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Siddharth Dubey
Assistant Professor, Department of Trauma Surgery AIIMS Rishikesh, Uttarakhand, India

Md. Quamar Azam
Professor and Head, Department of Trauma Surgery, AIIMS Rishikesh, Uttarakhand, India

Hawaibam Nongdamba
Post Graduate student, Department of Orthopaedics, AIIMS Rishikesh, Uttarakhand, India

Bhaskar Sarkar
Assistant Professor, Department of Trauma Surgery AIIMS Rishikesh, Uttarakhand, India

Himanshu Agrahari
Senior Resident, Department of Trauma Surgery AIIMS Rishikesh, Uttarakhand, India

Corresponding Author:
Himanshu Agrahari
Senior Resident, Department of Trauma Surgery AIIMS Rishikesh, Uttarakhand, India

Orthopaedic trauma during ongoing COVID 19 pandemic: Challenges and lessons learnt in a level I trauma center

Siddharth Dubey, Md. Quamar Azam, Hawaibam Nongdamba, Bhaskar Sarkar and Himanshu Agrahari

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Abstract
Objectives: Covid-19 pandemic has shown its massive impact on almost all aspects of human existence including social, economic and healthcare. Trauma victims are one such group of patients who have fallen prey to this worldwide crisis. Paucity of literature, lack of specific guidelines and prevailing panic has created new hurdles for those managing these patients. We performed this observational of first two months of this pandemic, to assess its impact on patient's attendance and management, in view of novel challenges imposed due to pandemic scenario. Also, we attempted to formulate a pathway to guide management of Orthopaedic trauma patients.
Material and Methods: All patients of orthopaedic trauma attending to emergency department from 11th march 2020 to 10th may 2020 were included. Demography and data of patients regarding mechanism of injury, nature of injury, treatment provided (conservative and operative) were retrieved and assessed.
Result: Total number of ortho trauma patients seen in emergency department were ninety-six. Most common mechanism of injury was fall from height, followed by household slip. Only 39 patients were operated in the study duration, which was far less than the number in preceding 3 months. Out of 31 patients due for first follow-up only 14 patients turned up for physical follow up, 13 patients turned up via telemedicine facility.
Conclusion: The number of ortho-trauma patients attending emergency department have significantly reduced. We need to follow a middle path so that adequate medical care is provided to those who need it, without subjecting those who can wait to additional risk of contracting COVID infection.

Keywords: COVID -19, pandemic, Orthopaedics, trauma, surgery, challenge

Introduction
India reported its first COVID case on 30 January 2020 [1]. On march 11 2020 WHO declared Covid-19 as a pandemic and since then this novel malady has shown its massive impact on almost all aspects of human existence including social, economic and healthcare [2]. Since no vaccine or proven prophylactic drug is available, social distancing, travel restrictions, quarantine and lockdowns have been the primary tools used to curb the spread of this virus [3]. These tools have shown their efficacy in controlling the spread of this disease but at its own cost. The approach of *"COVID first*" although necessary at this hour, has caused at least some amount of collateral damage specially to those patients suffering from other illness yet requiring emergent care. Trauma victims are one such group of patients who have fallen prey to this worldwide crisis. All the elective surgeries have stopped and outpatient departments (OPD's) have been suspended. A brunt of this have been borne by patients suffering from other problems including trauma. Paucity of literature, lack of specific guidelines and prevailing panic has created new hurdles for those managing these patients. Iyengar KP et al formulated a protocol for elective Orthopaedic surgeries, but protocols for management of emergency trauma patients are still ambiguous [4]. We performed this observational of first two months of this pandemic, to assess its impact on patient's attendance, nature on injury and management in view of novel challenges imposed due to pandemic scenario. We are sharing our experience of managing Orthopaedic trauma patients amidst this cataclysm.

Materials and Methods

An observational study was conducted in our level 1 trauma center, including the patients of orthopaedic trauma attending to emergency department from 11th march 2020 to 10th may 2020. Patients with complaints other than trauma and the patients not willing to participate in the study were excluded. Data was collected for the patient's records, emergency department, OT census and Telemedicine department regarding the number of ortho-trauma patients attending the emergency department, their mechanism of injury, nature of injury, injury to hospital presentation time, number of patients operated, number of patients turning up for first follow up at 2 weeks and number of patients attended using telemedicine facility. Data about the number of surgeries performed was compared with the data regarding the same from previous 3 months i.e. December, January and February to assess the trend and impact of this pandemic. Also, an analysis was performed to observe the patient profile which operated during this duration and the challenges encountered during the process were enlisted.

