

Orthopaedic Services during Nationwide COVID-19 Lockdown: Dhulikhel Hospital, Kathmandu University Hospital Experience and Review of Literature

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ABSTRACT

Background

The Nepal government issued a nationwide lockdown due to COVID-19 from 24 March to 21 July 2020. This halted elective medical services in our hospital. A number of modifications in the orthopaedic practices at our department were made.

Objective

This article discusses the impact on orthopaedic load at the Department of Orthopaedics and Trauma, Dhulikhel Hospital, Kathmandu University Hospital during the lockdown.

Method

This is a longitudinal observational study done during the nation-wide lockdown including all the patients who presented to the hospital requiring orthopaedic consultation. For comparison purposes, the patient numbers from the same date in previous year (2019) were retrieved.

Result

We received no COVID-19 cases requiring orthopaedics consultation. A total of 1828 patients were seen in the Orthopaedic Outpatient Department, 1077 trauma patients in the Emergency Department, 216 patients were admitted and 210 orthopaedics procedures were performed at the operation theatre. There was 82.21% decrease in OPD patients and 56% less surgeries in OT compared to the same duration of last year.

Conclusion

There was a great reduction in the patient numbers visiting the hospital, which reflected in decreased number of admission and surgery. A greater part of our work during the lockdown was trauma.

KEY WORDS

COVID-19, Orthopaedics, Trauma

INTRODUCTION

While the world has been coping with COVID-19 pandemic, many governments have enforced one or other measures to curb the rate of infection, while the healthcare system has been preparing to brace for the challenge of the pandemic.¹⁻³ Recognizing the impending peril, Nepal government affected countrywide lockdown from 24 March to 21 July 2020. At the end of the first lockdown Nepal had 17994 confirmed cases and 12477 recovered cases of COVID-19.⁴ This abruptly halted the elective medical services in Nepal, while major resources were redirected for COVID-19 diagnosis and treatment.

Dhulikhel Hospital, Kathmandu University Hospital had also closed all its elective medical services and remained open for only emergency cases during the period. A number of modifications in the orthopaedic practices at our department were made according to recommendations from various organizations including Nepal Orthopaedic Association to continue providing urgent and essential surgery during the crisis.⁵⁻¹⁵

This article discusses the impact on orthopaedic load at the Department of Orthopaedics and Trauma, Dhulikhel Hospital, Kathmandu University Hospital during the lockdown and reflects on our adaptations to the COVID-19 pandemic.

METHODS

This is a longitudinal observational study conducted at the Department of Orthopaedics and Trauma, Dhulikhel Hospital, Kathmandu University Hospital during the nation wide lockdown from 24 March to 21 July 2020. All the patients who presented to the hospital requiring orthopaedic consultation at OPD and ER were included. Demographic information, injury characteristics, diagnosis, and treatment, including operative procedures were recorded in pro forma for each patient by the attending doctors. All the follow ups and consultations done via telephones or electronic media were excluded. All the data were entered and analyzed in MS Excel. The data are presented as frequencies and percentages. For comparison purposes, the patient number from the same date in previous year (2019) was retrieved.

RESULTS

During the country-wide lockdown, we received no COVID-19 cases requiring orthopaedics consultation. In the Orthopaedic Outpatient Department (OPD) 1828 patients were seen and 1077 trauma patients were seen in the Emergency Department (ED). None of the patients showed any symptoms for COVID-19, and none had a history of contact with COVID-19 positive cases or travel history to areas with community spread of COVID-19.

A total of 216 were admitted under the care of orthopaedics and 210 orthopaedics procedures were performed at operation theatre (OT). This included 192 surgeries performed in the operation theatre. A total of 437 procedures were done in the procedure rooms at ED, OPD and ward as day care procedure or care of admitted patients, including dressing cast, suturing, debridements, skin grafting, and pinnings.

Of all admitted patients, 199 (92.13%) were trauma cases and 17 (7.87%) were infection, back pain, radiculopathy, and myelopathy. Among the admitted patients 125 (57.87%) were from Kavre, average age was 32.22 ± 20.71 years (range 1-88 years), male:female ratio was 2.18:1 and the average duration of hospital stay was 5.59 ± 7.23 days (range 1-89 days) compared to 5.45 ± 4.56 days for same period in 2019. ($p = 0.7496$)

Most of the surgeries done at the operating theatre were for trauma 167 (79.53%) and 43 (20.47%) procedures were for non-traumatic causes, including surgery for osteomyelitis, septic arthritis, chronic wound management, skin grafts, flap surgery for bed sores and open fractures, amputation, disc surgeries for severe symptoms not responding to conservative management and arthroscopic assisted surgeries for complex tibial plateau fracture.

