

ATYPICAL LYMPHOCYTE IN DENGUE HEMORRHAGIC FEVER: IT'S VALUE IN DIAGNOSIS

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INTRODUCTION

Dengue hemorrhagic fever (DHF) is an important public health problem in Southeast Asian and the Western Pacific regions, as it is among the ten leading causes of hospitalization in preschool children in many of the countries in these two regions (WHO, 1975). The stormy course of the disease which leads to shock and death, if not properly treated is the major medical problem confronting the clinicians. The prognosis of the disease depends upon the early recognition and the monitoring of preschool conditions. The diagnosis criteria that provide an early as well as accurate diagnosis are most desirable. The clinical criteria used at the Children's Hospital, Bangkok and recommended in the Technical Guides for diagnosis, treatment, surveillance, prevention and control of DHF have been shown to be valuable with 90% accuracy (WHO, 1975). The constant findings of sudden drop in platelets level preceded the onset of shock are unique in DHF (Nimmanitya, 1969, 1978, 1979; Halstead, 1981). Serial platelets and hematocrit determinations thus are essential for early diagnosis and the key note of the criteria. The high percentage of atypical lymphocytes in patients with secondary DHF have been reported (Suvatte and Longsamam, 1979; Well *et al.*, 1980). Suvatte *et al.* (1979) recommended the examination of the buffy coat preparation for atypical lymphocytes as an early and rapid diagnostic aid. Our study was designed to re-evaluate the diagnostic value of atypical lymphocytes in DHF since the study of Villaneuva (pers.

comm.) from the Philippines failed to support Suvatte and Longsamam (1979) report.

MATERIALS AND METHODS

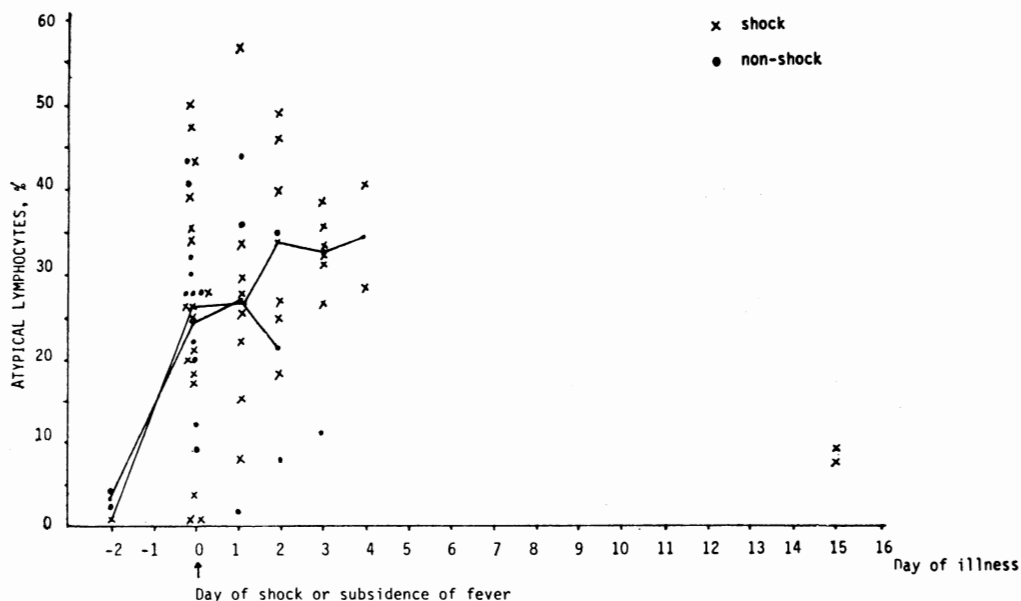
The study was conducted among 40 patients with clinical diagnosis of DHF admitted to the Children's Hospital, Bangkok. All were etiologically confirmed as dengue infection by serology and or virus isolation. They were all with secondary dengue infection by WHO criteria (WHO, 1975).

The control included 18 patients with bacterial infection, 18 other viral infections and 2 dengue fever associated with primary dengue infection. All were studied as follows: (1) Complete blood count which includes determination of hematocrit, white blood count, differential count and platelet count; (2) Buffy coat preparation and differential count.

