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ORIGINAL ARTICLE

Role of hs CRP level in orthopedic implant surgery- A clinical study

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***ABSTRACT*:**
Background: The present study was conducted to evaluate the hs CRP levels in orthopedic implant surgery.
Materials & Methods: The present study was conducted on of 58 patients requiring orthopedic implant surgery. All the patients who required orthopedic implant were analyzed for hs CRP 1 day prior to the surgery and then at 2 weeks, 4 weeks and 6 weeks after surgery.
Results: Age group 20-40 years had 10 males and 8 females, 40-60 years had 14 males and 11 females and >60 years had 8 males and 57 females. Commonly used implants were DTLP in 25 patients, PFN in 10, Malleolar screw in 6, BDCP in 4, bipolar hemi art in 5, flexi nail in 3 and clavicle in 5. The difference was significant (P< 0.05). 1 day before hSCRP level (mg/Dl) in males 1 day before surgery was 14 and 13 in females. After 2 weeks, it was 134 and 145 in males and females respectively. After 4 weeks, it was 86 and 62 in males and females respectively. After 6 weeks, it was 12 and 11 in males and females respectively. The difference was significant (P< 0.05).
Conclusion: Author found that there was reduction in level of CRP level following orthopedic implant surgery.
Key words: CRP, Implant, Surgery

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INTRODUCTION

Orthopedics deals with all type of bone diseases. The major surgeries which are done are knee replacement, fractures involving different bones etc. C-reactive protein (CRP), an acute-phase reactant, was discovered in the serum of patients with pneumonia by Tillett and Francis in 1930. At that early time, CRP was accepted as a parameter of severity for clinical diseases. CRP belongs to the humoral response of the immune system and functions by activating opsonization and the complement.[1]

The elevated level of the CRP can be a rationale for delaying surgery and is used as one of the diagnostic criteria of PJI after surgery.[2] However, the level of preoperative CRP can be elevated in various clinical situations, such as concomitant cardiac disease, even if there is no obvious infection. If the CRP elevation is caused by the reasons other than infectious conditions, TKA does not need to be delayed. On the other hand, an elevated preoperative baseline value of CRP can affect the temporal change patterns of inflammatory markers including CRP and erythrocyte sedimentation rate (ESR) after surgery. This may cause confusion during the follow up after surgery concerning whether additional diagnostic procedures are needed.[3]

The plasma levels of hsCRP in healthy adults are less then10 mg/l. The rapid increase in synthesis within hours of tissue injury suggests that it contributes to host defense and is part of innate immune response.[4] Thus raised hsCRP in healthy adults is considered to be useful parameter in detecting complications of bacterial infections after surgery to reflect the extent of surgical trauma.[5] The present study was conducted to evaluate the hs CRP levels in orthopedic implant surgery.

MATERIALS & METHODS

The present study was conducted in the department of Orthopedics. It comprised of 58 patients requiring orthopedic implant surgery of both genders. The informed consent of each patient was taken before starting the study. Ethical clearance was obtained from the Institutional Ethical Committee.

Data such as name, age, gender etc. was recorded. In all patients, a through clinical examination was done. All the patients who required orthopedic implant were analyzed for hs CRP. Blood samples of all patients were taken both pre and post operatively. The level of hsCRP was assessed 1 day prior to the surgery and then at 2 weeks, 4 weeks and 6 weeks after surgery. Results were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Age wise distribution of patients

Age groups (years)	Males	Females
20-40	10	8
40-60	14	11
>60	8	7

Table I, graph I shows that age group 20-40 years had 10 males and 8 females, 40-60 years had 14 males and 11 females and >60 years had 8 males and 57 females.

