SCREENING FOR PLATELET ABNORMALITIES IN NORMAL SCHOOL CHILDREN IN KUALA LUMPUR

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INTRODUCTION

The finding of a prolonged bleeding time in a patient whose platelet count is normal suggests some abnormality in the function of the platelets. This situation may be due to an inherent platelet defect or to the deficiency of a plasma factor necessary for some aspect of platelet function. Defects of platelet function are also seen in a wide range of disease states and may be caused by many different classes of drugs.[1]

Simple methods are available to identify abnormalities in platelet numbers and/or function. Tests of platelet aggregation, using the aggregometer, are now widely used to investigate patients suspected of having platelet disorders.

We observed in the last four years that thrombocythopenia is quite common amongst children and bleeding from platelet dysfunction, congenital or acquired, is not rare in Malaysia.

This study was done to assess the prevalence of platelet abnormality in a section of the general 'healthy' population of school-going children and to study the possible causes of any abnormalities detected.

MATERIALS AND METHODS

A total of 1,299 school children, age ranging from ten to twelve years, from various schools in the Federal Territory was screened for platelet dysfunction. Consent from the parents or guardians was obtained prior to the investigation.

In addition to the routine medical and family history and physical examination, measurements of the bleeding time, platelet counts and whole blood clot retraction were made at the time of study; stools were collected for detection of ova and cysts. Any child on any drug within the last two weeks prior to the screening was rejected. The test of bleeding time was done by a single person throughout, using Duke's method[2] and the observation for whole blood clot retraction was made after one hour incubation following the formation of a clot.[3] Platelet counts were obtained using the Ultra-Flo 100 by Clay Adams[4] and the detection of ova and cysts by the direct method. All subjects had their stained peripheral blood films examined for any evidence of haematological abnormalities.

Abnormalities in any of the measurements taken would be followed up with a platelet function test using the Chrono-Log aggregometer (Chrono-Log Corp., Pennsylvania), by the method of Born.[5]

RESULTS

Table I shows the number of school children screened by ethnicity. Only four cases were found to have a bleeding time of more than ten minutes at the time of initial investigation. The normal value for the bleeding time in this study was taken to be less than ten minutes. The distribution curve (histogram) for these values is shown in Fig. 1. The bleeding time obtained in this study

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TABLE I
NUMBER OF SCHOOL CHILDREN SCREENED BY ETHNICITY

Ethnic group	No. screened	% from total
Malays	526	40.7
Chinese	573	44.1
Indians	200	15.4

ranges from one to sixteen minutes with a mean of three minutes.

The platelet count, whole blood clot retraction and stool investigations were found to be normal in all the cases mentioned above. A repeat of all the measurements in all the four cases, done a few months later, were found to be normal. Due to this finding, no further follow-up tests were done.

Two cases of low platelet counts, 105×10^9 /l and 100×10^9 /l respectively, were found amongst the screened school children but their bleeding times were within normal limits. Both these cases were boys. No abnormalities were detected in the other measurements done for these two cases, and a repeat examination, done several months later, revealed normal values. The distribution curve (histogram) for the platelet counts in the children studied is shown in Fig. 2.

DISCUSSION

The bleeding time has been used as a screening test for platelet dysfunction in our laboratory for many years. The Duke's method was utilised due to its inexpensive apparatus and the simple technique required to carry out the test. This method, though reproducible, has been shown to be less sensitive than the Ivy's method using the template in detecting moderate bleeding disorders.[6] It also has a wider normal range as compared to the Ivy's method. In our experience, a Duke bleeding time greater than ten minutes always represents a clinically significant abnormal bleeding time.

Though the bleeding time in the four cases was found to be more than ten minutes at the time of initial investigation, a repeat of the bleeding time a few months later gave normal values. This might suggest an acquired platelet dysfunction which has corrected itself. The fact that many