Average injury surgery interval for trauma cases was 2.80 ± 3.38 days (range 0-15 days). The most common mode of injury for trauma patients was fall injury (54%), followed by cut injury. Most of the surgery done in the operation theatre were of the upper limb 96 (45.71%).(table 1)

Table 1. Orthopaedic procedures in operation theatre

Anatomical region	Number (%)
Upper limb	96 (45.71)
Lower limb	81 (38.57)
Spine (including epidural steroid /SNRB)	27 (12.85)
Pelvis and acetabulum	6 (2.85)
Total	210

We did 174 (82.85%) semi-urgent trauma surgeries, 14(6.67%) emergency surgeries, 19 epidural blocks or selective nerve root blocks and 3 semi-urgent spine surgeries (discectomy).

For comparison purposes, the data of OPD and OT in between 24 March to 21 July 2019 was retrieved. (table 2)

Table 2. Comparison of number of patient during normal hospital days and during lockdown

	2019 (24 March-21 July) (number of patient)	2020 (24 March-21 July) (number of patient)	Decrease (%)
OPD	10273	1828	82.21
OT	477	210	55.97

DISCUSSION

We have gone through various recommendations and tried to adapt them to our scenario during this pandemic.⁵⁻¹⁵ Realizing those changes in our practice for COVID-19 has been easier said than done. Challenges in designing a working protocol and constantly changing it according to need, acquiring proper PPE, training staff, availability of Polymerase Chain Reaction (PCR) for COVID-19 and most of all making changes to our own norm, made hindrances to "normal" daily activity of the hospital. Making sure of the safe practices, we not only continued our ED but also OPD, and OT services for all emergent and urgent cases.

Despite the hospital being open, there was a decline in the number of patients across all fields. Only 17.80% of the number of patients visited our OPD compared to the same duration of last year. Also, there was around 56% decrease in our surgeries in OT compared to last year. This decrease could be attributed to the lockdown, expansion of indication of conservative management of trauma and decree of the hospital, Nepal Medical Association and Ministry of Health and Population not to entertain non-urgent patients in the hospital.¹⁶ Due to reports of an increasing number of infections among health care workers during surgery with aerosol generating procedures (e.g. use of cautery, reaming, high speed burrs etc.) such decrees were made and subsequently hospitals increased the precautionary steps.¹⁷⁻²⁰ Behavioral changes amongst the patient including fear of contracting COVID-19 during hospital visit also may have added to the decrease number of patient visiting hospital.

Majority (79.53%) of operated cases were for trauma, mostly due to fall injury. These falls were generally from standing height, but there are a number of cases of fall from trees commonly causing spine trauma. We had 14 cases of road traffic accidents (RTA), frequently motor bike accidents. Given the fact that our hospital is near the merging point of two major highways, this number of RTA is relatively low from the numbers of RTA we usually have to deal with in our hospital. Most of the transportation facilities not functioning during the lockdown could have contributed to this decrease in RTA.²¹

Similar to our findings, Pradhan et al. have stated a decrease in orthopaedic burden at Patan Hospital, Nepal during lockdown to about a third of what they are used to.²² They reported that 84.1% of admitted cases were trauma and most of them had fallen from standing height. They however did not have any cases of RTA owing to the lockdown.²²

Average injury surgery interval for trauma cases was 2.80 ± 3.38 days (range 0-15 days), which is similar to 3.12 days reported by Pradhan et al.²² This interval could be attributed to unavailability of vehicles, difficult terrains, other patients requiring optimization of medical or local condition for surgery and during latter half of lockdown, waiting for

preoperative COVID-19 PCR reports.²² Interestingly enough the average hospital stay for the admitted patients during the lockdown compared to the previous year was not very different. Although we have tried to make the hospital stay shorter for all patient by discharging the patient from hospital earlier than we are used to, due to limited number of surgeries, surgeons, anesthetist and other human resources per day, limited number of ICU beds for patients who might have required ICU post-operatively, difficulty in obtaining necessary finances for surgeries due to limited opening of the banks, waiting for the reports of pre-operative nasopharyngeal swab for PCR for COVID-19, and one patient stayed for 89 days despite timely surgery, due to unavailability of vehicles to commute to and from the home.

