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Impact of COVID-19 pandemic on the care of severe burns in Japan: Repeated survey of specialized burn care facilities

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ABSTRACT

Background: The spread of coronavirus disease 2019 (COVID-19), which began in 2020, has had a major impact on healthcare systems. The spread of COVID-19 has been reported to have affected the readiness to treat patients with burns worldwide. However, the existing reports have evaluated burn care status within a limited time period during the pandemic, and no report clarifies the change in the impact of infection status on burn care from the beginning of the pandemic to the present.

Methods: Japanese Society for Burn Injuries–accredited burn care facilities were surveyed using questionnaires on April 9–23, 2020; June 23–July 6, 2020; July 9–21, 2021; and January 21–31, 2022. Differences between groups were evaluated using Friedman's test or Bonferroni's multiple comparison test, as appropriate.

Abbreviations: COVID-19, coronavirus disease 2019; JSBI, Japanese Society for Burn Injuries

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Results: From the 103 facilities included in the study, we received 85, 55, 56, and 58 responses in the first, second, third, and fourth surveys, respectively. We could continuously observe 34 facilities. The rate of acceptance of patients with severe burns improved significantly over time ($P < 0.05$). However, in the second and third surveys, there was an increase in the number of respondents who did not accept patients with burns irrespective of COVID-19 status.

Conclusions: The number of facilities treating patients with burns who have COVID-19 is increasing; however, COVID-19 care may negatively impact routine burn care. It is necessary to continuously examine medical resource allocation through methods such as information sharing by academic societies.

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1. Introduction

The spread of coronavirus disease 2019 (COVID-19), which began in 2020, has had a major impact on healthcare systems, including burn care. The first COVID-19 case in Japan was reported in January 2020. By early 2022, six large waves have occurred in Japan, and a state of emergency has been declared four times (Fig. 1).

According to a survey we conducted 4 years ago, 579 intensive care beds for patients with severe burns were available at 258 facilities in Japan. However, the spread of COVID-19 has been reported to have affected the readiness to treat patients with burns worldwide [1–3], and these patients could not be assured hospitalization [4]. Moreover, it is difficult to simultaneously treat patients with burns and patients

with COVID-19, and reallocation of medical resources and a change in burn care strategies are required [3].

However, the existing reports have evaluated burn care status within a limited time period during the pandemic [5–8], and no report clarifies the change in the impact of infection status on burn care from the beginning of the pandemic to the present.

This study aimed to investigate the impact of the COVID-19 pandemic on the care of patients with severe burns and to clarify its transition in Japan.

2. Methods

In this observational study, data were collected through questionnaire surveys in Japanese. The questionnaires were developed by the Disaster Network Study Committee of the Japanese Society for Burn Injuries (JSBI) and the board of

