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EARLY VERSUS DELAYED FIXATION OF ROAD TRAFFIC ACCIDENT-RELATED MANDIBULAR FRACTURES: A COHORT OF 84 PATIENTS

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Abstract

This prospective cohort study assessed fracture patterns and the effect of surgical timing in 84 patients with road traffic accident–related mandibular fractures treated by open reduction and internal fixation (ORIF). Most patients were young men, and two-wheeler accidents accounted for half of all injuries; helmet use among two-wheeler riders was low. Multiple fracture lines were common, with the parasymphysis being the most frequently affected site. Early ORIF performed within 72 hours was associated with significantly lower surgical-site infection rates and a substantially shorter hospital stay than delayed surgery. Although malocclusion was less frequent after early fixation, the difference was not statistically significant.

Keywords: mandibular fracture; road traffic accident; helmet; internal fixation; surgical timing; infection; maxillofacial trauma.

Introduction

Road traffic accidents (RTAs) are the leading cause of mandibular fractures in many low- and middle-income countries and mainly affect young men [1, 2]. Two-wheeler riders without helmets are at particular risk, and enforcement of helmet legislation reduces mandibular injuries [3, 4]. Associated injuries often postpone definitive treatment, and delay is linked with infection and the need for postoperative fixation [5, 6]. This study aimed to describe fracture patterns after RTAs and to compare early with delayed open reduction and internal fixation (ORIF).

Methods:

A prospective cohort of 84 patients with RTA-related mandibular fractures treated with ORIF using titanium miniplates was analysed. Patients were grouped by time from injury to surgery: early (≤ 72 hours, n = 45) or delayed (> 72 hours, n = 39). Data included age, sex, vehicle type, helmet use, fracture site and number of fracture lines. Outcomes were surgical site infection within six weeks, malocclusion at six weeks and hospital stay. Fisher's exact test, odds ratios (OR) and Welch's t-test were used; $p < 0.05$ was considered significant.

Results

The mean age was 25.8 ± 6.5 years, and 73 patients (86.9%) were men. Two-wheelers were involved in 42 cases (50.0%), and only 12 of these riders (28.6%) wore helmets. Multiple fractures were present in 51 patients (60.7%). The parasymphysis was the most common site (31; 36.9%), followed by the condyle (18; 21.4%), angle (15; 17.9%), body (13; 15.5%) and symphysis (7; 8.3%). Infection occurred in 2 of 45 early cases (4.4%) versus 8 of 39 delayed cases (20.5%; OR 0.18; $p = 0.039$). Malocclusion was less frequent after early fixation (6.7% vs 17.9%), although not significantly ($p = 0.176$). Hospital stay was shorter in the early group (5.1 ± 1.4 vs 9.3 ± 2.4 days; $p < 0.001$).

Discussion

RTA-related mandibular fractures predominantly affected young men and the parasymphysis, consistent with regional series [1, 2]. Low helmet use mirrors other two-wheeler cohorts [3], indicating that enforced legislation could reduce this burden [4]. Early fixation was associated with fewer infections and shorter hospitalisation, supporting pooled evidence that delay increases fracture-related infection and the need for postoperative fixation. Cervical spine and brain injuries must still

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be excluded before surgery [5]. When the general condition allows, ORIF within 72 hours should be the standard for RTA-related mandibular fractures.

Conclusion

Road traffic accident–related mandibular fractures predominantly affect young male patients, often involve multiple fracture lines, and are strongly associated with low helmet use among two-wheeler riders. When the patient is medically stable and associated injuries have been appropriately excluded or managed, ORIF within 72 hours should be prioritized. Early fixation reduces postoperative infection and hospital stay while providing comparable short-term occlusal outcomes to delayed treatment. Strengthening helmet-law enforcement and timely referral for maxillofacial surgery may reduce both the incidence and clinical burden of these injuries.

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