ORIGINAL ARTICLE

The Micro Erythrocyte Sedimentation Rate (ESR) Among Children of the Tobacco Plantation Laborers in North Sumatra

by

ANWAR NAPITUPULU, REHMAMANA SEMBIRING, CHAIRUDDIN P. LUBIS, S.M. MANOEROENG and HELENA SIREGAR

(From the Department of Child Health, Medical School, University of North Sumatera, Medan)

Abstract

Ninety-four children of the Tobacco Plantation Laborers of the PTP IX, aged between 2 months and 12 years, were investigated on erythrocyte sedimentation rate with the micro ESR method.

In the group of 0 - 1 year the mean ESR was : 16,6 mm/hour; 1 - 3 years: 20,4 mm/hour; 3 - 6 years : 19,3 mm/hour; 6 - 12 years : 21,3 mm/hour.

The values ranged from 0 - 36 mm/hour. The results were higher compared with those in the previous reports of other authors. The ESR test may be useful as an aid in the evaluation of an infectious disease in children, especially because the test requires only simple and inexpensive procedures.

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Introduction

Measurement of the rate of sedimentation of red cells, a frequently used non-specific test, which may indicate the presence of inflammation or occult disease, confirms the presence of disease diagnosed by other means or serves as a guide in following the course of a disease. A significant increase of the Erythrocyte Sedimentation Rate (ESR) value may suggest an organic disease, even if clinical and other laboratory studies are negative.

Conversely, a normal ESR is reassuring in a patient who is believed to have no organic disease, though a normal ESR does not rule out the presence of an organic disease. ESR is often used clinically as an aid in establishing the diagnosis and predicting the prognosis of a disease. It can be performed easily in adults, but not in children especially in babies.

In the macro method the difficulties lie in the great amount of blood needed and the small size of the veins of the babies. The micro ESR method requires only a few drops of blood obtained from a finger tip.

Landau (1933) and Smith (1936) developed this micro method; Evans (1970) and Lascari (1972) reported its use in neonates. This report described a modification of the micro sedimentation rate, which is called the micro ESR.

This modification has the advantage of making the ESR determination easily without purchasing special equipments and eliminates the need for much venous blood sample.

The standard values of the micro method in children have never been reported in Indonesia. The purpose of this study is to obtain the micro ESR as described by Adler (1975) in healthy children of Tobacco Plantation Laborers in North Sumatera.

Material and method

This investigation was performed by one same person in five plantations of PTP IX from February 7, 1977 till February 16, 1977. The distance of the plantations from Medan ranged from 6 - 55 kilometers. The material in this study consisted of 94 healthy children of Tobacco Plantation Laborers, 51 boys and 43 girls (Table 1). The criteria of healthy children are : no history of suffering from any disease, no abnormality on physical examination, and no anaemia.

Out of 358 children only 94 fulfilled the above criteria. The ages ranged from 2 months to 12 years. The method as described by Adler and Denton (1975) is as follows :

Blood is obtained by finger tip, heel, or toe puncture. The blood enters into a heparinized microhematocrit tube. The internal diameter of the tube is 1,1 - 1.2 mm, 75 mm long and 0,2 mm thick. Each tube contains 2 USP Units Ammonium heparin.

The tube is filled rapidly and completely. Air is not allowed to interrupt the column of blood. One end of the tube is scaled with 2 - 3 mm of clay and excess blood is wiped off the opposite end. The tube is taped immediately to a surface which holds the tube vertically. The distance from the top of the tube meniscus to the packed red cell column after one hour is the value reported, expressed in mm/hour. If a thick red tail of red blood cells remains at the end of one hour, or if clotting is formed in the tube, the test is repeated.

The hematocrit is measured in the same capillary tube after the ESR has been determined. All ESR with hematocrit less than 42% is corrected to 42% using the Wintrobe correcting chart (Wintrobe and Linsberg, 1935).

The corrected values are arranged in age groups of : 0 - 1 year, 1 - 3 years, 3 - 6 years and 6 - 12 years.

Results

The Mean Micro ESR in 94 children is :

0 - 1 year : 16.6 mm/hour; 1 - 3 years : 20.4 mm/hour; 3 - 6 years : 19.3 mm/hour; 6 - 12 years : 21.3 mm/hour (Table 2).

The mean values of the figure represent the determinations done in each age group. The values found (in cross marks) are compared to the values (in dotted marks) reported by Landau (1933) (Fig. 1).

Discusion

The Micro ESR is a simple, yet inexpensive test requiring only a few drops of capillary blood and a readily available micro hematocrit tube, hence it suites every newborn infant, and can be used as a hematocrit determination too.

