

Original Article

Comparative evaluation of 1st generation cephalosporin vs 3rd generation cephalosporin in non infected maxillofacial trauma

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ABSTRACT:

Background: To assess the efficacy of 1st generation cephalosporin (Cefazolin) along with its effect on healing in maxillofacial trauma in comparison with 3rd generation (cefotaxime) cephalosporin's. **Materials & methods:** A total of 84 patients were enrolled. They were divided into 2 groups. GROUP A –Randomly selected 42 patients were getting dose of IV CEFOTAXIME 1gm with gentamicin 80mg twice daily from the day of admission till postoperatively (1 day preoperatively and 7 days postoperatively). Student-t test was done. **Results:** The pain score postoperatively on day 5 in Group a (Cefotaxime) was 0.15 ± 0.20 while in (Cefazolin) was 0.47 ± 0.35 . Student t test found significant difference between the groups with p value 0.001. **Conclusion:** Cephalosporin is most common and effective antibiotic given as prophylaxis.

Keywords: Cefazolin, Cephalosporin, Antibiotic, Fractures.

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INTRODUCTION

Maxillofacial fractures (MFs) are fractures of the bony structures in the region of frontal sinus, orbit, nose, zygoma, maxilla and mandible. These fractures occur most commonly due to road traffic accidents, assault and falls. Maxillofacial fractures present clinically as pain, bruising, swelling and numbness of surrounding tissues, nosebleeds, and facial deformities.¹

Surgical antibiotic prophylaxis is defined as the administration of antibiotics to prevent SSI.² Antibiotic can be administered preoperatively, intraoperatively and postoperatively as prophylaxis. Preoperative antibiotic prophylaxis is the antibiotic dose given from time of injury up to 2 hours before surgical intervention. Antibiotic prophylaxis administered immediately prior to surgical intervention and lasts during surgery, up to 24 hours after surgery is perioperative antibiotic and postoperative antibiotic prophylaxis which lasts past the perioperative period. There are variety of antibiotic, in maxillofacial trauma surgery, prophylactic broad-spectrum antibiotics such as penicillin, cephalosporin's and erythromycin are preferred over other antibiotics.³ Worldwide, the

cephalosporin antibiotics are the most widely prescribed antimicrobial drugs in surgical practice and they are employed for therapeutic and prophylactic indications with almost equal frequency.⁴ The major prophylactic role is to prevent postoperative morbidity and mortality. Related objectives are to reduce the duration and cost of hospitalization. These goals are most likely to be achieved in surgical procedures where the potential risk of infection is high, for example, operations involving mucous membranes harbouring a micro flora.⁵ A most vexing problem is the choice of cephalosporin antibiotic among the burgeoning number of drugs currently available. The newer cephalosporin's have a broader spectrum than the earlier drugs, but it is not always clear that such increased antimicrobial activity is associated with enhanced benefits in surgical prophylaxis. Similarly, improved pharmacokinetics behaviour and greater tissue penetration are theoretically desirable for prophylactic use; yet these properties have not necessarily produced better clinical results. The essential issue is whether the newer agents are in fact superior to the traditional first and second generation cephalosporin's currently used in many hospitals.⁵ Hence, this study was conducted to assess the efficacy

of 1st generation cephalosporin (Cefazolin) along with its effect on healing in maxillofacial trauma in comparison with 3rd generation (cefotaxime) cephalosporin's.

MATERIALS & METHODS

A total of 84 patients were enrolled. They were divided into 2 groups.

GROUP A –Randomly selected 42 patients were getting dose of IV CEFOTAXIME 1gm with gentamicin 80mg twice daily from the day of admission till postoperatively (1 day preoperatively and 7 days postoperatively).

GROUP B – Randomly selected 42 patients were getting dose of IV Cefazolin 1gm with gentamicin 80mg twice daily from the day of admission till postoperatively. (1 day preoperatively and 7 days postoperatively). IV DYNAPAR 75mg twice a day was given to both the group A and B. Post-operative assessment was done 1st, 3rd, 5th, and 7th day. Patients

were evaluated on alternate days using following clinical parameters using

□ Clinical healing score at surgical site

□ Pain score (using visual analog scale) at surgical site

Student-t test was done to compare the scores between groups.

RESULTS

The study included 84 participants fulfilling the inclusion criteria were randomly divided into two groups on the basis of medication. The pain score preoperatively on day 1 in Group a (Cefotaxime) was 6.21 ± 2.29 while in Group B (Cefazolin) was 6.09 ± 1.80 . Student t test found non-significant difference between the groups with p value 0.84. The pain score postoperatively on day 5 in Group a (Cefotaxime) was 0.15 ± 0.20 while in (Cefazolin) was 0.47 ± 0.35 . Student t test found significant difference between the groups with p value 0.001.

