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Remote care guideline for pediatric patients with COVID-19

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Abstract: In China at the end of 2019 a new disease called SARS-CoV-2 was reported, multiple world centers responsible for public health including the Centers of Disease Control and Prevention (CDC) in Atlanta, United States and the World Health Organization (WHO) published different classifications according to each age group, giving great importance to the pediatric population, the comparative risk in adults/children, the importance of laboratory tests (polymerase chain reaction (PCR) and antibodies), and finally, treatments are discussed according to the case and the severity of the patients. Due to the high demand of patients and the collapse of health systems around the world and especially in Latin American countries where health systems are very fragile, technical tools such as ?Teleconsultation?, recommended by the WHO, are used. In this review article multiple clinical concepts of the disease in children, imaging, type of presentation of the disease including risk factors, hospitalization criteria and treatment are presented. Criteria for hospitalization and treatment. Biosecurity measures, isolation and medical supervision. And as a fundamental pillar of care, Telemedicine in the COVID-19 era.

Keywords: COVID-19, niños, pediatría.

Resumen: En China a finales del 2019 se puso en conocimiento esta nueva enfermedad denominada SARS-CoV-2, múltiples centros mundiales encargados de la salud pública entre ellos el Centers of Disease Control and Prevention (CDC) de Atlanta, Estados Unidos y la Organización Mundial de la Salud (OMS) publicaron diferentes clasificaciones acordes a cada grupo etáreo, dando mucha importancia a la población pediátrica, el riesgo comparativo en adultos/niños, la importancia de pruebas laboratoriales (prueba en cadena a la polimerasa (PCR) y anticuerpos), y finalmente, se discuten los tratamientos acorde al caso y la gravedad de los pacientes. Por la alta demanda de pacientes y el colapso de los sistemas de salud en todo el mundo y especialmente en los países de latinoamérica donde los sistemas de salud son muy frágiles se llega a recurrir de herramientas tecnológicas como la ?Teleconsulta?, recomendada por la OMS. En el presente artículo de revisión se plantea múltiples conceptos clínicos propios de la enfermedad en niños, imagenológicos, tipo de presentación de la enfermedad incluyendo factores de riesgo. Criterios de hospitalización y tratamiento. Medidas de bioseguridad, aislamiento y supervisión médica. Y como pilar fundamental de atención la Telemedicina en la era COVID-19.

Palabras clave: COVID-19, niños, pediatría.

After China published its epidemiological data and confirmed with epidemiological experience from the European continent and the United States, they showed that the paediatric population is the least affected by SARS-CoV-2 (COVID-19 as the term is now referred to; given the popularity of the term) compared to the adult group.

In data from the Center for Disease Control and Prevention (CDC; Atlanta, Georgia - United States) infants appear to be the most likely to be hospitalised, although admissions to intensive care wards appear to be significantly different. For example, at Wuhan Children's Hospital 171 children (1 day-15 years) infected with COVID-19 were described, in which the most common symptoms were: cough with a predominance of (48 %) of the admitted cases, pharyngitis (46.2 %), and fever (41.5 %). Other associated but less common symptoms were: diarrhoea, rhinorrhoea and nasal congestion in less than 10 % of cases. Tachypnoea in 28.7% of those hospitalised and hypoxaemia (oxygen saturation at pulse oximetry of <92% at sea level) in only 2.3% of children. The most common radiological finding was bilateral ground-glass opacity in 1/3 of the cases. And as a detail to mention so far deaths are rare in COVID-19 children, but there are some reported cases ^{1,20}.

In another epidemiological report (Dong Y, Mo X, Hu Y. et al. (2020)). There were 2,134 children with suspected or positive reactive test for COVID-19, of the 731 children confirmed by polymerase chain reaction (PCR), 94 (12.9%) were asymptomatic cases, 315 (43.1%) were mild cases, and 300 (41%) were moderate cases, accounting for 97% of the confirmed cases. Severe cases were 2.5% and 0.6% as critical cases ^{1,2}.

In another study of 36 children with COVID-19 in China, they found that about half of the cases were asymptomatic or had only mild acute upper respiratory symptoms and the other half had moderate pneumonia.

We cannot forget and be alert to the possibility of co-infection with other respiratory viruses such as influenza and respiratory syncytial virus (RSV). Available data on the severity of COVID-19 in children with comorbidities are scarce, which limits the possibility of identifying conditions with a higher risk of complications and mortality ³.

Clinical and laboratory markers that are determinants of disease severity are being investigated. In preliminary results ^{4, 5}, most adult patients, respiratory distress and associated lymphopenia were responsible for increased cytokine levels (particularly IL-6, IL-10 and tumour necrosis factor (TNF)), associated increased D-dimer values over time and decreased interferon (IFN) expression in CD4(+) T-cells are associated with severe COVID-19 ^{3, 21}.

