



The Impact of the First Wave of Covid 19 on Orthopaedic Surgeries in a Tertiary Care Teaching Hospital

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i48B33265

Editor(s):

(1) Dr. Ana Cláudia Coelho, University of Trás-os-Montes and Alto Douro, Portugal.

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Complete Peer review History: <https://www.sdiarticle4.com/review-history/75128>

Original Research Article

Received 10 August 2021
Accepted 14 October 2021
Published 08 November 2021

ABSTRACT

Background: The Covid 19 was declared a global pandemic that had a sizeable impact on the health care services in the surgical field including the orthopaedic department. There was additionally a decreased accessibility to healthcare personnel and facilities reallocated to manage the Covid patients. The study was mainly conducted to find out the impact of the first wave of COVID-19 on the orthopaedic surgeries.

Aim: The main aim of the study is to find out the alteration in the number, type of surgeries, financial implications, duration of hospital stay, delay in surgery during the first wave of the COVID-19 pandemic.

Study Design: Retrospective crosssectional study.

Methods: All the surgeries conducted in the orthopaedic department in the year 2019 and 2020 following first peak in March including pre-op and post-op COVID cases are included in the study. The procedure conducted, date of admission, date of surgery, date of discharge, investigations done and the cost expenses are the various parameters that are taken into consideration. The

results are analysed for each year and comparisons are made using statistical methods.

Results: The comparative analysis of the data collected from the years 2019 and 2020 showed an increase in the duration of hospital stay, delay in surgery, additional expenditure, back log in the number of elective surgeries done during the Pandemic.

Keywords: COVID 19; pandemic; elective; replacements; arthroscopy; waiting time; hospital stay.

1. INTRODUCTION

Covid 19 caused by a novel coronavirus, SARS COV -2 was declared a pandemic by WHO on March 11, 2020 [1]. A nationwide lockdown was imposed on March 23, 2020. The pandemic also created a severe economic crisis which had a direct impact on the incomes that caused people to reduce their out of pocket expenditure on treatment procedures. All these had a negative impact on the health care services in the surgical field especially the orthopaedic department where the procedures fall in both elective and emergency category. Following the peak in September 2020 there was a shortage of hospital beds, ventilators, testing kits and other health care facilities. Therefore the health care system was re organised in such a way that aimed at delaying non urgent procedures to reallocate the available health resources to the Covid 19 patients [2]. This resulted in a significant backlog in the number of elective surgeries conducted. The hospitals also established standard protocols for testing, management, pre-operative and post operative care to decrease the chance of exposure and control the spread of disease to ensure the safety of both health care professionals and the patients [3]. This study was conducted to find out the impact of first wave of Covid 19 on orthopaedic surgeries by comparing with the previous year 2019.

2. METHODOLOGY

A retrospective study is conducted at Saveetha Medical College, Chennai, a tertiary care teaching hospital in India. All the surgeries conducted in the orthopaedic department in the year 2019 and all the surgeries conducted in 2020 after March 23rd including the pre-op and post-op COVID cases are included in the study. The procedure conducted, date of admission, date of surgery, date of discharge, investigations done, cost expenses for both the years are the various parameters that are taken into consideration. The data for the type and number of each procedure conducted was obtained from the registers in the operation theatres and other details were collected from the electronic patient

registers in the wards. The waiting time was calculated from the date of admission and the date of surgery. The duration of hospital stay was calculated from the date admission and the date of discharge. The cost for individual investigations was found out from the billing department in the hospital.

The collected data is analysed using Microsoft excel 2017 and imported into SPSS version 23 for further analysis. The results were represented as tables and graphs and comparisons are made to find out the alteration in the number, type of surgeries, financial implications, duration of hospital stay and delay in surgery following the COVID 19 pandemic. P value was calculated to find out if the acquired results were statistically significant.

3. RESULTS

In the year 2019, 1348 procedures were done where as only 452 were conducted in 2020 showing a drastic 66.46% overall decline. COVID-19 had the least impact on Trauma procedures (Both Upper limb and Lower limb fracture fixations) with a 47.21% reduction and it had the maximum impact on the elective procedures -Arthroscopy, Replacements, Spinal procedures and Injections which showed a significant 68.85%, 70.88%, 80.59% and 89.64% reduction respectively.

The maximum time between admission and surgery was 10 days in 2019 and 20 days in 2020. 76.63% of the patients were operated within 6 days of admission in 2019 compared to only 21.90% of the patients in 2020 indicating a delay in the surgery in the latter. The change was statistically significant with p value of less than 0.05.