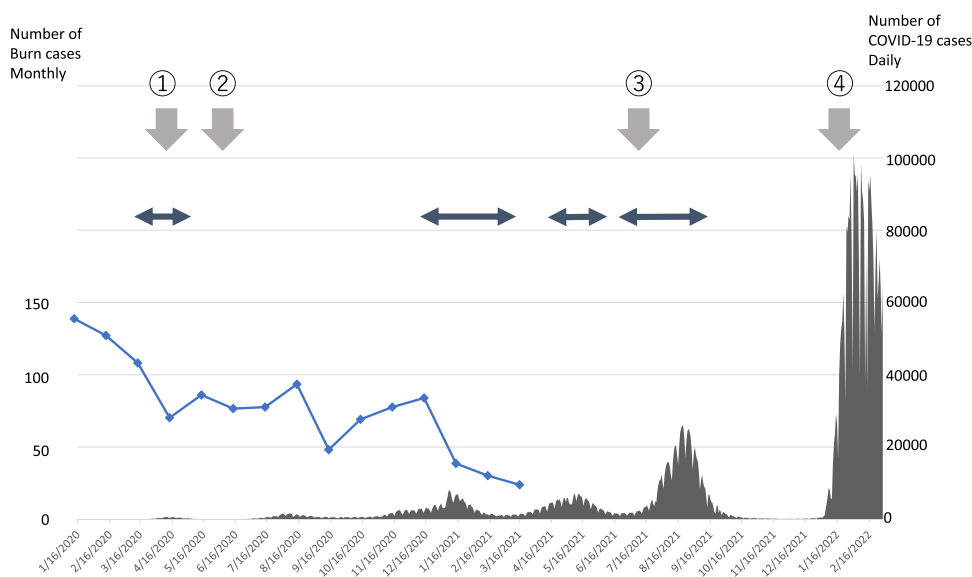


Fig. 1 – Number of new COVID-19 cases and hospitalized burn patients in Japan and the timing of the surveys in this study. The x-axis shows years, month, and date: the y-axis shows the number of new COVID-19 cases daily in the bar chart and the number of hospitalized burn patients monthly in the line graph; by January 2022, six waves had occurred in Japan. The horizontal two-sided arrows indicate the periods during which a state of emergency was declared in Japan. The downward-pointing arrows and circled numbers indicate the four survey periods. The four surveys were conducted during the declaration of the first state of emergency, immediately after the first state of emergency was lifted, the declaration of the fourth state of emergency, and in the midst of the sixth wave. COVID-19: coronavirus disease 2019.

directors of the JSBI permitted us to use them for this study. Respondents were asked for information on their facility's condition and whether their facility could accept patients with COVID-19 by selecting one of the following four options: all cases, mild and moderate cases, only mild cases, or no cases. They were also asked to state the COVID-19 status of the patients with severe burns they could accept by selecting one of the following four options: with or without COVID-19, only without COVID-19, no cases, or no answer.

The person in charge at each of the 103 JSBI-accredited burn care facilities was emailed the questionnaires. The respondents completed the surveys by accessing the questionnaires on the website using a Google form (https://www.google.com/intl/ja_jp/forms/about/). Four surveys were conducted, on April 9–23, 2020; June 23–July 6, 2020; July 9–21, 2021; and January 21–31, 2022, which corresponded to the first declaration of a state of emergency, immediately after the first state of emergency was lifted, the fourth declaration of a state of emergency, and amid the sixth wave, which was the largest, respectively (Fig. 1).

To determine the incidence of burn admissions before and after the COVID-19 epidemic, we used data from the nationwide burn registry of the Japanese Society for Burn Injury to examine the number of burn admissions per month from January 2019 through March 2021. These were the most recent data available.

2.1. Statistical analysis

All variables were categorical, and differences between the groups were evaluated using Friedman's test or Bonferroni's multiple comparison test, as appropriate. The primary outcome of interest was the acceptance of patients with COVID-19 and patients with severe burns. P-values of < 0.05 were considered significant. Statistical analyses were performed using the statistical software EZR (Saitama Medical Center, Saitama, Japan; version 1.55), which is based on R and R commander [9].

3. Results

In the first survey, we received 85 responses from 103 facilities (Table 1). Severely ill patients with COVID-19 could be treated at 57 of the 85 facilities. Twenty-five of eighty-five

facilities responded that they could treat patients with severe burns irrespective of their COVID-19 status.

We received 55, 56, and 58 responses in the second, third, and fourth surveys, respectively. We could continuously observe 34 facilities (Table 2). Most of them were core regional medical institutions, such as emergency medical centers and disaster base hospitals, and had an average (range) of 2.7 (1–10) intensive care beds for patients with severe burns.

The changes in acceptance of types of patients with COVID-19 stratified by facilities are shown in Fig. 2. The rate of acceptance of patients with COVID-19 significantly improved over time ($p < 0.05$). Facilities that were initially unable to accept patients with COVID-19 quickly established protocols to improve their readiness to accept them, and after 1 year, these burn care facilities generally accepted patients with moderate to severe COVID-19.

The changes in acceptance of types of patients with severe burns stratified by facilities are shown in Fig. 3. The number of "no answer" or "only without COVID-19" responses decreased and the number of facilities accepting patients with severe burns irrespective of their COVID-19 status increased. The rate of acceptance of patients with severe burns significantly improved over time ($p < 0.05$). However, in the second and third surveys, certain facilities that responded that they could accept patients with severe burns in the previous survey responded that they could not accept patients with severe burns in the next survey. The actual number of respondents who did not accept patients with severe burns irrespective of their COVID-19 status increased, although this finding was not statistically significant (Fig. 3). All these facilities accepted patients with COVID-19. In the fourth survey, the number of facilities that responded that they could not accept patients with severe burns decreased.

