

HOW A PEDIATRIC NEURO-ONCOLOGY UNIT WAS MANAGED IN MADRID DURING THE FIRST WAVE OF THE COVID-19 PANDEMIC

Rocio Vila¹, Felisa Vázquez-Gómez², Victoria Fioravanti², Miriam García-Fernández², and ALVARO LASSALETTA³

¹Hospital Infantil Universitario Niño Jesús

²Hospital Infantil Universitario Nino Jesus

³Hospital Niño Jesus

March 07, 2024

Abstract

During first wave of the COVID pandemic, infection prevention measures were enforced at our Pediatric Neuro-Oncology unit. A retrospective study analysing patients booked in this unit during lockdown was performed to describe its performance. There were 438 consultations for 123 patients (320 on-site/118 telephone). Eight new diagnoses, with one significant delay. Only one patient tested positive for SARS-COV2. Delay in imaging testing occurred in 15 patients. Chemotherapy was delayed in one case and not in radiotherapy. Measures implemented were effective in minimizing the risk of COVID-19 infection, achieving continuity in diagnoses and treatment and avoiding delays that could impact survival.

INTRODUCTION

Since the World Health Organization declared the COVID-19 pandemic on March 11, 2020, there have been more than eight and a half million documented infections and nearly half a million deaths in the first wave (as of June 21, 2020)⁽¹⁾. In Spain, state of alarm was declared and during lockdown (March-June 2020) the containment measures imposed were unprecedented. Mobility restriction and the overload of the health system forced the postponement or cancellation of many non-urgent health processes.

In the setting of Pediatric Neuro-Oncology, continued patient care is essential as the delay in diagnosis or treatment of these patients can result in an increase in morbidity and mortality. Furthermore, oncology patients on active treatment were considered at greater risk to both acquisition of infection and development of complications from COVID-19. Accordingly, during the first wave of the pandemic, hospital processes were adapted to guarantee healthcare in optimal safety conditions.

In the Neuro-Oncology Unit at Hospital Niño Jesus, approximately 40-50 new patients are diagnosed every year. Once state of alarm was declared, in order to reduce the exposure to the virus, the following measures were enforced: restriction of one parent per patient, facial mask, social distancing, hand hygiene and systematic PCR testing for COVID-19 of patients who required admission. In-person visits were reduced to a minimum and replaced by telephone consultations when necessary. These measures have been advised in the literature ⁽²⁾.

METHODS

We present a retrospective descriptive study analysing the clinical records of patients booked in this unit during lockdown to describe its performance. This study has been approved by a research ethics committee.

Patient epidemiological and clinical variables were collected, including the type of visit and the presence of delays in diagnosis and treatment. Quantitative variables were expressed as median and range and qualitative variables as percentages. Statistical analyses were performed using SPSS version 21.0.

RESULTS

During the study period, there were 438 consultations for 123 patients. The median age was 10.93 years (range, 1.58-22.24 years). Sixty-four patients (52%) had finished treatment by March 2020, with a median follow-up of 2.17 years (range, 0.15-13.9 years). The most frequent cancer type was low grade gliomas. Patient's characteristics are shown in **table 1**.

The unit also offered care to oncology patients from other hospital in Madrid that was fully dedicated to adult COVID-19 patients. There was a total of 8 newly diagnosed brain tumours. One patient suffered delay in diagnosis.

From all consultations, 320 were on-site and 118 were by telephone. Only one patient diagnosed with a craniopharyngioma was positive for SARS-CoV-2. PCR testing performed prior to hospital admission was negative in 100% of the 29 patients tested. Only one patient had contact with a confirmed case and did not develop infection (**Table 1**).

Delay in treatment and imaging schedules is widely described during the pandemic ⁽³⁾. In our study, there was a delay in imaging tests in 15 patients, with a median time of 49 days (range, 5 -215 days). In one patient diagnosed with medulloblastoma, magnetic resonance imaging (MRI) was delayed by a month and was diagnosed with a relapse at that time.

