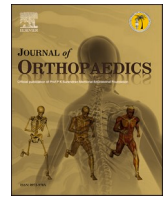




Contents lists available at ScienceDirect

Journal of Orthopaedics

journal homepage: [www.elsevier.com/locate/jor](http://www.elsevier.com/locate/jor)

Original Article

## Management of hip fractures during the COVID-19 pandemic at a high-volume hip fracture unit in the United Kingdom

Khalid Malik-Tabassum<sup>\*</sup>, Melissa Crooks, Alastair Robertson, Christopher To, Lucy Maling, Guy Selmon

Conquest Hospital, East Sussex Healthcare NHS Trust, Hastings, TN37 7RD, UK

### ARTICLE INFO

#### Keywords:

COVID-19  
SARS-CoV-2  
Coronavirus  
Hip fractures  
Trauma

### ABSTRACT

This study aimed to compare the treatment pathway and 30-day outcomes of hip fracture patients admitted during the COVID-19 pandemic with the pre-pandemic period. Three periods were retrospectively analysed: period C = 23/03/2020–11/05/2020, period A = 23/03/2018–11/05/2018, period B = 23/03/2019–11/05/2019. No statistically significant differences in time to surgery, type of treatment, complications, and mortality rates were noted. A significant reduction ( $p = 0.021$ ) in the time to orthogeriatric assessment and length of inpatient stay ( $p < 0.001$ ) was found in period C. Institutional adaptations to facilitate prompt treatment in hip fractures during the pandemic resulted in favourable outcomes.

### 1. Introduction

The outbreak of Coronavirus disease 2019 (COVID-19), caused by the novel Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), was declared a pandemic by the World Health Organisation (WHO) on March 11, 2020.<sup>1</sup> At the time of writing, over 8 million people had been infected with this virus, with a global death toll reported at 454,582.<sup>2</sup> United Kingdom (UK) has been one of the worst affected countries by the pandemic. To date, the UK has registered 301,935 infected cases and 42,373 COVID-19 related deaths, making it the nation with the second-highest mortality rate from COVID-19 (deaths per million).<sup>2</sup> On March 23, 2020, formal “lockdown” in the UK was announced, with the imposition of wide-ranging restrictions to freedom of movement, enforceable by law. These restrictions were eased in England on May 11, 2020, with guidance changing from “stay at home” to “stay alert”.<sup>3</sup>

COVID-19 presented unprecedented challenges to hospitals across the UK. In response to an anticipated surge of COVID-19 patients, numerous changes were made to service configurations, resource allocation, patient pathways and working patterns at our hospital trust. As per the national guidance, all elective operating lists were suspended from March 17, 2020.<sup>4</sup> A large proportion of anaesthetists and operating department practitioners were deployed to intensive care units resulting in the reduced provision of daily trauma operating lists. Additionally, prolonged turnover times between surgical cases due to personal

protective equipment (PPE) procedures and unfamiliarity with the evolving COVID-19 protocols further limited the Trauma and Orthopaedic (T&O) department’s operative productivity.

Hip fractures constitute a large proportion of the T&O workload, with approximately 76,000 patients presenting to emergency departments in the UK each year. The estimated overall cost of hip fracture care to the National Health Service (NHS) is over £1 billion per year.<sup>5</sup> Elderly patients with hip fractures are a particularly vulnerable group during the pandemic. There is compelling evidence that early surgery, prompt orthogeriatric care and early post-operative ambulation improves outcomes for patients with hip fractures.<sup>6–8</sup> Considering the irrefutable benefits of surgical management of hip fractures, the T&O and anaesthetic departments aimed to continue providing timely surgical care for hip fracture patients in line with the National Institute for Health and Care Excellence (NICE) guidelines, provided sufficient availability of staff, theatre space and adherence to the COVID-19 protocols.<sup>9</sup>

Our institution provides acute hospital and community health services to 550,000 people living in its catchment area. As our region has the second-highest proportion of residents over the age of 85 years nationally, we did not anticipate a decrease in the number of admissions due to hip fractures.<sup>10</sup> Several changes to the departmental infrastructure were implemented to mitigate the strain put on the hospital’s surgical capacity by COVID-19. To date, no UK-based studies have

<sup>\*</sup> Corresponding author. Conquest Hospital, East Sussex Healthcare NHS Trust, The Ridge, Hastings, Saint Leonards-on-Sea, TN37 7RD, UK.

