

**Changes in Erythrocyte Sedimentation Rate and C - Reactive Protein After Total Hip Arthroplasty**Mohd Zabair<sup>1</sup>, Gazala Abbas<sup>2</sup>, Tahir Afzal<sup>3</sup>, Anil Gupta<sup>4</sup>, Sanjeev Gupta<sup>5</sup><sup>1</sup>PG Resident, Department of Orthopaedics, Government Medical College and Hospital, Jammu, JKUT<sup>2</sup>Consultant, Department of Biochemistry, Government Medical College and Hospital, Jammu, JKUT<sup>3</sup>Assistant Professor, Department of Orthopaedics, Government Medical College and Hospital, Jammu, JKUT<sup>4</sup>Professor, Department of Orthopaedics, Government Medical College and Hospital, Jammu, JKUT<sup>5</sup>Professor and Head of Department, Department of Orthopaedics, Government Medical College and Hospital, Jammu, JKUT

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Conflict of interest: Nil

**Abstract:**

The serum erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) are the major important markers of per prosthetic joint infection. The ESR and CRP values are the important diagnostic inflammatory markers. Thus, the early and appropriate diagnosis is the most appropriate strategy to promote the functional outcomes of the orthopaedic patients. The present prospective observational study was conducted at Government Medical College and Hospital, Jammu, JKUT in the orthopaedic department with the aim to evaluate the trends of ESR and CRP in the first 3 weeks after uncomplicated THR. A total of 20 patients underwent uncomplicated THR were involved in the study. It was reported that the mean age of the patients was 55.95±8.24 years and majority of the patients were males (90%). It was found that there was a peak of ESR and CRP levels on third post-operative day, which gradually decreases on 7<sup>th</sup>, 12<sup>th</sup> and 3<sup>rd</sup> weeks after surgery. It was concluded that there was significant increase in ESR and CRP trends on third post-operative day which shows the inflammation.

**Keywords:** CRP, ESR, HIP Fracture, HIP Arthroplasty and Surgery.

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**Introduction**

The total hip arthroplasty is the commonest and cost-effective surgery performed to for the patients with end-stage degenerative hip osteoarthritis, etc. [1] There are various advancements and improvements in the arthroplasty, but it is reported that the joint infection is a major challenge in total joint arthroplasty which results in significant morbidity, poor functional outcomes and also increases the healthcare cost. [2] It is estimated that the incidence of periprosthetic joint infection is 1%. [3]

The commonest manifestations of joint inflammation are pain, swelling and cartilage break down. The joint inflammation leads to systemic inflammatory response and release the proinflammatory cytokines into systemic circulation. [4] The literature reported that the serum erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) are the major important markers of periprosthetic joint infection. [5,6] The ESR and CRP values are the important diagnostic inflammatory markers. [7,8,9,10] Thus, the early and appropriate diagnosis is the most appropriate

strategy to promote the functional outcomes of the orthopaedic patients.

**Aims and Objectives**

To evaluate the trends of ESR and CRP in the first 3 weeks after uncomplicated THR.

**Material and Methods**

The present prospective observational study was conducted at Government Medical College and Hospital, Jammu, JKUT in the orthopaedic department after obtaining the ethical permission from the institution over a period of 06 months.

A total of 20 patients underwent uncomplicated THR were involved in the study after obtaining the informed consent.

**Inclusion criteria:**

- Patients underwent arthroplasty.
- Patients aged between 30 to 70 years.

**Exclusion criteria:**

- Patients with comorbid diseases.