The total number of burn admissions during the COVID-19 infection period decreased relative to the pre-infection period (Table 3). The number of burn hospitalizations during the infection period declined somewhat later than the peak number of new COVID-19 cases (Fig. 1).

4. Discussion

Our findings suggest that the treatment capacity for severe burns during the COVID-19 pandemic improved over time. However, the response to the COVID-19 pandemic might have affected the system for the care of patients with burns. The total number of burn patients during the COVID-19 pandemic decreased compared to the pre-pandemic period, consistent with reports from various countries [4,5,10–12]. However, a detailed examination of the trends in the number of newly infected COVID-19 patients and the number of burn patients revealed that the decline in the number of burn patients occurred somewhat later than the peak in the number of new patients and was more pronounced when the state of emergency was declared and civilian activities were restricted. In other words, the decrease in the number of burn patients was slight in the initial phase when the number of new patients peaked with concern about the impact on the

Table 1 – Results of the first survey.

Total number of facilities	85
Facilities accepting patients with COVID-19	
All cases	57
Mild and moderate cases	7
Only mild cases	5
No cases	16
Facilities accepting patients with burns	
With or without COVID-19	25
Only without COVID-19	27
No cases	16
No answer	17
COVID-19: coronavirus disease 2019	

Table 2 – Status of 34 facilities being continuously monitored.

Facility	Emergency Medical Center	Disaster Base Hospital	Air Medical Services ^a	Type of Institution ^b	Status before the COVID-19 pandemic		Acceptance of patients with COVID-19 ^c				Acceptance of patients with burns during the COVID-19 pandemic ^d					
					Intensive Care Beds for severe burn	Surgery	Burn	1st Survey	2nd Survey	3rd Survey	4th Survey	1st Survey	2nd Survey	3rd Survey	4th Survey	
																Yes
1	Yes	Yes	DH	TH	3	Yes	S	S	S	S	S	S	ALL	ALL	ALL	ALL
2	Yes	Yes	DH	PUB	2	Yes	S	S	S	S	S	S	NA	ALL	NA	ALL
3	Yes	Yes	DH	PUB	2	Yes	S	S	S	S	S	S	ALL	ALL	ALL	ALL
4	Yes	Yes		PR	2	Yes	S	S	S	S	S	S	NA	COVID(-)	NA	ALL
5	Yes	Yes		PR	1	Yes	S	S	S	S	S	S	ALL	ALL	ALL	ALL
6	Yes	Yes		PR	1	Yes	S	S	S	S	S	S	ALL	ALL	ALL	ALL
7	Yes	Yes	DH	PR	3	Yes	N	L	S	S	S	S	NA	NONE	NONE	ALL
8	Yes	Yes		PUB	3	Yes	S	S	S	S	S	S	NA	NA	ALL	ALL
9	Yes	Yes		PUB	2	Yes	S	S	S	S	S	S	ALL	ALL	ALL	ALL
10	Yes	Yes		TH	2	Yes	S	S	S	S	S	S	ALL	ALL	ALL	ALL
11	Yes	Yes		TH	4	Yes	S	S	S	S	S	S	ALL	ALL	ALL	ALL
12	Yes	Yes		PR	2	Yes	S	S	S	S	S	S	ALL	ALL	ALL	ALL
13	Yes	Yes	DH	TH	3	Yes	S	S	S	S	S	S	NA	NA	ALL	ALL
14	Yes	Yes		PUB	3	Yes	S	S	S	S	S	S	ALL	ALL	ALL	ALL
15	Yes	Yes		TH	3	Yes	S	S	S	S	S	S	ALL	ALL	ALL	ALL
16	Yes	Yes		TH	3	Yes	S	S	S	S	S	S	ALL	ALL	ALL	ALL
17	Yes	Yes		TH	5	Yes	S	S	S	S	S	S	ALL	ALL	ALL	ALL
18	Yes	Yes		TH	1	Yes	M	M	S	S	S	S	ALL	COVID(-)	ALL	ALL
19	Yes	Yes	DH	TH	5	Yes	N	S	S	S	S	S	COVID(-)	ALL	NONE	ALL
20	Yes	Yes	DH	TH	3	Yes	S	S	S	S	M	M	NA	NA	COVID(-)	NONE
21	Yes	Yes		TH	3	Yes	N	S	S	S	M	M	NA	NA	NONE	NONE
22	Yes	Yes		PR	2	Yes	N	N	M	M	M	M	COVID(-)	COVID(-)	COVID(-)	COVID(-)
23	Yes	Yes		TH	1	Yes	L	S	S	S	S	S	COVID(-)	ALL	ALL	ALL
24	Yes	Yes	DH	TH	2	Yes	S	S	S	S	S	S	COVID(-)	ALL	ALL	ALL
25	Yes	Yes	DH	TH	2	Yes	S	S	S	S	S	S	COVID(-)	ALL	ALL	ALL
26	Yes	Yes		PUB	1	Yes	M	M	M	M	M	M	NA	COVID(-)	NONE	NA
27	Yes	Yes		PR	2	Yes	S	S	S	S	S	S	COVID(-)	ALL	ALL	ALL
28	Yes	Yes		PUB	3	Yes	S	S	S	S	S	S	COVID(-)	ALL	ALL	ALL
29	Yes	Yes	DH	PUB	2	Yes	S	S	S	S	S	S	COVID(-)	NONE	ALL	ALL
30	Yes	Yes		TH	2	Yes	N	S	S	S	S	S	NA	ALL	ALL	ALL
31	Yes	Yes		PR	3	Yes	S	S	S	S	S	S	NONE	NONE	NONE	COVID(-)
32	Yes	Yes		TH	10	Yes	M	M	S	S	S	S	COVID(-)	ALL	ALL	ALL
33	Yes	Yes		TH	3	Yes	N	L	M	M	M	M	NONE	NONE	NONE	NONE
34	Yes	Yes		TH	2	Yes	S	S	S	S	S	S	NONE	ALL	ALL	ALL
	28	12	9			2.7 ± 1.6										