E-mail addresses: [khalid.malik-tabassum@nhs.net](mailto:khalid.malik-tabassum@nhs.net) (K. Malik-Tabassum), [melissa.crooks@nhs.net](mailto:melissa.crooks@nhs.net) (M. Crooks), [alastair.robertson4@nhs.net](mailto:alastair.robertson4@nhs.net) (A. Robertson), [christopher.to@nhs.net](mailto:christopher.to@nhs.net) (C. To), [lucy.maling@nhs.net](mailto:lucy.maling@nhs.net) (L. Maling), [guy.selmon@nhs.net](mailto:guy.selmon@nhs.net) (G. Selmon).

<https://doi.org/10.1016/j.jor.2020.06.018>

Received 20 June 2020; Accepted 28 June 2020

Available online 2 July 2020

0972-978X/Crown Copyright © 2020 Published by Elsevier B.V. on behalf of Professor P K Surendran Memorial Education Foundation. All rights reserved.

published post-operative outcomes in hip fracture patients admitted during the pandemic. This study aimed to investigate the impact of the disruptions caused by the COVID-19 pandemic on the treatment and early post-operative outcomes of hip fracture patients admitted during the period of the UK lockdown and compare them with the pre-pandemic period.

## 2. Methods

### 2.1. Study design

This was an observational, descriptive, retrospective study conducted at a single NHS hospital trust. This study was approved by the institutional review board. Three different periods were studied. The first period was referred to as period C, which represented the strictest lockdown period between March 23, 2020, and May 11, 2020. Period A and period B corresponded to the same dates as period C in the last two years i.e. period A = March 23 to May 11, 2018, period B = March 23 to May 11, 2019.

### 2.2. Study population

The study included all patients over the age of 60 years who were admitted with a hip fracture. Type of fractures included in this study were trochanteric fractures, intracapsular neck of femur fractures and subtrochanteric fractures (proximal third of the femur). Patients that presented with fractures of the middle or distal third of the femur, peri-prosthetic femoral fractures, and fractures due to polytrauma were excluded.

### 2.3. Data collection

Data on patient demographics, treatment, and post-operative outcomes were extracted from the National Hip Fracture Database (NHFD). NHFD is a national hip fracture registry that audits hip fracture care against six evidence-based standards set out by British Geriatrics Society (BGS) and the British Orthopaedic Association (BOA).<sup>5</sup> Data on T&O procedures performed during the described periods were collected from the operating theatre management software. Incomplete or implausible data was queried and checked against electronic medical records for accuracy. All patient identifiable data was anonymised for analysis.

### 2.4. Variables

Demographic variables included age, gender, American Society of Anaesthesiologists (ASA) grade, pre-operative Abbreviated Mental Test Score (AMTS), pre-admission residence, and fracture type. Time to surgery, time to orthogeriatric assessment and type of treatment were also recorded. Post-operative outcomes consisted of length of inpatient stay, post-operative complications, return to theatre, and 30-day mortality. For patients admitted during period C, their COVID-19 test status was also assessed. Furthermore, we analysed the overall proportion of operations performed for hip fractures compared to all other trauma cases during all three described periods.

### 2.5. Statistical methods

General descriptive analysis of the data was initially performed. Continuous variables were reported as means and standard deviations (SD). Categorical variables were presented as absolute numbers and percentages. Analysis of variance (ANOVA) was used to compare continuous variables, whereas the Pearson chi-square test was used to compare categorical variables. A p-value  $\leq 0.05$  was considered statistically significant. The statistics software used for data analysis was JASP version 0.12.2.0 (<https://jasp-stats.org/>).

