Original Research Paper

Pathology

COMPARISON OF ESR VALUES MEASURED BY AUTOMATED AND MANUAL METHODS

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ABSTRACT
INTRODUCTION: Erythrocytes sedimentation rate at which red blood cells in whole blood descend in a standarisedtube in a period of one hour. ESR ia a very useful investigation in assessing diagnostic and prognostic aspect of the disease. It is used in the diagnosis of autoimmune diseases . The aimof the study is to compare between ESR values measured by automated and manualmethods.The present study was done in a tertiary care center at Saveetha Medical College

MATERIALS AND METHOD: This is a retrospective study which was carried out in haematology lab of Saveetha Medical College and Hospital Chennai. The ESR values of hundred patients were compared .The manual method used in our hospital is Westergren method(9). In this method 2ml of venous blood is collected in a tube containing 0.5 ml of sodium citrate. Then the tube is placed vertically for one hour. The values are measured in millimetres in 1 hour. The automated analyser used is Roller 20 [code SI R20 LC].The principle of thisanalyser is photometrical capillary stopped flow kinetic analysis.Given in mm/hr. Range – 2 to120 mm/hr.

RESULT: The mean of ESR calculated from the values obtained by manual method is 37.34.The mean of ESR calculated from the values obtained by automated method was 31.91.The mean of the ESR obtained frommanual methods were found to be higher than the values obtained fromautomated methods.

CONCLUSION: When the automated and manual ESR measuring methods were compared there was a marked discrepancy in the results regarding high ESR values. It was not the same for normal ESR values,which is unacceptable .Similar findings were noted by other researchers. Hence it is required to use some correction methods(3)(2). Hence ESR is a very useful in the diagnosis of many infections,diseases, chronic inflammation.

KEYWORDS :

INTRODUCTION

Erythrocyte sedimentation rate is the rate at which red blood cells in whole blood descend in a standardised tube in a period of one hour. It is acommon haematology test.It is a very useful investigation in assessing the diagnostic and more importantly prognostic aspect of the disease. ESR is useful in the diagnosis of trauma, infection , malignant disease, and other autoimmune diseases.(4). It serves as an indicator of chronic inflammation.

But now automated ESR is used widely sinvce in manual methods the lab physicians will have to handle blood manually. Due to increase in blood borne diseases like HIV and Hepatitis B it is always safer to use automated methods. It consumes less time .

The aimof my study is to compare the values of ESR obtained frommanualand automatedmethods.My study was done in the haematology lab in the tertiary care center – Saveetha Medical College And Hospital.The study was done using the blood samples of hundred patients.The picture show the rouleaux formation.The rouleaux formation islargely determined by increased levels of plasma fibrinogens and globulins. The orginal method recommended by the ICSH is based on that of Fahraeus and Westerner.(5)(10).

Some interferences which increase ESR
1) Increased levels of fibrinogens and globulin.
2) Technical factors such as tilted tube , high roomt emperature.

Someinterferences which decrease ESR
1) Abnormally shaped RBC (sickle cells, sperocytosis)
2) Technical errors such as short ESR tbes,low roomtemperature, clotted blood sample,excess blood coagulants,bubbles in tube.
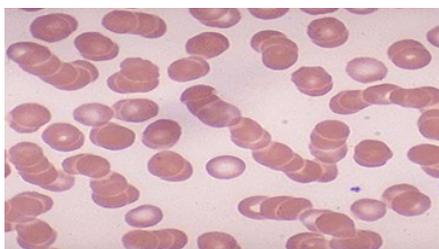
CLINICAL UTILITY

ESR can be used in the diagnosis of of Hodgkin disease,prostatic cancer , rheumatoid arthritis.(4), chronic inflammation, polycythemia, sickle cell, spherocytosis.

MATERIALS AND METHODS
Manual : Westergren

This method requires collection of 2ml of venous blood in a tube containing 0.5ml ofsodiumcitrate. It should be placed vertically in a rack for 1hour at room temperature.It should not be stored for more than two hours.The distance of fall of erythrocytes expressed in millimetre in one hour , is the ESR.

Automated : Roller 20 (code SI R20 – LC)(1).

The principle used is Photometrical capillary stopped flow kinetic analysis.

The result is expressed in mm/hr. Measures ESR values ranging between 2to 120mm/hr.

