PLATELET COUNT IN PERMANENT RESIDENTS OF HIGH ALTITUDE

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(Received on June 30, 1980)

Summary : Platelet count in 51 highlanders was studied at high altitude. A group of 48 age and sex matched lowlanders were studied at Sea level and then serially on exposure to 3658m for ten days for comparison. Highlanders had a significantly high platelet count. The results are reported and findings discussed.

Key words : platelet count high altitude highlanders lowlanders haemostasis

INTRODUCTION

Significant changes in haemostasis have been reported in lowlanders exposed to high altitude (1,2,3,4). Few of these might play a major role, singly or in combination with alterations in other body systems in the aetiopathogensis or in the progression of the various ill effects of high altitude exposure such as acute pulmonary oedema or acute mountain sickness. The exact mechanism of the development of these ailments in lowlanders still eludes us despite many studies (5,6,7,8). Recent upsurge of interest in this field has directed attention towards permanent residents of high altitude (highlanders) who are born and brought up in these areas. They hardly ever suffer from these ill effects to which some lowlanders scumb so readily, probably due to high level of adaptation of their body system to the environments.

Platelets play an important role in haemostasis. We have previously studied some aspects of this vital blood component in lowlanders exposed to highaltitude (3,4,9,10). Importance of the subject, continued paucity of reports on highlanders and to pursue the matter for better understanding, prompted this project. Platelet count was estimated in 51 normal highlanders at high altitude. A group of 48 age and sex matched lowlanders were also studied, serially on exposure to high altitude for comparison. The results are reported.

January-March 1981
Ind. J. Physiol. Pharmac.

MATERIALS AND METHODS

Nintynine, healthy male volunteers 19-41 years of age were studied in the following groups :—

Group 'A'— Fortyeight subjects normally resident at altitude lower than 1000m (lowlanders) who had never been exposed to high altitude. Their mean age was 24.5 years.

Group 'B'— Fiftyone permanent resident of high altitude, born and brought up at altitude above 3000m (highlanders) who had never been to lower altitude. Their mean age was 27.3 years.

Both the groups were comparable in anthropometric parameters and physical training. All subjects stayed in centrally heated laboratories kept at 28°C±2°C. They were detained in the laboratory for at least 3 days for stabilisation. Every effort was made to exclude physical and mental stress throughout the study.

Studies were carried out on group A at 198m above mean sea level (hence forth called sea level) and then serially on days 1,2,4,10 of their arrival to 3658m by air. The same team studied group B at an altitude of 3658m. Platelet counts were done from fasting blood collected in ethylene diamine tetra acetic acid using siliconised apparatus. Counts were performed in duplicate using an optical microscope within one hour of the venepuncture. Duplicate counts with a difference of greater than 5% were discarded and repeated The procedure was standardised as rigidly as was practicable. The subjects were resting in bed most of the time. They had fasted overnight and no smoking was permitted for 4 hours prior to the venepuncture. Hematocrits were done in all samples and the observed platelet counts were corrected for hemoconcentration by multiplying the observed platelet count by a factor control hematocrit-hematocrit.

RESULTS

Two hundred and ninety one samples were studied for platelet count. The mean platelet count at sea level in the lowlanders was 226,000/cmm. No significant change from the sea level was noted in them on induction to high altitude. However, the mean platelet count in the highlanders was 403,400/cmm and was significantly high ($P<0.001$) when compared with the lowlanders (Table I). The minimum platelet count in highlanders noted was 340,600/cmm and the maximum was 519,600/cmm. Mean hematocrit in the lowlanders and highlanders was 46.2±2.5% and 52.0±3.5% respectively It was significantly high ($P<0.01$) in the highlanders.

TABLE I : Corrected platelet count (000) in lowlanders (A) and highlanders (B).

	A				B
Sea level	*Days at high altitude*				
	1	2	4	10	
226.0	224.9	228.4	231.5	226.2	403.4
S.D.±28.4	±48.2	±44.3	±47.3	±31.2	±38.2
P value B vs A	<0.001	<0.001	<0.001	<0.001	—

DISCUSSION

Only a limited number of studies are available on the permanent residents of high altitude (11). It is likely that similar studies will provide more information and understanding for proper evaluation of changes recorded in lowlanders exposed to high mountains, especially in those who develop ill effects of such exposure.

Significant enhanced platelet adhesiveness has been noted only in those lowlanders who become symptomatic when airlifted to high altitude (3). However, no significant change in platelet count occurs in these subjects during 10 days of sojourn at 3658m. Present study reports a significantly high ($P<0.001$) platelet count in highlanders when compared with lowlanders. This is probably in response to hypoxia at high altitude. Whether platelet proliferation has any specific role to play in these circumstances or is just a by product of overall compensatory marrow hyperplasis, as a result of prolonged hypoxia, is not yet clear Our data suggests that high platelet count has no direct role in causation of ill effects of exposure but functional alterations due to qualitative changes in them may contribute significantly. It is supported by our earlier findings, (3,4). This, however, requires further long term controlled studies for proper understanding and evaluation.

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