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EDITORIAL

The IMPACT of COVID-19 on trauma & orthopaedic surgery provides lessons for future communicable disease outbreaks

MINIMUM REPORTING STANDARDS, RISK SCORES, FRAGILITY TRAUMA SERVICES, AND GLOBAL COLLABORATION

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Research into COVID-19 has been rapid in response to the dynamic global situation, which has resulted in heterogeneity of methodology and the communication of information. Adherence to reporting standards would improve the quality of evidence presented in future studies, and may ensure that findings could be interpreted in the context of the wider literature. The COVID-19 pandemic remains a dynamic situation, requiring continued assessment of the disease incidence and monitoring for the emergence of viral variants and their transmissibility, virulence, and susceptibility to vaccine-induced immunity. More work is needed to assess the long-term impact of COVID-19 infection on patients who sustain a hip fracture. The International Multicentre Project Auditing COVID-19 in Trauma & Orthopaedics (IMPACT) formed the largest multicentre collaborative audit conducted in orthopaedics in order to provide an emergency response to a global pandemic, but this was in the context of many vital established audit services being disrupted at an early stage, and it is crucial that these resources are protected during future health crises. Rapid data-sharing between regions should be developed, with wider adoption of the revised 2022 Fragility Fracture Network Minimum Common Data Set for Hip Fracture Audit, and a pragmatic approach to information governance processes in order to facilitate cooperation and meta-audit. This editorial aims to: 1) identify issues related to COVID-19 that require further research; 2) suggest reporting standards for studies of COVID-19 and other communicable diseases; 3) consider the requirement of new risk scores for hip fracture patients; and 4) present the lessons learned from IMPACT in order to inform future collaborative studies.

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Reporting standards in studies of COVID-19 and other communicable diseases

Uncertainty surrounding the effects of the COVID-19 pandemic on hip fracture patients propelled the need for rapid dissemination of information, however this resulted in heterogeneity of methodology and reporting.[1,2] Adherence to reporting standards for future studies investigating COVID-19 would improve the quality of the evidence presented, and these should include: pathogen factors (such as prevalence, virulence, and effects); healthcare factors (such as infection prevention and control strategies, diagnostic criteria, and relevant public health policies); and patient factors (such as vaccination status, comorbidity, and appropriate minimum follow-up duration).[3,4]

A systematic review revealed variation in the methods used to diagnose COVID-19 in hip fracture patients, with some classifying patients as COVID-19-positive based on clinical diagnosis only, which may have resulted in an inaccurate assessment of the prevalence of COVID-19.[1] Future studies should be consistent in using laboratory tests for infection.

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Nosocomial transmission played an important role in the spread of COVID-19 in the hip fracture population during the initial wave of the pandemic.[5] However, there remains poor reporting of the timing of COVID-19 diagnosis in relation to acute admission. Reliable assessment of the efficacy of infection prevention and control strategies is dependent on robust reporting of diagnosis date, especially when presenting data for 30-day mortality following admission, and analyzing the proportion of cases acquired beyond seven days of admission. There is poor reporting of follow-up duration in the existing literature, and the majority of studies examined patients up to 30 days post-admission rather than post-COVID-19 diagnosis. This inconsistency makes objective comparison of outcomes unreliable, and a minimum of 30 days' follow-up post-COVID-19 diagnosis is recommended for all future studies.

Original studies were conducted most frequently in Western Europe and North America during 2020 and, although these regions experienced a high prevalence of COVID-19, the literature may not be generalized to a broader sample of sex, race, ethnicity, healthcare systems, or geopolitical factors.[6,7] The International Multicentre Project Auditing COVID-19 in Trauma & Orthopaedics (IMPACT)-Global Hip Fracture Audit included patients from 14 countries spanning six continents, but further work is required to provide greater representation for patient groups in regions where hip fractures are becoming highly prevalent, particularly Southeast Asia and South America.[3]

Each study conducted on an inpatient population is dependent on general factors affecting the community from which the inpatients are derived. Future studies should report the contemporary background prevalence of the disease and the predominant SARS-CoV-2 variant of concern (VOC), as well as hospital and community public health and infection control policies relevant to transmission characteristics for their catchment population.

The majority of literature assessing the effects of COVID-19 on hip fracture patients report crude mortality rates and do not adjust for confounding factors that have been shown to affect outcomes.[1] Future studies should consider adjusting analyses for patient factors including age, sex, BMI, frailty, and major pre-existing conditions including pulmonary or renal disease.

