incidence of malaria was very high in seaside at the south of Turkey [6] therefore there was an anonymous sentence in Anatolia, "escape from place with rushy and goose, settle down the place with thyme and grouse" for the people of Mediterranean. They immigrated to keep away from malaria to uplands. There is no certain data about of Malaria prevalence in two regions but seaside is the high risk region in Turkey malaria map. While the incidence of thalassemia was found 13% in seaside in Antalya , its frequency is 3% in Isparta province which is located in the northern of Antalya [7,8].

Our hemoglobinopathy diagnostic center was established in 2003 and licensed by the Ministry of Health in 2004. Westudied a total of 89,981 blood samples from premarital tests for 10 years and the incidence of beta and alpha thalassemia trait was found to be 6.57 and 3.56%, respectively [9].

This study was designed for the malaria hypothesis. Villagers were scanned from the mountainsto the sea. The incidence of thalassemia in thisstudy is 3.3% in Yeşilbağand 3.1% in Değirmenözü where highland places are beginning of Köprüçay Riverthen 4.1% in Çaltepe and 4.2% in Beşkonak where midl and places of itandis 12.3 % in Kumköy where theestuarty of ittoMediterraneansea.

In conclusion, this study is first screening for supporting malaria hypotesis because the immigration roads from highland to seaside was screened for beta-thalassemia in South of Turkey.

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Cite this article

Canatan D (2017) Thalassemia Screening from Highland to Seaside: Malaria Hypothesis in South of Turkey. J Hematol Transfus 5(1): 1057.