• Patients with complicated THR. A detailed history was collected and physical examination was done. The demographic data such as, age and gender were collected. The parameters ESR and CRP were evaluated and all the patients

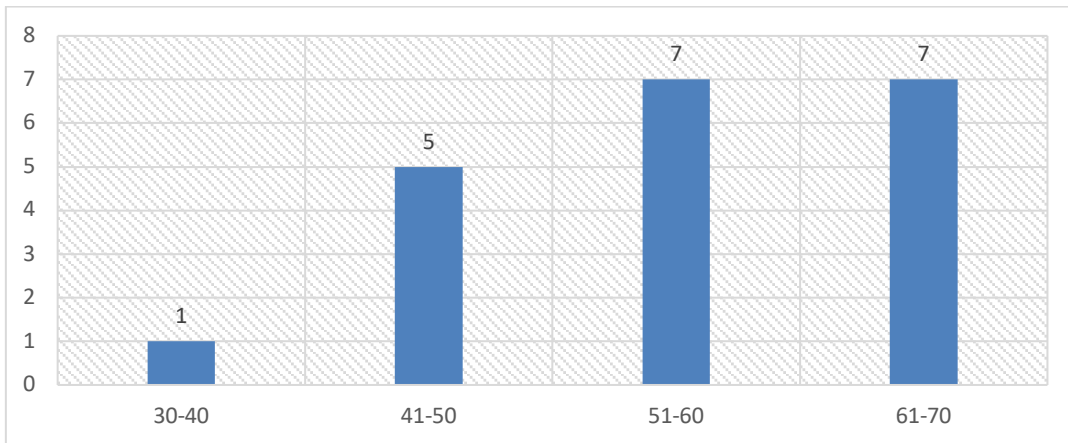
were followed up to three weeks after surgery. The data was recorded in Microsoft Excel and analysed with the help of SPSS 21.0 version.

**Observations and results**

**Table 1: Age**

Age (In years)	Frequency	Percentage
30-40	1	5
41-50	5	25
51-60	7	35
61-70	7	35

Table 1, shows that the maximum patients (35%) were in the age group of 51-60 years and 61-70 years followed by 41-50 years (25%) and 30-40 years (5%). The mean age of the patients was 55.95±8.24 years.

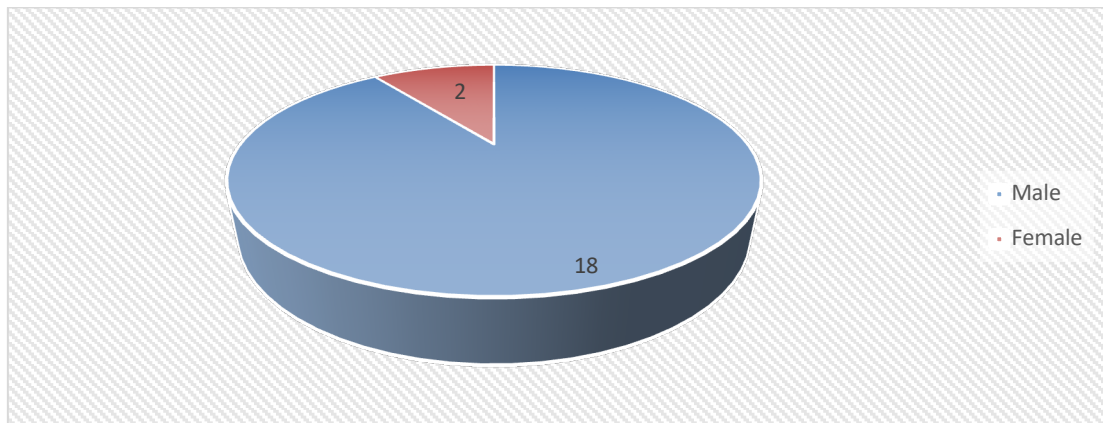


**Figure 1: Age**

**Table 2: Gender**

Gender	Frequency	Percentage
Male	18	90
Female	2	10

Table 2, depicted that the majority of the patients were males (90%).



**Figure 2: Gender**

**Table 3: ESR Level**

Day of operation	Mean ± SD (mm/hr.)
Pre-op	27.3±14.14
Post Op (Day-3)	98.55±31.02
Post Op (Day-7)	73.3±23.99
Post Op (Day-12)	57.45±15.77
Post Op (3-weeks)	39.65±8.76

Table 3, presented the level of ESR. On pre-operative day the ESR level was  $27.3 \pm 14.14$  mm/hr, on third post-operative day ESR level was  $98.55 \pm 31.02$  mm/hr, on 7<sup>th</sup> post-operative day ESR level was  $73.3 \pm 23.99$  mm/hr, on 12<sup>th</sup> post-operative day ESR level was  $57.45 \pm 15.77$  mm/hr and on 3<sup>rd</sup> week ESR level was  $39.65 \pm 8.76$  mm/hr.

