



Impact of Covid-19 pandemic on children with special needs requiring general anaesthesia for the treatment of dental disease: the experience of the Brescia Children's Hospital, Lombardy, Italy

K. Tewfik¹ · C. Peta¹ · M. C. De Giuli¹ · M. Rossini¹ · G. Giampaoli¹ · C. Covelli² · D. Burlini¹

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Abstract

Purpose Special needs children presenting with dental problems were penalised during the Covid-19 pandemic due to the reduction of clinical activity and the risks of nosocomial infection. The aim of this study is to evaluate the impact of the pandemic on oral healthcare in paediatric special needs patients.

Methods We retrospectively assessed and compared the outpatient clinic activity and dental procedures performed under general anaesthesia in children with special needs at Brescia Children's Hospital (Italy) in 2019, 2020, and 2021. Any delay between expected waiting time based on assigned priority and surgery was recorded. The efficacy of the protocol adopted to reduce the spread of Covid-19 was evaluated by reporting any infections in patients, parents, and health care providers.

Results In 2020, 270 outpatient visits were performed, and 40 patients were treated under general anaesthesia, with a 26% and 65% reduction, respectively, compared to 2019. In 2021, 362 visits were performed (similar to 2019) and 48 patients were treated under general anaesthesia (58% compared to 2019). The mean delay in the planned treatment was 1.0 month in 2019 (pre-pandemic period), 2.1 months in 2020, and 1.1 month in 2021. No cases of Covid-19 infection were reported in the cohort of patients and parents or among the operators related to nosocomial infection.

Conclusions The Covid-19 pandemic has profoundly reduced the activity of general anaesthesia in paediatric special need patients during 2020, with a gradual return to normal pre-pandemic activity in 2021. The adopted protocol prevented the spread of COVID-19 during hospitalisation.

Keywords Covid-19 · Special needs · Dental disease

Introduction

In March 2020, the World Health Organisation (WHO) declared the 2019 novel coronavirus disease (Covid-19) a public health emergency of international concern. Lombardy (Italy) was one of the most affected regions, and the Regional Healthcare system was forced to a profound and sudden reorganisation of hospital activities (Achiron et al. 2020), giving priority to the assistance of patients with Covid-19-related severe acute respiratory syndrome to the detriment of non-covid-related diseases (Allevi et al. 2020;

Longo et al. 2021). Despite the fact that the clinical manifestations of Covid-19 infection are generally less severe in children compared to adult patients (Lee et al. 2020; Dong et al. 2020; Paglia 2020a, b), hospital care for children, especially in case of elective surgical procedures, was severely reduced and reorganised due to the reallocation of resources and to limit the risks of infection and spread of the virus (Pelizzo et al. 2020). As for many other non-essential health-care related services, routine paediatric dental treatment was suspended in many countries because of the increased risk of cross-infection in dental practices. Dental care was provided only on an emergency basis, for urgent conditions (Ilyas et al. 2020; Alzahrani et al. 2021), or in cases of children with special needs because of their higher risk of oral health problems (Luo et al. 2021). Despite falling into the categories of “frailty with urgency,” children with special needs and their families were highly penalised by the Covid-19 pandemic, due to the limited possibility of accessing routine

✉ K. Tewfik
karim.tewfik@gmail.com

¹ Pediatric Maxillo-Facial Surgery Unit, Children's Hospital, ASST Spedali Civili of Brescia, Brescia, Italy

² Pathology Unit, ASST del Garda, Desenzano del Garda, Italy

care. Since 2010, the Pediatric Oral and Maxillofacial Unit at Brescia Children's Hospital, Lombardy, Italy, has offered a dental service dedicated to special needs children. The service includes outpatient clinic and surgery, and provides dental extractions, dental cleanings, and restorative treatments, all performed under general anaesthesia (GA). In the current study, we compare the clinical activity performed during the pre-covid year (2019), 2020 and 2021, and described the reorganisation of the Brescia Children's Hospital pathways for paediatric patients with dental problems. Lastly, given the possible increased risk of infection during dental procedures (Paglia 2020a; b), we evaluated the safety of the measures adopted to limit the spread of the virus by reporting any documented infections among patients, parents, and health care personnel involved related to hospitalisation.

