Pediatric Traumatology and COVID-19. Pandemic Experiences from Córdoba, Argentina

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ABSTRACT

Introduction: Coronavirus disease spreads rapidly, which leads to an increased demand for health services. Such services must be adapted accordingly. Our aim is to provide a general vision on the way these circumstances affect our practice, based on our experience and remarking the positive aspects as well as those which need to change in the future. **Materials and Methods:** A record was kept of the daily number of consultations, age of the patient, gender, trauma history, place of injury, reason for consultation, diagnosis and treatment. These data were contrasted with the records for the different quarantine phases and with the records for the same period of 2019. **Results:** the number of consultations amounts to 120, the number of surgeries amounts to 33, and 185 emergency room consultations were carried out, 160 of them with trauma patients. The most frequent place of injury was the home (56.25%). 30% of the injuries were wrist fractures and 28,8% were supracondylar fractures. The number of patients increased over quarantine flexibilization. **Conclusion:** Fast adaptation is fundamental. Common fractures occur even during quarantine, as well as infections. Professionals should avoid neglecting unpostponable attention to patients with a chronic condition.

Key words: Pediatric orthopedic; COVID-19; pediatric trauma; quarantine; fractures.
Level of Evidence: III

Traumatología infantil y COVID-19. Experiencias en pandemia desde Córdoba, Argentina.

RESUMEN

Introducción: La enfermedad por coronavirus se expandió rápidamente. Esto llevó a un aumento de la demanda de los servicios sanitarios, por lo cual fue necesario adaptarse de manera acorde. Nuestro objetivo es proporcionar una visión general del impacto en la atención y de nuestra experiencia, identificar aspectos positivos y aquellos por mejorar para futuras planificaciones. **Materiales y Métodos:** Se registró el número de consultas diarias, la edad, el sexo, la presencia de traumatismo, el lugar de la lesión, el motivo de consulta, el diagnóstico y el tratamiento. Se comparó el número de atenciones con las flexibilizaciones y con igual período de 2019. **Resultados:** Se realizaron 120 consultas, 33 procedimientos quirúrgicos, 185 atenciones por guardia, 160 con traumatismo. El lugar más frecuente de traumatismo fue el domicilio (56,25%). El 30% fueron fracturas de muñeca y el 28,8%, supracondíleas. Las consultas aumentaron con las flexibilizaciones del confinamiento. **Conclusiones:** Es fundamental adaptarse rápido teniendo en cuenta que las fracturas comunes seguirán ocurriendo pese al confinamiento, al igual que las infecciones osteoarticulares. No descuidar tampoco la enfermedad crónica impostergable.

Palabras clave: Traumatología infantil; COVID-19; pandemia; ortopedia infantil; cuarentena; fracturas.
Nivel de Evidencia: III

INTRODUCTION

Coronavirus disease caused by the virus COVID-19 spread rapidly since the first infections occurred in Wuhan, China, until the WHO declared it a pandemic on March 11th, 2020. Person-to-person transmission in major urban areas facilitated a rapid spread of the virus[1], which led to an increased demand of health services and, in some countries, a collapse[2].

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Naturally, every country, and even every city, experiences outbreaks differently, according to its preparedness, competence, resources and implementation of assistance. It is estimated that communities and health care settings will need to be adjusted for a few years[3].

One of the measures taken –and which has proven greater effectiveness in diminishing viral propagation– was social isolation and subsequent interruption of non-essential activities. But, although trauma is less likely to occur in countries under quarantine, accidents and osteo-articular injuries still occur[2, 3]. Thus, it is necessary to modify the health care system by adjusting regular medical care in order to reduce the risk for patients, their family members and health workers. In doing so, it is important not to neglect other clinical pictures and to emphasize the balance of risks and benefits of delaying attention to common diseases[2].

On March 19th, 2020, the government decreed Mandatory Preventive Social Isolation ("Aislamiento Social, Preventivo y Obligatorio"), which was highly rigorous during the first two weeks. Since then, it has been repeatedly extended and modified. Measures have been softened and, hence, movement of people has progressively increased.

According to the Ministry of Health, 31,564 cases of COVID-19 have been diagnosed until June 14th, most of them in the Autonomous City of Buenos Aires and its metropolitan area[4]. The province of Córdoba, the second most populated province in the country (INDEC, 2010 census), had confirmed 495 cases within the same period of time, mainly in its capital city.

Since the onset of the pandemic and over its track through different countries, experiences regarding adjustments in Orthopedics and Traumatology services have been reported and advised in order to liaise with the health system and provide treatment for the emerging demand. We are specialists in pediatric Orthopedics and Traumatology who work in a tertiary level institution chosen as a reference site for COVID-19 patients. As such, we had to design emergency response, outpatient clinic and surgery protocols in order to meet the emerging needs of the patients while also protecting them, their families and our own healthcare team.