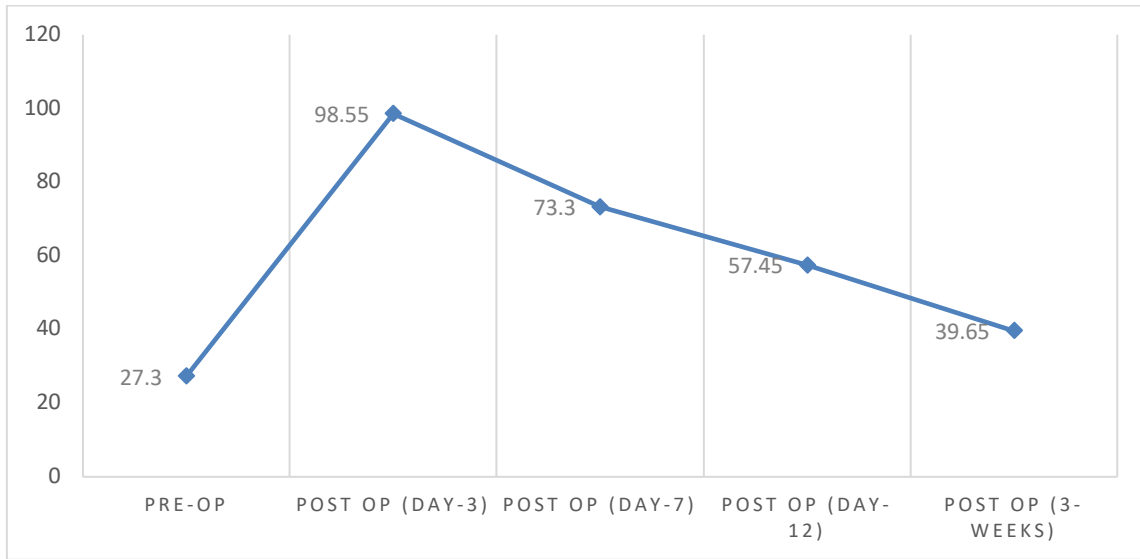


Figure 3: ESR (mm/hr.)

Table 4: CRP Level

Day of operation	Mean $\pm$ SD (Mg/dl.)
Pre-op	$0.8045 \pm 0.55$
Post Op (Day-3)	$13.49 \pm 13.74$
Post Op (Day-7)	$8.033 \pm 7.24$
Post Op (Day-12)	$3.827 \pm 4.24$
Post Op (3-weeks)	$1.42 \pm 1.00$

Table 4, depicted the level of CRP. On pre-operative day the CRP level was  $0.8045 \pm 0.55$  Mg/dl, on third post-operative day CRP level was  $13.49 \pm 13.74$  Mg/dl, on 7<sup>th</sup> post-operative day CRP level was  $8.033 \pm 7.24$  Mg/dl, on 12<sup>th</sup> post-operative day CRP level was  $3.827 \pm 4.24$  Mg/dl and on 3<sup>rd</sup> week CRP level was  $1.42 \pm 1.00$  Mg/dl.