^a DH: Doctor helicopter

^b TH: Teaching Hospital, PR: Private Hospital, PUB: Public Hospital

^c Accepts patients with COVID-19. S: accepts all cases, M: accepts mild and moderate cases, L: only accepts mild cases, N: accepts no cases

^d Accepts patients with burns during the COVID-19 pandemic. ALL: accepts all patients with burns irrespective of COVID-19 status, COVID(-): only accepts patients without COVID-19, NONE: does not accept any patients with burns, NA: no answer COVID-19: coronavirus disease 2019

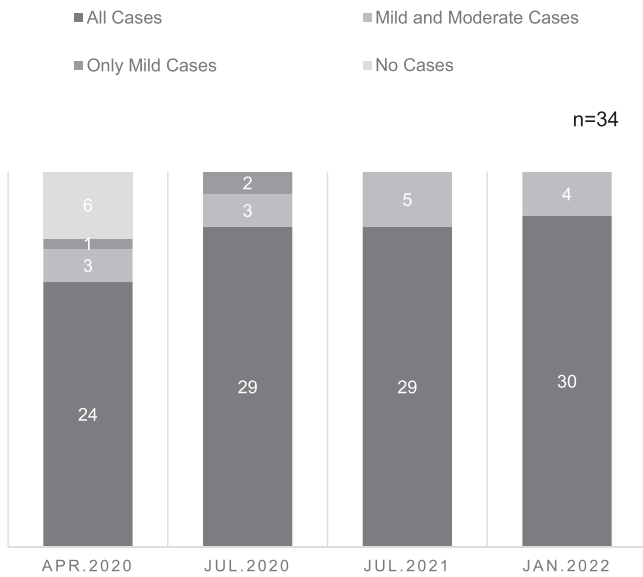


Fig. 2 – Changes in acceptance of types of patients with COVID-19 stratified by facilities. The status of the 34 facilities that continuously provided responses on whether they could accept patients with COVID-19 over the four surveys. In the first survey in April 2020, 24 facilities (70.6%) accepted patients with severe illness, 3 (8.8%) accepted those with moderate illness, 1 (2.9%) accepted those with mild illness, and 6 (17.6%) reported that they could not accept patients with COVID-19. In the second survey in July, 29 facilities (85.3%) responded that they could accept patients with mild to severe disease, and no respondents reported that they could not do so. Thereafter, no significant change was observed until January 2022. COVID-19: coronavirus disease 2019, Apr: April, Jul: July, Jan: January.

