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ERYTHROCYTE SEDIMENTATION RATE (ESR) IN RHEUMATOID ARTHRITIS

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ABSTRACT

The aim of the study was to describe ESR in patients of Rheumatoid Arthritis who attended in OPD of Central Research Institute of Unani Medicine, Lucknow, up, India. 50 cases of Rheumatoid Arthritis between the age group of 18 to 60 yrs of any sex were studied. During inflammation or cell damage, RBC clump together becomes heavier and settle down fast. High ESR indicates inflammation, infection, trauma or malignant disease in the body. Rheumatoid Arthritis (RA) is a commonest form of chronic inflammatory joint disease. RA is a symmetrical destructive poly-arthritis affecting small and large synovial joints. After the study we found that majority of patients of RA had mild to moderate elevation in ESR, belonged to age group of 31- 45 years and maximum patients were Females.

KEYWORDS: ESR, Rheumatoid Arthritis, Inflammation.

INTRODUCTION

Erythrocyte sedimentation rate (ESR) is a blood test that expresses in mm per hour the rate at which red blood cells settle when anti-coagulated blood is allowed to stand in a narrow vertical tube called Westergren's tube. The test measures the distance that erythrocytes have fallen after one hour in a vertical column of anticoagulated blood under the influence of gravity. In any condition that causes inflammation or cell damage, red blood cells tend to

clump together. This makes them heavier, so they settle. ESR determination is a simple and inexpensive laboratory test that is frequently ordered in clinical medicine.[1-2] It is an indirect measure of the level of inflammation in the body. A high ESR tells that patient may have an active disease process in his body. It is a useful test in clinical practice as an indicator of inflammation, infection, trauma or malignant disease. ESR is a commonly performed laboratory test with a time-honored role. The test remains helpful in the specific diagnosis of a few conditions, including temporal arteritis, polymyalgia rheumatica and rheumatoid arthritis.[3] The basic factors influencing the ESR have been understood since the early part of this century; the amount of fibrinogen in the blood directly correlates with the ESR. Any condition that elevates fibrinogen (e.g., pregnancy, diabetes mellitus, end-stage renal failure, heart disease, collagen vascular diseases, malignancy) may also elevate the ESR.[4]

There are 3 stages in erythrocyte sedimentation 1) Stage 1: Rouleaux formation - First 10 minutes 2) Stage 2: Stage of sedimentation or settling - 40 mins 3) Stage 3: Stage of packing - 10 minutes.

The normal reference range for ESR results is 1–13 mm/hr for males and 1–20 mm/hr for females. ESR varies greatly with age and sex. Because the ESR determination is frequently performed in laboratories, careful attention to technical factors that may produce erroneous values is important. A tilted ESR tube will cause an artifactual elevation, whereas inadequate anticoagulation with clotting of the blood sample will consume fibrinogen and may artifactually lower the ESR.[5]

Rheumatoid arthritis (RA) is a chronic, symmetrical, inflammatory autoimmune disease that initially affects small joints, progressing to larger joints, and eventually the skin, eyes, heart, kidneys, lungs, nerves and blood Often, the bone and cartilage of joints are destroyed, and tendons and ligaments weaken.[6] All this damage to the joints causes deformities and bone erosion, usually very painful for a patient. Common symptoms of RA include morning stiffness of the affected joints for > 30 min, fatigue, and fever and weight loss, joints that are tender, swollen and warm, and rheumatoid nodules under the skin. The onset of this disease is usually from the age of 35 to 60 years, with remission and exacerbation.[7-8] While the cause of rheumatoid arthritis is not clear, it is believed to involve a combination of genetic and environmental factors. The underlying mechanism involves the body's immune system attacking the joints. This results in inflammation and thickening of the joint capsule. It also affects the underlying bone and cartilage. The diagnosis is made mostly on the basis of a