## 3. Results

### 3.1. Demographics

A total of 242 records were identified. There was an overall reduction in the number of admissions due to hip fractures during period C (n = 68) compared to period A (n = 84) and period B (n = 90). There were no statistically significant differences in mean age, ASA grade, pre-operative AMTS score, pre-admission residence or fracture types among patients admitted during these periods. In period C, a significantly higher proportion of men were admitted with hip fractures, p < 0.037 (Table 1). 76% of patients with hip fractures were tested for COVID-19. Only one patient had a confirmed positive test result (Fig. 1).

### 3.2. Treatment of hip fracture patients

Overall, there were no significant differences in the type of treatment provided to patients with hip fractures among the three studies periods. Only 4 patients underwent non-surgical treatment, 2 during period B, and 2 during period C. Among the patients treated conservatively, 3 patients were medically unfit for surgery, whereas 1 patient was asymptomatic and successfully mobilised with minimal difficulty. Since the highest proportion of patients during all 3 periods sustained intra-capsular neck of femur fractures, the most frequently performed procedure was a cemented hemiarthroplasty (Table 2).

**Table 1**  
Patient demographics.

	Period A	Period B	Period C	P-value
Total number of NOF fractures (n)	90	84	68	
Mean age (SD)	82.9 (9.9)	83.8 (7.7)	84.3 (8.9)	0.634
Gender				
Female	69 (76.7%)	68 (81.0%)	43 (63.2%)	<b>0.037</b>
Male	21 (23.3%)	16 (19.0%)	25 (36.8%)	
ASA Grade				
1	3 (3.3%)	1 (1.2%)	0 (0.0%)	0.299
2	24 (26.7%)	29 (34.5%)	17 (25.0%)	
3	52 (57.8%)	46 (54.8%)	47 (69.1%)	
4	11 (12.2%)	8 (9.5%)	4 (5.9%)	
Pre-operative AMTS				
0–6	30 (33.3%)	21 (25.0%)	22 (32.4%)	0.439
7–10	60 (66.7%)	63 (75.0%)	46 (67.6%)	
Pre-admission residence				
Nursing care	11 (12.2%)	3 (3.6%)	8 (11.8%)	0.286
Own home/sheltered housing	66 (73.3%)	69 (82.1%)	52 (76.5%)	
Residential care	13 (14.4%)	12 (14.3%)	8 (11.8%)	
Fracture type				
Intracapsular – displaced	47 (52.2%)	37 (44.0%)	36 (52.9%)	0.708
Intracapsular – undisplaced	10 (11.1%)	7 (8.3%)	8 (11.8%)	
Subtrochanteric	4 (4.4%)	3 (3.6%)	3 (4.4%)	
Trochanteric - grade A1/A2	20 (22.2%)	27 (32.1%)	18 (26.5%)	
Trochanteric - grade A3	9 (10.0%)	10 (11.9%)	3 (4.4%)	

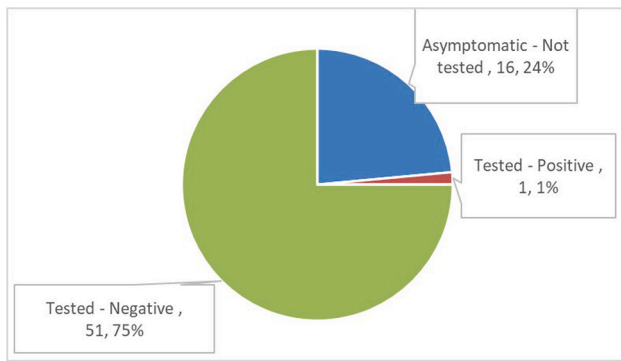


Fig. 1. COVID-19 test status of hip fractures admitted during Period C.