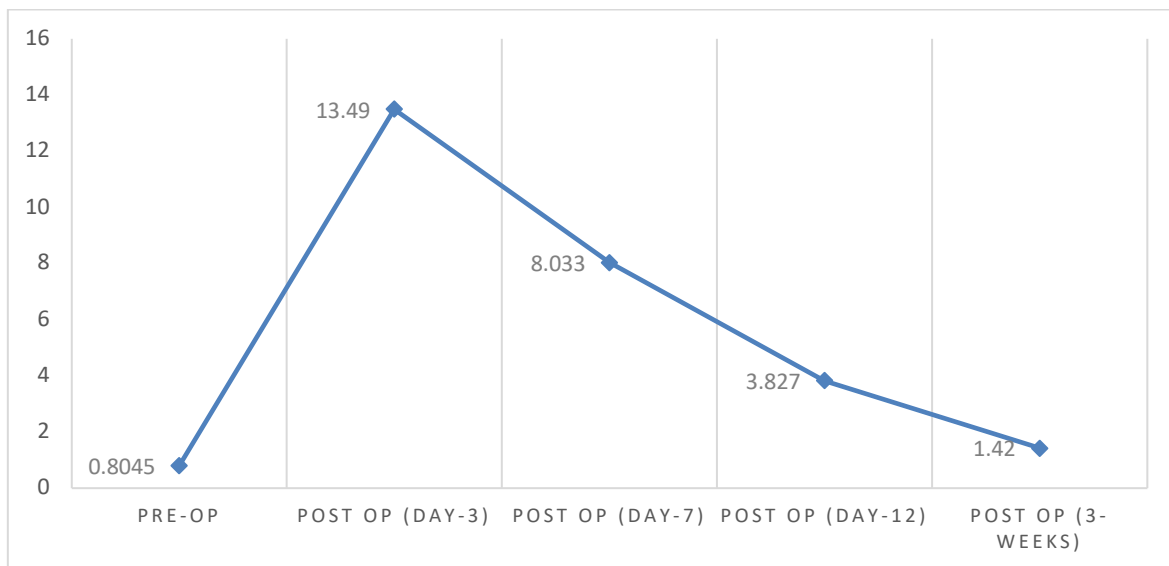


Figure 4: CRP (Mg/dl.)

In the present study it was reported there was a peak of ESR and CRP levels on third post-operative day, which gradually decreases on 7<sup>th</sup>,

12<sup>th</sup> and 3<sup>rd</sup> weeks after surgery as shown in table 3 and 4.

## Discussion

The mean age of the patients was  $55.95 \pm 8.24$  years and majority of the patients were males (90%). These findings are correlated with the study conducted by Mederake M et al., (2022) found that the median age of the study subjects was 71 years and the most of the patients were males.<sup>2</sup> In another study performed by Krishna A et al., (2021) reported that the mean age of the patients undergoing THR was 47.32 years and the majority of the patients were males (71%). [11]

In the present study it was reported there was a peak of ESR and CRP levels on third post-operative day, which gradually decreases on 7th, 12th and 3rd week after surgery. On pre-operative day the CRP level was  $0.8045 \pm 0.55$  Mg/dl, on third post-operative day CRP level was  $13.49 \pm 13.74$  Mg/dl, on 7th post-operative day CRP level was  $8.033 \pm 7.24$  Mg/dl, on 12th post-operative day CRP level was  $3.827 \pm 4.24$  Mg/dl and on 3rd week CRP level was  $1.42 \pm 1.00$  Mg/dl.

The results are comparable with the study conducted by Krishna A et al., (2021) found that the CRP level showed a peak at end day with mean  $204.88$  mg/l and decreased after third post-operative day and ESR level was at its peak on 3rd and 7th post-operative day with the mean value of  $41.48$  mm/hr. [11]

In another study conducted by Cho MR et al., (2021) reported that the mean CRP level in pre-operative, early post-operative, 2 week after postoperative and 4th week after surgery was  $28.61 \pm 29.18$  mg/L,  $86.73 \pm 60.90$  mg/L,  $24.38 \pm 24.16$  mg/L, and  $12.46 \pm 16.97$  mg/L, respectively. [12]

In similar study performed by Nazem K et al., (2016) observed that there was significant increase in ESR and CRP levels which gradually decreases after 1 month.

## Conclusion

The present observational study concluded that there was significant increase in ESR and CRP trends on third post-operative day which shows the inflammation, which gradually decreases on 7<sup>th</sup>, 12<sup>th</sup> and 3<sup>rd</sup> weeks after surgery.

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