ORIGINAL ARTICLE

Impact of Covid-19 Pandemic on Trauma and Orthopaedic Service at A Tertiary care Military Hospital

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ABSTRACT

Background: The regional lockdown due to the SARS-CoV-2 pandemic had a significant impact on trauma presentation and its management process. Essential orthopaedic care had to be provided despite the risks of exposure to the deadly COVID-19 virus. The present study investigated the numbers and nature of injuries requiring intervention with the most common region involved in trauma amidst the pandemic. The other objective of the current study is to share our experience regarding the measures taken; to conserve healthcare resources, in prioritizing medically necessary trauma and orthopaedic procedures and for the safety of the healthcare workers involved.

Methods: An observational study having a retrospective design to measure the pattern of orthopaedic trauma reported during regional lockdown due to COVID-19 pandemic at Combined Military Hospital (CMH), Rawalpindi, Pakistan. Hospital's patient record form was used as a study tool to collect data from 25 March 2020 until 30 June 2020.

Results: A total of 260 admissions were done in the orthopaedics department during the lockdown period. Among these, 35 patients tested positive for COVID-19 and were shifted to a dedicated facility for further management. The remaining 225 patients were admitted in the routine wards. Based on the mode of injury, 45% of COVID-19 negative admissions had fractures due to high energy trauma, 36% were geriatric fractures, and 19% consisted of paediatric trauma. The remaining 7% were mostly essential elective cases. The region most commonly involved in a fracture was the osteoporotic hip, which accounted for 24% of all trauma surgeries.

Conclusion: Regardless of the duration and severity of this pandemic, trauma and orthopaedic will remain available for emergency services. However, due to massive healthcare resource allocation for the novel coronavirus pandemic, treatment of the orthopaedics patient population has been markedly affected and severe disabilities will emerge and pose management challenges in the post COVID-19 phase.

Keywords: COVID-19, Trauma and Orthopaedic, Healthcare Resources, Pakistan

INTRODUCTION

The first case of the novel coronavirus (SARS-CoV-2) was detected in a student in Karachi on 26 February 2020, who returned from neighbouring Iran which was the epicentre for the disease at the time[1]. Later, several measures were taken to screen and develop a quarantine centre at the Taftan Iranian border. However, around 8000 pilgrims from Iran had already returned to Pakistan by that time[2]. The first COVID-19 related death in the country occurred on March 18 of a 50-year-old pilgrim who contracted the virus while performing Umrah in Saudi Arabia[3].

By 25 March 2020, as the number of positive cases surpassed 700[4], a nationwide lockdown was imposed, including closure of outpatient departments of hospitals, international flights, and complete bans on public transport as well as gatherings in public and private places[5]. The army along with the local authorities were deployed on the streets to raise awareness and ensure compliance by the public.

As our regional health care structure in general, gradually became overwhelmed with the number of novel coronavirus infections, admission policies were critically reviewed and several measures were taken to cope with the pandemic by conserving as much resources as possible. The largest tertiary care health facilities of Pakistan Armed Forces located at Rawalpindi also had to be tailored with resource reorganization to deal swiftly and aptly with the pandemic-affected entitled population. Pakistan Emirates Military Hospital Rawalpindi (PEMH)[6], being the largest medical facility, was devoted solely to the care of COVID-19 patients with intensive care units (ICU) prepared for the surge in patients that needed and may need ventilatory support. In addition, the largest rehabilitation center (Armed Forces Institute of Rehabilitation Medicine or AFIRM, Rawalpindi) was also converted into a quarantine facility[7]. Combined Military Hospital (CMH), Rawalpindi, the largest tertiary care surgical facility, underwent a major shakeup to cater for screening of all medical/surgical emergencies in addition to management of all COVID-negative medical/surgical patients.

Keeping in mind the associated risks, trauma and orthopaedic services stood at the frontline, as medically necessary orthopaedics procedures had to be carried out. The present study was planned to document the pattern of trauma presenting in these extraordinary times, and the measures taken to prioritize admissions to conserve healthcare resources and prevent the spread of novel coronavirus infections.