SAMPLE REQUIREMENT:

The sample must be whole blood collected in inEDTA anti coagulant. It is better to test the sample within two to six hours from venipuncture or within 24 hours hours if kept in +4/+8degree Celsius, provided it is rewarmed to room temperarture , before testing.

RESULT:

Erythrocytes sedimentation rate at which red blood cells in whole blood descend in a standarised tube in a period of one hour. ESR is a very useful investigation in assessing diagnostic and prognostic aspect of the disease. It is used in the diagnosis of autoimmune diseases . The aimof the study is to compare between ESR values measured by automated and manualmethods.The present study was done in a tertiary care center at Saveetha Medical Collegeand hospital Chennai.

 The mean for the ESR values measured using manual method was found to be 37.34.

 The mean for the ESR values measured using automated method was found to be 31.91.

Difference of mean values calculated using manual and automated was found to be 5.43

MEAN	MANUAL	AUTOMATED	DIFFERENCE
	37.34	31.91	5.43

Discrepancy in the results regarding high ESR values were found. This problem did not exist for normal and low ESR values .Insuch cases were there is high ESR values it is always better to use correction methods.Usage of such correction methods helps us to eliminate such discrepancies. It is always better to use manual methods in some special cases.

Automated analyser methods underestimated the values measured by manual methods.Since the values are underestimated , they cannot be accepted for clinical interpretation.(7).This was was clearly seen in samples which had high ESR values. The same was not evident in samples with low ESR values. The mean values of ESR measured by automated analyser was found to vary with the values measured by the manual methods. by The same findings were noted in other researches don eby researchers Arulselvi Subramanian,Kanchana Rangarajan, RavindraMohan Pandey, Jatin S Gandhi,Vijay Sharma, Sanjeev Kumar Bhoi. They also recommend the use of such correction methods to avoid discrepancies. So it is always better to use manual methods for higher ESR values , to prevent such discrepancies.

DISCUSSION:

Erythrocytes sedimentation rate at which red blood cells in whole blood descend in a standarisedtube in a period of one hour. ESR ia a very useful investigation in assessing diagnostic and prognostic aspect of the disease.

Erythrocyte sedimentation rate is used as an indicator forchronic inflammation,infection ,autoimmune disease,multiple myeloma, tempral arteritis, polymyalgia rheumatic , systemic lupus erythromatosus, chronic kidney disease , Kawasaki disease, infective endocarditis, sub acute thyroiditis, non infectious inflammatory disorders,inflammatory bowel diseaselike crohns disease and ulcerative cholitis.

The best manual method employed for the measurement of erythrocyte sedimentation rate is Westergren method. This methods has some disadvantages. It includesmodification such us using unopened samplesof blood. Due to increase in the rate of blood borne diseases such as Hepatitis B , HIV infections ,westergren methods and other manual methods are avoided. This may be one reason as to why automated methods are recommended over manual methods. The time consumed by automated methods were found to be less, compared to that of manual methods.

The Automated analyser used in our hospital (Saveetha Medical College and Hospital) is Automated : Roller 20 (code SI R20 – LC)(1).The principle used is Photometrical capillary stopped flow kinetic analysis. The result is expressed in mm/hr. Measures ESR values ranging between 2to 120mm/hr.Sample requirement: The sample must be whole blood collected in in E DTA anti coagulant. It is better to test the sample within two to six hours from venipuncture or within 24 hours hours if kept in +4/+8degree Celsius, provided it is rewarmed to room temperarture , before testing. I have compared my research with the research of Arulselvi Subramanian,Kanchana Rangarajan, RavindraMohan Pandey, Jatin S Gandhi,Vijay Sharma, Sanjeev Kumar Bhoi. The automated machine used in their research is Monitor 100. This automated ESR requires only thirty minutes to produce the result. Westergren was the manualmethod used. The manual method used was Westergren.Their study also showed a marked difference in the values of erythrocyte sedimentation rate measured by automated and manual method. They have also indicated that such discrepancies were experienced by other researchers(8). Another study(6)(7) also indicates low agreement between values measured by automated and manual methods. Thus it is recommended to use correction methodsto avoid such discrepancies.

CONCLUSION:

When the automated and manual ESR measuring methods were compared there was a marked discrepancy in the results regarding high ESR values. It was not the same for normal ESR values,which is unacceptable .Similar findings were noted by other researchers. Hence it is required to use some correction method(2). Hence ESR is a very useful in the diagnosis of many infections,diseases, chronic inflammation.

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