medical system, indicating that medical institutions needed to respond to both COVID-19 and burn patients.

In the first survey, which was conducted in the early stages of the outbreak, a quarter of the burn care facilities responded that they could not accept patients with COVID-19 or that they could accept only mildly ill patients. Only 30% of the facilities were able to accept patients with severe burns who had COVID-19, and 20% of the facilities answered that it was not clear whether this was possible. The results indicated that the facilities were not prepared for this situation. Many burn care facilities in Japan are also core regional medical institutions, such as emergency medical centers and disaster base hospitals, which are the main providers of treatment for COVID-19. Nevertheless, burn care facilities have been working to be well-prepared for treating patients with severe burns while functioning as core regional facilities. Of the 34 facilities that we were able to continuously observe, only 13 responded in the first survey that they would accept patients with severe burns irrespective of their COVID-19 status, but in the second survey, 22 facilities (more than 60%) provided this response.

However, the number of facilities that responded that they could not accept any patients with severe burns increased in the second and third surveys, indicating that

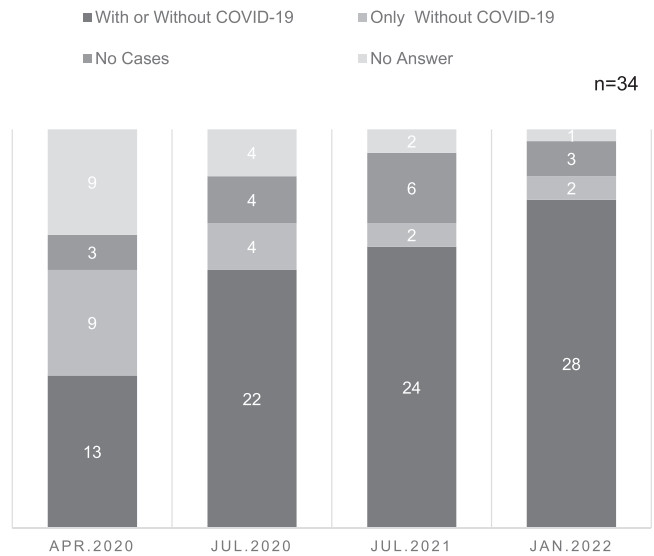


Fig. 3 – Changes in acceptance of types of patients with severe burns stratified by facilities. The status of the 34 facilities that continuously provided responses on whether they could accept patients with severe burns over the four surveys. In the first survey in April 2020, 13 facilities (38.2%) accepted all patients with burns irrespective of their COVID-19 status, 9 (26.5%) only accepted those without COVID-19, 3 (8.8%) did not accept patients with burns at all, and 9 (26.5%) could not answer the question. The number of facilities that accepted patients with severe burns with or without COVID-19 increased to 22 (64.7%) in the second survey, 24 (70.6%) in the third survey, and 28 (82.4%) in the fourth survey. The rate of acceptance of patients with severe burns significantly improved. This is because the number of facilities providing no answer or responding that they only accepted patients without COVID-19 decreased. However, in the second and third surveys, the number of respondents who did not accept patients with severe burns irrespective of their COVID-19 status increased, although this finding was not statistically significant. In the fourth survey, the number of facilities that responded that they could not accept patients with severe burns decreased. COVID-19: coronavirus disease 2019, Apr: April, Jul: July, Jan: January.

Table 3 – Total number of hospitalized burn patients.

