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GENERAL ORTHOPAEDICS

Restarting elective orthopaedic surgery as COVID-19 lockdown restrictions are reduced

HAVE PATIENT PERCEPTIONS TOWARDS SURGERY CHANGED?

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Aims

The COVID-19 pandemic drastically affected elective orthopaedic services globally as routine orthopaedic activity was largely halted to combat this global threat. Our institution (University College London Hospital, UK) previously showed that during the first peak, a large proportion of patients were hesitant to be listed for their elective lower limb procedure. The aim of this study is to assess if there is a patient perception change towards having elective surgery now that we have passed the peak of the second wave of the pandemic.

Methods

This is a prospective study of 100 patients who were on the waiting list of a single surgeon for an elective hip or knee procedure. Baseline characteristics including age, American Society of Anesthesiologists (ASA) grade, COVID-19 risk, procedure type, and admission type were recorded. The primary outcome was patient consent to continue with their scheduled surgical procedure. Subgroup analysis was also conducted to define if any specific patient factors influenced decision to continue with surgery

Results

Overall, 88 patients (88%) were happy to continue with their scheduled procedure at the earliest opportunity. Patients with an ASA grade I were most likely to agree to surgery, followed by patients with ASA grades II, then those with grade III (93.3%, 88.7%, and 78.6% willingness, respectively). Patients waitlisted for an injection were least likely to consent to surgery, with just 73.7% agreeing. In all, there was a large increase in the proportion of patient willingness to continue with surgery compared to our initial study during the first wave of the pandemic.

Conclusion

As COVID-19 lockdown restrictions are lifted after the second peak of the pandemic, we are seeing greater willingness to continue with scheduled orthopaedic surgery, reinforcing a change in patient perception towards having elective surgery. However, we must continue with strict COVID-19 precautions in order to minimize viral transmission as we increase our elective orthopaedic services going forward.

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Introduction

The first cases of COVID-19 were first reported in Wuhan, the capital city of the Chinese province of Hubei, in December 2019.[1] Affected patients primarily develop a fever and pulmonary symptoms, which can rapidly evolve to an acute respiratory distress syndrome (ARDS) requiring intubation, ventilation, and admission into intensive care. The World Health Organization (WHO) declared the disease a global pandemic on 11 March 2020 after substantial international spread and over ten million confirmed cases.[2] The unprecedented effects of the virus during the

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Table I. Patients at high, moderate, and low risk of COVID-19, as defined by the NHS.[11]

High risk	Moderate risk	Low risk
■ Organ transplant recipients ■ Patients with severe respiratory conditions ■ Patients on immunosuppressive therapy sufficient to increase infection risk ■ Patients with rare diseases and inborn errors of metabolism ■ Patients with problems with the spleen, including splenectomy ■ Down's syndrome ■ Patients on dialysis ■ Pregnant women with heart disease ■ Patients undergoing chemotherapy or radiotherapy for cancers ■ Patients with bloods cancers ■ Recipients of bone marrow/stem cell transplants in the last six months	■ Patients who are aged 70 years or older, or are under the age of 70 years with the following conditions: ■ Chronic respiratory disease ■ Chronic heart disease ■ Chronic renal disease ■ Chronic liver disease ■ Chronic neurological condition, such as Parkinson's Disease ■ Patients with diabetes ■ Patients with weakened immune systems as a result of medical conditions or medications ■ Overweight (BMI > 40 kgm^2) ■ Pregnant	■ Patients who do not fit into the high or moderate risk groups

peak of the pandemic overwhelmed healthcare systems globally, with reported shortages of frontline staff, beds, ventilators, and personal protective equipment (PPE).[3] The rate of spread of the virus during its initial peak led to the cessation of elective services, including elective orthopaedic surgery, so that our limited resources could be shifted to fighting the pandemic.[4-8] Surgical staff were redeployed to intensive care unit (ICU) teams, and medical wards and operating theatres were adapted to cater for ICU beds.[9]