**Table 2**  
Type and timing of treatment for hip fracture patients.

	Period A	Period B	Period C	P-value
Mean time to surgery - hours (SD)	26.5 (18.7)	28.2 (51.7)	21.8 (12.1)	0.490
Delay in surgery >36 h?				
Yes	15 (16.7%)	8 (9.8%)	7 (10.6%)	0.321
No	75 (83.3%)	74 (90.2%)	59 (89.4%)	
Mean time to orthogeriatric assessment – hours (SD)	37.1 (25.9)	39.0 (38.7)	25.7 (26.8)	0.021
Treatment				
Total hip replacement	7 (7.8%)	5 (6.0%)	1 (1.5%)	0.263
Hemiarthroplasty (cemented)	41 (45.6%)	36 (42.9%)	39 (57.4%)	
Internal fixation - Cannulated screws	4 (4.4%)	0 (0.0%)	3 (4.4%)	
Internal fixation - Dynamic Hip Screw	23 (25.6%)	25 (29.8%)	12 (17.6%)	
Long intramedullary nail fixation	3 (3.3%)	6 (7.1%)	3 (4.4%)	
Short intramedullary nail fixation	12 (13.3%)	10 (11.9%)	8 (11.8%)	
Non-surgical treatment	0 (0.0%)	2 (2.4%)	2 (2.9%)	

### 3.3. Time to surgery and orthogeriatric assessment

There was a reduction in the mean time to surgery for hip fracture patients during period C compared to the previous years (21.8 h in period C, 28.2 in period B, 26.5 in period A), though this difference was not found to be statistically significant,  $p = 0.49$  (Table 2). Most patients did not experience a delay in surgery for more than 36 h. The reasons for the surgical delays are outlined in Fig. 2. Compared to the previous two years, there was a significant reduction ( $p = 0.021$ ) in the elapsed time between admission and orthogeriatric assessment (25.7 h in period C, 39.0 in period B, 37.1 in period C) (Table 2).

### 3.4. Post-operative outcomes

The mean length of inpatient stay was significantly shorter during the period C (8.6 days) compared to the previous two periods (period B = 16.3 days, period A = 15.8 days),  $p < 0.001$ . When comparing discharge destinations for patients in the three described study periods, a statistically significant difference was noted, with a higher proportion of patients ( $p = 0.002$ ) discharged to a rehabilitation facility within the same NHS trust during the period of lockdown (23.5% in period C, 9.5% in period B, and 10% in period A). The differences in complication rates, return to operating theatre, 30-day mortality rate, and proportion of patients discharged to their pre-admission residence during all three periods were not significant (Table 3). Post-operative complications are summarised in Fig. 3. The only patient who tested positive for COVID-19 pre-operatively (period C), was medically unfit for surgery and died four days following admission.

### 3.5. Surgical procedures for hip fractures versus other trauma cases

There was a 26% reduction in the total number of operative trauma cases during period C ( $n = 194$ ) compared to period B ( $n = 262$ ), and a 24% reduction compared to period A ( $n = 255$ ). The proportion of operations for hip fractures were similar in all three time periods i.e. 35% in period C, 32% in period B, and 35% in period A (Fig. 4).

## 4. Discussion

Our objective was to review the epidemiology of hip fractures, treatment pathways and outcomes of patients admitted during the period of national lockdown (March 23 – May 11, 2020). According to the NHFD data, over 630 patients with hip fractures are admitted to our

