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FUNCTIONAL OUTCOME OF A DISLOCATED FRACTURE OF THE MIDDLE THIRD OF THE CLAVICLE TREATED SURGICALLY WITH TENS AND PLATING

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ABSTRACT

In recent times, mid-clavicle fractures have been managed by intra-medullary fixation with titanium elastic nails. Mostly, an ante-grade portal is made. This technique is used in simple displaced mid-clavicle fractures. It gives relative stability for fracture fixation. There is less soft tissue dissection. Since there is micro-movement at the fracture site, it heals by secondary healing through callus formation. The disadvantage of this technique was the prominence at the entry site and nail migration; Nail migration was later corrected and rectified using TENS nail Cap\plug, which was attached at the proximal end of the nail so there was no distal migration. Patient compliance is good as they can return to routine activities earlier than the other surgical modalities. This study had 59 patients with displaced middle third clavicle fractures. All the cases had closed injuries. We had one Group of 31 patients treated with plate fixation with 3.5 mm pre-contoured locking compression plates, and the other Group of 28 was managed with TENS fixation. In the present study, we found that patients treated by plating showed excellent outcomes in 12 cases (38.7%), while 20 cases (71.4%) were in the TENS group based on constant and Murley scoring systems. Patients treated with TENS were found to be better in terms of Constant and Murley scores than compared to patients treated with plate. The TENS group had early union then compared to the plate group. The postoperative postoperative stay duration in the hospital was less in the TENS group compared to the plate group.

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1. INTRODUCTION

A clavicle is a bone that connects the thorax to the shoulder girdle and aids shoulder girdle mobility. Clavicle fractures are a common traumatic injury in the shoulder girdle due to their subcutaneous position. It is caused by a high- or low-energy traumatic injury [1]. A clavicle fracture is one of the most common bone injuries. When seen in the coronal plane, the clavicle is a small bone that is larger medially at the sternal articulation and substantially thinner at the lateral third. The three-dimensional structure becomes more obvious when viewed axially [2–4]. The clavicle is convex at the medial end and concave forward at the lateral end, giving a slight S shape. The form resembles the musical symbol clavicula, thus the name [5].

The clavicle is an S-shaped bone that connects the sternum to the glenohumeral joint as a strut. It also has a shoulder girdle suspensory function. The coracoclavicular ligament connects the shoulder to the clavicle [6]. The mid-clavicular area of the clavicle has a weak point, accounting for most clavicle fractures. The clavicle is subjected to a variety of muscular and ligamentous stresses, and understanding these forces is crucial to comprehend the nature of clavicle fracture displacement and

why particular fracture patterns are likely to produce issues if not minimized and surgically stabilized [7].

The mid-clavicle fracture is one of the most frequent skeletal injuries, accounting for 3% to 5% of all fractures and 45 % of shoulder injuries. Mid-clavicle fractures occur 64 times per 100,000 people per year [8]. Lateral end clavicle fractures account for 15% to 30% of all clavicle fractures, while medial end clavicle fractures account for 3% [9]. Open clavicle fractures are extremely uncommon, occurring in approximately 0.1 % to 1% of cases. Men had more than double the rate of mid-clavicle fractures as women. The incidence is highest in the third decade of life [10].

The rate of non-union of mid-clavicle fractures is generally between 0.1 and 0.8 %, and non-operative therapy has been the majority of treatment. Conversely, these figures come from studies in which clavicle fractures needed to be properly identified based on the patient's age and fracture displacement [7]. According to more current statistics based on comprehensive fracture classification, the rate of non-union in displaced comminuted mid-shaft clavicle fractures in adults is between 10% and 15% [11].

Surgery is becoming increasingly widely acknowledged as the preferred therapy for displaced mid-shaft clavicle fractures because non-surgical treatment is seen as clinically and functionally inferior to operational treatment. The failure of closed reduction can also be caused by a continuous broad separation of pieces with soft tissue interposition [12]. Widely dislocated fractures of the middle-third of the clavicle treated without surgery have a 15% non-union incidence. Non-union was seen in all fractures with an initial shortening of more than 2cm3 [13]. Several studies have examined the safety and efficacy of primary open reduction and internal fixation for totally displaced mid-shaft clavicle fractures, finding a high union and low complication rates [14].

With a locked compression plate, an acceptable result may be achieved in a substantial proportion of complicated clavicle fractures with a low complication rate. Primary internal repair of displaced comminuted mid-shaft clavicle fractures results in predictable and prompt function [15]. Older research showed that a fracture of the clavicle shaft, even if severely displaced, was fundamentally a benign injury with an intrinsically favorable prognosis when treated non-operatively. Although non-surgical care may be ideal for many fractures, non-surgically treated fractures may only sometimes have acceptable outcomes [16].