It can be performed in children as well as in babies. The small lumen and the shortness of the capillary tube (small height) can retard the Micro ESR, but Adler and Denton (1975) proved that this had no great effect on the setting of the red cells.

The mean values in our normal group were higher than those reported by Landau (1933) : 1 month — 12 months : 3 mm/hour; 1 - 3 years : 3 mm/hour; 3 - 6 years : 3 mm/hour; 6 - 12 years : 3.5 mm/hour. Lascari (1972) reported that the micro ESR in children ranged from 0 - 20 mm/hour.

Our result was nearly the same as Lascari's (1972). Hillinger and Robinson (1953) did the ESR in children of 4 - 5 years. Our results were higher compared to their results (Table 3).

Sembiring et al. (1976) found the ESR in newborns between 2 and 16 mm per hour. The factor, that made the ESR values in this study higher than that reported by others, was not clear. Follow up investigation on micro ESR in children is still needed.

TABLE 1 : *Age and Sex Incidence of 94 children*

Age (year)	Boy	Girl	Total
0 — 1	4	4	8
1 — 3	17	12	29
3 — 6	17	8	25
6 — 12	13	19	32
Total	51	43	94

TABLE 2 : *The micro ESR of 94 children*

Age (year)	Total	Corrected ESR	mm/hour
0 — 1	8	9 — 30	16 — 63
1 — 3	29	9 — 27	20 — 37
3 — 6	25	7 — 31	19 — 28
6 — 12	32	0 — 36	21 — 28
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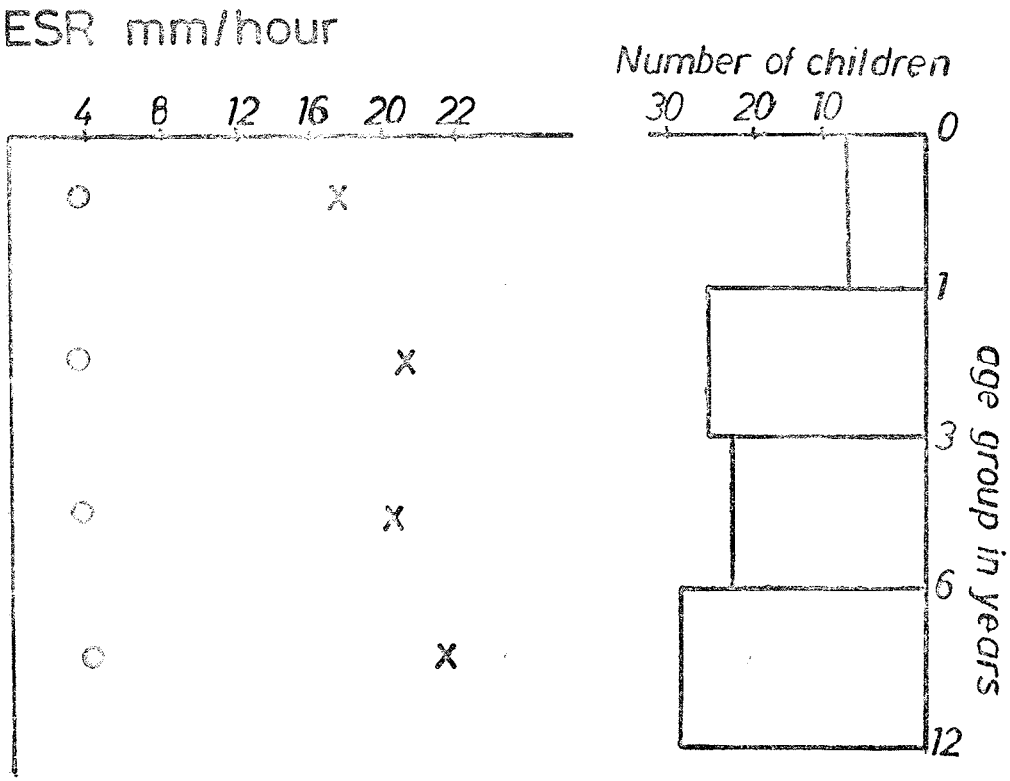
TABLE 3: *Micro ESR done by Hellinger and Robinson (1953)*

Age (year)	Micro LED (Mean)
4	11.4 mm/hour
5	14.5 mm/hour
6	9.2 mm/hour
7	11.6 mm/hour
8	9.1 mm/hour
9	8.7 mm/hour
10	7.2 mm/hour
11	7.6 mm/hour
12	9.8 mm/hour
13	7.8 mm/hour
14	9.2 mm/hour
15	6.3 mm/hour

FIG. 1 : *Mean Micro ESR in PTP IX children (X) compared with that reported by Landau. (O) = Normal values by Landau (1953); (X) = PTP IX children*



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