Period	Number of patients
Jan.2018 – Dec.2018	1800
Jan.2019 – Dec.2019	1746
Jan.2020 – Dec.2020	1007

Jan: January, Dec: December

certain facilities had difficulty simultaneously providing treatment to patients with COVID-19 and those with burns. In particular, the third survey was conducted at a time when shortage of medical resources was feared due to increased bed utilization, and the impact on burn care was considered to be more pronounced compared to that in the former surveys.

In the fourth survey, the number of facilities responding that they could not accept patients with severe burns decreased. However, in the sixth wave, during which this survey was conducted, the number of patients with COVID-19 was higher, but the number of patients with severe disease was lower than that in the fifth wave, suggesting that the impact on routine burn care was smaller than in the previous waves. Therefore, the results of the fourth survey might not be due to increased acceptance of patients with severe burns at burn care facilities, but it might rather be a reflection of the impact of COVID-19 on routine practice.

This suggests that it is difficult for certain facilities to simultaneously accept patients with COVID-19 and those with severe burns. The COVID-19 pandemic has been reported to impact the treatment of cancer [13,14], non-COVID-19 intensive care [15], and neonatal intensive care [16]. Therefore, we believe that it is better to divide facilities into those that can treat patients with COVID-19 and those that can treat severe burns rather than having all facilities manage both. To this end, it is necessary to share region-wide and situation-specific information on which facilities can handle patients with severe burns irrespective of their COVID-19 status.

We have published information on our web page (<http://www.jsbi-burn.org/members/disaster/archive/chousakekka.html>) on the number of beds for burn care in Japan. We have also tracked the contact points of the burn care facilities. A dedicated contact point for inquiries has been established to provide information when needed. We believe that establishing a system of collaboration among burn care facilities in this way will be useful in supporting the delivery of appropriate burn care during the COVID-19 pandemic [17].

Many reports indicate that, although the number of burn patients decreased during the COVID-19 epidemic, we saw no change in the demand for treatment needed for severe burn patients, including the use of ICU beds and burn surgery [4,5,10–12]. To ensure that medical resources are available to deal with the acute phase of severe burns, some patients were discharged early to secure acute beds, and attempts were made to reallocate medical resources to discharge sites so that early discharge was possible [4,12]. Since the situation changes with changes in the COVID-19 case load, burn care that was previously performed routinely is no longer possible, and it is necessary for each region to prepare to reallocate medical resources by continuously sharing information on their situation.

5. Limitations

This survey was only conducted on burn care facilities accredited by the JSBI and did not include all burn care facilities in Japan. The response rates for the second through fourth surveys were lower than that for the first survey. The facilities responding to the second through fourth surveys may be more positive about burn care for patients with COVID-19 than those from which no response was obtained. In this study, we focused only on the acceptance of patients, which made it possible to repeat the survey. Therefore, we were unable to collect data related to treatment, survival, or cost. Further study is needed.

6. Conclusions

We determined the impact of the COVID-19 pandemic on burn care in Japan. The number of facilities that are able to treat patients with burns who have COVID-19 is increasing; however, COVID-19 care may negatively impact routine burn care. The allocation of medical resources should be continuously examined through methods such as information sharing by academic societies.

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Authors' contribution

Tetsuro Kiyozum, Ichiro Hashimoto, Junichi Sasaki, and Hiroyuki Sakurai contributed to conception and design of the study. Tetsuro Kiyozum, Takayuki Ogura, Kazuma Morino, Taichi Takeda, and Atsushi Narumi contributed to the acquisition, analysis, and interpretation of data. Tetsuro Kiyozum and Daizoh Saitoh drafted the manuscript. All authors have contributed substantially to its revision. All authors have approved the final article prior to submission and take responsibility for the paper as a whole.

Declarations of interest

None.