Table 1: Comparison of Pain Scores between groups at different time interval

Days	N	Group A	Group B	P- value
Day 1 (preop)	42	6.21 ± 2.29	6.09 ± 1.80	0.84
Day 3	42	1.64 ± 0.57	2.43 ± 0.65	0.022*
Day 5	42	0.15 ± 0.20	0.47 ± 0.35	0.001*
Day 7	42	0.0 ± 0.0	0.0 ± 0.0	1.00

The Clinical Healing Score preoperatively on day 1 in Group A (Cefotaxime) was 4.65 ± 2.29 while in Group B (Cefazolin) was 4.70 ± 1.80 . Student t test found non-significant difference between the groups with p value 0.93. The Clinical Healing Score postoperatively on day 7 in Group A (Cefotaxime) was 0.0 ± 0.0 while in (Cefazolin) was 0.0 ± 0.0 . Student t test found non-significant difference between the groups with p value 1.00.

Table 2: Comparison of clinical Healing score between the groups

Days	N	Group A	Group B	P- value
Day 1 (preop)	42	4.65 ± 2.29	4.70 ± 1.80	0.93
Day 3	42	0.90 ± 0.57	1.55 ± 0.65	0.034*
Day 5	42	0.20 ± 0.20	0.34 ± 0.35	0.019*
Day 7	42	0.0 ± 0.0	0.0 ± 0.0	1.00

DISCUSSION

Postoperative infections have been shown to significantly increase morbidity, extend the patients hospital stay, drastically increase the cost of the medical system and cause severe physical limitations that diminish the quality of life.⁶ Decreasing the incidence of surgical site infection is a matter of utmost interest to both the patients and surgeons. Literature is flooded with articles that relate surgical site infection to a variety of factors of which some are modifiable; some are not. The use of prophylactic antibiotics is one of the most important factors in decreasing infection and one that all surgeons are concerned about. Hence, this study was conducted to assess the efficacy of 1st generation cephalosporin (Cefazolin) along with its effect on healing in maxillofacial trauma in comparison with 3rd generation (cefotaxime) cephalosporin's.

In the present study, 84 participants fulfilling the inclusion criteria were randomly divided into two groups on the basis of medication. The pain score

preoperatively on day 1 in Group a (Cefotaxime) was 6.21 ± 2.29 while in Group B (Cefazolin) was 6.09 ± 1.80 . Student t test found non-significant difference between the groups with p value 0.84. The pain score postoperatively on day 5 in Group a (Cefotaxime) was 0.15 ± 0.20 while in (Cefazolin) was 0.47 ± 0.35 . Student t test found significant difference between the groups with p value 0.001. A study by Milani et al.,⁷ compared pain score in patients before and after maxillofacial surgery using visual analog scale found pain will disappear at the 7th day after surgery in most patients and showed non-significant difference between the groups. Rastogi A et al.,⁸ had found similar result where they found decrease in pain after maxillofacial surgery among patients using regional anesthesia. The pain was significantly less than the patients operated using general Anesthesia.

In the present study, the Clinical Healing Score preoperatively on day 1 in Group A (Cefotaxime) was 4.65 ± 2.29 while in Group B (Cefazolin) was 4.70 ± 1.80 . Student t test found non-significant

difference between the groups with p value 0.93. The Clinical Healing Score postoperatively on day 7 in Group A (Cefotaxime) was 0.0 ± 0.0 while in (Cefazolin) was 0.0 ± 0.0 . Student t test found non-significant difference between the groups with p value 1.00. Another study by Brown G et al.,⁹ compared the effectiveness of Ceftriaxone and cefazolin for severe skin and soft tissue infections. They found no statistical difference in cause of infection, healing of wound, site of infection, duration of treatment, noncompliance, or need for incision or drainage of the wound. Simatupang MD et al.,¹⁰ compared the effectiveness of prophylactic antibiotics between cefazolin and ceftriaxone in patients with closed long bone fractures after implant surgery. They found the same effectiveness in preventing the growth of germs on the surgical wound base smear and prevent the occurrence of superficial infection on the 30th postoperative day. The result of Sugiura S et al.,¹¹ was contradictory to the result of present study. They Compared ceftriaxone and cefazolin as prophylactic antibiotics for surgical site infection in orthopedic upper extremity surgery. 1684 patients were included in this study. The incidence of deep systemic infection was 0.08% (1/1140 cases) in the cefazolin group and 1.1% (6/534 cases) in the ceftriaxone group, with a significant difference between the two groups (odds ratio, 12.9; p = 0.005). They advocated the use of cefazolin in these type of surgery. Another study conducted by Lalka SG et al.,¹² stated that cefazolin were more effective to be given in higher doses with more frequent to get better results to decrease the wound infection after surgery. Cephazolin is a member of Cephalosporin Generation I. Cefazolin is active against grampositive and some gram-negative bacteria such as E. Coli, Proteus, and Klabsiella.¹³ Cephazolin has been widely recommended as a prophylactic antibiotic in surgical procedures. Cephazolin has the advantages of: 1) its moderate half-life, which is about 120 minutes, so it is considered sufficient to provide protection during surgery with a duration of 1-2 hours; 2) excellent anti-staphylococcal activity; 3) and the incidence of allergic reactions is lower than third generation cephalosporin.

CONCLUSION

Both 1st and 3rd generation cephalosporin are effective at 7th day. 3rd generation cephalosporin is more effective than 1st generation cephalosporin in controlling pain and clinical healing score.

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