



Research Article

Operative Treatment of Patients with Fractures During COVID-19

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Abstract

Objective: The epidemic of COVID-19 virus in Serbia began on March 6, 2020 with the first confirmed positive test. The pandemic affected all spheres of life, especially the functioning of the health system. The newly introduced measures in the fight against the spread of the epidemic in Serbia included a curfew lasting 54 days, as well as limited working hours of state services, catering and sports facilities and a ban on mass gatherings of the population. As the introduced measures significantly affected the freedom of movement and activity of the population, the aim of this paper was to compare the distribution of fractures that were operatively cared for at our Clinic with the same period in 2019.

Methods: The observed period in both years lasted from March 6 to December 31. There were 651 operated trauma patients in 2019 and 630 in 2020. Patients were divided into groups of fractures based on their anatomical localization. Groups were then compared in number of patients, as well as the age and sex distribution.

Results: Our results showed that there is no statistically significant difference in the total number of operated patients in the two observed time intervals. The most common were fractures of the trochanteric region and fractures of the lower leg with almost identical age and sex distribution. Only the number of malleolar fractures and proximal humerus fractures showed a significant decline in the pandemic year.

Conclusion: Despite the difficult working conditions in the newly emerging epidemiological situation, the scope of traumatological activities of our Clinic has remained almost unchanged. Approximately identical number of operated trauma patients in the two observed intervals indicates that most of our patients suffer injuries during daily activities at home, which were not affected by restriction of movement and other pandemic conditions.

Keywords: COVID-19; Fractures; Trauma; Hip; Orthopedics; Traumatology

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Introduction

The epidemic of COVID-19 virus in Serbia began on March 6th, 2020 with the first confirmed positive test, a month and a half after first registered case in Europe [1]. The pandemic affected all spheres of life, especially the functioning of the health system. The spread of new and unknown disease was fast which forced massive changes in everyday life. The newly introduced measures in the fight against the spread of the epidemic in Serbia included a declaration of the state of emergency on March 15th and curfew lasting 54 days, as well as limited working hours of state services, catering and sports facilities and a ban on public and private mass gatherings of the population. Temporary closed factories or reduced workload, suggestions to work from home and closed borders and airports made people spend more time in home environment.

For the start of our observed period, we used 6th of March as the date when the first case of COVID-19 infection was registered in Serbia. Pandemic period in 2020 also includes 54-day long Lockdown in Serbia. During the lockdown there was a restriction

of free movement. On weekdays, Police hour was starting at 5PM and lasted until 6AM next day while on weekends there was 24-hour ban. These restrictions were implemented for population younger than 65 while older citizens were in complete 24-hour lockdown as a precaution measure. The only period during the week when older population could go outside was on Sundays between 4 and 7AM. On weekends, there was a complete 24h ban for the rest of the population. The lockdown lasted until May 6th. Since then, there were not additional restrictions of going outside for general public, but shortened working hours of public services, restaurants, cafes and sport facilities impacted on people activity.

Outbreak of COVID-19 infection hit whole Europe almost in the same time so countries across continent also needed to implement new measurement to prevent spreading of the virus and to organize medical practice in these new circumstances. At the beginning of the pandemic, Italy was the country with the most cases of COVID-19 infection and the situation was especially dramatic in the region of Lombardy [2]. Most general hospital had to be transformed into COVID hospitals because of the rapid increase of COVID cases and only the major orthopedic institutions in Italy treated acute trauma, acute infections and malignant tumors resections while elective orthopedic procedures had to be cancelled or postponed. Norway introduced its own lockdown on March 13th which led to significant decrease in number of planned hip arthroplasties in following weeks while the number of traumatic hip surgeries stayed almost the same [3]. On the other hand, Swedish approach to the pandemic was different and it was more focused on individual responsibility and changes in everyday routine without strict lockdown of general public [4]. As the introduced measures and emerging epidemiological situation significantly affected the freedom of movement and activity of the population, the aim of this paper was to compare the distribution of fractures that were operatively cared at our Clinic with the same period in 2019 and to answer the question - did COVID-19 pandemic influenced the distribution of fractures and the general number of operated trauma patients in Nis?