METHODS

It was an observational study with a retrospective design measuring trauma and orthopedic services in a tertiary care hospital (CMH) during the lock-down period and the peak of COVID-19 pandemic, i.e. from 25th March 2020 till 30th June 2020. The only inclusive criteria were patients requiring admission for surgery with the objective to observe the effect of pandemic on the pattern of trauma and compare it with

the data from the last year in similar days. Ethical approval for the study was applied and obtained through the institutional scientific ethical approval committee having an ethical approval number 97/07/20 (34). Data recorded from the patient's health record form was transferred to Microsoft excel, and later was coded and transferred to the Statistical Package of Social Sciences (SPSS version 20) for analysis. Descriptive statistics were used and data was displayed as numbers and percentages.

RESULTS

There have been 260 admissions in the three months period in the orthopaedics department in whom 35 patients (13%) tested positive for COVID-19 and were shifted to a dedicated facility (PEMH). The majority of COVID-19 patients were managed conservatively and quarantined for two weeks under observation. Two deaths of orthopaedics patients were noted who were receiving symptomatic treatment for COVID-19.

The remaining 225 patients were managed in the main operation theatres while taking recommended precautions. There were 16 cases belonging to the category of essential elective orthopaedic procedures (4.4) including 3 MDT directed soft tissue/bone sarcomas. The remaining 209 were trauma patients, in which paediatric fractures constituted 40 patients (19%), 75 were geriatric fractures (36%), and 94 fractures (45%) were secondary to high energy trauma or road traffic accidents (RTA) (Table I).

In comparison with the last year's data in the same season, there has been a marked reduction in the number of RTAs from 210 cases to just 94 cases this year, whereas no significant change in geriatric and paediatric fractures has been observed throughout. Also the total number of trauma surgeries in three months reduced from 347 in last year to just over 200 during the current pandemic year (Figure 1).

The most common fractured region observed in this study was the osteoporotic hip, which stood at 24% (51 fractures) of all trauma surgeries, followed by long bone fractures. More than half of the paediatric trauma operated consisted of supracondylar humerus fractures, making 21 of the total 40 paediatric fractures (Figure 2).

DISCUSSION

The most important finding of this study was the marked reduction in the number of patients with high energy trauma or road traffic accidents during the lockdown period. The last year's average for this group of patients in the same season (i.e. April to – June 2019) stood at 60% of all trauma admissions, compared to just 45% in this year. On the other hand, the frequency of osteoporotic fractures in the geriatric population and pediatric fractures remained almost the same once compared to last year (Figure 1). These findings were also consistent with other studies carried out elsewhere in the world [8,9].

In this unique set of circumstances, while people are encouraged to stay indoors, traumatic injuries still occur, but with varying frequencies. As Pakistani authorities ordered the closure of all major businesses except the essential services, the impoverished are still on the streets, and adhering to social distancing and remaining safe from physical harm seems impossible.

Furthermore, our understanding of this global crisis and measures to be taken to protect the masses are still evolving. People of extreme ages are the most vulnerable, and their protection from coronavirus diseases and injury is of paramount importance. Therefore, 'stay home' and 'stay safe' guidelines do not necessarily keep them protected from accidental falls/slipping incidents, which ultimately leads to hospitalization and risk of exposure to SARS-CoV-2.

Healthcare resources during COVID-19 pandemic have been stretched to limit leading the governments to face harsh realities[10]. Although some countries contained the disease earlier and avoided a terrible human tragedy, others were placed in an extreme situation. In a developing country like Pakistan, there has been an acute shortage of PPEs and ICU care was insufficient to meet the demand. By the time of writing this manuscript, Pakistan COVID-19 cases had tripled in June and the tally reached 209,337. The nationwide death toll recorded on 30 June 2020 was 4,304[11].

We admit that our response will vary from that of other regions and the guidelines we adopted were for the local outbreak, orthopaedic communities from around the world may benefit from our proposals in the current and future pandemics.

4.1 Resource Management: After the outbreak of COVID-19, the head of the institution and departmental heads created a crisis team for effective and efficient resource allocation. The first decision was to close outpatient departments and block unnecessary hospital visits. The accident and emergency department, however, remained operational providing 24/7 emergency care. Triage of patients and protection of the workforce with provision of PPE's were made mandatory[12].

Considering the drop in clinical activity, hospital's human resource was optimized with working shifts restructured in a way to reduce physical presence. Remote working was implemented where possible.

4.2 The clinical pathway: Screening of all emergency visitors for temperature and flu-like symptoms started at the entrance to the Hospital by a dedicated team wearing PPE as pointed out previously. Urgent and life-threatening conditions were managed in a resuscitation room where full precautionary measures were in place.