Low-contact dynamic compression plates are a robust plate fixation alternative; however, they are difficult to shape and cause soft tissue discomfort. Anatomical pre-contoured plates may have the benefit of requiring less bending, having a smaller profile, and creating fewer soft tissue issues while maintaining the mechanical strength of stronger plates [17]. Titanium For displaced mid-clavicle fractures, elastic nail fixation is a suitable approach that requires minimal soft tissue dissection [18]. This study compares "the functional outcome of displaced fracture middle third of clavicle managed surgically by both plating versus TENS" clinically and radiological.

2. METHODS

The present study was conducted from August 2016 to September 2018 at the Department of Orthopedics. During this period, we had 70 cases of mid-clavicle fractures. Out of these 59 cases, Surgical was the most treated. The patients are between 16 and 60 years old, having third clavicle fractures and closed fractures (irrespective of any type). The patients who were unfit for surgery and had fractures due to pathological conditions were excluded from the study. A detailed history of fracture conditions, in addition to the demographic data, was recorded at the time of informed consent. The patients were thoroughly checked for any abnormality in the vascular and respiratory systems. Before surgery, patients were maintained nil by mouth for 6 hours. A written informed permission for surgery was obtained from the patient in their language. Preparation was done on the neck, chest, axilla, shoulders, and arm. The anesthetist recommended tranquilizers, so they were delivered. All patients received systemic antibiotics, commonly Inj. Cefaparazone + sulbactum 1.5gm intravenously, 30 minutes before surgery. All of the patients were put under general anesthesia for the procedure. Titanium Elastic Nailing was done by adopting the previous methods. Intravenous antibiotics were administered to both groups for 3 to 5 days before switching to oral antibiotics for another 5 days [19,20]. An arm sling was used to immobilise the operated limb. On the third postoperative postoperative day, the wound was examined, and an X-ray was performed to examine the alignment of the fracture pieces. The pain was measured using a visual analog score of 55 (VAS) on a scale of 0 to 10 while putting on the dressing [21,22].

3. RESULTS

The present study included 59 patients who underwent surgery for a fresh middle third clavicle fracture between August 2016 and September 2018. Plate fixation was used in 31 patients, while titanium elastic intramedullary nail fixation was used in 28 individuals. The two groups were the plate group and the TENS nailing Group. All of the patients were followed up on a regular basis. The clinical and radiological findings were scrutinized. There was no significant variation in age between the two groups.

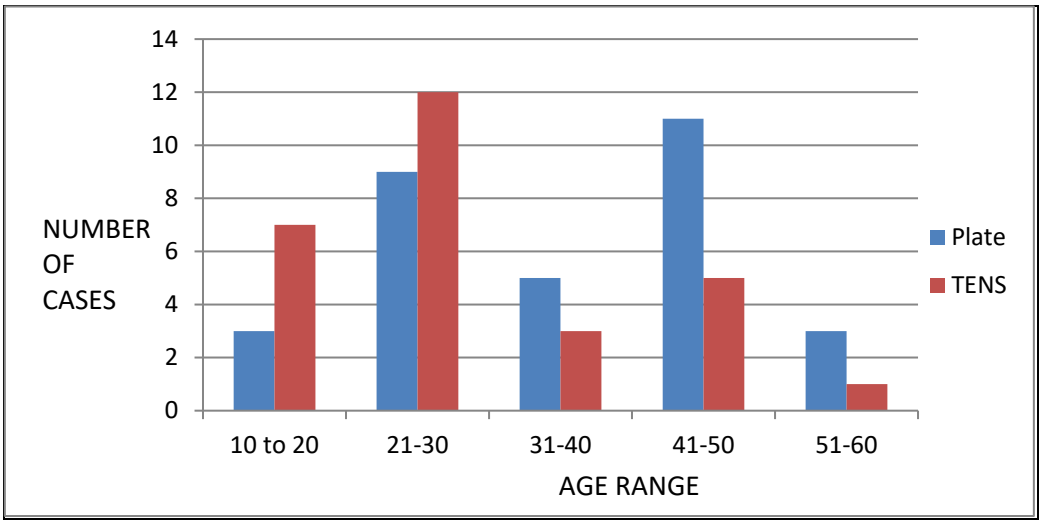

Figure 1. Age distribution

The present study included 59 patients who underwent surgery for a fresh middle third clavicle fracture between August 2016 and September 2018. Plate fixation was used in 31 patients, while titanium elastic intramedullary nail fixation was used in 28 individuals. The two groups were the plate group and the TENS nailing Group. Regularly, all of the patients were followed up on. The clinical and radiological findings were scrutinized. There was no significant variation in age between the two groups. These results showed that males were affected more strongly than females (Figures. 1 and 2).