COVID-19 vaccinations have been available since late 2020 and there is encouraging evidence that they are effective at reducing transmission and disease severity, thus vaccine status of the patient should be reported in future studies.[8] Consideration should be given to the specific vaccination type, regimen, and dates administered to patients, as well as the predominant viral variant, as these factors may have a differential effect on outcomes.[8]

Future work in COVID-19

COVID-19 still presents a global health threat that requires continual monitoring of incidence, variants, transmissibility, virulence, clinical effects, and susceptibility to vaccine-induced immunity.[9]

More work is needed to assess the long-term impact of COVID-19 infection on patients who sustain a hip fracture, with particular attention given to the long-term survival rates and wider care needs in the acute and rehabilitation periods. The disruption to specialist hip fracture services will have had a deleterious effect on both the patients who have had COVID-19 and those who have not. This will increase the burden on health and social care services.[10]

It is likely that nosocomial infection is an important factor in the high rates of COVID-19 observed among vulnerable inpatients, although the effect of vaccination programmes on this needs to be investigated. Further studies are required to assess the specific patterns of transmission within hospitals, downstream inpatient facilities, residential care settings, and the community in order to provide evidence-based strategies for infection prevention and control.[5]

Hip fracture risk scores in the context of COVID-19

A diagnosis of COVID-19 in combination with a hip fracture is associated with a three-times increased 30-day mortality risk that is independent of confounding factors. The IMPACT studies demonstrated that during the first wave of the pandemic in the UK, one in three patients who had COVID-19 around the time of hip fracture died within a month of injury. This high mortality rate represents the combined effects of having two acute conditions – each associated with a significant mortality risk independently – and may represent a 'double-hit' effect in this vulnerable population.

There are also indirect effects of COVID-19 on affected patients, since the presence of COVID-19 typically results in disruption to the usual hip fracture care process, including delays to surgical treatment, alternative perioperative care regimens, management on non-specialist orthopaedic units, and interruption to multidisciplinary care. The deleterious effect of COVID-19 on care processes may be modulated by the widespread availability of COVID-19 vaccinations, which have been shown to reduce both the acquisition and transmission of infection.[8]

Consequently, COVID-19 status and COVID-19 vaccination status need to be considered when predicting mortality risk associated with a hip fracture admission, and established risk scores should be modified to take this into account.

Lessons for future epidemics and pandemics

The response to future disease outbreaks can be informed by the lessons learned during the pandemic and may help prepare for the anticipated emergence of endemic COVID-19, new variants of existing pathogens, seasonal influenza, and novel communicable diseases. It raises the question of whether we should put enhanced infection

control measures in place during seasonal influenza outbreaks, and whether influenza vaccination should be offered on admission to hospital, given that the average length of stay of hip fracture patients in 2020 was approximately 15 days.[11]

The prevalence of COVID-19 in hip fracture patients has been shown to be several times higher than the background prevalence reported in the nations in which studies have been conducted, and it is likely that hip fracture patients are the single group of surgical admissions that account for the largest number of COVID-19-related deaths. An under-recognition of the extreme vulnerability of this patient group in communicable disease outbreaks may have contributed to the major disruption to fragility trauma care as orthopaedic resources were redistributed to non-orthopaedic services.[12] This should not occur in any future waves of COVID-19, or in the context of future disease outbreaks.

Although surgery should not be delayed in COVID patients, care should be taken to protect patients from being managed on open generalist wards by non-specialized staff, which is likely to result in an inferior standard of care, a longer duration of hospital admission, increased transit of patients and staff between clinical areas, and an increased likelihood of contracting COVID-19 in hospital.[13,14] The implementation of tools for risk stratification, isolation pathways, and in-hospital and community-based contact tracing should be developed in anticipation of future outbreaks. Standard operating procedures should be instituted to tackle the inefficiency and variability of practices within operating departments.[5,15]

General orthopaedic services, particularly those provided to patients with fragility trauma or injuries that require early definitive management, should be protected and not disrupted during future health crises. The needs of other vulnerable orthopaedic patients who are not routinely considered as part of the hip fracture cohort, such as patients with periprosthetic fractures of the femur, should be considered, since their susceptibility to COVID-19 infection and associated death has been shown to be very high.[16] This may involve the expansion of day-case operating for appropriate patients in order to reduce resource demand, length of stay, and risk of virus transmission. These principles may be further expanded to planned orthopaedic surgical services, which have been shown to be safe despite a communicable disease outbreak, in order to provide a sustainable solution to serve the health needs of the population.[17-19]

IMPACT formed the largest multicentre collaborative audit conducted in orthopaedics in order to provide an emergency response to a global pandemic.[20,21] However, many audit services are on an insecure footing and their delivery was disrupted at an early stage, despite being vital for guiding evidence-based management. Thus, it is crucial that these resources are protected during future health crises. Rapid data-sharing between regions in the form of low-cost and agile audit collaborations should be developed, with wider adoption of the revised 2022 Fragility Fracture Network Minimum Common Data Set for Hip Fracture Audit, and a pragmatic approach to information governance processes in order to facilitate cooperation.[22] These measures will ensure that future emergency audit responses can be commenced with reduced lead times, greater diversity and generalizability to global populations, and larger sample sizes through compilation of datasets using a meta-audit approach.[23]

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