Results

During the study duration, total number of ortho trauma patients seen in emergency department were 96 (41 male and 55 female) i.e. an average of 1.6 patients per day which is significantly lower than that we used to see otherwise (around 30 per day). Most common mechanism of injury was fall from height (n = 38), followed by household slip (31). Only nine patients reported following road traffic accident as a mechanism of their injury. Average injury to hospital presentation time was 7.5 days. Two patients with spine fractures presented after 9 days and 12 days respectively. The second patient was having bed sore at presentation. One Knee dislocation patient presented at 3 weeks. Most of the patients had injuries of lower limb, followed by upper limb, spine and pelvic girdle. Distribution of patients according to their injury pattern is shown in table 1. Only 39 patients were operated in the study duration, which was far less than the number in preceding 3 months. Fig. 1 represents the nature of injury of the patients operated. Fig 2 represents the trend of number of patients operated from 1st December till may 10th 2020. Total number of patients operated in march was 31 out of which only 13 patients were operated after 11th march. Number of patients operated in may represents cases operated till 10th may. Two patients of shaft femur fracture went LAMA. Out of 31 patients due for first follow-up only 14 patients turned up for physical follow up, 13 patients turned up via telemedicine facility. Total number of patients seen by telemedicine facility in 2 months was 37.

Discussion

A pneumonia like illness caused by an unknown organism was reported in December 2019 from Wuhan, China [5]. The ailment was found to be caused by a virus, sharing characteristics of Coronaviridae family. Later on, it was found that this virus was similar to SARS virus, hence was named as SARS-Cov-2 and the disease was named as COVID-19 [6]. Infectivity of this virus is very high (R_0 – 1.5 – 5.5) and thus the spread was exponential [7].

We are working in a level I trauma center, attached to a tertiary care government hospital. Before the advent of this catastrophe we were running OPD's, emergency department and two 24 hours functional operation theatre (OT) dedicated to the care of trauma patients. Major proportion of patients attending trauma emergency were secondary to road traffic accidents. Since the inception of this pandemic, there has been rapid reorganization of healthcare infrastructure to facilitate early diagnosis, isolation and management of COVID patients. Elective surgeries and OPD's were suspended as a preventive measure. Our trauma center was converted to a dedicated COVID block and trauma care infrastructure was reorganized. After nationwide lockdown was imposed, number of patients reporting to trauma emergency were significantly decreased. Several factors are responsible for this paradigm shift. It is self-implied that as a secondary effect of lockdown, number or road traffic accidents have decreased. Travel restrictions and difficulty in arranging transportation has led to this decline in the number of patients reporting emergency department. Apprehension in the minds of people about catching this infection in hospital environment was also one of the contributing factors. Even the patients who were admitted and planned for surgery were apprehensive about getting tested for COVID 19 in pre-operative period even after repeated counselling.

We had several new challenges in management of these familiar injuries due to unforeseen circumstances

1. Due to mobilization of resources including beds, doctors, nurses and equipment to COVID unit, assets were reduced
2. Single OT running for all the emergency procedures, so arranging OT slots for these "Non-life threatening" injuries was a difficult task
3. Surgeries involve aerosol generating procedures, so ensuring the safety of operating team, anesthetists and allied staff was a concern as transmission is possible through asymptomatic patients [8].
4. Assessing the risks and benefits for the patients in view of this additional risk of acquiring infection during hospital stay
5. For patients who needed surgical intervention, arranging orthopedic implants was also a problem due to nationwide strict lockdown and prevailing panic among distributors. This often resulted in delay in surgery as well as compromise in implant selection.
6. Managing follow ups in postoperative period was also difficult as commuting was a problem, also number of visits had to be minimized to reduce their chances of contracting infection

In light of above-mentioned issues, the usual management protocol for these patients was neither plausible nor possible. To meet these challenges certain steps were taken to optimize the utilization of resources for those who need the most, at the same time ensuring the safety of patients and healthcare workers.

1. All patients were provided with surgical mask at the time of entrance to emergency department.
2. To curtail exposure of our residents, we formulated a team-based approach for managing patients. Multiple teams were made which were rotated every 2 weeks. Single team managed both emergency and admitted patients. Considering reduced number of patients during this crisis, it was manageable.
3. To mitigate the risk to operating team, pre-operative COVID testing was done for all patients planned for semi-emergent surgery.
4. For 'true' emergency procedures e.g. open fractures or vascular injuries, when getting preoperative COVID testing was not feasible, the whole operating team donned Personal Protective Equipment (PPE). We tried to keep

number of staff to minimum. These patients were operated in a separate operation theatre in the block dedicated to COVID patients.
5. Most of the upper limb trauma was managed non-operatively after due explanation to patient and his attendants regarding pros and cons of surgical intervention.
6. To minimize hospital visits we applied plaster of Paris (POP) cast/Brace primarily after explaining possible complications and strict advice of limb elevation during transport and home-stay.
7. To minimize exposure, only one attendant was allowed with the patient and they also had to undergo compulsory COVID screening during hospital stay
8. Management strategy was mostly in line of nonoperative wherever feasible. Surgical fixation was done only when it was mandatory e.g. fracture neck of femur, shaft of femur and spine injuries with neurological deficit, after taking all the necessary precautions.
9. To overcome the problems of availability of implants, a hospital inventory was prepared for Orthopaedic implants needed in essential or emergency surgeries.
10. Telemedicine facility which was established as per recent guidelines, was used to facilitate post-operative follow-up of patients which did not require any intervention [9].