Surgical face masks were provided to every patient and attendant (one per patient allowed where possible). Oropharyngeal swab tests and high-resolution CT scan of the chest were carried out for every patient requiring admission and were detained in COVID-19 suspected ward (Figure 3). Those who had a positive result were shifted to PEMH following the dedicated pathway. Patients with negative PCR for COVID-19 and no symptoms or contact history were then admitted to the usual wards, where a safe distance was maintained between beds and wearing of masks by patients and staff was mandatory.

4.3 COVID-19 Positive Patients: Pakistan Emirates Military Hospital (PEMH) devoted to COVID-19 care received all patients from the emergency department as well as from the COVID-suspect ward of CMH, if a PCR test was positive. This hospital included dedicated wards, ICU's and operation theatres for the care of COVID-19 patients. The employees received specific training with the use of personal protective equipment (PPE) following World Health Organization[13] and regional recommendations. All essential

orthopaedic procedures in COVID-19 positive patients were carried out with absolute care by the minimized use of power tools to avoid aerosols generated from body fluids[14]. Damage control surgeries were mostly done with the application of a temporary external fixator and definitive surgery postponed once safe to do so (Figure 4).

4.4 Priority stratification of Orthopaedic procedures: As a major adaptation to the ongoing pandemic, priority stratification of trauma and orthopaedic procedures was done and information disseminated to all peripheral military hospitals for strict adherence. The list was as follows:

4.4.1 List of priority 1 cases: Emergent (requiring intervention within 24 hours)

- Dislocation of joints
- Acute compartment syndrome
- Open fractures
- Neurovascular/skin compromise in long bone/pelvic/hip fractures
- Septic arthritis

4.4.2 List of Priority 2 cases: Urgent (requiring intervention within 72 hours)

- Intra-articular fractures (unstable) that will result in severe disability with conservative treatment (both upper and lower limbs)
- Unstable pelvic fractures
- Lower limb long bone fractures
- Hip fractures
- Pathological fractures

4.4.3 List of priority 3 cases: Urgent elective (requiring intervention in 2-4 weeks)

- Upper limb long bone fractures that will result in severe disability with conservative treatment
- Acetabular fractures (displaced and unstable) that will result in severe disability with conservative treatment
- Knee extensor disruption (including fracture of patella)
- Acute tendon ruptures warranting repair (Tendo Achilles, Hamstring, Rotator cuff)
- Locked joints at – any site
- Secondary wound closures

4.4.4 List of priority 4 cases: Essential elective (requiring intervention in 1-3 months)

- MDT (Tumor Board) directed sarcoma surgery – any site
- Surgery for solitary metastasis at – any site
- MDT (Tumor Board) directed destructive bone lesion surgery having risk of fracture, e.g., GCT
- Core decompression for AVN hip
- MDT (Tumor Board) directed benign bone/soft tissue tumor excision
- Arthroscopic surgery of a joint with loose body/torn meniscus causing reversible mechanical symptoms
- Arthroplasty of – lower limb where delay will prejudice the outcome

4.4.5 List of priority 5 cases: Nonessential elective (discretionary) (requiring intervention in more than 3 months)

- Primary / revision arthroplasty
- Arthrodesis, e.g., triple arthrodesis
- Reconstructive sports surgery
- Hand and upper limb surgery – not otherwise specified
- Metal ware removal
- Any other orthopaedic procedure – not otherwise specified

4.5 Fractures treated conservatively: The majority of upper extremity fractures presenting to the emergency department were managed conservatively with plaster to reduce the overall number of hospitalizations. These included simple diaphyseal and non-articular fractures that one would not expect to cause severe disability later on. These patients were sent home with specific recommendations for the disease and appropriate follow-up subsequently at the telemedicine clinic, as is widely practiced during this pandemic[15].

4.6 Discharge Criteria: Operative patients who were COVID-19 negative were discharged after treatment and advised routine follow-up for stitch removal at 2 weeks. On the other hand, protocols for discharging COVID-19 positive patients differed for symptomless and sick patients. Those who showed symptoms were treated in the COVID wards until their symptoms improved and repeat PCR test turned negative, whereas patients without symptoms were shifted to quarantine facility[7].

CONCLUSION

Regardless of the duration and severity of this pandemic, trauma and orthopaedic will remain available for emergency services. However, due to massive healthcare resource allocation for the novel coronavirus pandemic, treatment of the orthopaedics patient population has been markedly affected and disabilities of distinct natures will emerge and pose management challenges in the post COVID-19 phase.

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