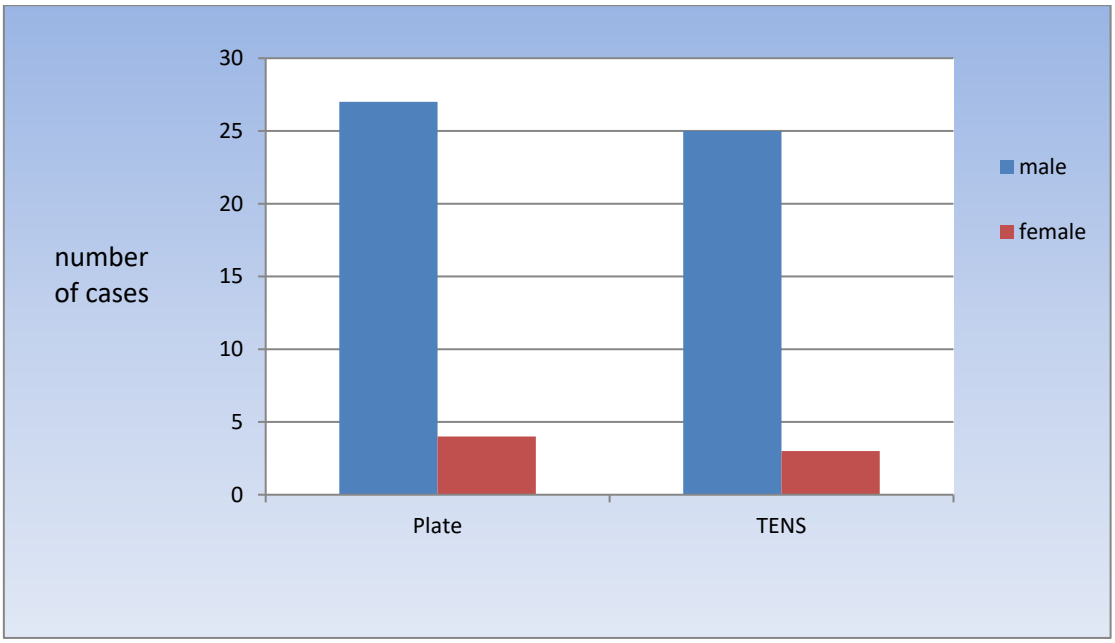

Figure 2: Gender distribution

The damage mechanism was uniformly distributed in both groups. A motor accident caused 64.4 % of instances, a fall from a height caused 25.4 %, sports activity caused 6.8 %, and assault caused 3.4 % (Figure. 3).

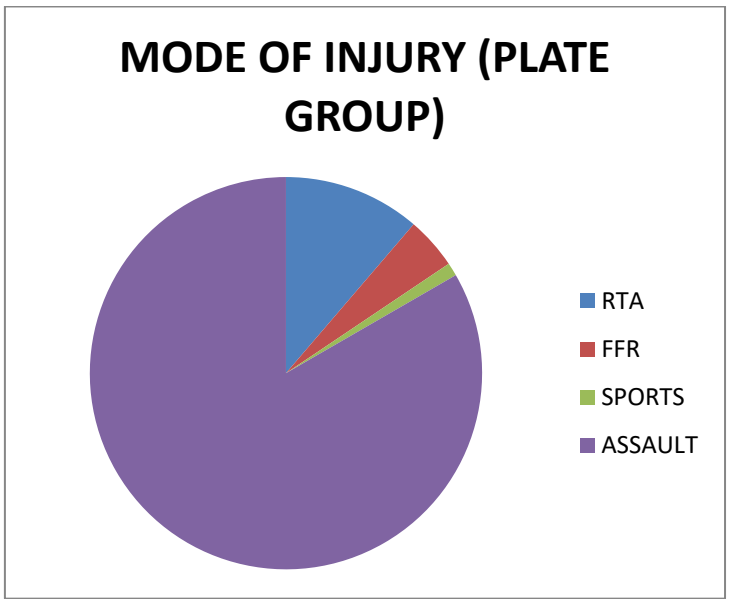

Figure. 3. Injury in plate group

Road traffic accidents accounted for 67.7% of incidences in the plate group, falls from height accounted for 25.8%, and sports activity accounted for 6.5 % of instances (Figure. 3).