The maximum duration of hospital stay in the year 2019 was 25 days while in 2020 it was more than 30 days. 20.32% were discharged within 6 days in 2019 while in 2020 only 8.41% were discharged within 6 days indicating a lengthened hospital stay. The change was statistically significant with p value of less than 0.05.

Table 1. List of different procedures

PROCEDURES	% Change
JointReplacements	-70.88
Arthroscopy	-68.85
UpperLimb Fracture Fixation	-58.65
LowerLimb Fracture Fixation	-39.62
Other Upper Limb Procedures	-55.93
Other Lower Limb Procedures	-73.57
Spine Surgeries	-80.59
Injections (Intra-articular,Epidural,Intra-lesional)	-89.64
TOTAL	-66.46

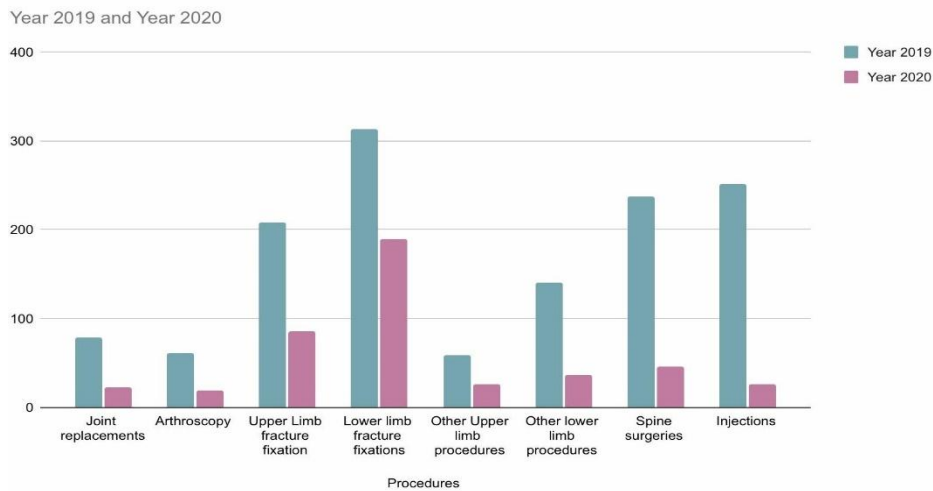


Fig. 1. Histogram showing percentage of changes in different procedures

Table 2. Duration between date of admission and date of surgery

NUMBER OF DAYS	2019 Number of patients (N=1348)	2019 (%)	2020 Number of patients (N=452)	2020 (%)
≤5	1033	76.63	99	21.90
6-10	315	23.36	126	27.87
11-15	0	0	163	36.06
16-20	0	0	61	13.49
>20	0	0	3	0.67

$\chi^2= 841.01, df = 4, P Value<0.05, \chi^2 = chi square value, df = degree of freedom$

Table 3. Duration of Hospital Stay

NUMBER OF DAYS	2019 Number of patients (N=1348)	2019 (%)	2020 Number of patients (N=452)	2020 (%)
≤5	274	20.32	38	8.41
6-10	363	26.92	30	6.63
11-15	620	45.99	110	24.33
16-20	65	4.82	46	10.17
21-25	26	1.92	125	27.65
26-30	0	0	100	22.12
>30	0	0	3	0.66

$\chi^2= 720.70, df = 6, P value<0.05, \chi^2 = chi square value, df = degree of freedom$

Routine investigations done prior to surgery costs around 1650 following the peak in 2020 due to the additional investigations done for COVID-19 screening that included CT- Chest, RT-PCR, ESR, CRP, D - Dimer there was an additional expenditure of 4250 in each patient.

4. DISCUSSION

In this study the number of orthopaedic surgeries conducted in 2020 plummeted to 66.46% when compared with the previous year. The main reason was that the hospital at which the study was conducted was being used as a centre for treatment of Covid patients. So the healthcare system in this hospital was reorganised in such a way to reallocate the anaesthetists, OT nurses, OT technicians, orthopaedic faculty, PGs to the Covid 19 patients. The results showed a drastic difference when compared to a study conducted by Maximiliano Barhona et al., that showed only 22.8% decline [4]. This is because in this hospital the biggest aim was the prioritisation of surgical procedures based on patients' age, presence of co-morbidity, availability of ventilators, ICU beds.