Materials and methods

The surgical and clinical activities performed in paediatric patients with special needs and dental problems at the Brescia Children's Hospital during 2019, 2020, and 2021 were retrospectively evaluated and compared. Children with special needs included patients under 18 years old with physical or mental disabilities, such as autism, genetic syndromes, cerebral palsy, psychomotor retardation who require dental care in GA. In detail, we analysed the following:

1. The number and type of dental surgical procedures performed under GA
2. The waiting time observed and any delay in treatment according to the priority classes assigned. The classes of priority were defined according to the National plan for the governance of waiting lists for the period 2019–2021 (Salute.gov):
 - Class A: surgical procedure to be performed within 1 month (patients with dental pain at high risk of developing odontogenic abscesses);
 - Class B: surgical procedure to be performed within 2 months (patients at increased risk of developing odontogenic abscess or dental pain);
 - Class C: surgical procedure to be performed within 6 months (patients at limited risk of developing odontogenic abscesses or dental pain);
 - Class D: surgical procedure to be performed without priority, but not beyond 12 months (patients requiring dental treatment in GA without any urgency).
3. The number of outpatient and urgent visits performed.

In addition, we evaluated the changes made to the hospitalisation process, and the outpatient clinical volume, to reduce the spread of Covid-19. The efficacy of the safety

protocols adopted in the hospital setting and in the outpatient clinic was assessed by reporting any infections in patients and caregivers during the hospital stay, and in the subsequent 14 days. Any cases of infection of Covid-19 among the operators involved was also reported.

Results

In 2019, 115 paediatric patients with special needs (M:F=76:39) with an average age of 8.1 years (range 3–17 YY) were treated for dental problems at Children's Hospital of Brescia, Italy. A total of 52 professional dental cleaning, 231 restorative care for dental caries, and 503 tooth extractions were performed, all under GA. In 2020, 40 patients (M:F=24:16) with an average age of 9.7 years (range 1–18) were treated under GA (65% reduction, compared to 2019). A total of 22 professional dental cleanings (58% reduction, compared to 2019), 80 dental restorations (65% reduction) and 179 dental extractions (64% reduction) were performed. From January 1st to February 15th, the surgical activity was similar to the other years, with 17 procedures done in 2019 and 16 operations completed in 2020. The most consistent change in clinical activity was observed between February and May, 2020, during the lockdown period, when all the dental surgical procedures under GA were suspended. In the same period in 2019, 31 paediatric special needs patients were treated under GA. Starting from May 18th, 2020, the surgical activity gradually resumed at a reduced rate, with a total of 24 procedures under GA completed, compared to the 67 operations performed in the same period in 2019 (64% reduction). There were no other lockdowns in Italy in 2020 and 2021. During 2021, 48 patients (M:F=31:17) with an average age of 8.9 years (range 4–18) were treated under GA, with a reduction of 58% compared to 2019. A total of 32 professional dental cleanings (38% reduction compared to 2019), 60 dental restorations secondary to caries (74% reduction) and 237 tooth extractions (53% reduction compared to 2019) were performed. No cases of documented dental trauma needing restoration were reported in our cohort of patients. Details are shown in Figs. 1 and 2.

In 2019, the distribution of patients according to the class of priority assigned was the following: 23 patients in class A, 35 patients in class B, 49 in class C and 8 with class D. Conversely, in 2020, children in class A were 10, class B=14, class C=14 and class D=2 out of 40 patients while in 2021 patients on class A were 19, on class B were 13, on class C were 10 and finally on class D were 6 (Fig. 3). The average delay observed between the expected time and the date of the intervention was 1.0 month (range 0–9 months) in 2019, 2.1 months (range 0–8 months) in 2020 and 1.1 months (range 0–6 months) in 2021.