RESULTS

The percentage of atypical lymphocytes was below 5% at 2 days before onset of shock or subsidence of fever. There was a significant rise of atypical lymphocytes in both shock and non-shock patients on the day of shock or subsidence of fever. The mean value of atypical lymphocytes was 26% with standard deviation of 12%. The persistence of atypical lymphocytosis was at least 4 days thereafter. On the 14th day after shock 2 patients with DHF show few atypical lymphocytes. Absence of atypical lymphocyte was found in 2 patients on the day of shock (Fig. 1).

ATYPICAL LYMPHOCYTE IN DENGUE HEMORRHAGIC FEVER



Serial determinations of atypical lymphocytes (buffy coat) in shock and non-shock (secondary) dengue hemorrhagic fever

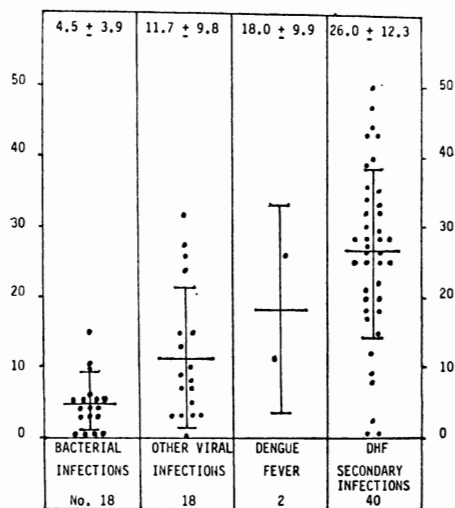
Fig. 1.

The percentage of atypical lymphocytes is significantly high in DHF when compared to bacterial and other viral infections ($p < 0.001$). Two patients with dengue fever associated with primary infection, who have no thrombocytopenia or hemoconcentration had atypical lymphocyte of 25% and 11% (Fig. 2).

Serial determinations of platelet count in patients with DHF revealed dropping in number of platelets within 1 day before shock or subsidence of fever in all patients. All patients had the platelet count below 100,000/c.mm and the level remained persistently low for at least 4 days after shock or subsidence of fever (Fig. 3).

Serial determination of hematocrit in patients with DHF showed highest hematocrit level which reflects the maximal leakage of plasma on the day of shock or subsidence of fever. The mean value of hematocrit appeared to be higher in the group with shock on the day of shock and 1 day thereafter. The lower level of hematocrit during convalescent

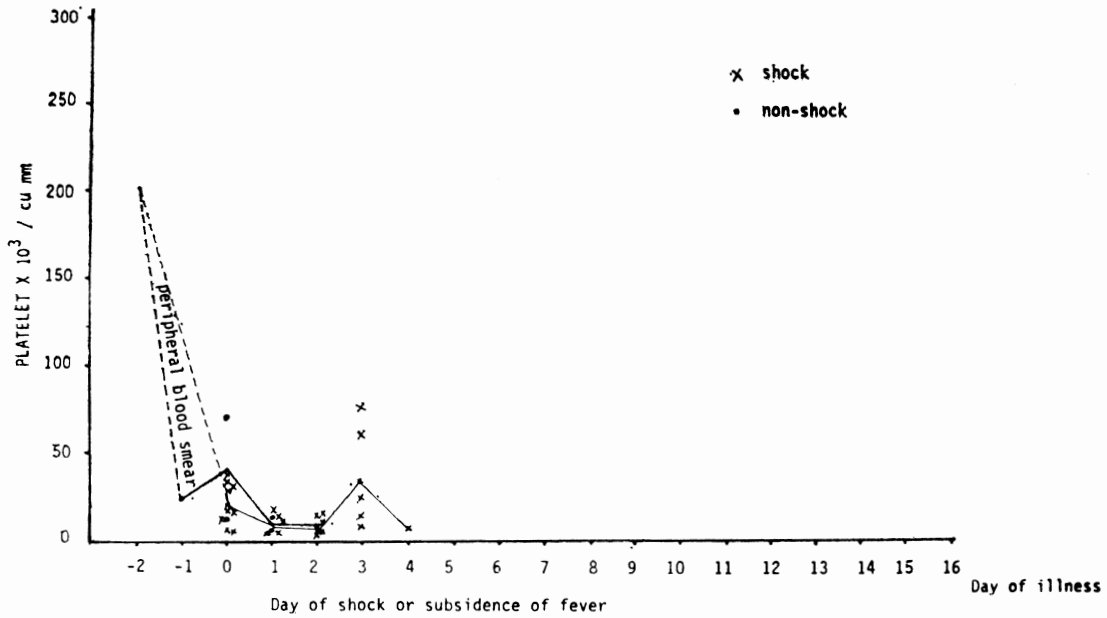
ATYPICAL LYMPHOCYTES IN PER CENT
(.mean \pm S.D.)