We have seen a decrease in the orthopaedic and trauma volume across the globe due to the COVID-19 pandemic. (Table 3) Beside the hospitals' own policy to close the services of elective surgery, the changes in behavior and government barriers during the pandemic have had a profound effect on trauma volume. Changes in human behavior due to the COVID-19 pandemic such as starting to telecommute, schools suspension, limited gatherings, work from home, along with decreased mobility could have impacted the risk of fracture.²⁴

Scott et al. have shown that the changes in population mobility and trauma volume from baseline correlated significantly during the pandemic.²⁴ Google Mobility Report for Nepal for July to September shows around 44% reduction (maximum ~60%) in mobility for places that are public transport hubs, compared to baseline data and 14% increase in mobility trends for place of residence.³⁵ This shows that out-door activity in Nepal had also decreased during the lockdown period, which can be linked to decrease in orthopaedic volume.

At the start of the nationwide lockdown only two confirmed cases and no fatalities were reported however at the end of lockdown it had increased to 17,994 positive cases and 40 deaths.⁴ After easing the lockdown on June 21, there was a surge of people entering Nepal from India, which correlated with the spikes of infection throughout the country.³⁶ This resulted in lockdown in specific parts within the country including the capital.^{36,37} We have been fortunate to learn from the experience of other countries and prepare ourselves for this surge.³⁸⁻⁴⁵ We have expanded our facilities to diagnose and treat the COVID-19 patients. Although we are yet to receive COVID patients with emergent orthopaedic condition, we have setup and protocols to guide us through the treatment if we need to. We have seen transmission within our hospital staff despite the safeguarding effort and planning. We have seen how a single case of COVID-19 can drastically deplete the workforce. We have managed to learn from our mistakes and amend our protocols as we see fit.

Table 3. Comparison of effect of epidemic and pandemic on orthopaedic practices across countries

Country	Year	Disease	OPD	Admission	Surgery
Taiwan ²³	2008	SARS	55% decrease	43% decrease	
UK ²⁴	2020	COVID-19	44% reduction	36% reduction	36% reduction
Italy (Padova) ²⁵	2020	COVID-19	decreased	decreased	30%reduction
Hongkong ²⁶	2020	COVID-19	29.4% decreased	41.2% decreased	44.2% reduced
Singapore (hand surgery) ²⁷	2020	COVID-19	66% reduction		31% postponed
US ²⁸	2020	COVID-19	45.1% decrease in orthopaedic trauma encounters		
UK (London) ²⁹	2020	COVID-19	Acute trauma referrals ~50% reduction	~one third reduction	
Italy (Milan) ³⁰	2020	COVID-19		56% reduction	
India ³¹	2020	COVID-19	< 75% reduction for 50% respondent orthopaedic surgeon		
Italy (Tuscany) ³²	2020	COVID-19			12-30% reduction in trauma procedure
Italy ³³	2020	COVID-19	73.8% decrease in trauma in ED		
Austria, Germany, Switzerland ³⁴	2020	COVID-19	91.1% orthopaedic surgeons - personal surgical volume was drastically reduced		
Nepal (Patan) ²²	2020	COVID-19	2/3 rd decrease in orthopaedic burden		

We searched for the literatures related to the impact on orthopaedic practices due to past epidemics of severe acute respiratory syndrome (SARS) and Middle Eastern respiratory syndrome (MERS). Although there were articles about protocols and guidelines but very few article described the effect on the hospital only. We could find just one article which had mentioned the impact of SARS on the orthopaedic department along with other department of the hospital.²³ Literature of this kind do help us for evidence based preparation of the disaster of this magnitude in future for things like resources and staffing deployment;; lack of such means learning by doing and relying much on the “expert” opinion.

Scott et al. have documented the direct correlation between reflective deviation in the social behavior and mobility and decrease in orthopaedic trauma volumes during the early stages of COVID-19 pandemic in Edinburgh.²⁴ However he also concluded that hospitals need to maintain facility for the fragility fractures as their numbers remained unaffected.²⁴

Ruggieri et al. also documented the decrease in activities in the orthopaedic department due to the pandemic in one of the severely hit zone of Italy.²⁵ They also documented no decrease in fracture among elderly patients. They have emphasized their success of limiting transmission of COVID to health care workers and patient to their strategy of extensive swab testing for PCR for COVID of all health-care worker (periodically) and patients (before admission or surgery).²⁵

Wong et al. revealed the reduction in orthopaedic activity in 43 public hospitals and 122 outpatient clinics in HongKong due to pandemic.²⁶ They showed almost 70 - 90% reduction in elective procedure due to administrative measures to decrease the elective cases owing to around