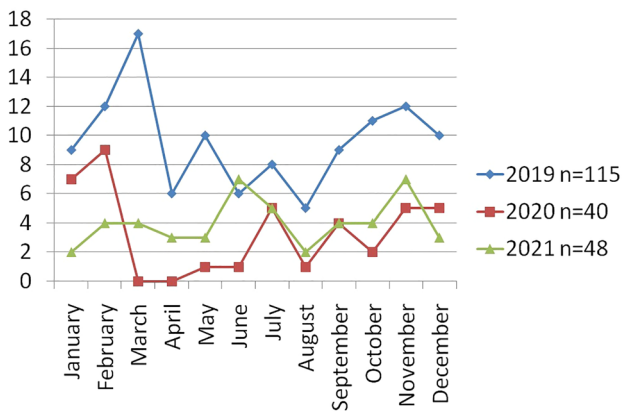


Fig. 1 Patients treated in 2019, 2020, and 2021 per month

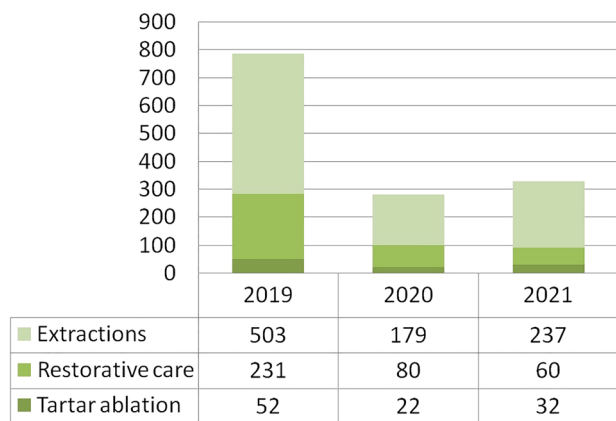


Fig. 2 Surgical treatments performed on 115 patients in 2019, on 40 patients in 2020, and on 48 patients in 2021

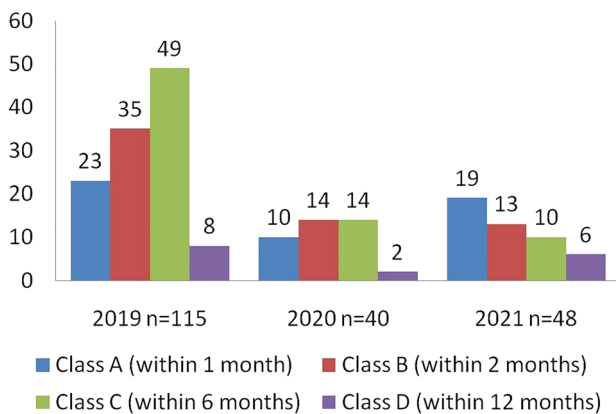


Fig. 3 Class of priority assigned to the patients treated in 2019, 2020, and 2021

When the hospitalisation process was considered, before the pandemic all the patients with the need of dental procedure under GA were routinely admitted to hospital the

day before surgery with one of their parents, and performed blood tests, anaesthesia visit, and electrocardiogram (ECG). They underwent the surgical procedure the day after admission and were discharged after 8 h of observation. Surgery took place twice a week.

After the lockdown in 2020, the surgical activity under GA was performed once a week, and a new protocol was adopted to guarantee the safety of patients and their parents. During the hospital stay, all patients were accompanied by one parent only, and they underwent a PCR Covid-19 molecular swab 48 h before the pre-admission, followed by a rigorous fiduciary isolation at home. If the swab was negative, patients were pre-hospitalised the day before surgery during which blood tests, ECG and anaesthetic visit were performed. After those exams they were discharged following a rigorous fiduciary isolation at home and readmitted the day after for surgery. The surgical procedure took place in the same day of the admission, followed by 8 h of observations in the paediatric ward and discharge. None of the patients or parents tested positive for pre-admission swab. None of the 24 patients treated in the post lockdown period and their caregivers developed any Covid-19 infection in the hospital or experienced any symptoms within 14 days of discharge. None of the patients treated in 2021 nor their caregivers developed Covid-19 infections attributable to their hospitalisation for dental treatments. The Unit of Pediatric Oral and Maxillofacial Surgery consists of 1 Maxillofacial surgeon, 1 Otolaryngologist, and 2 Dentists, and none of them developed Covid-19 infection between May 2020 and December 2021. None of the Anaesthetist staff, operating room staff, and department staff experienced any Covid-19 infection correlated with nosocomial contagion in the period between May 2020 and the end of December 2021, as confirmed by the negative molecular swabs routinely performed every 3 weeks.