On comparing the decline in major procedures it is seen that there was a least impact on trauma procedures that included both upper limb and lower limb fracture fixations that showed a 47.21% decline. The results were congruous with a previously conducted study that showed a decline of 47% [5] and another study conducted by RajuVaishya et al., in a tertiary care centre in New Delhi that had a 42.21% decline [6] and in both these studies the trauma procedures were the least affected. Despite showing least impact in comparison with the other procedures there was a significant fall in the number of trauma procedures conducted in 2020. This might probably be due to the curfews and travel restrictions that were newly brought in during lockdown. This study showed that the Covid 19 had the maximum impact on Joint Replacement procedures, Arthroscopies that reduced by 70.88% and 68.55% respectively. This result matched a study that showed a 76.5% reduction in the number of knee and joint replacements conducted during the Covid period [7]. A similar study conducted in Sweden during the first wave of Covid 19 also showed a sharp decline in the number of elective knee and hip surgeries conducted falling in line with our observation [8]. Whereas the fall in the arthroscopic procedures in our hospital seems to be around 20% more than the study conducted by Andrea Dell'Isola et

al and RajuVaishya et al that showed a comparatively lesser rate of 42% and 49.81% decline respectively [8][6]. The main reason for the backlog in the elective surgeries was because of the judgment call by the doctors whose main aim was to prioritise surgeries based on surgical urgency and those procedures that can be delayed without causing any significant short term or long term effect on the patient and those procedures requiring increased duration of hospitalisation were either cancelled or rescheduled at a later date. During the first wave of the pandemic eight of the orthopaedic surgeons including residents and the post graduates turned positive. This led to an additional stress when it comes to operating. The general public also considered the hospitals as high risk areas because of elevated awareness of Covid instances that impeded their need to go to the hospitals [9]. Apart from this the increased financial burden following the pandemic, newly imposed travel restrictions and the expanding tele medicine has contributed to the decreased hospital admissions.

The average waiting time was 4.17 days in 2019 and 10.15 days in 2020 showing the duration between admission and surgery was much prolonged in 2020. The most important cause is delay in testing and delay in obtaining the results. In emergency instances just a CT was taken and the patients were operated with additional precautionary measures. Whereas in other cases, all the patients scheduled to undergo procedures were required to be screened for Covid 19 and given a negative report 48 hours prior to surgery [10]. In addition to this there was decreased availability of the anaesthetist, nursing teams and orthopaedic surgeons who were redeployed to manage the Covid patients in the ICU [5]. Moreover the patients found it comfortable in proceeding with their previously scheduled surgeons even if this meant a delay in the surgery [11]. All these factors lead to the potential increase in the waiting time and subsequent increase in the duration of the hospital stay. In 2019 the duration of hospital stay exceeded 20 days in only 1.92% of the patients whereas in 2020 the length of hospital stay exceeded 20 days in more than 49% of the patients and 0.66% it was more than 30 days. Patients preferred to be hospitalised for a longer time till the completion of wound healing instead of revisiting the hospital again for suture removal as the on and off imposed travel restrictions seemed to be a hurdle. Increased duration of hospital stay may be attributed to advanced age,

raised neutrophil count , raised CRP and D-dimer and also some of the patients remain oxygen dependent even after testing negative for Covid-19 contributing to the further delay [12].

In 2020 for Covid screening additional investigations were done like RT-PCR that costed around 1000. CT chest was done to find out the level of lung involvement in case of infection that costed 2250. CRP and D-dimer levels to find out the severity of the disease and predict the progression. All these pre-operative Covid screening investigations were made mandatory that costed an additional Rs.4250 making people prioritise their financial burden over their health and thus becoming another cause for the fall in the number of surgeries.

5. CONCLUSION

From our study it has been concluded that during COVID – 19 pandemics first wave (April 2020 – December 2020), the cases done in orthopaedic department has reduced drastically by 66.4%. The reduction was least in trauma surgeries (47.21%) and most in arthroplastic (70.88%) and arthroscopic surgeries (68.85%). The cost incurred to undergo orthopaedic surgery, the duration of hospital stay and waiting period for surgery in the hospital has also increased during COVID – 19 pandemic by 75%.

This study provides insight to the hospital administration, the public health authorities about the variation in orthopaedic surgeries in a tertiary care hospital which also treats COVID. So, they can make necessary arrangements and be prepared. So, that the patients and the health care workers were least affected during subsequent waves of COVID – 19 pandemic.

CONSENT

It is not applicable.

ETHICAL APPROVAL

The approval for conducting this study was obtained from the institutional ethics committee.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:

The peer review history for this paper can be accessed here:
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