Methods

During the pandemic period in 2020 Clinic had to be relocated several times. At the start of the epidemic in Serbia, whole building of New Clinical Centre, where Clinic is located, was transformed into COVID Hospital. For almost two months, orthopedic patients were mostly threatened and located in Emergency Centre or transported to Military hospital nearby, after being operated. Because of lack of space and staff, which was highly engaged in the treatment of COVID patients, elected operations had to be postponed or cancelled for the most of pandemic period in 2020 [5]. For that reason, we only included operated trauma patients from these observed periods.

Total number of observed patients in our paper is 1281, 578 male patients and 703 female patients. By year: 651 patients in 2019 (285 male and 366 female) and 630 patients (293 male and 337 female) in 2020.

All the fractures were divided in ten big groups. Nine groups were created according to its anatomical area (clavicle, humerus, forearm, hand, pelvis, femur, lower leg and foot), while the last group is consisted of polytraumatic patients. Most of the patients are included in humerus, forearm, femur and lower leg group so these groups are further divided in subgroups. Humeral fractures are divided in proximal humerus, distal humerus fractures and fractures of humeral shaft. Forearm group consists of fractures of olecranon, antebrachial fractures and wrist fractures. The biggest and the most complex is femoral fractures group. These fractures are divided in femoral neck, trochanteric and subtrochanteric fractures, femoral shaft fractures, distal femur fractures and special group of periprosthetic femoral fractures. Lower leg fractures include subgroups of proximal tibia, tibial shaft and distal tibia fractures and also malleolar fractures. With all subgroups, there are total of 22 groups of fractures presented in our paper.

Results

The difference in total number of operated patients between two observed periods is just 21 which is a reduction of only 3,2% during pandemic 2020. The most common fractures in both periods were trochanteric fractures followed by hip, subtrochanteric fractures and fractures of tibial shaft and malleoli. In all three groups of fractures with the most patients, average age of patients was above 70 years with almost identical age distribution between compared groups. Sex distribution in groups of hip and trochanteric region fractures was almost the same in 2019 and 2020. The only two groups with significant decrease in number of operated patients in 2020 were proximal humerus and malleolar fracture group. The group of proximal humerus fractures also have lower patient mean age in 2020 while the sex distribution in malleolar group shows 33% less female patients (Table 1).

Groups of Fractures	n (2019)	%	n (2020)	%	M/F (2019)	M/F (2020)	Average Age (2019)	Average Age (2020)
Clavícula	0	0,0	6	1,0		1/5		29
Proximal humerus	25	3,8	15	2,4	14/11	7/8	59,92	53,2
Humeral body	15	2,3	16	2,5	5/10	8/8	51,86	52,69
Distal humerus	11	1,7	5	0,8	6/5	1/4	52,27	35,4
Olecranon	9	1,4	7	1,1	5/4	0/7	53,2	57,57
Forearm	21	3,2	24	3,8	13/8	18/6	52,3	45,08
Wrist	13	2,0	8	1,3	6/7	3/5	52,54	52,12
Hand	13	2,0	8	1,3	1/12	1/7	38,23	32,14
Hip	105	16,1	99	15,7	37/68	40/59	72,63	72,77
Trochanteric	149	22,9	140	22,2	42/107	43/97	75,67	74,74
Subtrochanteric	55	8,4	65	10,3	17/38	21/44	70,71	71,48
Femoral body	23	3,5	29	4,6	13/10	16/13	54,48	49,97
Periprosthetic femoral	9	1,4	16	2,5	7/2	9/7	75,2	75,73
Distal femur	18	2,8	15	2,4	14/4	10/5	66,1	67,6
Patella	12	1,8	12	1,9	2/10	8/4	65,08	56,92
Proximal tibia	17	2,6	20	3,2	9/8	8/12	52,53	52,7
Tibial shaft	50	7,7	47	7,5	34/16	31/16	49,40	52,37
Distal tibia	14	2,2	17	2,7	5/9	7/10	54	56,88
Malleolar	59	9,1	45	7,1	23/36	21/24	50,41	51,02
Foot	5	0,8	10	1,6	1/4	4/6	30	46,2
Pelvic	11	1,7	10	1,6	3/8	1/9	59,1	45,2
Polytrauma	17	2,6	16	2,5	8/10	13/3	60,47	52,37
Total	651	100%	630	100%	285/366	293/337		

Table 1: Number of Patients (n), the Percentage of a particular Fracture during the Year (%), Gender Distribution (M/F) and average Age of Patients of each Group.