60% reduction on elective hospital admission. However such measures allowed for conservation of PPE, reduction of unnecessary hospital traffic, and preservation of staffing to afford deployment to COVID-19 wards. They also pointed out a number of reasons for changes in behavior of patients to delay or not opt for medical attention such as fear of contracting COVID-19, altruistic consideration for health-care workers, financial constraints, or preference for private health-care facilities.²⁶

Stoker et al. also showed decrease in orthopaedic trauma events in Michigan due to the pandemic and shelter-in-place order.²⁸ He suggested that decrease in traffic volume and road traffic accidents in the same time in Michigan could have caused the decrease in trauma volume.²⁸

Park et al. also showed reduction in trauma referrals and surgeries during post-COVID lockdown in London.²⁹ He further showed reduction in sporting injury owing to banning of all group activities and closure of gyms following social isolation and reduction in road traffic collisions owing to decreased road use. They have reported in reduction in operative procedures and stated that main cause of this reduction being decreased referral volume rather than altered threshold of surgical intervention.²⁹

Margo et al. reviewed their main challenges in a specialty hospital during COVID-19 pandemic in Lombardy, Italy and found reduction in their patient and surgery volume.³⁰ They outlined important factors influencing the capability of the hospital to maintain operations from their experience, (1) triage, (2) separate COVID and non-COVID hospital, (3) coordinated reaction to changing environment with instantaneous means of communication, (4) preserving and relocating staff, and (5) regional co-operation among hospitals.³⁰

Thirunarayanan et al. in their survey among practicing orthopaedic surgeon in Chennai, India showed reduction of workload among the orthopaedic surgeon, however none had tested positive for COVID-19.³¹ Majority of cases for them were domestic injuries and geriatric patients. They reported shortage of staff in private clinics and corporate hospitals owing to voluntary reduction of staff pattern, lack of transport facilities during lockdown, and cutting back in number of staff due to reduced income for hospitals. They also reported decreased RTA due to lockdown keeping public at home. Safe OPD practices with social distancing, mask, temperature screening, availability of sanitization, provision of PPE and creating awareness among staffs were followed by most, others closed their OPD indefinitely.³¹

Guintoli et al. reported decrease in scheduled and trauma surgeries in three hospital in Tuscany, Italy due to COVID-19 pandemic.³² However proximal femur fractures were as frequent as pre-COVID-19 times. They also reported treating 5 COVID-19 confirmed cases for fractures and 1 death among them. They have reported no positive case among the staff. They have emphasized in integrated approach within the same geographical area for better allocation of resources.³²

Luceri et al. stated decrease in patient flow in Milan, Italy due to COVID-19.³³ They partially attributed the decrease to people's fear of contagion from emergency department. They also identified social isolation as a cause of reduction of trauma in general population.³³

Leibensteiner et al. reported drastic reduction in arthroscopic procedure among German speaking orthopaedic surgeon in Austria, Germany and Switzerland, while 20% reported of shutting down of all orthopaedic procedures.³⁴ They believed that orthopaedic surgery will not be able to return to pre-pandemic level earlier than within 3 months.³⁴

In order to protect our workforce and keep the department functioning, besides holding back non-urgent surgeries,

we have made few changes in the way of our work in the department. Our department has been working with two pools of health care workers and limiting the contact of personnel from one pool to others. All of our academic activities have been going on online. And all the admitted cases are discussed online before the ward rounds in morning to decrease the time for rounds.

The guidelines are changing as evidence develops, and now there are many studies and recommendations on performing elective surgeries in "new normal."^{13,46-48} The larger number of people holding back their non-urgent ailments could overwhelm our capacity when the "normal" days start in our hospital. We are bracing ourselves for such future events. We still do not know the end of the pandemic as of today, but what we know is that the effect of the pandemic will be here long after the end. Previous study from Taiwan during the SARS epidemic showed that if the whole hospital is shut down during an infectious disease outbreak, the impact is much longer than anticipated and recovery in terms of patient numbers for surgical departments take more than 2 years.²³ However, our policy for this pandemic, is to perform emergent and urgent surgeries with precautions and expanding indications for conservative management. This is partly due to the increasing number of cases of COVID-19 within the country and partly due to the fact that we want to preserve our work-force.

CONCLUSION

There was a reduction in the patient numbers visiting the hospital, which reflected in decreased number of admission and surgery and a greater part of our work during the lockdown was trauma. We catered the trauma patients presenting amid lockdown with modifying the 'indications', adopting and contextualizing the guidelines/recommendations and taking proper precautionary measures.

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