(e) ISSN Online: 2321-9599

(p) ISSN Print: 2348-6805

ORIGINAL ARTICLE

Assessment of hsCRP level before and after Orthopedic Implant Surgery- A Clinical Study

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ABSTRACT:
Background: Orthopedics deals with all type of bone diseases. Early detection of an infection may prevent substantial problems later. The present study was conducted to assess the hs CRP levels before and after orthopedic implant surgery. **Materials & Methods:** The present study was conducted on of 42 patients requiring orthopedic implant surgery. All the patients who required orthopedic implant were analyzed for hs CRP. The level of hsCRP was assessed 1 day prior to the surgery and then at 2 weeks, 3 weeks, 4 weeks and 6 weeks after surgery. Results were analyzed statistically. P value less than 0.05 was considered significant. **Results:** Age group 20-40 years had 8 males and 7 females, 40-60 years had 10 males and 8 females and >60 years had 4 males and 5 females. The difference was significant (P< 0.05). hS CRP level (mg/Dl) 1 day before surgery was 10 and 12 in males and females respectively. After 2 weeks, it was 165 and 140 in males and females respectively. After 3 weeks, it decreased to 130 and 115 in males and females respectively. After 4 weeks, it was 80 and 65 in males and females respectively. After 6 weeks, it was 14 and 10 in males and females respectively. The difference was significant (P< 0.05). **Conclusion:** CRP is the basic inflammatory parameter in orthopedic surgery. Its level rises in first few days after surgery then decline steadily. It is only a laboratory parameter and must always be correlated with clinical signs of infection.
Key words: Implant, inflammatory, Orthopedic.

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This article may be cited as: Kumar V. Assessment of hsCRP level before and after Orthopedic Implant Surgery- A Clinical Study. J Adv Med Dent Scie Res 2014;2(4):187-189.

INTRODUCTION

Orthopedics deals with all type of bone diseases. Early detection of an infection may prevent substantial problems later. Inflammatory markers such as the C reactive protein (CRP), white blood cell count (WBC) and body temperature can easily be measured, the way in which they change in the early post-operative period after instrumented spinal surgery has not been reported in depth.[1] Highly sensitive C -reactive protein (hs CRP) is an acute phase protein produced in hepatocytes. It is one of the serum inflammatory markers which are widely used in the follow-up of patients with localized infections in the orthopedic domain, but trauma or surgery may also result in their transient elevation. hs CRP is phylogenetically highly conserved plasma protein that participates in systemic response to inflammation. Its plasma concentration increases during inflammatory states.[2]

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.[3] 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. It has been shown that hsCRP levels become raised after conventional knee and hip arthroplasty and they reflect the degree of systemic trauma after surgery.[4]

There are several methods to measure hsCRP. They are ELISA, immuno turbidimetry, nephelometry, rapid immune- diffusion and visual agglutination. After trauma or operation a rise of CRP-levels in serum were seen as expression of inflammatory response. In conservative fracture treatment CRP levels shows a slight elevation around 5-10 fold of normal levels.[5] The present study was conducted to assess the hs CRP levels before and after orthopedic implant surgery.

MATERIALS & METHODS

The present study was conducted in the department of Orthopedics. It comprised of 42 patients requiring orthopedic implant surgery. Ethical clearance was obtained from the Institutional Ethics Committee. The informed consent of each patient was taken on prescribed proforma before starting the study.

In all patients, factors such as implant used for the surgery and time taken for the surgery were recorded. Fasting blood sugar (FBS) level was assessed. 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, 3 weeks, 4 weeks and 6 weeks after surgery. Results were analyzed statistically. P value less than 0.05 was considered significant.