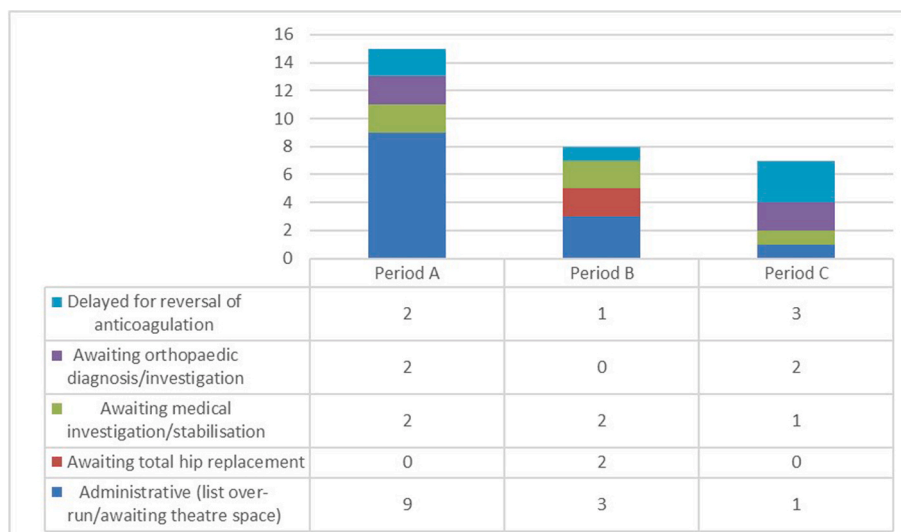


Fig. 2. Reasons for delay in surgery >36 h.

**Table 3**  
Post-operative outcomes.

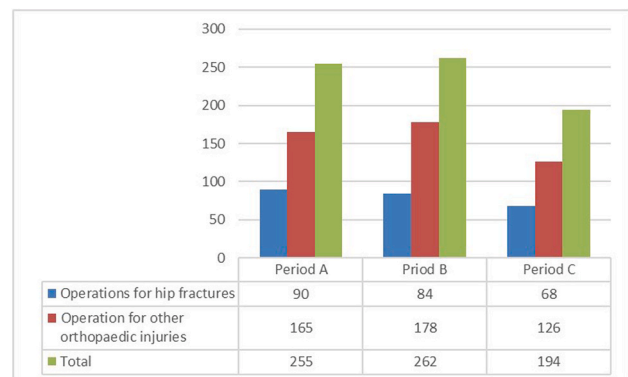
	Period A	Period B	Period C	P-value
Mean length of inpatient stay – days (SD)	15.8 (11.4)	16.3 (11.4)	8.6 (4.6)	<0.001
Post-operative complications %	7 (7.8%)	10 (12.2%)	3 (4.5%)	0.240
Return to operating theatre (%)	0 (0.0%)	4 (4.9%)	2 (3.0%)	0.119
30-day mortality (%)	3 (3.3%)	9 (10.7%)	6 (8.8%)	0.157
<b>Discharge destination</b>				
Death during inpatient admission	2 (2.2%)	9 (10.7%)	4 (5.9%)	<b>0.002</b>
Nursing care	11 (12.2%)	6 (7.1%)	9 (13.2%)	
Own home/sheltered housing	31 (34.4%)	45 (53.6%)	27 (39.7%)	
Rehabilitation unit - NHS funded care home	9 (10.0%)	4 (4.8%)	4 (5.9%)	
Rehabilitation unit - hospital bed in the same Trust	9 (10.0%)	8 (9.5%)	16 (23.5%)	
Residential care	15 (16.7%)	9 (10.7%)	6 (8.8%)	
Transfer to another acute hospital	13 (14.4%)	3 (3.6%)	2 (2.9%)	
<b>Discharge to pre-admission residence?</b>				
Yes	46 (51.1%)	30 (35.7%)	28 (41.2%)	0.115
No	44 (48.9%)	54 (64.3%)	40 (58.8%)	

hospital annually, making it one of the busiest hip fracture units in the country.<sup>5</sup> We aimed to assess if the disruptions to the routine trauma workflow caused by COVID-19 resulted in a detrimental effect on the treatment and outcomes of hip fracture patients compared to similar periods in the past two years.