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REFERENCES

- [1] Laura P, José A, Nikki A, Khaled A, Barret JP, Jeffery C, et al. Impact of COVID-19 on global burn care. *Burns* 2021. <https://doi.org/10.1016/j.burns.2021.11.010>. S0305-4179:00312-0.
- [2] Keshri VR, Peden M, Jain T, Babu BV, Saha S, Singhal M, et al. Impact of COVID-19 and containment measures on burn care: a qualitative exploratory study. *Burns* 2021;S0305-4179:00316-8. <https://doi.org/10.1016/j.burns.2021.11.011>
- [3] Barret JP, Chong SJ, Depetris N, Fisher MD, Luo G, Moiemmen N, et al. Burn center function during the COVID-19 pandemic: an international multi-center report of strategy and

- experience. *Burns* 2020;46:1021–35. <https://doi.org/10.1016/j.burns.2020.04.003>
- [4] Codner JA, De Ayala R, Gayed RM, Lamphier CK, Mittal R. The impact of the COVID-19 pandemic on burn admissions at a major metropolitan burn center. *J Burn Care Res* 2021;42:1103–9. <https://doi.org/10.1093/jbcr/irab106>
- [5] Rogers AD, Cartotto R. The impact of COVID-19 on burn care at a major regional burn center. *J Burn Care Res* 2021;42:110–1. <https://doi.org/10.1093/jbcr/iraa181>
- [6] Varma P, Kazzazi D, Anwar MU, Muthayya P. The impact of COVID-19 on adult burn management in the United Kingdom: a regional center experience. *J Burn Care Res* 2021;42:998–1002. <https://doi.org/10.1093/jbcr/irab015>
- [7] Kumar S, Kain R, More A, Sheth S, Arumugam PK. Burns and COVID-19-Initial experience and challenges. *J Burn Care Res* 2021;42:794–800. <https://doi.org/10.1093/jbcr/iraa217>
- [8] Delfani F, Shoghi M. Burn care strategy in the covid-19 pandemic: a narrative review study. *Int J Burns Trauma* 2021;11:289–95.
- [9] Kanda Y. Investigation of the freely available easy-to-use software “EZR” for medical statistics. *Bone Marrow Transpl* 2013;48:452–8. <https://doi.org/10.1038/bmt.2012.244>
- [10] Farroha A. Effects of COVID-19 pandemic on burns epidemiology. *Burns* 2020;46(6):1466. (<https://pubmed.ncbi.nlm.nih.gov/33131948/>).
- [11] Valente TM, Ferreira LPS, Silva RAD, Leite JMRS, Tiraboschi FA, Barboza MCC. Brazil Covid-19: Change of hospitalizations and deaths due to burn injury? *Burns* 2021;47(2):499–501. (<https://pubmed.ncbi.nlm.nih.gov/33131948/>).
- [12] Farroha A. Reduction in length of stay of patients admitted to a regional burn centre during COVID-19 pandemic. *Burns* 2020;46(7):1715. (<https://pubmed.ncbi.nlm.nih.gov/32553860/>).
- [13] Habermann FOJ, Schmitt D, Failing T, Fischer J, Ziegler DA, Fischer LA, et al. Patterns of pretreatment diagnostic assessment in patients treated with stereotactic body radiation therapy (SBRT) for non-small cell lung cancer (NSCLC): special characteristics in the COVID pandemic and influence on outcomes. *Curr Oncol* 2022;29:1080–92. <https://doi.org/10.3390/curroncol29020092>
- [14] Salari A, Jalaeefer A, Shirkhoda M. What is the best treatment option for head and neck cancers in COVID-19 pandemic? A rapid review. *Am J Otolaryngol* 2020;41:102738. <https://doi.org/10.1016/j.amjoto.2020.102738>
- [15] Indian Registry of Intensive care (IRIS), KJ Adhikari N, Beane A, Devaprasad D, Fowler R, Haniffa R, et al. Impact of COVID-19 on non-COVID intensive care unit service utilization, case mix and outcomes: a registry-based analysis from India. *Wellcome Open Res* 2021;6:159. <https://doi.org/10.12688/wellcomeopenres.16953.2>
- [16] Cena L, Biban P, Janos J, Lavelli M, Langfus J, Tsai A, et al. The collateral impact of COVID-19 emergency on neonatal intensive care units and family-centered care: challenges and opportunities. *Front Psychol* 2021;12:630594. <https://doi.org/10.3389/fpsyg.2021.630594>
- [17] Al-Benna S, Gohritz A. Availability of Covid-19 information from national and international burn society websites. *Ann Burns Fire Disasters* 2020;33:177–81.