The activity of the outpatient clinic had a 26% reduction between 2019 and 2020 going from 364 to 270 visits, respectively. In 2019, visits were usually performed once a week. During the lockdown (March–April 2020) the outpatient clinic dedicated to paediatric special needs patients and dental problems was suspended. Starting from May 2020 the visits were distributed over 2 days per week to reduce the risk of gatherings and to allow the sanitation of the room between one visit and another. From May to December 2020, 210 visits were performed, guaranteeing a service similar to that offered in 2019 for the same period (238 visits), with a reduction in November and December due to the second wave. In 2021 the outpatient activity gradually returned to pre-covid standards with 362 visits performed over 2 days per week to reduce crowding in the waiting room. Figure 4 shows the visits performed in 2019, 2020 and 2021. Despite the suspension during the lockdown, no changes were observed in the number of urgent visits in Accident and

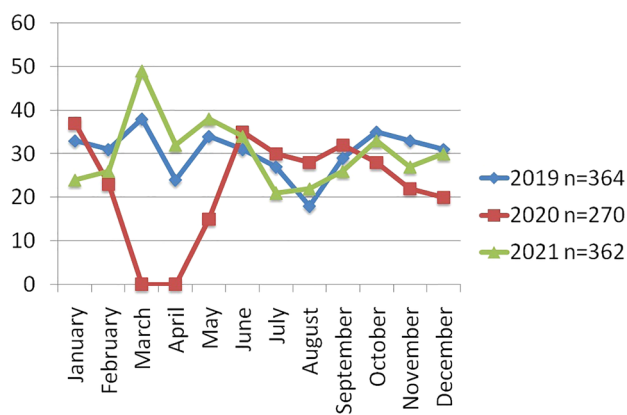


Fig. 4 Outpatient clinic activities during 2019, 2020, and 2021

Emergency room between 2019, 2020 and 2021 (5 visits in 2019 vs 6 visits in 2020 vs 6 visits in 2021).

Discussion

In the last year, after the Covid-19 outbreak, various recommendations were put in place in Pediatric Dentistry including prioritising procedures, together with suggestions for safety of treatments to reduce the possibility of infection of Covid-19 among health care providers, patients and parents (Luzzi et al. 2021; Sales et al. 2021; Acharya et al. 2020). Despite being part of the vulnerable population, children with special needs were not a focus of discussion during the pandemic and their health care was heavily penalised in various aspects (Houtrow et al. 2020). The same scientific community has paid little attention to paediatric special needs patients presenting with dental problems, offering limited recommendations (Al-Halabi et al. 2020). To the best of our knowledge this is the first article that analyses the impact of Covid-19 pandemic on this fragile population with oral health needs. The worldwide reduction in paediatric care was linked both to the closure of services due to pandemic-related redistribution and to the reticence of family members and caregivers of paediatric patients with disabilities for the fear of exposure to coronavirus in hospital (Lazzerini et al. 2020). The pandemic caused a persistent decrease in Maxillofacial clinical activity throughout Italy, especially in the period of the lockdown, with reductions in the average national surgical (78%) and outpatient clinic activities (87%) (Allevi et al. 2020). In our study, we observed higher trends during the lockdown period with no surgical activity or scheduled visits performed at all. Despite this, we have not observed any increase in access to the emergency room either during the lockdown or post lockdown period compared to 2019. As other paediatric Hospital in Lombardy (Pelizzo et al. 2020) during the post lockdown period, a wide