As the peak of the initial pandemic passed, the challenge moved to the resumption of routine elective services. Our institution (University College London Hospital, UK) previously conducted a prospective study of 102 patients assessing patient consent to continuing with their planned elective orthopaedic procedure, with the census taking place in May 2020.[10] This study showed that 58 patients (56.8%) on the waiting list were happy to proceed with their procedure given that we had developed a 'green pathway' to reduce the risk of COVID-19 transmission. Moreover, patients with lower American Society of Anaesthesiologists (ASA) grades and those listed for soft tissue knee surgery were more likely to consent to surgery than those with higher ASA grades and those listed for a primary or revision arthroplasty procedure.[10]

The purpose of this study was to determine if there is any change in patient perception for having elective orthopaedic surgery compared to May 2020. With the UK government creating a roadmap for gradually lifting the COVID-19 restrictions, we hypothesize that a greater proportion of patients will be in agreement to continue with their planned procedure compared to our initial study. Furthermore, we hypothesize that we will see a reduction in the proportion of higher-risk patients wanting to delay their treatment.

Methods

We conducted a prospective study of 100 patients who were on the trauma and orthopaedic elective waiting list at our hospital. All patients on the waiting list who had been given an operation date were included. In all, 18 patients from the previous study cohort remained on the waiting list and are included within this study cohort. Patients on the waiting list for any emergency or trauma procedure or those who were due to have their operation in the private sector were excluded from our study. The starting date of the study was 15 January 2021. Ethical approval was not necessary for our study as it was considered a fundamental review of the waiting list.

The primary outcome was patient consent to proceed with their planned elective orthopaedic procedure given we are still under COVID-19 government restrictions. All patients were telephoned by two authors (AM, WW). Our standardized patient protocol for elective orthopaedic operations during the pandemic was conveyed to patients. This included: 1) self-isolation for a period of 14 days prior to the date of the operation; 2) preoperative COVID-19 screening; 3) a preoperative COVID-19 test conducted at a "drive-through" facility 48 to 72 hours prior to the date of the procedure; 4) social distancing prior to hospital admission; and 5) surgery performed at a COVID-19-free site. Patients were informed that these measures were in place to minimize the risk of contraction of the virus; however, the risk could not be totally eliminated. Patients were given the option to either continue with their planned surgical procedure as scheduled, or defer their proposed intervention until after the COVID-19 pandemic had passed.

Baseline characteristics including age, sex, ASA grade, planned procedure, COVID-19 risk, and admission type were recorded. The risk of COVID-19 was categorized as low, medium, and high risk, as described by the NHS (Table I). Admission type was divided into inpatient

Table II. Baseline characteristics and study outcomes for all patients.

Variable	Patients agreed to surgery, n (%)	p-value*
Overall (n = 100)	88 (88)	
Age, yrs		
< 60 (n = 38)	34 (89.5)	0.283
60 to 70 (n = 25)	22 (88)	
> 70 (n = 37)	32 (86.5)	
ASA grade		
ASA 1 (n = 15)	14 (93.3)	0.142
ASA II (n = 71)	63 (88.7)	
ASA III (n = 14)	11 (78.6)	
ASA IV (n = 0)	0 (0.0)	
COVID-19 risk		
Low (n = 16)	14 (87.5)	0.634
Moderate (n = 56)	50 (89.3)	
High (n = 28)	24 (85.7)	
Type of procedure		
Primary hip arthroplasty (n = 38)	36 (94.7)	0.021†
Primary knee arthroplasty (n = 31)	27 (87.1)	
Soft tissue knee surgery (n = 9)	9 (100)	
Revision arthroplasty (n = 3)	3 (100)	
Hip or knee injection (n = 19)	14 (73.7)	
Surgical priority		
Urgent (n = 0)	0 (0.0)	N/A
Routine (n = 100)	88 (88)	
Admission type		
Day surgery (n = 59)	53 (89.8)	0.437
Inpatient (n = 41)	35 (85.4)	

*Categorical outcomes were assessed using chi-squared test.
†Statistically reduced agreement to proceed with surgery in patients undergoing hip or knee injections compared to the other types of procedures.
ASA, American Society of Anaesthesiologists; ;N/A, not applicable.

and day-case procedures. Subgroup analysis was also conducted to establish if any patient factors influenced the decision to proceed with the surgical procedure.