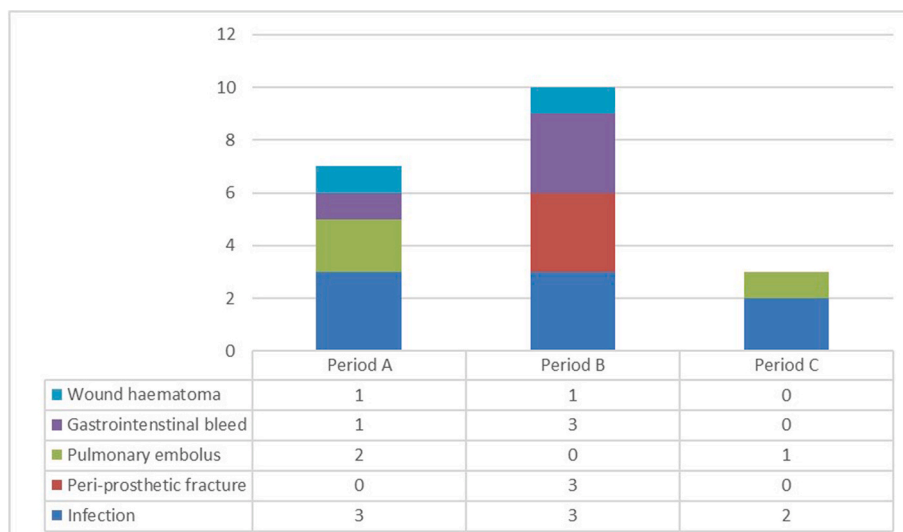
In the weeks leading to the implementation of the national lockdown, our department observed a marked reduction in younger adults presenting to the emergency department with traumatic injuries that required operative treatment. This apparent reduction in trauma case-load was counterbalanced by a steady flow of elderly patients admitted with fragility fractures. In the meantime, there was a surge in the number of patients admitted with respiratory compromise from COVID-19, requiring invasive ventilation. In response, a significant number of anaesthetists were deployed to the intensive care units and several operating rooms and recovery spaces were converted to intensive care beds.

In pandemic scenarios, healthcare resources are allocated to serve “the greatest amount of good for the greatest number”, and therefore, undoubtedly patient comorbidities and life expectancy influence surgical and anaesthetic decision-making. This presented both a logistical and ethical dilemma for orthopaedic surgeons, anaesthetists, and orthogeriatricians. The benefits of early surgical intervention for elderly hip fracture patients were balanced against limited operative capacity. Furthermore, in context of the proven high mortality rates in this vulnerable group of patients due to COVID-19, the perceived risk of viral transmission to hip fractures patients from a prolonged inpatient stay due to non-operative treatment was deemed an unacceptable option.<sup>11</sup> Hence, a multi-disciplinary decision was made at our institution to prioritise surgery for hip fracture patients despite the lack of theatre capacity. Several steps were taken to neutralise the interference to the provision of T&O services.

The conventional daily trauma meeting was relocated to a larger room with facilities for video conferencing. Physical attendance of T&O staff was restricted to the on-call teams to facilitate social distancing and reduce the risk of viral transmission. T&O surgeons, trainees, orthogeriatricians, anaesthetist and operating theatre co-ordinator attended these meetings remotely to discuss daily admissions and pending operative cases. Virtual meetings allowed improved communication between members of the multi-disciplinary teams and facilitated the departments’ effort to maintain a healthy workforce. Cancellation of elective services meant that the department had a reserve roster of



**Fig. 4.** Comparison of operations performed for hip fractures versus all other trauma operations.



**Fig. 3.** Post-operative complications in hip fracture patients.

orthopaedic surgeons and trainees who would stand-in to cover staff sickness or operate on trauma patients awaiting surgery at short notice if unexpected operating theatre space became available. Although some members of the T&O team were redeployed to other specialties, no changes were made to the on-call structure, junior ward cover, or provision of orthogeriatric care.

Operating theatres were split into “green zone” and “red zone”. Asymptomatic patients or those who tested negative for coronavirus underwent surgery in the green zone, whereas patients with respiratory symptoms or those tested positive were treated in the red zone. Initially, PPE protocols were implemented in the red zone only, but as guidance evolved and orthopaedic operations were classified as aerosol-generating procedures, use of PPE for all trauma cases was made compulsory in the latter half of period C. Institutional protocols regarding testing for COVID-19 evolved in line with the guidance provided by the Department of Health. Initially, only patients who presented to emergency departments with respiratory symptoms such as a new cough, shortness of breath and associated fever were tested. In the first half of period C, test results took between 48 and 96 h to arrive. As the capacity for testing, the turnaround time for results and testing accuracy improved, all patients admitted to the hospital were tested for COVID-19. Therefore, in the last three weeks of period C, all hip fracture patients were tested before surgery, with results available within 3–4 h.