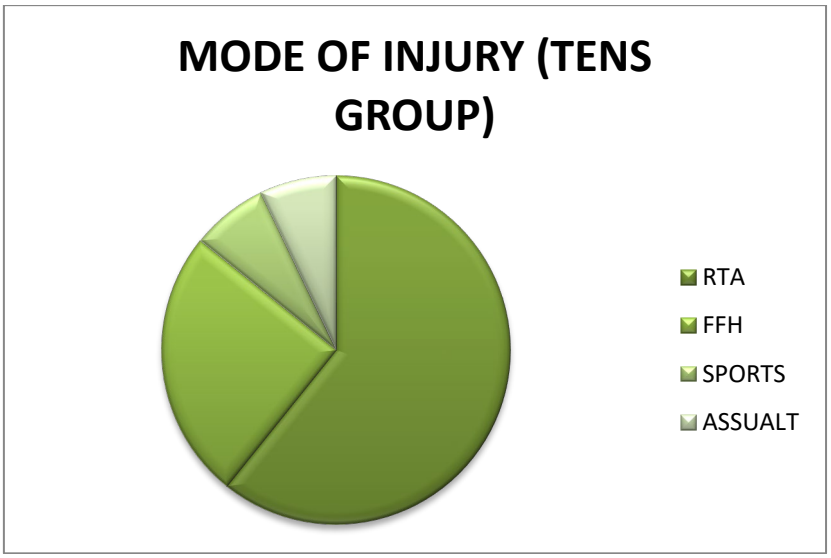

Figure. 4. Mode of injury in TENS group.

A driving collision produced 60.7 % of instances in the plate group, while a fall from a height caused 25%, sports activity caused 7.1 %, and attack caused 7.1 %. An automobile accident is the most common cause of injury, followed by a fall from a large height and sports activity. The patient's right side was more affected in the plate group (51.6 %), and the patient's left side was more affected in the TENS group (57.1 %) (Figure 4).

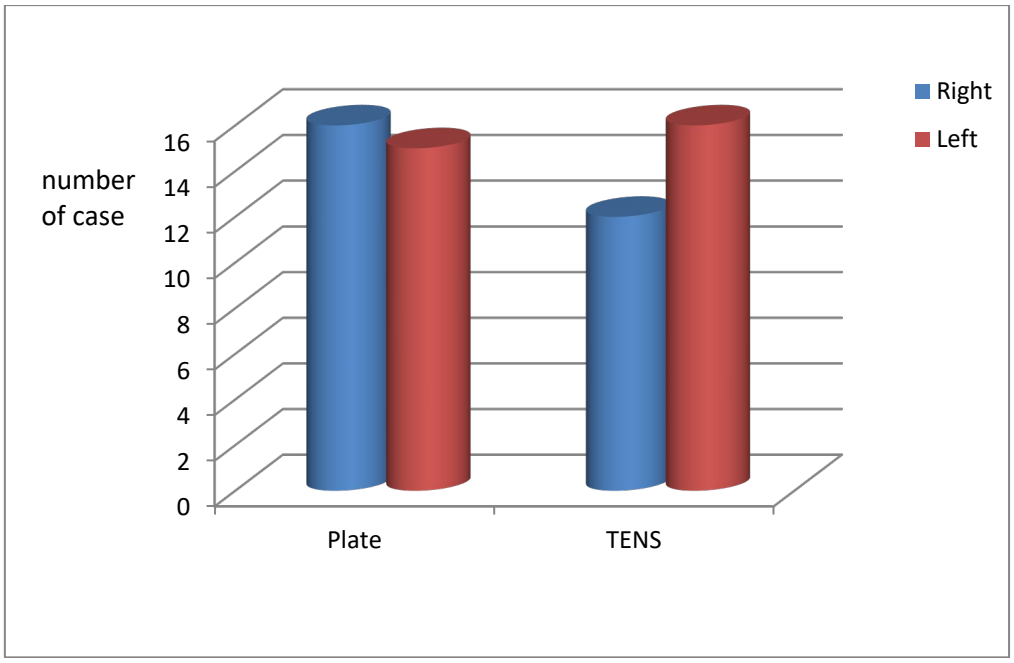

Figure. 5. Shows the distribution of cases based on the side affected.

According to Robinson's classification, 83.1 % of the patients in my research were simple (B1) type, and 16.9% were wedge/comminuted (B2) type. The plate group had 71 % (22) basic (B1) examples and 29 % (9) wedge instances (B2). 96.4 % (27) of the TENS cases were basic (B1), whereas 3.6 % (1) were wedge (B2) (Figure. 5).

4. CONCLUSION

The study was conducted from August 2016 to September 2018. Fifty-nine cases with displaced mid-shaft clavicle fractures were operated with plate fixation in 31 cases and TENS nail fixation in 28 cases. Functional assessment was done using the Constant and Murley scoring system, which showed excellent scores in 12 patients, good results in 16 patients, fair Results in 2 patients, and poor results in 1 patient belonging to the plate Group. Whereas in the TENS group, 20 patients had excellent results, good results were seen in 7 patients, and fair results were seen in 1 patient.

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ETHICAL APPROVAL

Nil

COMPETING INTEREST

The authors declare no conflict of interest.

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