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Management of oral and maxillofacial trauma during the first wave of the COVID-19 pandemic in the United Kingdom

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Abstract

We assess the effect of coronavirus disease 2019 (COVID-19) on UK oral and maxillofacial (OMF) trauma services and patient treatment during the first wave of the pandemic. From 1 April 2020 until 31 July 2020, OMF surgery units in the UK were invited to prospectively record all patients presenting with OMF trauma. Information included clinical presentation, mechanism of injury, how it was managed, and whether or not treatment included surgery. Participants were also asked to compare the patient’s care with the treatment that would normally have been given before the crisis. Twenty-nine units across the UK contributed with 2,229 entries. The most common aetiology was mechanical fall (39%). The most common injuries were soft tissue wounds (52%) and, for hard tissues, mandibular fractures (13%). Of 876 facial fractures, 79 patients’ treatment differed from what would have been normal pre-COVID, and 33 had their treatment deferred. Therefore the care of 112 (14%) patients was at variance with normal practice because of COVID restrictions. The pattern of OMFS injuries changed during the first COVID-19 lockdown. For the majority, best practice and delivery of quality trauma care continued despite the on-going operational challenges, and only a small proportion of patients had changes to their treatment. The lessons learnt from the first wave, combined with adequate resources and preoperative testing of patients, should allow those facial injuries in the second wave to receive best-practice care.

Keywords: Covid 19; Coronavirus; Trauma; Oral and Maxillofacial Trauma

Introduction

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and the related pneumonia coronavirus disease (COVID-19) have had an impact on the way we practice. The focus of attention to support critically ill COVID-19 patients during the first wave meant that the essential re-allocation of resources, including medical staff, significantly reduced the ability of the NHS to deliver routine care. Also, surgical provision under general anaesthesia (GA) was recognised as a significant risk of morbidity and mortality for patients who may have had, or could develop, COVID-19.

Drawing on previous lessons from the 1997 and 2008 national facial injury surveys (NFIS), the authors established a central database for oral and maxillofacial surgery (OMFS) units in the UK to record prospective data on all patients with OMF trauma who attended those units during the first COVID-19 lockdown. We review the data collected over this period and assess the impact of COVID-19 on OMFS trauma services and patients’ treatment.

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Material and methods

Using the research and clinical trial arm of the British Association Oral and Maxillofacial Surgeons (BAOMS) and the National Facial, Oral and Oculoplastic Research Centre (NFORC), a database was set up using the Research Electronic Data Capture (REDCap) system hosted by the Barts Cancer-Research UK Centre, Queen Mary University of London. REDCap is a secure, web-based software platform designed to support data capture for research studies. The database was opened from 1 April 2020.\(^3\)\(^4\)

Leads in each OMFS unit were asked to obtain local approval from their hospital to collect the data, and completely anonymised data were collected and entered on to REDCap. Each unit chose a start date to mark the beginning of formal changes in care provision caused by COVID-19 at their hospital. Data were collected from that date until 31 July 2020 on all patients who presented to the OMFS team.

The information collected included age, gender, clinical presentation, source of referral, mechanism of injury, treatment(s) provided and, if admitted, length of hospital stay (LOS). Respondents were also asked to indicate how a patient’s management compared to what would normally have been given pre COVID-19.

Results

Twenty-nine OMFS units UK-wide participated in this service evaluation, resulting in 2229 records and 2514 injuries during the first wave of the pandemic until 31 July 2020 (Fig. 1).

Soft tissue injuries to the head and neck accounted for 52% (n = 1298) of all injuries. Hard tissue injuries included mandibular fractures (13%, n = 321), dental injuries (11%, n = 278), zygomatic complex fractures (10%, n = 251), isolated orbital floor fractures (10%, n = 253), and nasal bones and Le Fort/naso-orbitoethmoidal (NOE) complex fractures (5%, n = 113).

A total of 1455 injuries (64%) were in men.

As summarised in Fig. 2, the most common aetiology was mechanical fall (39%, n = 927), mainly resulting in soft tissue (56%) and dental injuries (34%). The second most common cause was alleged assaults (23%, n = 583), which mainly caused fractures (80%). Alleged assaults were reported to be suspected domestic violence in 26 cases (6%). Finally, the third most common source was sports-related injuries (19%, n = 497), which led to soft-tissue injuries (57%), facial fractures (25%), and dental injuries (18%).

Fig. 3 demonstrates the type of injury by age group. Most injuries occurred in those aged 0-9 years and over 70 (20%, n = 452 and 16.2%, n = 360, respectively), and they were soft tissue injuries (76% and 49%, respectively) resulting from falls (54% and 58%, respectively).

Care provided

Soft tissue wounds were caused by mechanical falls (40.3%), and sports-related accidents (22%); all other causes accounted for less than 10%. They were also the only injuries in which animal/human bites (9.8%) made a significant
contribution. Wounds were mainly treated under local anaesthesia (LA) using steri-strips/tissue glue, and suturing (75%).