Graph I Age wise distribution of patients

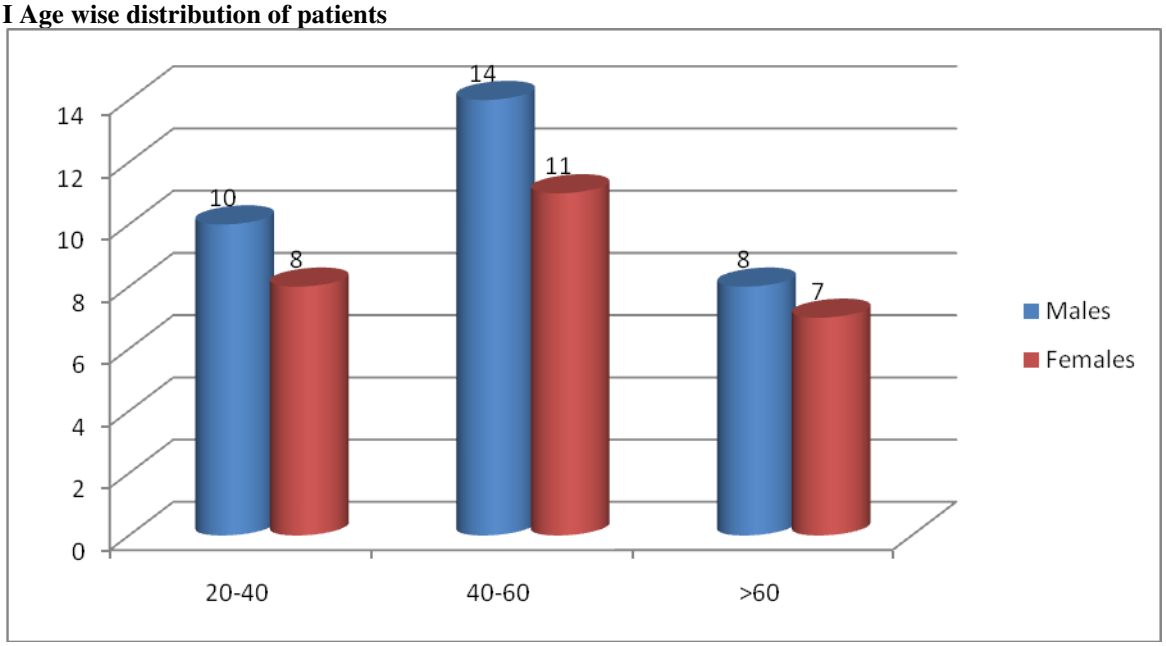


Table II Type of implant used in patients

Type of implant	Number	P value
DTLP	25	0.01
PFN	10	
MALLEOLAR SCREW	6	
BDCP	4	
BIPOLAR HEMI ART	5	
FLEXI NAIL	3	
CLAVICLE	5	

Table II, graph II shows that commonly used implants were DTLP in 25 patients, PFN in 10, Malleolar screw in 6, BDCP in 4, bipolar hemi art in 5, flexi nail in 3 and clavicle in 5. The difference was significant (P< 0.05).