It is difficult to predict that how long this ongoing crisis will last and also what would be its pattern in coming future. It is important to make policies and guidelines for management of COVID patients, but at the same time we need to develop protocols for management of other ailments which will keep on occurring and require medical attention like cancer and trauma. This subgroup of patients cannot be neglected because their mismanagement can be disastrous. Guidelines are changing at a very rapid rate as we are acquiring more and more information about this infection, so keeping oneself updated is also difficult yet essential. As number of surgeries is decreasing as an effect of this pandemic, this can be utilized as an excellent opportunity to try your hand on and master the forgotten art of non – operative management in fracture patients where ever feasible.

Table 1: Distribution of total number of orthopaedic trauma patients attended in emergency department according to their anatomical location

Anatomical location	Number of Cases
Lower Limb	46
Proximal Femur	10
Shaft femur	10
Tibia	9
Foot and Ankle	6
Knee dislocation	2
Patella fracture	3
Sprains	5
Pathological fracture femur shaft	1
Upper Limb	22
Humerus	14
Forearm	4
Hand	3
Shoulder Dislocation	1
Spine	19
Cervical	4
Dorso-lumbar	15
Pelvic Girdle	11

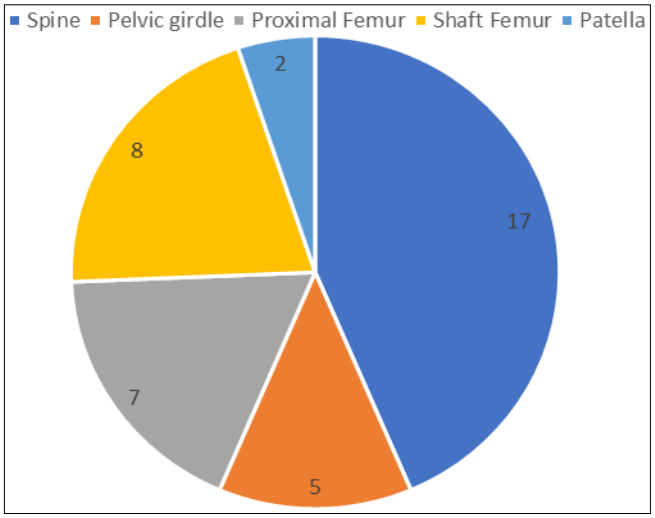

Fig 1: Pie chart representing number of patients operated and their distribution according to site of injury.

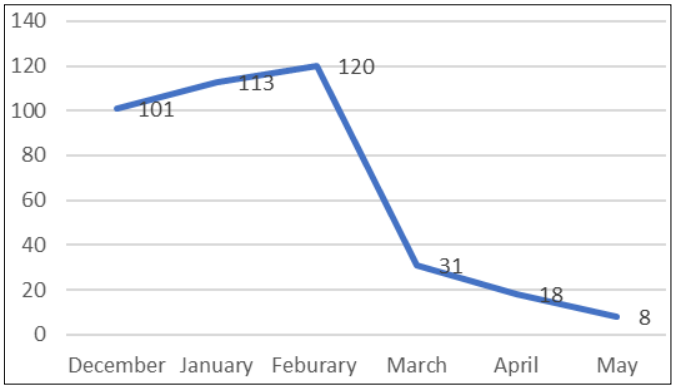

Fig 2: Line diagram depicting number of patients operated per month from December 2019 till may 10 2020. Graph shows drastic decline in the number of patients operated from February to March and then a consistent downslope.

Conclusion

Complete lockdown was a serious dilemma but necessary for early flattening the curve. Over highlighting of mortality in western world lead to panicky in the community which often delayed presentation to hospital. Total number of ortho-trauma patients attending emergency department have significantly reduced. The number of surgeries performed has also drastically reduced. The We need to follow a middle path so that adequate medical care is provided to those who need it, without subjecting those who can wait to additional risk of contracting COVID infection. All means of communications (media, social sites and mobile) should be utilized judiciously to alleviate fear psychosis in public. Ensuring safety of healthcare workers is also vital and should be a priority while policy making. We need to keep ourselves motivated with a belief that *"this too will pass"*

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