Statistical analysis. Independent-samples *t*-tests were used to compare study outcomes found to be normally distributed, while the Mann-Whitney U test was used for continuous outcomes found not to be normally distributed. Categorical outcomes were compared using the chi-squared test and Fisher's exact test. Statistical significance was set at a p-value < 0.05 for all analyses, and all statistical analyses were performed using SPSS software version 26 (SPSS, USA).

Results

Our follow-up study included 100 patients, with 57 females (57%) and 43 males (43%). Overall, 38 patients (38%) were aged below 60 years, 25 patients (25%) were aged between 60 and 70 years, and 37 patients (37%) were aged above 70 years. A total of 15 patients (15%) were classified as ASA grade I, 71 patients (71%) were grade II, and 14 patients (14%) were grade III. COVID-19 risk was deemed low in 14 patients (14%), moderate in 56 patients (56%), and high in 28 patients (28%). A total of 41 patients (41%) were scheduled for inpatient procedures. Waitlisted procedures included primary hip arthroplasty (n = 38), primary knee arthroplasty (n = 31), revision arthroplasty (n = 3), soft tissue knee surgery (n = 9), and hip or knee injection (n = 19).

Overall, 88 patients (88%) in our cohort agreed to proceed with their scheduled operation (Table II). Of the 18 patients who were also on the waiting list in our previous study,[10] 15 (83.3%) were happy to be listed for their procedure. Patients who were of ASA grade I had the highest rate of willingness to proceed with their procedure, followed by those who were ASA II, and lastly patients classified grade III (93.3%, 88.7%, and 78.6% willingness for ASA grades I, II, and III, respectively). Patients listed for a hip or knee injection were statistically less likely to want to continue with the scheduled procedure compared to the other subgroups (p = 0.021, chi-squared test). Agreement to continue with surgery was shown not to be influenced by patient age (< 60 years (89.5%), 60 to 70 years (88%), and > 70 years (86.5%); p = 0.283, chi-squared test), COVID-19 risk (low risk (87.5%), moderate risk (89.3%), high risk (85.7%); p = 0.634), or admission type (inpatient (85.4%), day surgery (89.8%); p = 0.437, chi-squared test). Furthermore, an increase in patient willingness to continue with their listed procedure is seen in comparison to the study carried out by our institution during the first wave of the pandemic. A comparison is illustrated in Figure 1.

Discussion

This study demonstrates that 88% of our patient cohort were happy to proceed with their planned elective orthopaedic procedure once resumption of services occurs. This is a much higher proportion in comparison to our initial study involving 102 patients conducted during the lockdown period of the first COVID-19 wave, which showed a willingness to proceed rate of 56.8%.[10] This follow-up study illustrated that age, COVID-19 risk status, and admission type did not impact patient consent to proceed with their scheduled operation. Patients scheduled for soft tissue knee procedures were more likely to agree to continue with their operation compared to patients listed for other procedures, with 100% of this subgroup agreeing to continue. Of the nine patients in this subgroup, seven were graded ASA I and two were graded ASA II. Moreover, all nine of these patients were aged under 60 years, with a mean age of 38.1 years (15 to 57), which likely contributes to their willingness to proceed with surgery. In comparison to the initial study published from our institution during the first COVID-19 lockdown, this subgroup were also the most likely to want to continue with their planned procedure, with 90% of the cohort being agreeable to surgery.[10]