Of all patients receiving chemotherapy (47 patients) treatment administration was only delayed in one case. A patient included in a clinical trial could not receive treatment at our institution, but was referred to his local hospital for treatment administration on time. No delays were identified in patients treated with radiotherapy (9 patients).

DISCUSSION

COVID-19 pandemic has changed life as we knew. This pandemic has brought overwhelmed health care systems, leading to resource optimization, postponing non-urgent processes, relocating staff or promoting telemedicine.

Pediatric oncology patients, including neuro-oncology patients, have been in an extremely vulnerable situation during this period. It is well known that delays in diagnosis can result in more advanced disease stage, and delays or interruption in treatment can result in treatment failure or tumor relapsed ⁽³⁾. This is in addition to a highly risk of acquiring infection in hospitals and developing complications due to immunosuppression.

Although there have been publications about impact of COVID-19 in pediatric oncology patients, there is few available data about children with brain tumors. Most of them measure its impact by surveying centres about administration during COVID-19 pandemic or describe small case series of delays in diagnostics. This is why we share our experience in order to help other Pediatric Neuro-Oncology units, especially in countries with limited resources.

These vulnerability and impact of COVID-19 in children with cancer has concerned oncology units, which have adopted several preventive measures to keep patients assistance safely ⁽²⁾⁽⁴⁾⁽⁵⁾. One of them has been telemedicine, in order to keep in touch with patients who could not attend the hospital. In our experience, many parents preferred to in-person visits, even when a telephone consultation was offered instead. Despite having more on-site visits than strictly necessary, following all the preventive measures, this did not result in an increase in COVID-19 infection among our clinic cohort.

The incidence of COVID-19 during first wave of pandemic in our unit has been low (0,8%), comparing to literature⁽⁴⁾. Only one patient had SARS-CoV-2 confirmed infection. This patient was tested while in intensive care unit, and did not have any symptoms of COVID-19 or known positive contact. There was

only one confirmed contact (0,8%), who did not developed infection. In our perception, most of parents were conscious and aware of risk of COVID-19.

Delayed referral of pediatric brain tumors has been well documented during first wave⁽⁶⁾. In our cohort only one patient was diagnosed later due to a several months gap between symptom onset and medical consultation due to home lockdown measures.

The unprecedented situation of shortage of beds, lack of ventilators, medication, blood products and staff, delays in treatments such as chemotherapy and radiotherapy, and delays in imaging and surgery, has been described all around the world ⁽³⁾⁽⁷⁾⁽⁸⁾⁽⁹⁾. Although International Societies recommend that planned diagnosis and treatment of children with cancer should continue with as few modifications as necessary ⁽²⁾.

In our unit, it was more frequent to postpone imaging than radiotherapy or chemotherapy. Surgery has not been analysed, as well as shortage of medication or blood products.

Comparing to other countries like the POEM group survey including 34 centres, there were delay in chemotherapy in 10 centers (29%) and in radiotherapy in 16 centers (47%)⁽³⁾. Comparing to patients in Latin America, in a survey of 553 patients corresponding to 20 centers, there were a delay or modification in chemotherapy in 36% cases and in 33% of radiotherapy treatments ⁽⁹⁾. There is less data about imaging test, which is important, especially MRI, in patients with brain tumors, both in diagnostic and follow-up.

These comparisons are difficult due to the differences between countries and socio-economic situations. Our unit is also located in a pediatric hospital which has not attended adults, without shortage of critical care beds.

CONCLUSION

We can conclude that the measures implemented in the Pediatric Neuro-Oncology Unit during the lockdown in Spain were effective in minimizing the risk of COVID-19 infection. These measures allowed for continuity in the diagnosis and treatment of children and adolescents with brain tumors, avoiding delays that could impact their survival, as recommended by the Pediatric Oncology Societies ⁽³⁾and without a significant exposure to COVID-19 infection.

DECLARATIONS

- **Acknowledgments of research support for the study:** None
- **Conflict of Interest:** None
- **Availability of data and material:** the manuscript has no associated data

All authors have participated in the design, data collection and writing of the manuscript.

This study has been approved by Hospital Niño Jesus research ethics committee, with appropriate consents.

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