

## ORIGINAL RESEARCH

### To study the effect of balanced diet versus nutrient supplements on fracture healing

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#### ABSTRACT

**Background:** The present study was done to compare the role of balanced diet versus nutrient supplements in fracture union in patients with proximal tibial fractures managed with Locking Compression Plate.

**Materials & methods:** 50 patients with proximal tibia fractures were included in the study. These patients were divided in to two groups. Group A includes 25 Patients who were put balanced diet and Group B 25 Patients who were put on nutrient supplements. Patients were diagnosed with proximal tibia fracture after complete history, clinical examination and x rays. Surgical procedures were done under adequate anaesthesia and follow-up examination was done for assessing the fracture union.

**Results:** Although non-significant, mean duration of hospital stay was slightly higher among subjects of nutrient supplement group (15.6 days) in comparison to the balanced diet group (14.1 days). fracture union seen radiographically among patients of group A and group B . Mean time for fracture union was found to be 14.3 weeks in group A and 15.5 weeks in group B. Although non-significant, fracture union time was slightly better among patients of the balanced diet group. Also, patients of the balanced diet group demonstrated slightly lower incidence of superficial infection.

**Conclusion:** We conclude that balanced diet is better in comparison to nutrient supplements in soft tissue and fracture healing and also comparatively lower rate of infections.

**Key words:** Nutrient, Supplements, Fracture healing

#### INTRODUCTION

Tibia refers to weight bearing long bone of the leg with higher dimensions and strength in comparison to its other counterpart; Fibula. Proximal portion of the knee joint is formed by femur and tibia while distal portion of the joint is formed by fibula and talus. Medial condyle along with presence of lateral condyle forms the proximal component of the tibia. These collectively and jointly complete the knee's inferior component. The intercondylar area refers to meeting point of all the ligaments.<sup>1,2</sup>

Long bone fractures comprise of a significant proportion of operative procedures being carried out in major surgical and trauma settings. Significant proportion of complications is known to be associated with tibia fractures because of deprivation of circumferential soft tissue covering about the Tibia specifically to the distal component which results in higher incidence of non-union.<sup>3,4</sup>

Significant problems are encountered in the management of proximal tibia fractures because of immobilization of patients associated with its recovery. Undisplaced fracture can be

managed with conservative management but there are high chances of Knee stiffness with this method. Conventional open reduction and internal fixation with plating needs massive fracture exposure and extensive soft tissue loss.<sup>5,6</sup> But now with use of locking compression plates (LCP) in proximal tibia fractures has reduced the chances of extensive soft tissue injury as well as surgery time.<sup>7</sup>

Along with adequate fixation there is significant role of diet and nutrients supplements in management of long bone fractures. Few researchers prefer use of balanced diet in managing these patients while other emphasize on using nutrient supplements.<sup>6,7</sup> Hence; the present study was undertaken to compare the effects of balanced diet versus nutrient supplements in healing of proximal tibial fractures.

## MATERIALS & METHODS

The present study was conducted with aim of comparing the role of balanced diet and nutrient supplements in managing patients with proximal tibial fractures with Locking Compression Plate. 50 subjects were enrolled and were divided into two study groups as follows:

Group A: 25 Patients who were put balanced diet;

Group B: 25 Patients who were put on nutrient supplements

Complete clinical and radiological examination all patients were done. All patients were primarily managed in emergency and definitive managed with open reduction and internal fixation with locking compression plates. All these patients were regularly followed up in OPD till fracture union. Statistical analysis was done by using SPSS software.

## RESULTS

Out of 50 subjects, two study groups were formed- group A and group B. Mean age of patients in group A was 45.8 years and mean age of group B was 44.9 years. Most of the patients with proximal tibia fracture were males. Road traffic accident was the major reason for admission of the patients. Right side involvement occurred in more than sixty percent of the cases of both the study groups. Mean duration of surgery among subjects of group A and group B was 74.6 minutes and 76.9 minutes respectively (p-value > 0.05). Although non-significant, mean duration of hospital stay was slightly higher among subjects of nutrient supplement group (15.6 days) in comparison to the balanced diet group (14.1 days). Mean fracture union time radiographically among subjects of group A and group B was 14.3 weeks and 15.5 weeks respectively. Although non-significant, fracture union time was slightly better among patients of the balanced diet group. Also, patients of the balanced diet group demonstrated slightly lower incidence of superficial infection.