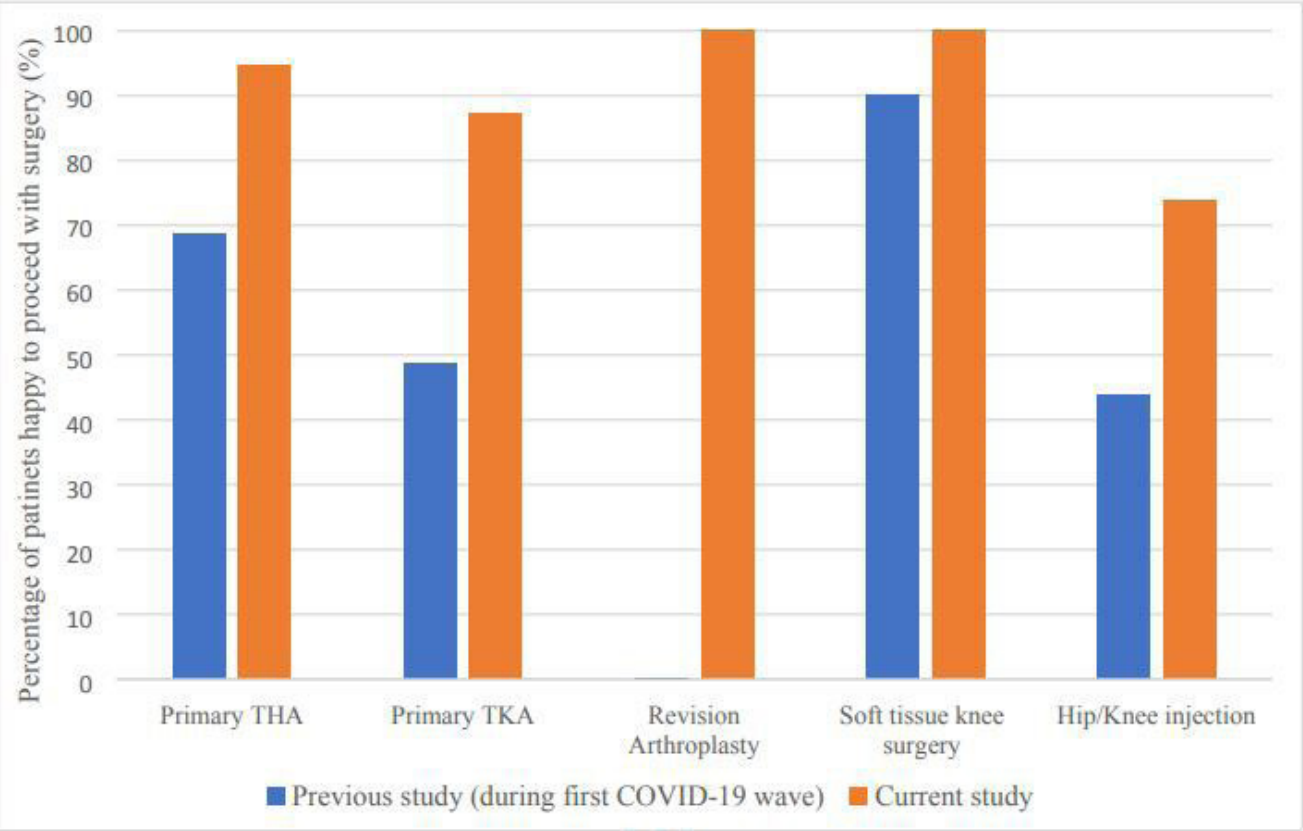

Fig. 1

Comparison in willingness to proceed with surgery within the different procedure subgroups between our previous study during the first COVID-19 wave and our current study.