The percentage of atypical lymphocytes (buffy coat) from patients with bacterial infections, other viral infections, dengue fever, and (secondary) dengue hemorrhagic fever.

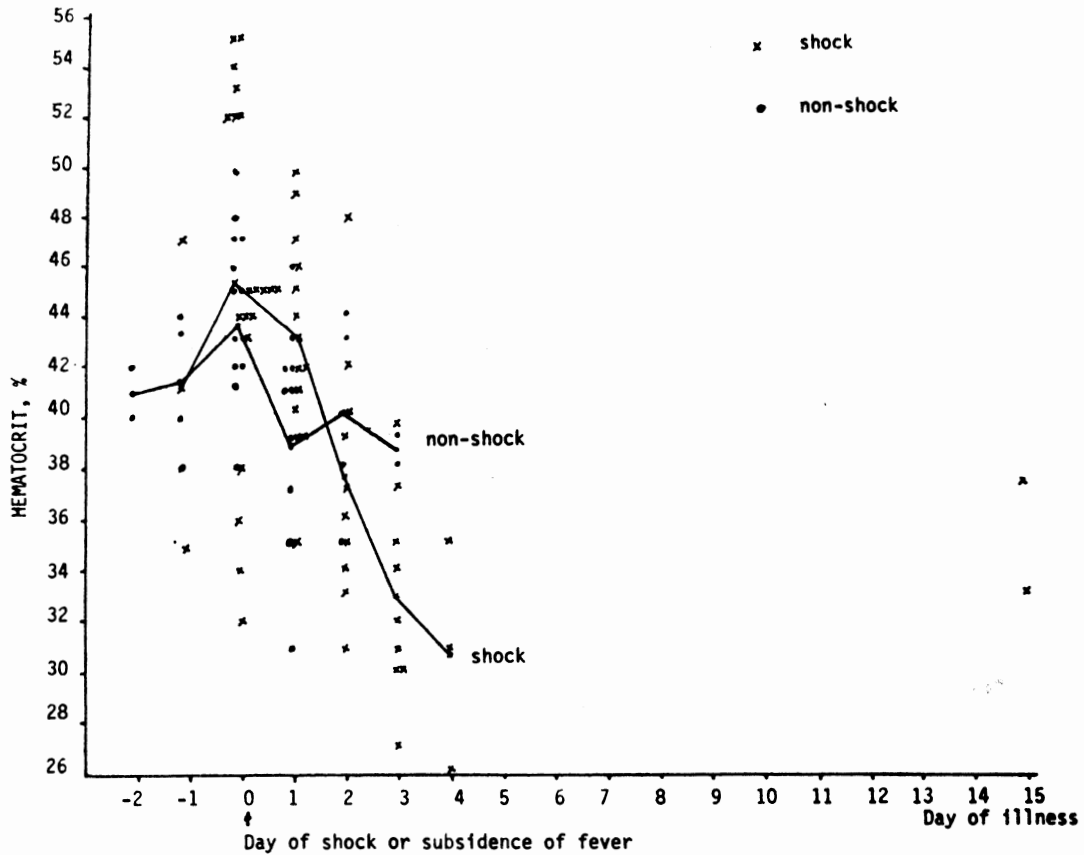
P value of bacterial infections VS (secondary) DHF less than 0.001
P value of other viral infections VS (secondary) DHF less than 0.001

Fig. 2.



Serial determinations of platelet count in shock and non-shock secondary dengue hemorrhagic fever

Fig. 3.



Serial determinations of hematocrit in shock and non-shock (secondary) dengue hemorrhagic fever

Fig. 4.