**Table 1: Fracture union**

| Fracture union     | Group A                 |            | Group B            |            |
|--------------------|-------------------------|------------|--------------------|------------|
|                    | Number of patients      | Percentage | Number of patients | Percentage |
| 12 to 16 weeks     | 20                      | 80         | 18                 | 72         |
| 17 to 20 weeks     | 4                       | 16         | 6                  | 24         |
| More than 20 weeks | 1                       | 4          | 1                  | 4          |
| Total              | 25                      | 100        | 25                 | 100        |
| Mean (weeks)       | 14.3                    |            | 15.5               |            |
| p- value           | 0.112 (Non-significant) |            |                    |            |

**Table 2: Incidence of post-operative complications**

| Complications         | Group A            |            | Group B            |            | p- value |
|-----------------------|--------------------|------------|--------------------|------------|----------|
|                       | Number of patients | Percentage | Number of patients | Percentage |          |
| Superficial infection | 1                  | 4          | 2                  | 8          | 0.19     |
| Delayed union         | 1                  | 4          | 1                  | 4          | 1        |

## DISCUSSION

As per previous authors, adequate balanced diet is very important for skeletal growth and diet requirement further increased during period of injury and fractures. However; some studies prefer to use dietary supplements for fracture healing. Physiotherapy also have very important role to maintain skeletal growth and post surgery during the period of fracture healing. Previous data also suggests that micronutrients (zinc, selenium etc.) also had very important role in fracture healing.<sup>8-10</sup> Hence; the present study was undertaken for comparing the role of balanced diet and nutrient supplements in managing patients with proximal tibial fractures with Locking Compression Plate.

In the present study, out of 50 patients, two study groups were formed- group A and group B. Mean age of patients of group was 45.8 years while that of group B was 44.9 years. Most of the patients were male (male were 40 and female were 10). Road traffic accident was the major reason for injury. Right side involvement occurred in more than sixty percent of the cases of both the study groups. Mean duration of surgery among subjects of group A and group B was 74.6 minutes and 76.9 minutes respectively (p-value > 0.05). Although non-significant, mean duration of hospital stay was slightly higher among subjects of nutrient supplement group (15.6 days) in comparison to the balanced diet group (14.1 days). Karpouzou A et al evaluated literature utilizing bone health, nutrition, and fractures as key words. Inadequate intake of certain nutrients severely affect bone health and fracture healing. The significance of variable micronutrients is important concerning bone health and fracture healing. They concluded that healthy nutrition with satisfactory quantity of both nutrients is vital, for both reducing risk for fracture and elevating the fracture healing.<sup>10</sup>

In the present study, mean fracture union time (clinically and radiologically) among patients of group A and group B was 14.3 weeks and 15.5 weeks respectively. Although non-significant, fracture union time was slightly better among patients of the balanced diet group. Also, patients of the balanced diet group demonstrated slightly lower incidence of superficial infection. Kasnavieh et al get dietary recommendations for fracture healing as per traditional Persian medicine (TPM) literature. They get substances required during fracture healing from textbooks in TPM. In TPM, food was classified according to its nutritive value. They found significant effects of different diet pattern for better fracture healing.<sup>11</sup> In another study shows the beneficial effects of vitamin - K1 along with vitamin - D. Both these dietary components decrease the risk of osteoporotic fractures specially hip and spine.<sup>12</sup> In another study, authors found significant correlation between a diet rich in protein, calcium, potassium intake in adult life and their skeletal condition during old age. During adulthood, sufficient intake food rich in protein, calcium, and micronutrients was associated with better bone mineral density, lesser chances of osteoporosis and osteoporotic fracture of spine and the hip.<sup>13</sup>

## CONCLUSION

The authors conclude that balanced diet is better in comparison to nutrient supplements in terms of early healing in long bone fracture patients.

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