

An Analysis of E-Scooter Related Trauma

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Abstract

Aim

Electronic (E)-scooters are growing in popularity on Irish roads. Research in other countries has highlighted the impact of e-scooter related injuries. The purpose of this report was to analyse e-scooter related trauma presenting to our suburban hospital.

Methods

Retrospective data analysis was performed. 22 patients with e-scooter related injuries were identified between October 2019 and November 2020. Medical records were reviewed, and Injury Severity Score (ISS) calculated.

Results

All patients had at least one radiological investigation. 68% (n=15) sustained radiologically confirmed fractures and 36% (n=8) required surgical intervention. The mean ISS score was 9.3 (59% (n=13) of patients required outpatient follow-up and 73% (n=16) attended physiotherapy. The mean driver age was 38.2 while 60% (n=12) of drivers were not wearing a helmet.

Conclusion

E-scooter trauma results in a high rate of orthopaedic injuries, which frequently require surgical intervention. The impact on our health system as they grow in popularity may be significant. Addressing the safety concerns regarding these vehicles now may prevent serious injury.

Introduction

Electronic or e-scooters are becoming increasingly popular on Irish roads. According to the Irish Road Safety Authority, e-scooters fall under the umbrella of 'Mechanically Propelled Vehicles'¹. They are therefore technically subject by law to rules such as helmet use and licensing requirements.

While there is no legal speed limit in place, many of these vehicles can reach speeds of over 25km/hr².

Studies in the United States³, Germany⁴, Austria⁵, and New Zealand⁶ have highlighted the impact of e-scooter related trauma. High speed, low fall height and short reaction time, in combination with a lack of personal protective equipment, means users are particularly vulnerable to upper extremity and head injuries⁷. Significant costs are associated with these injuries^{6, 8} and a high percentage of patients require radiological imaging⁹, admission and orthopaedic intervention⁸.

Anecdotally, it was noted that a new cohort of patients with e-scooter related injuries were being treated at our facility. The aim of this report was to analyse e-scooter related trauma at our hospital.

This is the first study on e-scooter related trauma in the Irish cohort.

Methods

This report took place at a 280-bed level 3 facility suburban hospital in Dublin. Retrospective data analysis was performed. Patients were identified by searching our electronic database for presentations coded as including “scooter” or “e-scooter”.

45 patients were identified in the period October 2019- November 2020. Patients under the age of 16 (n=1) were excluded as our hospital does not provide paediatric trauma services. A further 22 patients were excluded as the vehicle involved was not an e-scooter.

Medical records, radiology and operative notes were reviewed, and all patients were contacted by phone. Injury severity score (ISS), a validated trauma scoring system¹⁰, was calculated for all patients.

Results

Injury and Clinical Outcomes

100% (n=22) had at least one radiological investigation. 95% (n=19) underwent Xray and 27% (n=6) had a CT scan. One third (n=2) of these CT scans were CT Brains.

68% (n=15) of patients sustained radiologically confirmed fracture. Figure 1 (Next page) outlines the documented orthopaedic diagnoses for these patients.

The ISS range was 1- 34 with a mean of 9.3 and a median of 9.

Injury	Surgical Intervention
Open Comminuted Distal Tibia Fibula Fracture	1 Application External Fixation Device 2 ORIF and Retention External Fixation Device 3 2 nd Stage ORIF
Bimalleolar Ankle Fracture with Syndesmosis Injury	ORIF Ankle and Syndesmosis Repair
Weber B Ankle Fracture with Syndesmosis Injury	1 ORIF Ankle 2 Syndesmosis and Deltoid Ligament Repair
Middle Phalanx Fracture Index Finger	Nil
Middle Phalanx Fracture Little Finger- Intra articular	Manipulation Under Anaesthesia and K Wire Insertion
Scaphoid Fracture	Nil
Scaphoid Fracture	Nil
Comminuted Intra-Articular Distal Radius Fracture	Open Reduction Internal Fixation (ORIF) Distal Radius
Bilateral Radial Head Fracture	Nil
Radial Head Fracture, Bilateral Distal Radius Fracture	ORIF Distal Radius
Radial Head Fracture	Nil
Surgical Neck of Humerus Fracture	Nil
Greater Tuberosity of Humerus Fracture	Nil
Completely Displaced Clavicle Fracture with Pneumothorax	1 Pleurodesis at specialist facility 2 ORIF Clavicle
Complex Facial Bone, Orbital Wall and Maxilla Fractures	Maxillofacial surgical intervention at specialty facility

Figure 1: Orthopaedic Injury and Surgical Intervention.

64% (n=14) of patients were discharged from the emergency department after initial investigation and management. 36% (n=8) of patients were admitted to hospital for surgical intervention, with 14% (n=3) requiring more than one surgical procedure (Figure 1).

The length of admission measured per overnight stay ranged from 1-14 nights, with a mean of 3.9.

59% (n=13) of patients were followed up at an outpatient clinic, while 73% (n=16) of patients attended outpatient physiotherapy.

Demographics, helmet usage and driving experience

91% (n=20) of the group were e-scooter drivers while 9% (n=2) were pedestrians struck by an e-scooter. 45% (n=9) of drivers were commuting with the remaining 55% (n=11) using the vehicle for recreation. The mean driver age was 38.2 years old, with a range of 17-56. 73% (n=16) of drivers were male.

40% (n=8) of drivers were wearing a helmet at the time of injury while 45%(n=9) held a full driver's licence.

25% (n=5) of patients reported having under one week of e-scooter driving experience, and 60% (n=12) reported having under 6 months experience.

Discussion

E-scooter use is likely to continue to grow in Ireland. This report demonstrates that e-scooters are used by a wide range of age groups and are used as a mode of commute, not just for recreation.

The majority of patients sustained at least one fracture and the proportion which ultimately required surgical fixation was very high at over one third of the study group. It was also noted that the documented orthopaedic injuries were complex, with one patient sustaining an open tibial fracture. Most patients required both outpatient follow up and physiotherapy. Further research may be helpful in assessing the cost of these presentations to the healthcare system as well as the cost to patients in terms of morbidity and work absence.

Compliance with personal protective use is poor with less than half of drivers were wearing a helmet. This may provide support for calls to address the safety concerns surrounding these vehicles, including the enforcement of rules regarding helmets and the introduction of speed limits. Given the high number of upper limb injuries, in particular radial head fractures, other protective equipment such as elbow protectors may have a role to play. It is important to note that these vehicles produce minimal noise and users should be encouraged to make themselves as visible as possible with reflective clothing and lighting.

This report is limited given the relatively small numbers involved. However, given the size of our hospital, these numbers still have an important impact on our facility. Higher numbers may be presenting to larger inner-city hospitals. It is also likely that these numbers will increase as e-scooter usage becomes more widespread.

In conclusion, e-scooter trauma results in a high rate of complex orthopaedic injuries, many of which require surgical intervention. The impact on our health system as e-scooters grow in popularity may be significant and further research is needed to assess their cost burden. Addressing the safety concerns regarding these vehicles now may prevent serious injury in the Irish cohort.

Declaration of Conflicts of Interest:

The authors have no conflicts of interest to declare.

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