The aim of this paper is to provide an overall perspective of the impact on health care and of our experience in this peculiar context, as well as an assessment of the reasons for consultation, the mechanisms of injury in trauma, the most common injuries and the specific treatments in times of Mandatory Preventive Social Isolation. The ultimate goal is to identify the positive aspects and those which still need to be enhanced in pursuit of forthcoming planning for similar contexts.

MATERIALS AND METHODS

Ever since the decree of isolation resulted in the enforcement of the quarantine, different decisions were made at the Orthopedic and Traumatology Service in order to maintain medical attention for patients with urgent needs or for whom a delay in treatment would imply a significant deterioration of the clinical picture. The measures were taken in consideration of the safety of every person involved, preventing them from unnecessary exposure and potential infection.

All these actions were recorded on a detailed protocol, and work teams were formed to operate in 24-hour on-call shifts. A record of daily medical consultations was elaborated which specified the type of assistance (clinic, surgery, emergency). As regards clinical assistance, the amount of daily consultations and the most frequent reasons for consultation were considered. With respect to emergency assistance, the following details for every patient were registered daily: age, gender, existence of injury, place of injury, mechanism of injury, reason for consultation, diagnosis and treatment performed. These data were entirely collected between April 15th and May 31st inclusive. The amount of assisted patients was examined throughout the flexibilization and the increase in movement of people, as well as compared to the amount of patients assisted in the same period of 2019.

RESULTS

Five teams of two traumatologists each were formed, which worked in ER 24-hour shifts, including weekends. In turn, we designed a Monday-to-Friday schedule for backup staff to take over outpatient health care at surgical procedures. Such staff must attend the hospital only in case there were any pending surgeries from the previous day. Formerly scheduled appointments for outpatient offices were cancelled, but the offices kept on functioning for fracture monitoring, post-surgical follow-up and assistance to oncology patients.

During the recorded period, 120 outpatients were treated. 80% of the treatments consisted in fracture monitoring and post-surgical treatment, some of the latter having started before the beginning of the quarantine. The remaining 20% included oncology follow-up (5%), previous treatment (10%) and orthopedic consultation (5%).

In the same period of 2019, 550 outpatient treatments were performed, 60% of which corresponded to fracture monitoring and post-surgical follow-up. The remaining 40% corresponded to orthopedic issues (spinal column: 10%, tumors: 5%, neuroorthopedics: 5%, hip: 10%, others: 10%).

Scheduled surgeries were also cancelled. During the examined period, 33 surgeries were performed. 14 procedures were performed for supracondylar fractures, which represent 42.4%; 3 of them for lateral condyle fractures, which represent 9%; 7 of them for other fractures (one of them femoral), which represent 21.2%. The rest of the surgeries were interventions because of osteoarticular infections, except for one, which consisted in a tumor prostheses replacement due to breakage. In the same period of 2019, 118 surgical procedures were performed, both scheduled and emergency.

As regards clinical emergency, during the examined period 185 patients were assisted, 115 of which were male (62.2%) and 70 female (37.8%). Age distribution was 89 patients from 0 to 5 years old (48.1%), 68 patients from 6 to 10 years old (36.7%) and 28 patients >10 years old (15.1%). In the same period of 2019, 935 patients were assisted, but the disaggregated data for that period are not available.

Number and progression of patients per day are shown in Figure 1. Among them, 160 (86.5%) had suffered previous trauma, and 25 (13.5%) had not suffered previous trauma.