**Mandibular fractures**

Leading causes were alleged assaults (53.1%), mechanical falls (17%) and sports-related injuries (13.8%). A total of 186 (58%) were treated by open reduction and internal fixation and 80 (25%) by closed management (archbars, intermaxillary fixation screws, Leonard buttons, eyelet wiring, bonded brackets, or bridle wires, and/or external fixators). No intervention was provided to 90 patients (28%) (Table 1). The median (range) LOS was 3 (2-42) days (IQR 2 days).

**Zygomatic fractures**

These were due to falls (43%, n = 108), alleged assaults (37%, n = 93) and sports injuries (14%, n = 34). A total of 172 patients (68%) had no intervention, 27 (10%) had their fractures reduced and plated, 26 (10%) were treated with closed
Table 1
Management of fractured mandibles. Data are number (%).

| Anaesthetic | No intervention | Intermaxillary fixation | Intraoral ORIF with plate(s) | Extraoral ORIF with plate(s) | External fixator |
|-------------|-----------------|--------------------------|-----------------------------|-----------------------------|------------------|
| General     | 870             | 172 (53)                 | 10 (3)                      | 3 (1)                       |                  |
| Local       | 0               | 0                        | 0                           | 0                           |                  |
| None        | 68 (21)         | 1 (4)                    |                              | 0                           |                  |

ORIF: open reduction and fixation.
* Leonard buttons/IMF screws or bridged wire.
* Leonard buttons.

Fig. 4. Anaesthetic management of each injury.

reduction, and in 16 (6%) treatment was deferred. Surgical intervention took place at a median (range) of 11 (0–28) days (IQR 10 days) after presentation.

Orbital floor fractures

These resulted from falls (45.7%, n = 111), alleged assaults (35.8%, n = 87), and sports injuries (11.1%, n = 27). Most did not require intervention (85.2%, n = 207) or were deferred until after lockdown (n = 7, 2.1%). When undertaken, surgical treatment (exploration/repair, n = 22, 9.1%) occurred at a median (range) of 6.5 (0 – 30) days (IQR 10 days).

Nasal bone and Le Fort / NOE fractures

These occurred mainly in adults (aged 20 years or above) and, similar to other fractures, were mainly due to alleged assaults (32%), mechanical falls (31%), and sports injuries (16.4%).

Dental injuries

Dental injuries were mainly caused by falls (47.4%, n = 137), sports-related injuries (30.8%, n = 89), alleged assaults (12.4%, n = 36), and road traffic accidents (RTA) (4.2%, n = 12). A total of 108 (39%) did not require intervention, while a quarter (n = 71) were treated non-surgically (splinting of teeth), of which 46 (16%) needed extraction.

Care changed by COVID

Of all valid cases (n = 206), 158 (7.6%) patients had their treatment changed (3.3%) or deferred (4.4%).

Soft tissue injuries were affected the least with only 4.5% of cases (45/993) having their treatment changed or deferred. The rates of deferrals for hard tissue injuries were 14.1% for nasal bones / Le Fort /NOE complex, 7.7% for mandibular fractures, and less than 5% for the remaining types of injury. There was no significant regional effect on deferral rates. Of the 29 OMFS units, 18 had deferred a patient’s treatment as a result of COVID-19. Rates of deferral were below 10% (average 4%) except in one unit that had a rate of 13%.

In order of frequency, the treatments that differed from those that would have been provided before COVID were zygomatic complex fractures (11.9%), Le Fort/NOE complex fractures (10.2%), and dental injuries (7.7%). Other types of injury had rates below 2%. Patients whose treatments were changed across all injuries were more likely to be young children (0-9 years) and young adults (20-49 years) (13.9% and 50.6%, respectively). For hard tissue injuries alone, the treatment of patients aged 20-49 years altered the most (42%).
treatments in all other age groups were altered in less than 10% of cases. Aetiology remained unchanged with alleged assault, mechanical falls, and sports causing the most injuries.

Anaesthetic treatment was altered by COVID measures in 6.4% (92/1442 valid cases). The injuries for which a change of anaesthetic was most likely to occur were soft tissue injuries and zygomatic complex fractures. Similar patterns were observed for gender, age, and aetiology.

When available, the main reasons for altering or deferring a patient’s treatment were ‘applying local COVID policies’ (29%) and ‘avoiding aerosol-generating procedures’ (10%); ‘limiting activity to preserve stock of personal protective equipment (PPE)’ was cited only twice.

Discussion

This UK-wide study has produced an illustration of the patterns of OMFS injuries during the first wave of the COVID-19 pandemic in participating units. Overall, units continued to provide a trauma service, and treated their patients in a similar way to the way in which they had before the pandemic, despite some changes (type of intervention/ anaesthetic and deferral) in a small number of cases.

Zygomatic fractures were affected the most by alterations in treatment, followed by mandibular and orbital fractures. Zygomatic fractures are usually offered to treat a change in appearance rather than function, usually under GA, and restricted access to the semielective GA theatre, risks associated with GA, uncertainty about the patient’s COVID status, and the lack of resources may all have altered treatment decisions.