Graph II Type of implant used in patients

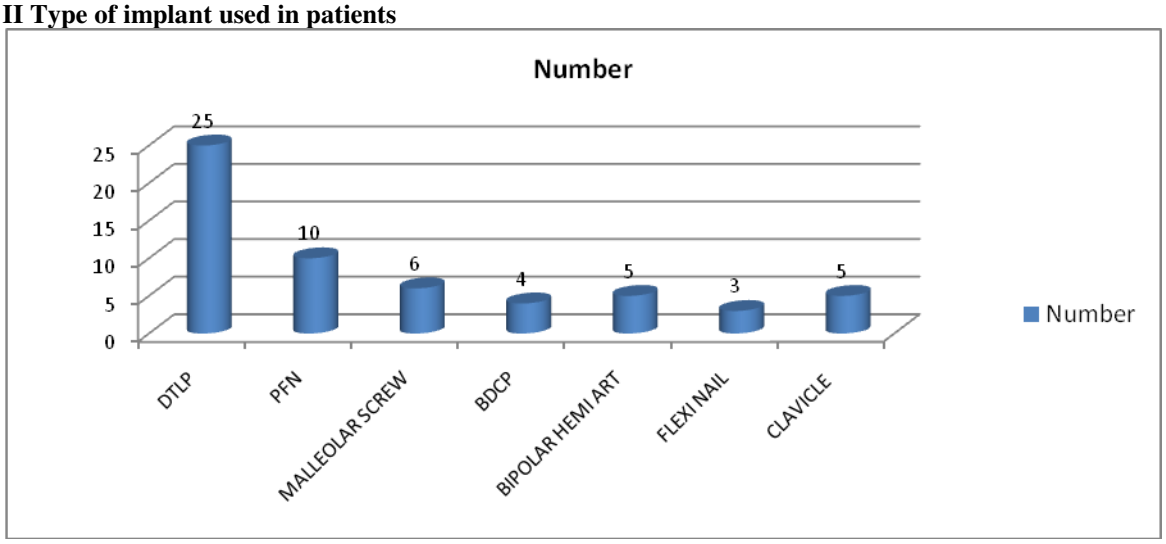
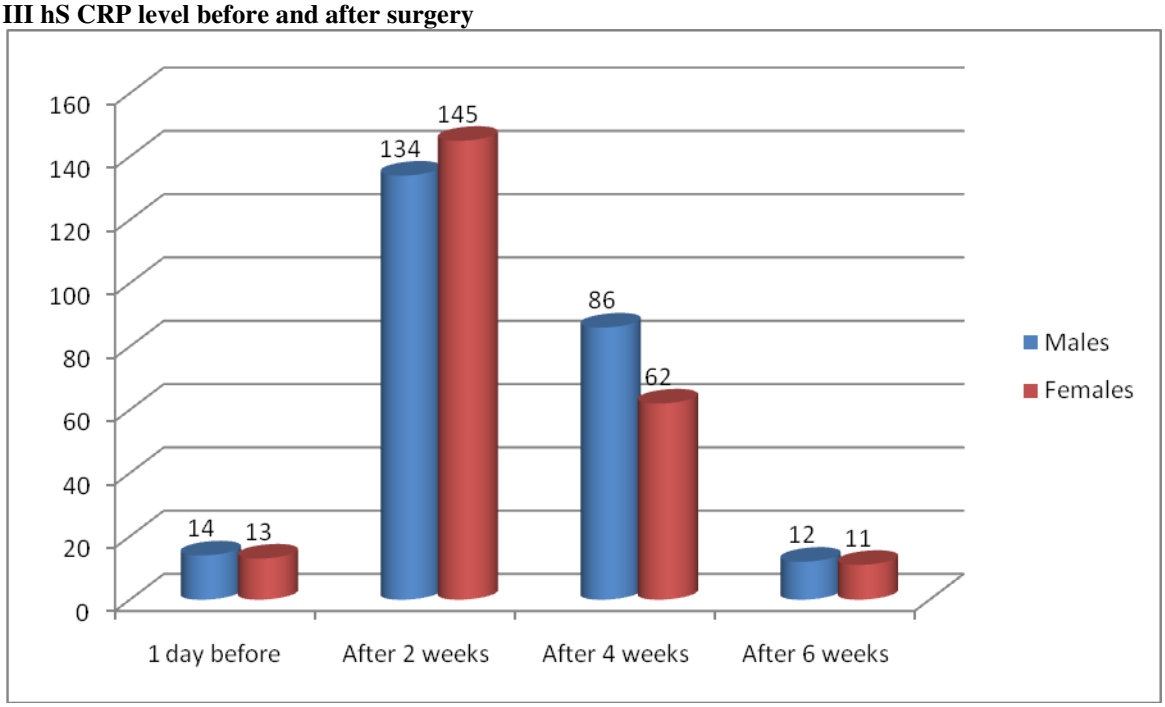