reorganisation took place and surgical activities on children with special needs resumed with a reduction of 60% compared to the same period in 2019. However, in our practice, the reduction in surgical activity did not generate considerable delays in waiting times compared to scheduled interventions: the mean delay time in 2019 was 1.0 month and 2.1 months for 2020 while approaching the pre-covid period in 2021 with an average delay of 1.1 months. This trend seems to be in line with the wishes and suggestions invoked by various authors on the medical assistance of children with frailty during and after the lockdown that should be considered essential (Luo et al. 2021). However, it is important to note that the majority of 2021 patients were class A priority with an opposite trend compared to previous years in which class B and C were the majority. The data could be linked to the treatment delays accumulated in 2020 or to the fears of families of going to the hospital for check-ups with consequent deterioration and worsening of the oral condition of paediatric patients with special needs requiring more urgent treatments.

No children or relatives in the study cohort had a positive swab before hospitalisation nor developed any Covid-19-related symptoms during or after hospital stay: these findings appear to be in line with the hypothesis that children are not at higher risk of carrying SARS-CoV-2 asymptomatically compared to adults (Milani et al. 2021). The healthcare staff involved in the care of these patients was tested for Covid-19 with swab every 3 weeks, and none developed Covid-19 infection. These data are relevant if compared to a recent study conducted in the same institution, where 22% (535/2404) of healthcare workers in Brescia were tested positive for SARS CoV-2 (Boffetta et al. 2021). The result obtained has several explanations: first, the use of personal protection equipment (PPE) by the medical personnel; second, the compliance with the recommendations to avoid rotating instruments during dental treatments (Bardellini et al. 2020); and finally, the limited risk of exposure while performing surgical procedures under GA (Ferrazzano et al. 2020). The result was also achieved, thanks to the adherence to the fiduciary quarantine of patients and parents before admission and it is probably secondary to the reduced exposure to society of children with special needs (Faccioli et al. 2021). As described by Ustun (Ustun et al. 2021), we observed a consistent reduction in outpatient clinic activity during the lockdown comparing 2020–2019 which, however, did not produce changes in access to paediatric emergency rooms. Thanks to the safety standards adopted according to the literature (Mascarenhas et al. 2021) and the distribution of visits over two days instead of one, there were no cases of Covid-19 infection in the health workers involved. The screening of patients and relatives who reached the outpatient clinic was carried out through the measurement of

the temperature, through a questionnaire about any covid-related symptoms presented in the previous days or contact with positive patients. All patients and relatives were required to wear a mask and wash their hands before the visit.

One of the limitations of the current study is that it was difficult to quantify the clinical impact of missed or delayed treatments by evaluating the access to the emergency room only. In case of dental pain or infections, parents of paediatric patients with special needs during the lockdown may have contacted by telephone the family paediatrician or private dentist for any urgent oral/dental related problems, as described by other authors (Ilyas et al. 2021). However, the poor cooperation often observed in children makes the remote diagnosis of dental pain or infections challenging even with the help of teledentistry (Kumar Mallineni et al. 2021; Saccomanno et al. 2020). Finally, any dental procedure on these patients requires GA, and the diagnosis is often possible only intraoperatively due to poor compliance. For all these reasons, alongside the management of severe SARS-CoV-2 cases, healthcare for children with special needs should be considered essential (Fung and Ricci 2020).

Conclusions

The Covid-19 pandemic had a major impact on the oral care of patients with special needs. The post lockdown reorganisation and the adoption of rigorous safety protocols allowed the resumption of hospital activities in safety without evidence of contagion among paediatric patients, relatives, and healthcare workers.

Author contributions KT and CP conceived the ideas; CP, MCDG, and GG collected the data; MR and DB analysed the data; and KT, CC and CP led the writing. All authors read and approved the final version of the manuscript.

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Data availability Data are available at ASST Spedali Civili of Brescia.

Declarations

Conflict of interest The authors have no relevant financial or non-financial interests to disclose. The authors have no conflicts of interest to declare that are relevant to the content of this article. All authors certify that they have no affiliations with or involvement in any organisation or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript. The authors have no financial or proprietary interests in any material discussed in this article.

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