Consistent with recent trends,5 soft tissue injuries predominated and corresponded to lower energy injuries that were more likely to be sustained in the home, rather than to higher energy injuries that would occur outside, such as RTA. The overall pattern of extreme age groups being more affected by mechanical falls, with soft tissue and/or dental injuries in the younger groups, is reflective of injuries occurring in the home. Extended periods of time spent at home and reduced child supervision compared to that provided at nurseries and clubs, the lack of suitable home fittings, as well as restricted access to support networks and social care during lockdown, may all have contributed to this observation.

The management of soft tissue injuries in terms of intervention was little affected, and the cessation of routine OMFS clinical activity allowed an increased number to be managed under LA in the outpatient department. The creation of urgent/trauma clinics and ‘Patch and Plan’ sessions, which should allow more efficient care of soft tissue injuries, could be positive developments of the COVID experience.

This study was not able to compare the activity from each participating unit before COVID-19. Instead we used as comparators the two UK national facial injury surveys (NFIFS) conducted in 19979 and 2008.9 In these surveys facial injuries due to falls accounted for 39%-40% of cases. Here it was 44%. Typically, these injuries result from interpersonal violence and are likely to be alcohol-related and to happen near drinking venues.7 The lockdown stopped this specific aetiology almost completely and inevitably altered the proportion of injuries caused in other ways. It also changed the age and demographics from predominantly male and late-teens to late-twenties, to the bimodal distribution of the young and the old. Interpersonal violence accounted for 23% of cases. This was similar to the 24% seen pre-COVID for all presentations to A&E departments in the NFIS 1997 and the less than 31% seen in the 2008 survey, but was a considerable change in those being referred to OMFS here (6%).5,6 Domestic abuse is more prevalent when movements are restricted and vulnerable persons are socially isolated, so there were concerns about the potential risks of lockdown.8-10

Dental injury increased as a proportion of all presentations from the 5% previously seen in the 2008 survey to 11%, the same level as in the 1997 survey.5,6 This could be related to an increase in the amount of outdoor exercise and play that was allowed by the suspension of school and work, but also to the guidance issued by NHS England’s Chief Dental Officer and the General Dental Council advising the closure of most general dental practices.11 Lack of PPE for the primary care sector meant that access was limited to urgent dental care centres, but even these were affected and their services were variable.12,13

Despite patient pathways being made more complex by COVID requirements, in most cases interventions have been timely. Using fractures of the mandible as a proxy indicator of LOS, the mean LOS increased from 2.1 days in the pre-COVID-19 report by Getting It Right First Time (GIRFT) to 3 days.14 For most mandibular fractures LOS is due to preoperative delay rather than postoperative care, a change that is understandable but unlikely to be clinically significant. The cessation of elective procedures may have freed senior clinicians and allowed them to follow national guidance to create a consultant-delivered assessment and surgery service. Access to the emergency theatres, however, may have been the rate-limiting factor due to the redistribution of theatre staff and the increased use of emergency theatres from other surgical specialties whose elective lists would have been cancelled as well.

OMFS as a specialty is considered particularly high risk due to the use of powered surgical instruments and generation of aerosols.15 This has led to changes in management, with BAOMS advocating four key recommendations: to wear PPE, avoid transfers/surgery, restrict visits/aerosols/staff numbers, and abbreviate waiting times/consultations.16 Concerns about the lack of PPE stock and testing (most patients had an unknown COVID-19 status), which were particular challenges at the start of the pandemic, may have resulted in an initial change in surgical practice affecting essentially aesthetic procedures such as zygomatic fractures.

The closed treatment of fractured mandibles (intermaxillary fixation under LA), which is uncomfortable for the patient and has specific risks linked to having the jaws wired
together, can be performed in an outpatient setting. As access to theatres subsequently increased and patient pathways were established with COVID testing, conventional operative practice may have returned. It remains to be seen, however, if deferrals have created a future health burden but, without any apparent imminent end to the pandemic, it may be some time before this is recognised.

Finally, we acknowledge that our study has two main limitations. First, participation varied greatly between units and we were unable to ascertain whether the number of entries were an accurate reflection of activity during lockdown. Secondly, data collection was limited to the lockdown period, and therefore there were no data to serve as a pre-COVID baseline, which is why we used the two UK NFIS for comparison.

**Conclusion**

COVID-19 and lockdown had an impact on the aetiology of OMFS injuries and the overall number of patients, and for a small but significant number the management of their injuries differed significantly from normal practice. Patients whose definitive treatment was deferred or who chose not to be treated at the time, perhaps to avoid the risk to themselves of a GA, may result in an additional workload in the medium-term future. In the face of ongoing operational challenges, it has proven feasible to continue best practice and deliver quality trauma care for the majority of patients. In the face of the second wave, no surgery should be postponed or changed because of a lack of resources. Patients may wish to decline the offer of surgery because of the risk to themselves, but testing and isolation should help to moderate these concerns.

We hope that appropriate care pathways should prevent any avoidable change in best practice.

**Conflict of interest**

We have no conflicts of interest.

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**Ethics statement/Confirmation of patients’ permission**

Neither ethics approval nor patients’ permission was required.

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**Appendix A.**

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