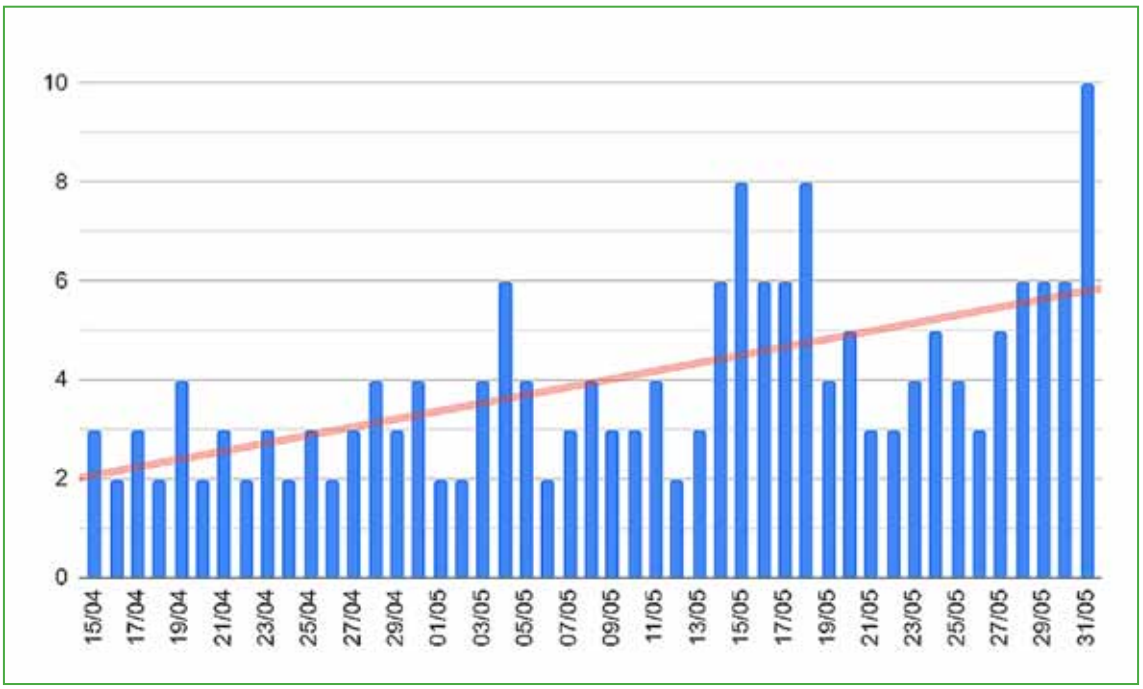

Figure 1. Daily progression of patients treated in ER at Children's Hospital in Córdoba, from 01/15/2020 to 05/31/2020.

The reasons for consultation are listed in the Table, with falling from floor level as the most frequent (44 cases). Figure 2 specifies the place where the injury occurred.

Table 1. Reasons for consultation/trauma mechanism.

Reason for consultation	
Control	10
Joint pain (with or without fever)	10
Upper limbs traction	14
Orthopedic issues	3
Falling from games for children	8
Falling from furniture	25
Falling from floor level	44
Injury or falling from bike skates, etc.	23
Sprain	10
Home accident	14
Sport injury	8
Other	16
Total	185

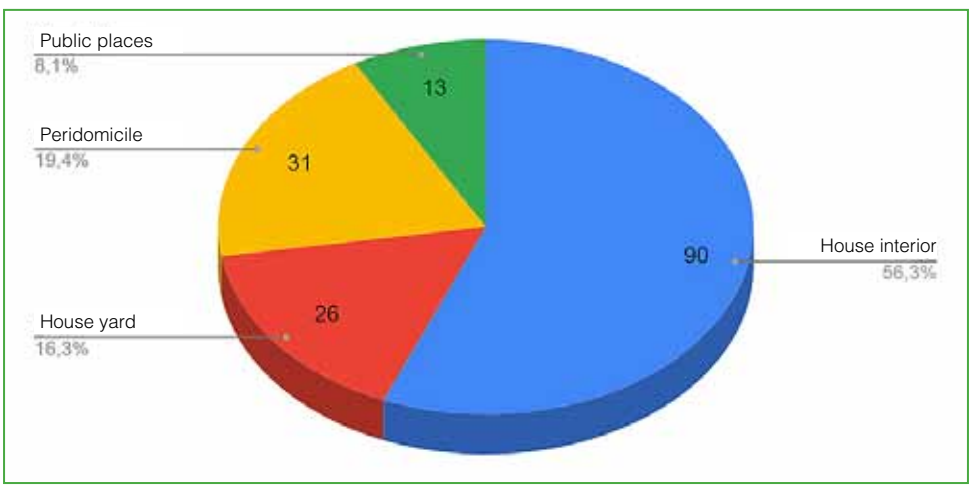

Figure 2. Place where the injury occurred. "Peridomicile" means the surroundings, including sidewalks, neighbours property and parks nearby.

The most common diagnosis by far was fracture of the upper limbs (43.25%, N° = 80), followed by injury without fracture, both in lower limbs (25 cases) and upper limbs (22 cases). The rest of the diagnoses are shown in Figure 3.

Lastly, Figure 4 details the type of fracture of the upper limbs. In 2019, there were 201 supracondylar fractures, which results in an average of 16.75 fractures per month.

Regarding lower limbs fractures, during the examined period five femoral fractures were treated. One of them required surgery, and the rest were treated with plaster cast. There were also two tibia fractures, one of the medial malleolus, one fibula fracture and an open fracture of the calcaneus as a result of a motorbike accident.