ATYPICAL LYMPHOCYTE IN DENGUE HEMORRHAGIC FEVER

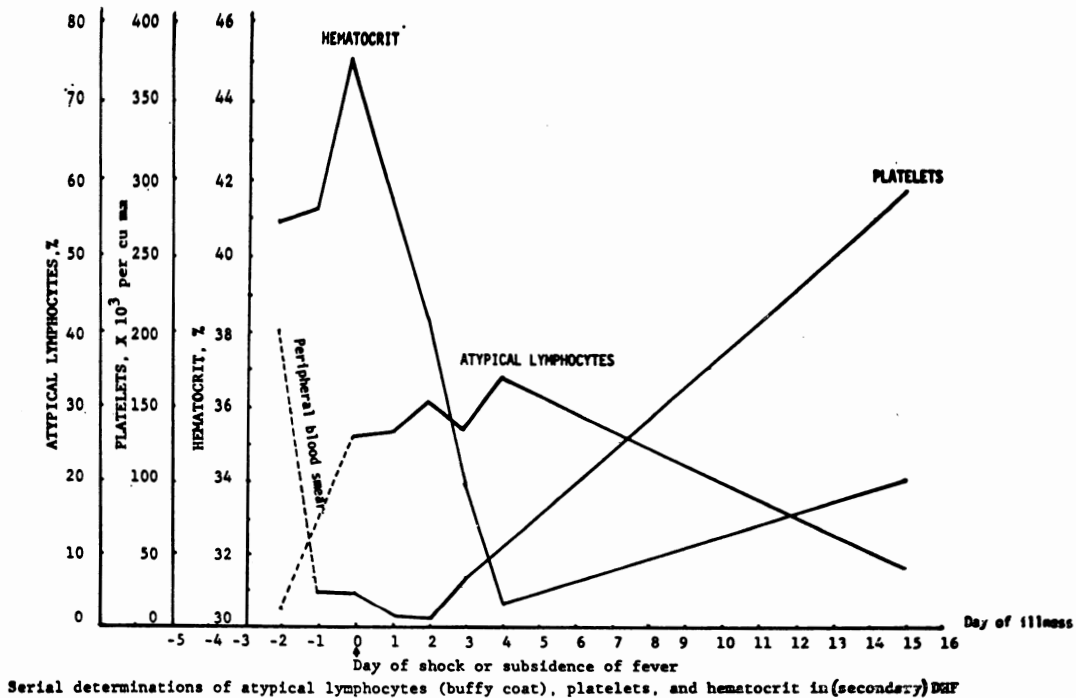


Fig. 5.

stage in shock patients was consistent with reabsorption of extravasated plasma and/or hemorrhage (Fig. 4).

Fig. 5 shows mean value of atypical lymphocytes, platelet count and hematocrit in 40 patients with DHF. On the day of shock or subsidence of fever, the platelet count was low, the hematocrit level was high as well as high percentage of atypical lymphocytes. The significant rise of atypical lymphocytes was not earlier than the drop in platelets or the rise of the hematocrit level.

DISCUSSION

The major pathophysiologic change in DHF is leakage of plasma that leads to hypovolemic shock, if the lost plasma is critical. The rising of hematocrit thus indicates the onset as well as the magnitude of leakage (Nimmannitya, 1978). The dropping of platelets is usually shortly before or simul-

taneously with the rise of hematocrit. Serial platelet count and hematocrit determinations in patient suspected of DHF on the grounds of having high fever, petechiae and/or positive tourniquet test, hepatomegaly thus are of diagnostic and prognostic value. With these simple and reliable tests the monitoring of preshock which results in modification of the disease severity is possible (WHO, 1975; Nimmannitya, 1969, 1978, 1979).

Our study demonstrated that the number of atypical lymphocytes is unusually high in DHF as compared to other viral and bacterial infections and thus may be used as supported evidence in diagnosis. The time course relationship in its appearance in relation to the onset of shock however does not appear to be earlier than the drop of platelets and rise of hematocrit. Its absence on the day of shock in some patients is of greater concern. It thus appears that the diagnostic value of atypical lymphocytes in DHF is not

greater than serial platelet and hematocrit determination.

SUMMARY

Simple peripheral and buffy coat smear were studied in 40 serological confirmed dengue hemorrhagic fever patients, and in other patients with viral and bacterial infections. Atypical lymphocytosis was found in majority of dengue hemorrhagic fever both associated with secondary and also in dengue fever with primary infection as compared to other infections. The time course relationship of atypical lymphocytosis, platelet and hematocrit level were discussed, concerning their value as diagnostic and prognostic criteria in dengue hemorrhagic fever.

ACKNOWLEDGEMENTS

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