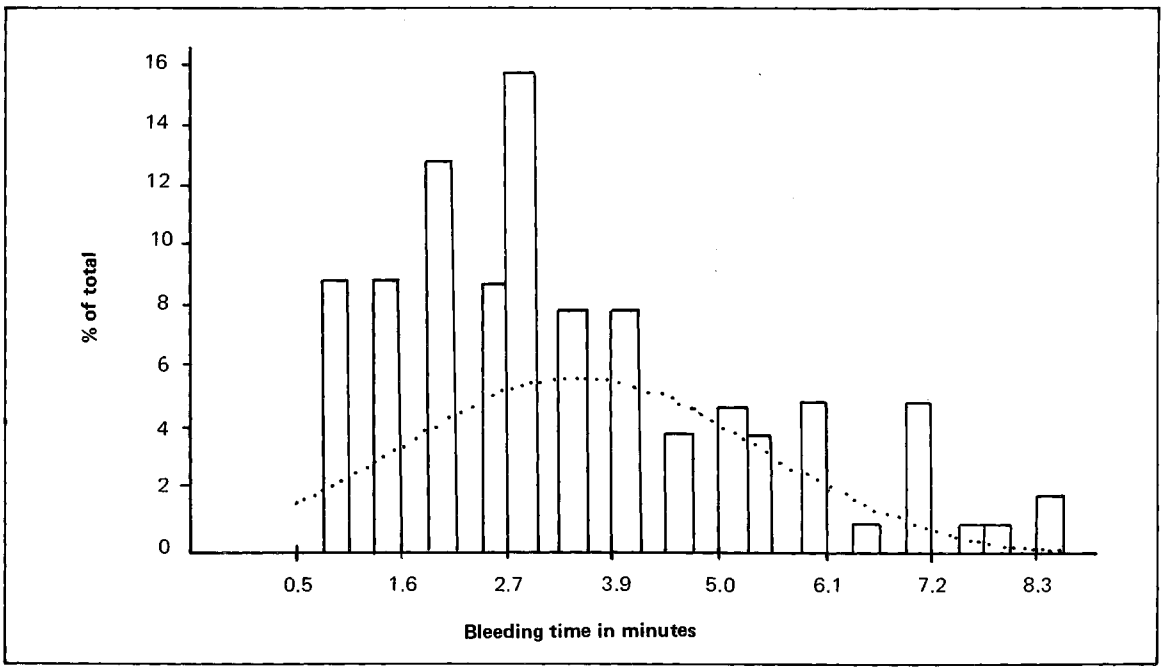

Fig. 1 The distribution curve (histogram) for the bleeding time values. (Note: the computer printout includes a normal Gaussian curve, shown in dotted line, for comparison.)

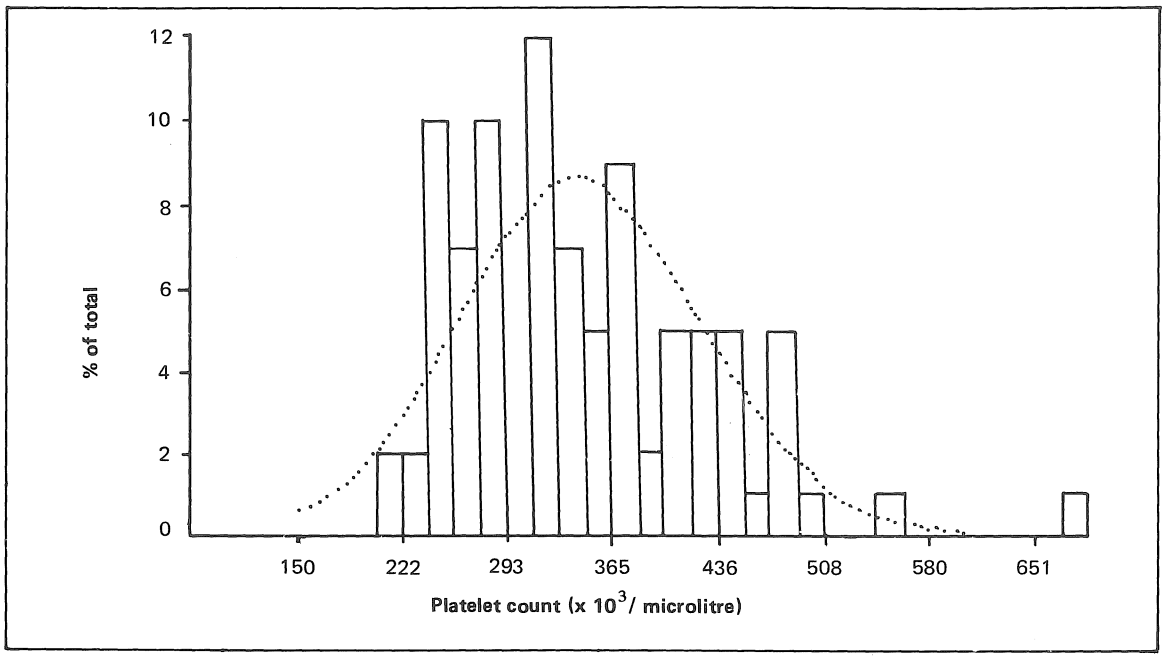

Fig. 2 The distribution curve (histogram) for the platelet counts. (Note: the computer printout includes a normal Gaussian curve, shown in dotted lines, for comparison.)

classes of drugs and some food could cause defects in the platelet function which give rise to prolonged bleeding time has not been overlooked, but it would be difficult to prove this relationship in any of the cases. The four cases (two Chinese and two Indians) denied taking any drugs or traditional herbs. The possibility that the prolonged bleeding time in the cases mentioned above was caused by drugs ingested prior to the investigation, even in the absence of a positive drug history, cannot be ruled out, as the children might not be aware of what was given to them by their parents in the two weeks prior to the tests. Many traditional remedies given for minor ailments may contain compounds that can compromise platelet function.

Thrombocytopenia is not uncommon amongst children with bleeding disorders referred to this Division. Over the past four years (1982 – 1985 inclusive), of 55 children with bleeding disorders seen in this Division, nine were due to some defect in platelet functions and five due to low platelet count. In this study, however, only two cases of low platelet counts were obtained. Neither of them had a prolonged bleeding time; there were sufficient numbers of platelets present (counts of 100×10^9/l and 105×10^9/l respectively) to ensure adequacy in function *in vivo.* The counts returned to normal several months later. Viral infections are said to cause a thrombocytopenic condition. Since there was no evidence of viral infection in the peripheral blood film, no serological tests were done, but subclinical viral infection cannot be ruled out. Drugs and chemicals have been shown to be a common cause of moderate to severe thrombocytopenia. However, in neither case was a history of exposure to drugs or chemicals elicited.

From the results obtained in this study, we conclude that the prevalence of the platelet dysfunction in the general 'healthy' population of school-going children in this country is very low. The investigation into the possible causes of abnormalities in the platelet function was not accomplished due to the absence of any case of persistent platelet dysfunction amongst the school children screened. The chances are that such dysfunctions probably reflect subclinical viral infections which explain its transient nature. Thrombocytopenia is also a rare finding and, again, transient in nature; the probability is, again, that viral infections are responsible for

causing these transient mild depressions in the platelet count without any outward clinical effect, although this is difficult to prove.

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