There were no infections among the personnel nor was it necessary for any of the members of the medical team to be isolated.

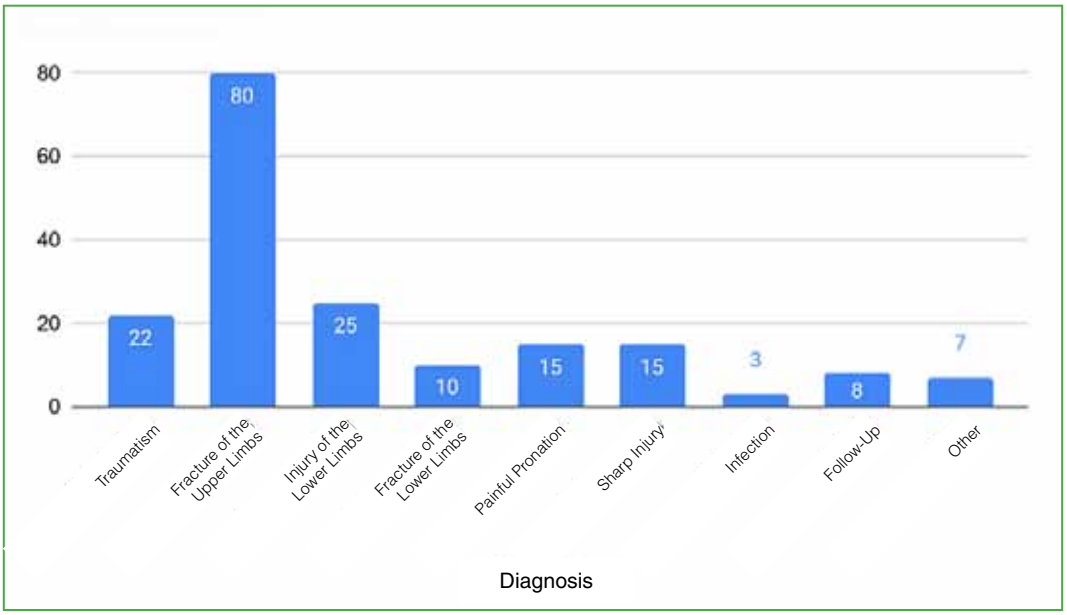

Figure 3. Amount per diagnosis type. "Other" includes bracing or removal of plaster cast.

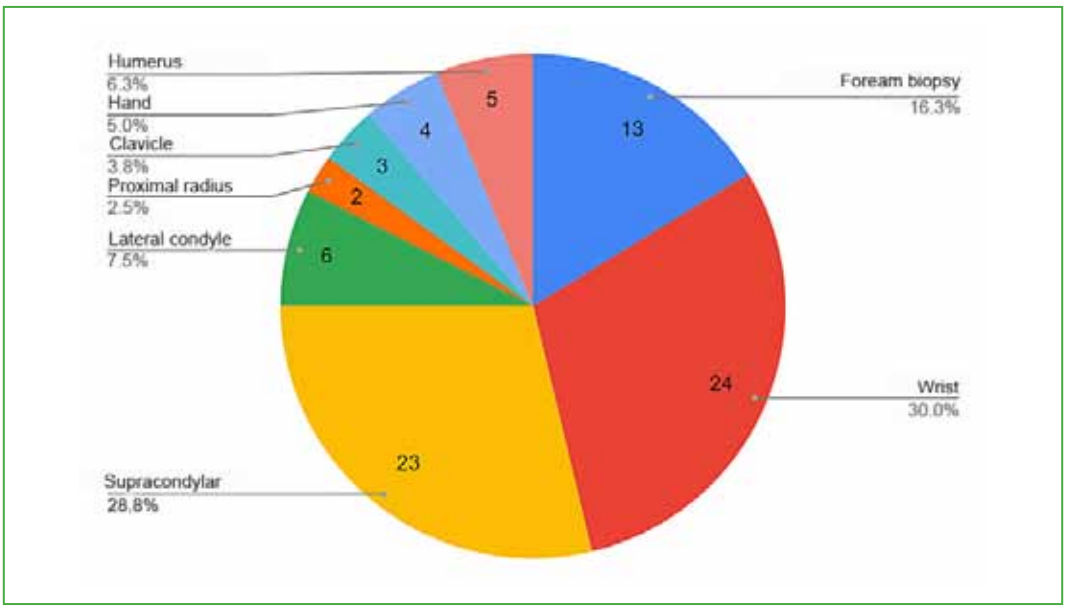

Figure 4. Fractures of the upper limbs. "Humerus" includes diaphyseal and proximal fractures.

