



The COVID-19 era and pediatric procedural sedation: A consecutive case series with an emphasis on preparation, precautions, and risk reduction

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The COVID-19 pandemic challenged healthcare systems to balance high standards of care with patients' needs and healthcare workers' safety.¹ Pediatric sedation poses multiple potential contagion risks: aerosol-generating procedures such as bag-valve-mask ventilation and oro-pharyngeal suctioning,² close proximity of the sedationist to the patient's airway, the need for airway manipulation or insertion of airway devices, and the risk of patient vomiting and coughing. Although COVID risk mitigation to providers is achieved for elective procedures that allow for pre-sedation COVID-19 testing, it is important to recognize that there are still false negatives, with sensitivity cited to be as low as 73.3%.³ For this reason, thoughtful consideration should be directed to means of lowering the healthcare providers' risk of COVID-19 exposure during pediatric procedural sedation.

This manuscript will detail practice changes instituted to mitigate exposure risk and evaluate the implementation and outcomes. The study was approved by the IRB and conducted at a Children Hospital in Trieste, in the Friuli Venezia Giulia region, serving an area of 250.000 inhabitants. As of 15th August, out of 1.250.000 inhabitants of the region, COVID-related hospital admissions and deaths, according to the Istituto Superiore Sanità, were respectively 2967 and 348.

We consecutively registered all sedation procedures performed outside the OR, and all staff' swabs performed from the first days of March up to 15th August 2020.

The earliest initiative was a widespread surveillance measure that started at the beginning of Italy's lockdown, of the first week of March 2020. Our hospital started a periodical testing of all staff members with oro-pharyngeal and nasopharyngeal (both nostrils) swabs every 15 days. The COVID-19 detection was performed on the CFX96TM Real-Time PCR Detection System (Bio-Rad), using

TABLE 1 Data description

Total children sedated (N.)	213
Total procedural sedation performed (N.)	251
Bone marrow aspirations	63
Lumbar punctures with intrathecal drug injections	67
Endoscopies	70
MRIs	27
Other procedures	24
Drugs used for sedation (%)	
Intravenous propofol	52
Intravenous ketamine	15
Intranasal dexmedetomidine	8
Combination of drugs	25
Patient' swabs (N.)	
Negative	108
Positive	2
Not performed	143
Parent' swabs (N.)	
Negative	106
Positive	2
Not performed	143
Hospital staff tested (N.)	552
Total hospital staff' swabs (N.)	6223
Hospital staff' positive swabs (N.)	5

the NeoPlexTM COVID-19 Detection Kit (Genematrix) targeting the viral N and RdRp genes and the housekeeping gene of B-actin as internal control.

The second practice change was screening of patients and parents for COVID-related symptoms, contacts with positive patients, and travel history based on national recommendations. Those with possible symptoms and history, all oncologic patients and those patients and parents who will be admitted to hospital for inpatient stay, underwent COVID-19 swab testing. The third practice change with direct impact on pediatric sedation included preventive measures of hand hygiene, use of a face shield, eye protection and the donning of a n-95 mask, and gloves and gown by the sedation providers. Ancillary health providers and parents wore surgical masks.

Those patients with high suspicion (parent's positive swab, suggestive symptoms such as fever, cough, dyspnea, or Kawasaki like syndrome), or testing positive for COVID 19 were triaged to specific management with consideration to reducing contagion exposure. These procedures were performed in a negative-pressure isolation room, attendant staff numbers were minimized, and all who were present in the isolation room donned personal protective equipment which included n-99 mask, face shield, gloves, and gown.

All patients wore surgical masks until sedation was started, eventually replaced by an oxygen delivering face mask close to the mouth, facilitating ability to evaluate for clinical signs of hypoventilation or airway obstruction, and allowing for rapid airway management and oro-pharyngeal suctioning. For each patient, a bag-valve-mask with a bacterial/viral filter-Heat and Moisture Exchanger gauged to the patient's tidal volume was used. All patients were monitored according to the American Society of Anesthesiologists 2018 guidelines. Social distancing was maintained in both pre- and postprocedure areas between parents and care providers. Following the procedure, each room was disinfected and air exchange ensured.

During the study period, the sedation team consisted of five pediatricians, all experienced with pediatric sedation, and two pediatric anesthesiologists, available in close proximity for consultation or assistance. The procedures, medications administered, and COVID 19 testing results are presented in Table 1. Out of 552 health workers,

five doctors (<1%) tested positive, none of them working in the sedation unit.

Even though this study has the limit of a single-center experience based in a Children's Hospital, the precautions implemented can be applied to all areas of COVID risk. These five-month monitoring suggests that an institutional program of COVID-19 guidelines and procedures specific to procedural sedation can be implemented successfully and potentially reduce contagion risk to hospital staff, patients, and accompanying family member.

CONFLICT OF INTEREST

All authors declare no conflict of interest.

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