Discussion

Our results, which are presented in this paper, showed that COVID-19 pandemic did not affect the total number of operated trauma patients and only slightly influenced the distribution of these fractures because staying inside is already one of the main factors for potential trochanteric and femoral neck fractures among older population while more time spent at home and general reduction of activity led only to decrease of malleolar and proximal humerus fractures. The spread of COVID-19 in Serbia was quite rapid and only 9 days since the first case was registered, Serbian government decided to declare the state of emergency. From the start of epidemic, epidemiological situation was quite difficult in the region of Southeast Serbia, where Nis is located. Great amount of COVID-19 positive patients required hospital care so the whole building of New Clinical Centre in Nis and many hospitals in surrounding towns were transformed into COVID centers. Orthopedic surgeons, orthopedic residents, nurses and medical technicians from our Clinic were included in treatment of COVID patients throughout whole pandemic period in 2020. Despite lacking in staff and space, treatment of trauma patients never stopped in our Clinic. That activity was especially important during the period of lockdown when our Clinic was the only institution in Southeast Serbia to perform urgent trauma surgeries, in a region of around 1,5 million people [5]. Early during the epidemic, Serbian medical authorities banned elective orthopedic operations such as total joint arthroplasty and arthroscopic procedures and the focus was on trauma patients. Our trauma patients were observed and operated in operation rooms of Emergency Centre and after the surgery, transferred to Military hospital nearby since the space and total capacity of Clinic was dedicated to COVID patients. This process was repeated throughout whole Lockdown period. Even after lockdown, our Clinic had to be relocated two more times during 2020 but continued to treat trauma patients despite reduced number of hospital beds. The main goal in these new conditions was surgical treatment of trauma patients as soon as possible and patient's discharge from hospital 1-2 days after the operation [6]. That was the most secure way to prevent COVID infection among operated patients.

The most common fractures in both observed periods were trochanteric and hip fractures. Trochanteric fractures made up 22,9% of all fractures in 2019 and 22,2% in 2020 while hip fractures 16,1% in 2019 and 15,7% in 2020. Both types of fractures are usually a product of low-energy trauma, such as falling in home environment and mostly occur in elderly population [7]. A slightly lower number of these fractures during 2020 was not statistically significant which means that newly introduced restrictions of free movement did not affect older population who already spend much more time inside than younger population [8]. Fear from potential COVID infection in hospital environment and avoiding visits to emergency room, among elderly population, might also be considered as a factor in this slight decrease in number of recorded hip fractures during the pandemic period. This was especially the case in the beginning of pandemic during the lockdown [5].

Groups of proximal humerus fractures and malleolar fractures were the only ones to have a noticeable decrease in number of treated patients in pandemic year. Fractures of proximal humerus had a 40% decrease while 23,7% decrease was recorded in malleolar fractures compared with numbers in 2019. There are still divided opinions regarding the mechanism of humeral fractures, but two main reasons described in literature are falling on floor and falling outside during winter season. Also, we need to assume that there was a certain number of humeral fractures which were treated conservatively but would probably been operated in regular circumstances. The main reduction in total number of malleolar fractures was registered among females while the number stayed almost the same in male population [4]. Since the average age of operated patients in both types of fractures was below 55 years in 2020, we can say that more time spent at home and general reduction of activity, including less sport injuries and traffic accidents, caused by COVID-19 pandemic and the measures that followed, might be consider as a type of preventive or protective effect for these fractures [9-11].

Conclusion

Despite the difficult working conditions in the newly emerging epidemiological situation, the scope of traumatological activities at our Clinic has remained almost unchanged. Approximately identical number of operated trauma patients in the two observed intervals indicates that most of our patients suffered injuries during daily activities at home, which were not affected by restriction of movement and other pandemic conditions.

Conflict of Interest

The authors have no conflict of interest to declare.

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