person's signs and symptoms. Erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) provide the best information about the acute phase response.[9] Auto antibodies such as RF and anti-CCP are very helpful for the diagnosis of RA. Anti-CCP antibody demonstrated a comparable sensitivity but a greater specificity than RF for the diagnosis of RA.[10] Anti-CCP exerts additional diagnostic ability in recognizing seronegative RA.[11] Assessment of synovial fluid anti-CCP may be very diagnostic in recognizing RA from non-RA arthritis. Radiological features such as joint space narrowing, erosions and subluxation are also the mainstay in confirmation of RA.[12] In early RA; sonography can detect greater number of erosions and in a greater number of patients than can radiography.[13] The introduction of MRI imaging provides more diagnostic facility in earlier diagnosis of RA and differentiating RA from non-RA diseases. MRI is more sensitive than clinical examination to detect synovitis of hands and wrists in RA.[14] The goals of treatment are to reduce pain, decrease inflammation, maximize joint function, prevent joint destruction and deformity and improve a person's overall functioning. Treatment regimens consist of pharmaceuticals, by balancing rest and weight-bearing exercise, use of splints and braces or the use of assistive devices and educating patients about the disease. Surgery to repair, replace, or fuse joints may help in certain situations.

METHODS

Complete history was taken and every patient was subjected to complete rheumatological assessment. Total 50 patients of any sex having Rheumatoid Arthritis between the age group 18 to 60 yrs were studied for ESR.Westergren's method was used for estimation of ESR. Procedures: Pipette 0.4 ml of sodium citrate anticoagulant into a small container. Add 1.6 ml of venous blood or EDTA anticoagulated blood and mix well. Using a safe suction method, draw the blood to the 0 mark of the Westergren pipette, avoiding air bubbles. Place the Westergren pipette absolutely vertical on the ESR stand and allow the blood cells to sediment without disturbing it for 1 hour. Set the timer for 1 hour. Ensure the ESR stand and pipette should not be exposed to direct sunlight. At end of 1hour, the numerical results are noted in millimeters directly from imprinted scale on the Westergren pipette.

RESULTS AND DISCUSSION

ESR was investigated among the patients of Rheumatoid Arthritis. The Patients included were of any sex and age group between 18 to 60 years, who attended the OPD of Central

Research Institute of Unani Medicine, Lucknow, UP, India. The study was done during 2020-2021.

Table 1: ESR in Rheumatoid arthritis patients.

Parameter	Normal Value (mm/hr)	Mean	S.D.
ESR	00-15	55.8	23.15

Elevation in ESR was found in almost all the patients of Rheumatoid Arthritis.

Table 2: Elevation in ESR of RA patients.

Elevation in ESR (mm/hr)	No. of Patients	% of Patients
Upto 60	32	64
More than 60	18	36

Majority (64%) of patients had elevation in ESR upto 60 mm/hr.

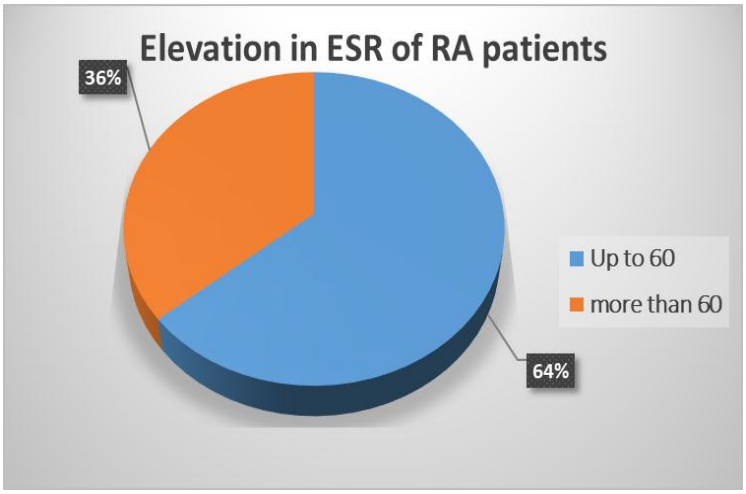

Figure 1

Table 3: Age wise classification of RA patients having elevated ESR.

Age group (Yrs)	No of Patients	% of Patients
18 – 30	15	30
31 – 45	26	52
46 – 60	09	18

Majority (52%) of patients were belonging to 31-45 years of age group.