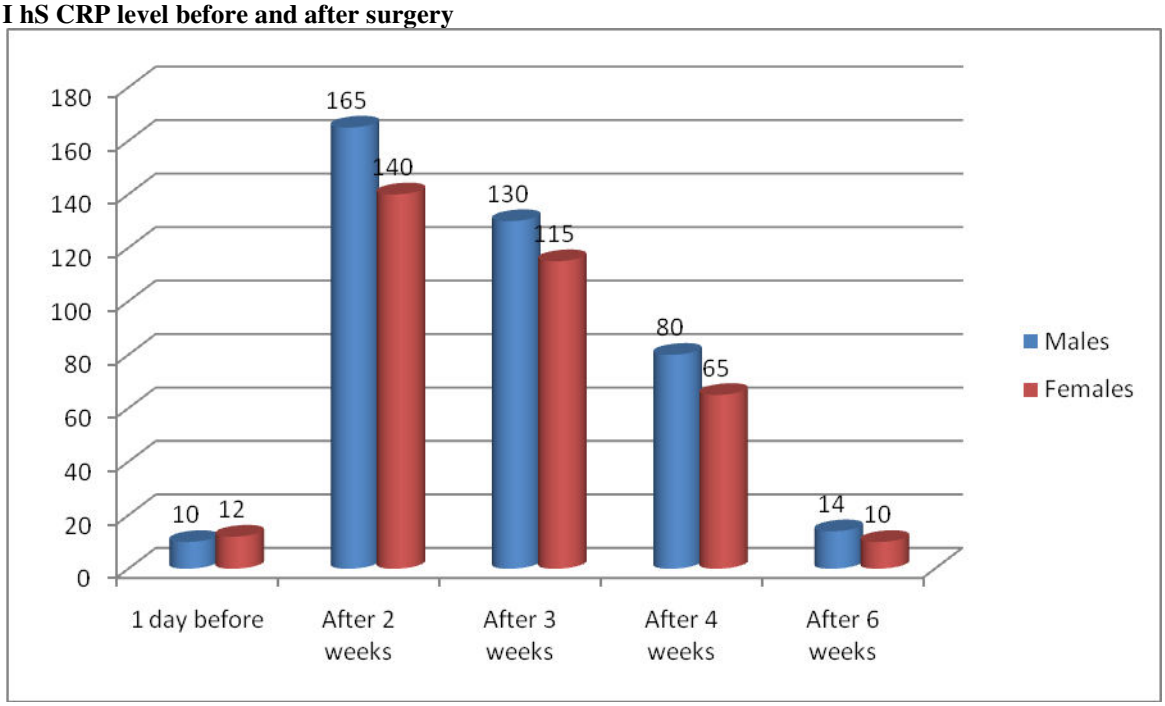
RESULTS

Table I Age wise distribution of patients

Age groups (years)	Males	Females	P value
20-40	8	7	0.01
40-60	10	8	
>60	4	5	

Table I shows that age group 20-40 years had 8 males and 7 females, 40-60 years had 10 males and 8 females and >60 years had 4 males and 5 females. The difference was significant (P< 0.05).

Graph I hS CRP level before and after surgery



Graph I shows that hS CRP level (mg/Dl) 1 day before surgery was 10 and 12 in males and females respectively. After 2 weeks, it was 165 and 140 in males and females respectively. After 3 weeks, it decreased to 130 and 115 in males and females respectively. After 4 weeks, it was 80 and 65 in males and females respectively. After 6 weeks, it was 14 and 10 in males and females respectively. The difference was significant (P< 0.05).

DISCUSSION

CRP rises within 2hrs of onset of inflammation upto 50000 fold and peaks at 48 hrs. Its half life of 18 hrs is constant thus levels are maintained by rate of production and severity of precipitating cause. Microorganisms involved in infection of orthopedic devices are highly adapted on the implant or in the bone cement adhering to environment of the micro biofilm.[6] An elevated hsCRP which could not be explained by any other condition highly indicates prosthetic infection. The ability of hsCRP levels to return to normal is much faster than ESR which makes it a more sensitive indicator particularly in early post operative period.[7] The present study was conducted to assess the hs CRP levels before and after orthopedic implant surgery.

In present study, out of 42 patients, males were 22 and females were 20. Age group 20-40 years had 8 males and 7 females, 40-60 years had 10 males and 8 females and >60 years had 4 males and 5 females. Aono et al[8] measured CRP marker pre-operatively and at 1, 4, 7 and 14 days postoperatively in 143 patients who had undergone an instrumented posterior lumbar interbody 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.

In present study, there was significantly rise of CRP for 2 weeks followed by decrease in level. hS CRP level (mg/Dl) 1 day before surgery was 10 and 12 in males and females respectively. After 2 weeks, it was 165 and 140 in males and females respectively. After 3 weeks, it decreased to

130 and 115 in males and females respectively. After 4 weeks, it was 80 and 65 in males and females respectively. After 6 weeks, it was 14 and 10 in males and females respectively. This is in agreement with Pepys.[9]

Larsson et al[10] found that out of 113 patients, the mean serum hs CRP of the patients on the first day was (166.7 ± 105.3mg/L) but it peaked on the third day post trauma (373.4 ± 131.2mg/L) and declined on the eighth day to 300.0 ± 156.5mg/L). C- reactive protein levels increase in the blood of trauma patients as a result of tissue damage but decreased after the third day following trauma. However, in the presence of infection, the increase was sustained. Author recommended that serial quantitative C-reactive protein measurements be done as an adjunct to surgical care in patients with acute injuries. CRP proved helpful as a marker in risk stratification. The preoperative CRP-level based on unsuspected infection or trauma predicts the postoperative course. High levels have a poor outcome. The limitation of the study is small sample size. Other causes of rise in CRP were not assessed. Complications of surgeries were not assessed.

CONCLUSION

Author stated that CRP is the basic inflammatory parameter in orthopaedic surgery. Its level rises in first few days after surgery then decline steadily. It is only a laboratory parameter and must always be correlated with clinical signs of infection.

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Source of support: Nil

Conflict of interest: None declared