Availability of dedicated orthopaedic trauma lists was variable. Provision of dedicated trauma lists ceased on April 1, 2020, and therefore, T&O had to share the 24-h emergency operating list with other surgical specialties. This setup rapidly became incompatible with the volume of daily trauma cases, resulting in a significant backlog of trauma patients awaiting surgery. As a result, the operating theatres in the adjacent private hospital were utilised for the provision of daily trauma lists between April 16, 2020, and May 11, 2020. A dual operating theatre model was also adopted, where trauma cases alternated between two adjacent theatres, improving theatre efficiency.

This study showed that despite severe disruptions to the acute trauma services at our hospital, the standard of care for hip fracture patients was maintained. The implementation of contingency measures resulted in similar outcomes for hip fracture patients during the pandemic when compared to the national average.<sup>12</sup> Hip fracture patients received orthogeriatric assessments more promptly during period C and did not experience a delay to surgery when compared to period A and period B. There was a reduction of mean length of inpatient stay during period C by almost 50%. Furthermore, a significant improvement in the provision of rehabilitation beds in our trust was also noted. These differences are explained by the extensive efforts made by the integrated discharge teams to ensure timely discharges to minimise patients’ risk of acquiring COVID-19, and to create bed capacity for the anticipated surge of COVID-19 patients.

Although it is difficult to prove direct causation, we believe that by maintaining the bundled care protocol for hip fractures in accordance with the NICE guidelines, and not altering the thresholds for surgical treatment played a key role in optimising patient outcomes during the pandemic. We acknowledge that our department was fortunate to have a low number of confirmed cases of COVID-19 during this period. Nevertheless, the Northern Italian experience reported by Catellani et al. showed that prompt surgical treatment for proximal femoral fractures resulted in improvement of respiratory parameters in symptomatic COVID-19 patients.<sup>13</sup> Additionally, the preliminary results of the Spanish HIP-COVID multi-centre study demonstrated that at 14-days post-admission, the mortality rate among hip fracture patients treated conservatively was 67%, compared to 4% for patients who were treated surgically.<sup>14</sup> These studies add significant strength to the evidence that supports prompt surgical treatment in hip fracture patients despite stretched medical resources during the pandemic.

The authors acknowledge the limitations of this study due to its retrospective design. Our analysis relied on the accuracy of the data

submitted to the NHFD. We presented findings from a single hip fracture unit, and therefore the overall numbers of patients included in this study were low. As this study was conducted during the “lockdown” period of the pandemic in the UK, the longer-term outcomes of patients admitted during this period are unknown. We concede that outcomes for hip fractures at our hospital might be associated with the lower COVID-19 infection rates in our region compared to the national figures. Despite this, our unit experienced similar challenges to the ones faced by hospitals from other regions in the country, such as staff sickness, redeployment, shortage of PPE and uncertainties surrounding COVID-19 related guidance and protocols.

## 5. Conclusion

Our experience showed that prioritising provision of surgical treatment for hip fractures during the pandemic resulted in favourable outcomes for these patients. Whilst the overall number of operative trauma cases reduced during the pandemic, the epidemiology of hip fractures remained largely unaffected. A vaccine or proven treatment for COVID-19 is yet to be discovered; therefore, given the future risk of the “second wave”, it is vital that stakeholders understand the impact of the pandemic on commonly occurring public health problems. Due to the rapidly increasing elderly population in the UK, fragility hip fractures will continue to present a significant challenge to the NHS in the future.<sup>15</sup> Unfortunately, it is the very same population that has the highest mortality rate due to COVID-19.<sup>11</sup> Over the coming months, healthcare providers across the country must formulate contingency plans considering the lessons learned from the last five months. Hospital policies need to ensure restructuring of services and allocation of resources to accommodate this vulnerable patient population in case of a second surge of infective cases.