The high proportion of patient willingness to proceed with surgery during the pandemic can be attributed to a number of factors. Structural arrangements creating COVID-free sites or 'green' sites, as well as preoperative testing 48 to 72 hours prior to the procedure (RT-PCR test), staff testing, preoperative isolation, and an increase in critical capacity may have influenced a higher proportion of patients to become more agreeable to surgery. The roll-out of COVID-19 vaccinations have also started and are taking place at an increasing rate, with many patients in the vulnerable groups already having received two doses of the vaccine. This may have greatly influenced a large proportion of patients towards being more agreeable to surgery. Furthermore, a number of recent studies have shown that with a strict protocol in place, viral transmission can be significantly reduced, allowing for safe resumption of elective orthopaedic activity.[12-16] Studies have also shown that patient confidence in surgical safety measures is vital in ensuring provision of elective surgery during the pandemic.[17-19] Moreover, the pandemic's first wave resulted in significant delays to elective surgery, causing greater waiting times for operations which are already associated with prolonged waitlisting, such as joint arthroplasty. Many of these patients may have experienced significant deterioration of their physical and mental health, which can be reflected in the high rate of patient agreement to proceed with their respective procedures. Elective orthopaedic surgery is considered life-enhancing procedures.[20,21] Based on EuroQol five-dimension (EQ-5D) questionnaires, 19% of those waiting for a total hip arthroplasty (THA) and 12% of those waiting for a total knee arthroplasty (TKA) are in a state described as 'worse than death.'[22] A recently published follow-up study conducted during the COVID-19 pandemic determined that over one-third of patients waiting for a THA and just under one-quarter waiting for a TKA are in a state of being 'worse than death.'[23] Wilson et al,[24] in their study assessing patient perceptions of COVID-19-related surgical delay, showed that although the vast majority of patients understood that delay was in their best interest, 68% of the patient cohort reported being in emotional distress as a result of the delay. In addition, Hotchen et al[18] showed that patients with a worse joint-specific quality of life were likely to be willing to proceed with their elective lower limb arthroplasty procedure even during higher COVID-19 alert levels (levels 3 to 5). Our results may be used to echo the findings of these studies, as 94.7% of patients waiting for a THA and 87.1% of those waiting for a TKA were happy to proceed with their operation. Additionally, all three patients listed for revision arthroplasty

were also happy to proceed. In comparison to our initial study last year, only 68.%, 48.7%, and 0% of those listed for THA, TKA, and revision arthroplasty, respectively, were agreeable for surgery,[10] highlighting the desperation of our patient cohort for intervention.

We found a reduced willingness in patients waiting for a hip or knee injection, compared to the other subgroups, with 73.7% wanting to proceed with their scheduled injection. This subgroup was also the least willing to proceed with surgery in our initial study, with only 43.8% of patients happy to consent to being scheduled as planned.[10] This highlights patients' fear of the effects of a steroid injection in the midst of the pandemic. This is reflected in the guidance that has been issued by various professional bodies encompassing the safety of the use of corticosteroid injections, given the potential immunosuppressive effects.[25-28] The potential for steroid injections increasing vulnerability to viral infection was deduced from a retrospective study considering the effect of a steroid injection on risk of influenza contraction.[29] This study found that corticosteroid injection was the greatest predictive factor for influenza contraction. On the contrary, NHS England have advised that individuals must not be treated with a corticosteroid injection if they have an active COVID-19 infection; however, in non-infected patients, clinicians "need to undertake an individual risk analysis on a case-by-case basis" when considering the use of corticosteroid injections during this pandemic.[30]

There are some limitations associated with our study. The patient cohort are all awaiting lower limb surgery on an arthroplasty surgeon's waiting list. It is possible that patients who would be more ambulatory postoperatively, such as those on upper limb waiting lists, would be more likely to want to proceed with their operation, generating an even higher rate of willingness for surgery. Moreover, our institution is a tertiary centre in central London, which is considered the UK's epicentre of COVID-19. It is conceivable that patients living in geographical areas with a lower transmission rate of COVID-19 may be even more willing to proceed with surgery.

Our study shows a high rate of patient willingness to proceed with both inpatient and outpatient surgery, therefore, we do not need to wait until all COVID-19 restrictions are lifted. On the other hand, patients should follow safety precautions, which include strict isolation for a period prior to their scheduled procedure, a low threshold for investigating and testing for COVID-19, and practicing good COVID-19 safety measures, such as wearing a mask and good hand hygiene, as we lift restrictions going forward.

In conclusion, restarting elective surgery again after another prolonged lockdown period is a difficult task; however, studies have shown very low viral transmission rates when there is a protocol in place to minimize the risk of infection. Our study illustrates a high proportion of patient willingness to continue with their elective orthopaedic procedure, despite not fully overcoming the pandemic, reflecting an overall change in patient perception towards having operative intervention as we pass the second peak of the COVID-19 pandemic. This reinforces the fact that as we begin to reinstate elective services, very strict COVID-19 measures are prudent in order to minimize viral contraction going forward as we see more patients in the vulnerable groups admitted for surgery.

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