

Review article

Erythrocyte sedimentation rate in tropical intraerythrocytic blood infection

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Abstract

Erythrocyte sedimentation rate (ESR) determination is a classical hematological test. Although it is a non specific laboratory parameter it is still widely used in present medicine. The author hereby briefly reviews and discusses on clinical importance of ESR test for important tropical intraerythrocytic blood infection (malaria, leishmaniasis and babesiosis).

Keywords: Sedimentation; Malaria; Leishmaniasis; Babesiosis

INTRODUCTION

Erythrocyte sedimentation rate (ESR) is an important hematological parameter. This test is accepted as a basic laboratory investigation in laboratory medicine. The test is classified as a non specific laboratory test. The ESR is accepted as an important non specific hematology parameter^[1,2]. ESR is presently widely used as a laboratory test in clinical medicine^[1,2]. It is basically used for primary detection and screening for several medical disorders. Several medical conditions can alter the ESR. Those changes are usually due to the inflammatory process. The change of EST is useful for diagnostic propose. In this brief article, the author will discuss and describe for the ESR test for important tropical intraerythrocytic blood infection (malaria, leishmaniasis and babesiosis).

Basic principle of ESR test^[1,2]

Basic principle of ESR test is not difficult to understand. The test bases primarily on basic physics principles. In the ESR determination, the erythrocyte is basically tested for its physical properties.

The test has been used for several years in laboratory medicine. At present, although it is not specific it is still useful and widely used in clinical practice. Focusing on the mechanism for determination of ESR, the basic rheology can be used for explanation. Considering the method for determination of ESR, there are many presently used methods. However, the gold standard method in laboratory medicine is Westergren method. Also, there are many other alternative methods including Sediplast (erythrocyte sedimentation pipette method) and Seditainer (vacuum blood collection based method). Good reliability and correlation among those presently tests are accepted. It should be noted that any testes should have good quality control in processing. It should also be mentioned that all tests still base on the same basic test principle. The basic rheology principles can be applied. The basic physical principle of falling in viscous fluid can be applied. The sedimentation is the scenario of falling of particles in viscous fluid. In ESR case, the particles are red blood cells and the viscous fluid is blood plasma. The falling is due to the gravity and there is a counteracting process due to floating property of the fluid, blood plasma. The resulted force is due to the resulted force vector between gravity and floating force. For sure, gravity force is more than floating force and these results in sedimentation of red blood cells. It can be seen that there are two main factors determining the sedimentation: the falling particles and fluid. Therefore,

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both red blood cells and blood plasma are important determinants for ESR. Any disorders of red blood cells or blood plasma can affect the result of ESR determination. Rheologically, the stages of red cell sedimentation are a) aggregation between red blood cells to form red blood cell mass and b) the actual stage for settling down or falling stage. The basic standard time to determine the ESR is one hour or 60 minute and the result is reported in millimeter per hour. It should also be noted that external environment also affects the ESR. For example, temperature can affect the ESR result. The consideration on environment is necessary in quality control of ESR test.

ESR in malaria

Malaria is a tropical mosquito borne infection. It is high prevalent in many tropical countries. The intraerythrocytic plasmodium infection is the hallmark of malaria. High fever with chill in case with history of entering into endemic area is the common presentation of malaria. The role of ESR test in malaria is widely discussed^[3-7]. As an acute febrile illness, acute phase reactants can bring increased ESR in malaria^[3,4]. In addition, the malarial parasite is also accepted as extra-mass adding to the affected red blood cell. Based on the recent published paper by Wiwanitkit, the proportion of increased ESR is varied to the percentage of parasitemia in malaria. The following up of ESR can be useful in both primary diagnosis, high ESR, and determining response to treatment, lowered ESR^[5-7].

ESR in leishmaniasis

Leishmaniasis is a tropical fly borne disease. This infection is common in the Middle East. Both cutaneous and visceral forms of leishmaniasis are listed in medicine. The role of EST test in leishmaniasis is also mentioned. Similar to malaria, acute phase reactants bringing increased ESR can be seen in leishmaniasis. Mass adding due to leishmanial parasite can also fasten the sedimentation rate. It is also noted that ESR is useful in discriminate between clinical and subclinical forms of leishmaniasis^[8-10]. It is proved that higher ESR can be seen in clinical form of leishmaniasis^[8-10]. In addition, this can imply the usefulness of continuous declined ESR as an important determinant for succeed in treatment of leishmaniasis.

ESR in babesiosis

Babesiosis is another important tropical blood infection. The endemic area of babesiosis is tropical South America. The similar clinical manifestation to malaria can be seen. The clinical usefulness of ESR in human babesiosis has never been reported. However, there is an evidence confirming high ESR in canine banesiosis^[11]. The similar high ESR in human babesiosis can be expected.

CONCLUSION

ESR is a basic hematological test that can be useful in diagnosis and following up of tropical intraerythrocytic blood infection.

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