## Ethics

This study adhered to the ethical principles outlined by the UK Medical Research Council. Since this was a retrospective analysis of anonymised data from National Hip Fracture Database (NHFD), ethics review by the Research Ethics Committee (REC) was not required.

## Funding statement

This study did not receive any funding or grants.

## Authors contributions

KMT: Conceptualisation, methodology, investigation, formal analysis, writing – original draft preparation. MC, AR, CT, LM: Data retrieval, writing – reviewing and editing. GS: Writing – reviewing and editing, supervision.

## Declaration of competing interest

None.

## Acknowledgements

We thank our clinical data administrator for helping with data extraction.

## References

- 1 Coronavirus (COVID-19) events as they happen. World Health Organization. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen>. Accessed June 9, 2020.
- 2 COVID-19 map. Johns hopkins coronavirus resource center. <https://coronavirus.jhu.edu/map.html>. Accessed June 19, 2020.

- 3 Cabinet Office. Staying alert and safe (social distancing) - GOV.UK. <https://www.gov.uk/government/publications/staying-alert-and-safe-social-distancing>. Accessed June 9, 2020.
- 4 Cancelled operations. The nuffield trust. Published October 26 <https://www.nuffieldtrust.org.uk/resource/cancelled-operations>; 2018. Accessed June 9, 2020.
- 5 National hip fracture Database (NHFD) annual report 2019. Published December 13 <https://www.rcplondon.ac.uk/projects/outputs/national-hip-fracture-database-nhfd-annual-report-2019>; 2019. Accessed June 9, 2020.
- 6 Klestil T, Röder C, Stotter C, et al. Impact of timing of surgery in elderly hip fracture patients: a systematic review and meta-analysis. *Sci Rep.* 2018;8(1):13933. <https://doi.org/10.1038/s41598-018-32098-7>.
- 7 Neuburger J, Currie C, Wakeman R, et al. Increased orthogeriatrician involvement in hip fracture care and its impact on mortality in England. *Age Ageing.* 2017;46(2): 187–192. <https://doi.org/10.1093/ageing/afw201>.
- 8 Oldmeadow LB, Edwards ER, Kimmel LA, Kipen E, Robertson VJ, Bailey MJ. No rest for the wounded: early ambulation after hip surgery accelerates recovery. *ANZ J Surg.* 2006;76(7):607–611. <https://doi.org/10.1111/j.1445-2197.2006.03786.x>.
- 9 Hip fracture management: clinical guideline [CG124]. National Institute for health and care excellence. <https://www.nice.org.uk/guidance/cg124/chapter/Recommendations>. Accessed June 9, 2020.
- 10 State of the county 2019 focus on East Sussex. <https://www.eastsussex.gov.uk/media/13538/state-of-the-county-2019-for-website.pdf>. Accessed June 9, 2020.
- 11 Mahase E. Covid-19: death rate is 0.66% and increases with age, study estimates. *The BMJ.* 2020;369. <https://doi.org/10.1136/bmj.m1327>.
- 12 NHFD outcomes benchmark summary 2018. National hip fracture Database. <https://www.nhfd.co.uk/20/NHFDcharts.nsf/fmbenchmarks?ReadForm&report=outcomes&year=2018&region=All>. Accessed June 11, 2020.
- 13 Catellani F, Coscione A, D'Ambrosi R, Usai L, Roscitano C, Fiorentino G. Treatment of proximal femoral fragility fractures in patients with COVID-19 during the SARS-CoV-2 outbreak in Northern Italy. *J Bone Joint Surg Am.* 2020. <https://doi.org/10.2106/JBJS.20.00617>. Published online April 28.
- 14 Muñoz Vives JM, Jornet-Gibert M, Cámara-Cabrera J, et al. Mortality rates of patients with proximal femoral fracture in a worldwide pandemic: preliminary results of the Spanish HIP-covid observational study. *J Bone Joint Surg Am.* Published online May. 2020;6. <https://doi.org/10.2106/JBJS.20.00686>.
- 15 National population projections. Office for national statistics. <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/nationalpopulationprojections/2018based>. Accessed June 11, 2020.