Table III hS CRP level before and after surgery

hSCRP	Males	Females	P value
1 day before	14	13	0.12
After 2 weeks	134	145	0.51
After 4 weeks	86	62	0.01
After 6 weeks	12	11	0.92

Table III, graph III shows that 1 day before hSCRP level (mg/Dl) in males 1 day before surgery was 14 and 13 in females. After 2 weeks, it was 134 and 145 in males and females respectively. After 4 weeks, it was 86 and 62 in males and females respectively. After 6 weeks, it was 12 and 11 in males and females respectively. The difference was significant (P< 0.05).

Graph III hS CRP level before and after surgery



DISCUSSION

CRP is a marker of general tissue damage in addition to inflammation, which is also used in cardiology.6 It is superior to the conventional parameters (leukocyte counts, erythrocyte sedimentation rate) in highlighting surgical complications with bacterial infection. However, CRP was not found to be predictive of organ failure and sepsis in a small number of patients. CRP is also considered to reflect the extent of surgical trauma.[7] The present study was conducted to evaluate the hs CRP levels in orthopedic implant surgery.

In present study, age group 20-40 years had 10 males and 8 females, 40-60 years had 14 males and 11 females and >60 years had 8 males and 57 females. Neumaier et al[8] studied the kinetics of CRP levels after fracture surgery in 1,418 patients. In 787 cases the operative fracture treatment was uneventful; in 17 of the other cases a deep wound infection occurred. In the uneventful cases, a similar evolution in CRP concentrations was found: the peak level, which occurred on the second postoperative day, depended on the region (136 mg/L in femoral fractures and 45 mg/L in ankle fractures) and reflected the extent of surgical trauma. For deep wound infection, a cut off level of 96 mg/L (sensitivity 92%, specificity 93%) after the fourth day of surgery was recorded.

We found that commonly used implants were DTLP in 25 patients, PFN in 10, Malleolar screw in 6, BDCP in 4, bipolar hemi art in 5, flexi nail in 3 and clavicle in 5. It was observed that 1 day before hSCRP level (mg/Dl) in males 1 day before surgery was 14 and 13 in females. After 2 weeks, it was 134 and 145 in males and females respectively. After 4 weeks, it was 86 and 62 in males and females respectively. After 6 weeks, it was 12 and 11 in males and females respectively. The difference was significant (P< 0.05).

Spangehl et al[9] measured CRP marker pre-operatively and at 1, 4, 7 and 14 days postoperatively in 143 patients who had undergone an instrumented posterior lumbar inter-body fusion. The CRP proved to be the only sensitive marker and had returned to its normal level in 48% of patients after 14 days. The CRP on day 7 was never higher than that on day 4. Age, gender, body temperature, operating time and blood

loss were not related to the CRP level. A high CRP does not in itself suggest infection, but any increase after four days may presage infection.

Zimmerli W et al[10] conducted a retrospective study included 30 TKAs with a diagnosis of osteoarthritis with elevated preoperative CRP (>1 mg/dl) without clinical signs and symptoms of infection before surgery (elevated CRP group). Patients without elevated preoperative CRP were matched in a 1:10 fashion according to age, sex, number of comorbidities and whether TKA was unilateral or bilateral (nonelevated CRP group). The temporal values of CRP and ESR after TKA were compared between the two groups until 2 months after surgery. The mean peak values of CRP and ESR after surgery were similar between the two groups in both unilateral and bilateral TKAs. In the unilateral TKA, mean values of CRP and ESR and the proportions of the knees with normal CRP and ESR at 2 months after surgery were similar in the two groups. However, in the bilateral TKA, mean values of CRP and ESR were higher and the proportions of the knees with normal CRP and ESR at 2 months after surgery were lower in the elevated CRP group compared to the non elevated CRP group.

CONCLUSION

Author found that there was reduction in level of CRP level following orthopedic implant surgery.

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