DISCUSSION

A changing context demands fast adaptation. It was necessary that many services modified their assistance patterns to meet the demand in times of pandemic. Orthopedic and Traumatology Service is no exception, and, moreover, it must be prepared to deal with emergency patients affected by COVID-19, even though the service is not assigned to directly provide assistance to COVID-19 patients. It is estimated that a decrease in movement of people leads to a decrease in occurrence of trauma, but even so, trauma still represents a reason for consultation in emergency services[2, 3, 5-14].

Adjusting the system entails protecting the personnel, the patients and their families over the process of treating and assisting the sufferers whose orthopedic and traumatology injuries are urgent. It also implies avoiding unnecessary exposure and reducing the use of resources in order to contribute with the health system at large[5, 14].

By separating the work team into smaller groups, staff exposure is reduced and the risk of cross-infection diminishes. This measure also enables the staff to self-quarantine. Farrell et al. advise that a backup team is available in case the small groups are oversaturated with work or have been infected[2].

Córdoba Children's Hospital is part of the health organization destined to assist patients diagnosed with or suspected of COVID-19 infection. Movement of general public was restricted and peripheral hospitals were adjusted and prepared to treat patients who were not infected with COVID-19.

The Orthopedic and Traumatology Pediatric Service is the only service in the province's public health system. Therefore, it generally receives many patients derived from other institutions of the province. For this reason, the service needed to adjust in order to keep on providing assistance. Predictably, the usual number of consultations diminished during the pandemic, except for the most serious cases, like tumors, trauma, infection and postoperative complications, for which the number of consultations remained stable[10].

If compared to the same period of 2019, the amount of outpatient consultations and surgeries decreased significantly by 80%. A delay from the patient in consultation is also reported in the literature in 35% of the cases[11]. Such information could not be corroborated in this study.

The institution came to the decision of cancelling all of the scheduled surgeries, including outpatient. The only exceptions were those surgeries which, because of a delay, would carry a great deterioration in the patient's condition. Regarding this, some healthcare centers considered outpatient procedures safe, unlike our institution, and thus they did not interrupt the surgeries, but took protection measures instead[1, 2, 6, 15].

Most of the surgeries performed in our institution over the period considered were supracondylar fractures. The amount remained constant compared to the same period of 2019. The amount of emergency consultations decreased by 70% compared to the same period of 2019. The drop observed was more pronounced at the beginning of the record, which coincided with the most strict stage of confinement. A slight increase of demand and fractures was observed as the confinement measures gradually softened. This is shown by the recorded data for the first week of social isolation (with strict measures of confinement which only permitted movement of essential workers). In such period, the average of attention was 3 patients per day, while for the last week (opening phase 3, with recreational and commercial activities) it was 6.43 patients per day.

Even though it is difficult to compare these data to world reports, given the disparity in the restrictive measures taken, several authors mention a decrease in cases during the pandemic and the period of confinement[2, 6, 8, 11]. On the contrary, Hernigou et al. report an increase in child trauma. They also notice that confinement for cohabiting families increases the chance of neglect and child fracture[12]. In our records, only one patient was diagnosed with humerus fracture and suspected abuse. By far, the vast majority of consultations were due to prior trauma (86.5%), followed by infections and post-treatment follow-up. This also corresponds to experiences in other institutions[1, 5, 8, 11-13].

In times of confinement and movement restriction, it is not surprising that the most frequent place of injury should be, by far, the interior of the house, with an average of 56.3%, which, including the house yard, amounts to 72.6%. The most common diagnoses did not differ from common practice, being the upper limbs the most affected area, and the wrist fracture the most frequent injury[16]. By contrast, attention is drawn to the number of recorded supracondylar fractures, which almost equaled the number of wrist fractures (23 vs. 24). If compared to the usual published numbers, this change in ratio might be due to the fact that other health care centers absorbed the minor cases (e. g. wrist fractures without displacement).

Many health centers suggested telemedicine monitoring, which was not possible for our facility due to lack of infrastructure[1, 2, 6, 7, 10, 11, 16-19].

CONCLUSIONS

In health emergency contexts, it is necessary to adjust the services rapidly and efficiently, in order to provide assistance without increasing stress for the healthcare system, and aiming to preserve the patients and the workers. Separating the work team into smaller groups is highly recommended, and so is using telemedicine, if possible.

Even though confinement impacts directly on the number of patients, health centers must be prepared for continuing on treating common child trauma and the most frequent fractures. Professionals should also be alert to occurrence of osteoarticular infections, and should avoid neglecting unpostponable attention to patients with a chronic condition.

Conflict of interests: Authors claim they do not have any conflict of interests.

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