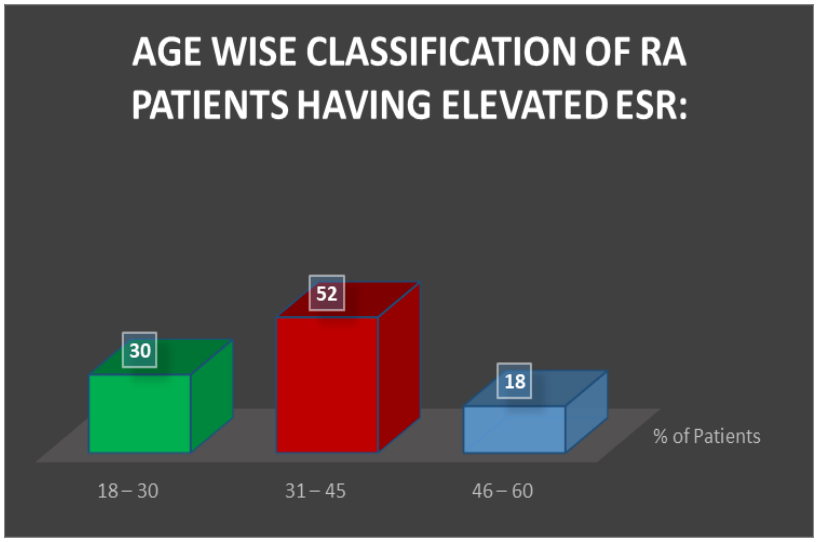

Figure 2

Table: 4: Sex wise classification of RA patients having elevated ESR:

Sex	No of Patients	% of Patients
Male	11	22
Female	39	78

Maximum (78%) patients were Females.

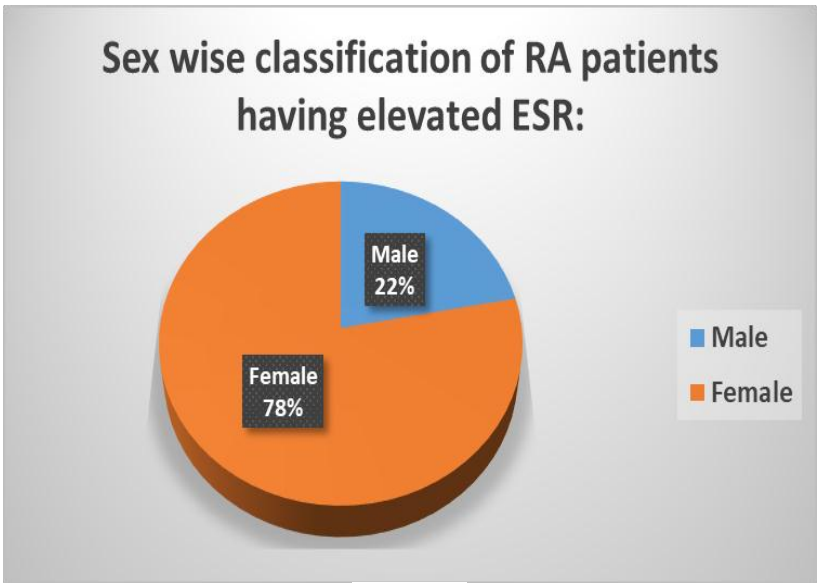

Figure 3

The ESR traditionally has been a diagnostic parameter for rheumatoid arthritis, but it is used as a means of staging the disease rather than as one of the major diagnostic criteria.[15] Most rheumatologists believe that careful joint examination confirming synovitis constitutes a more important diagnostic criterion. However, the ESR may still be useful if the diagnosis is questionable and definite evidence of inflammation might affect therapeutic decisions. In

rheumatoid arthritis, the ESR tends to reflect clinical disease activity but usually mirrors other symptoms such as morning stiffness or fatigue.[16]

CONCLUSION

The results in the Tables revealed that majority (64%) patients of RA had mild to moderate (less than 60 mm/hr) elevation in ESR. Majority (52%) belonged to age group of 31- 45 years and maximum (78%) patients were Females.

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