Possibly the lower risk in paediatric patients presenting (severe forms) of COVID-19 compared to older age groups remains unclear and several hypotheses have been put forward to explain this phenomenon. Adults would be more likely to develop unbalanced immune responses, leading to the development of a cytokine storm, often associated with lung damage and poor prognosis, as opposed to infants and children in whom

one would expect to observe differences in innate immunity and a more efficient T-cell response, capable of eliminating the virus ²¹.

The hypothesis on the reduced severity of COVID-19 may be related to the expression of angiotensin-converting enzyme 2 (ACE-2) in alveolar epithelial cells type I and II. ACE-2 was found to be the receptor for COVID-19, necessary for host cell entry and subsequent viral replication ^{6, 7, 17}.

Therefore, limited expression of ACE-2 in childhood, at a period of development when the lungs are still forming to their adult anatomical and physiological disposition, could protect children from severe forms of the disease. Interestingly, males have higher levels of ACE-2 compared to females, which could explain the higher severity rates in males, a trend also observed in studies in children when comparing childhood hospitalisation rates.

Data from the Asian country regarding the risk of intrauterine transmission showed no evidence of congenital infection to COVID-19 mothers. However, two recent studies have shown results that raise doubts: The first demonstrated the presence of IgM and IgG antibodies (Immunoglobulin M and G respectively) at birth of two newborns born to mothers with COVID-19, and the second case to be demonstrated described three newborns with early-onset COVID-19 infection ^{7, 17}.

It is important to note that none of the infants described in these two studies had virological evidence of COVID-19 infection, emphasising the need for more data before asserting that infection can be acquired in utero. Although it is not known at this time whether mothers with COVID-19 can transmit the disease through breast milk, we continue to encourage mothers to continue breastfeeding their infants. Mothers should follow simple biosecurity measures such as hand washing, use of gloves and face masks to avoid contamination and exposure.

Although asymptomatic or oligosymptomatic, infected infants and children may have a high localised viral load in the nasopharynx, in addition to faecal shedding of virus over longer periods. A study in "Shenzhen" ⁸ compared cases identified through symptomatic surveillance and contact tracing, showing that children were at the same risk of being infected as adults. All this evidence shows that children are susceptible to virus infection, often presenting with asymptomatic or mild forms of the disease, representing a substantial source of infection in the community, anticipating that they may play an important role in viral transmission. Robust epidemiological studies are urgently needed to clarify the uncertainties behind the exact role of children in disease transmission.

This information will be of great importance to help guide and modulate non-pharmaceutical interventions implemented to reduce the magnitude of the COVID-19 epidemic peak and lead to fewer overall cases, hospitalisations and deaths. These interventions, which include not only home isolation of suspected cases and quarantine of household contacts, but also population-wide social distancing, as well as school and university closures, face several impediments that needed to be

implemented in a timely manner. In places like Bolivia, we must recognise that these challenges are even greater, given the proportion of the population living in extreme poverty in large, densely populated cities.

The most important focus is to understand how COVID-19 emerged and was transmitted from one animal species to another from an early bat reservoir to zoonosis. Currently there are no antivirals as a specific treatment. Treatment in children is similar to that of adults; it develops in the «symptomatology» sphere, depending on oral or parenteral rehydration in the case of more severe situations, maintaining adequate levels of nutrition, mitigating the increase in temperature with antipyretics. In more complicated phases of the disease, supplementary oxygen and, in more complex cases, ventilatory support in the intensive care unit (ICU) ¹⁸.

Statistically there is a low number of severe cases in children, there are no specific and scientifically proven data on the safety and efficacy of the different therapeutics being tested in adults. For the time being, there are guidelines that recommend some antivirals, but these have not yet been 100% directly tested with COVID-19, and the vaccine will soon be a way to prevent the disease but not to treat it. The vaccine is still in the pipeline at multiple universities and laboratories around the world.

The first SARS-CoV epidemic was in 2002, as the cause of an outbreak of severe acute respiratory syndrome (SARS). With a special focus on older adults. Previous experience with vaccines against SARS-CoV (2002) and MERS-CoV (2012), the latter standing for Middle East Respiratory Syndrome, has paved the way and will facilitate the development of vaccines for the current pandemic. Until such a vaccine is available, we must focus on implementing timely and effective non-pharmaceutical interventions to reduce the burden of disease and protect the most vulnerable population, minimising the enormous social cost we are already facing, expanding health care capacity, providing sufficient protective equipment for health professionals, encouraging frequent hand washing and the use of strict masks. And similarly for the general population the mandatory use of masks ⁹.

This manuscript was written in May 2020, and as we are facing a «new» disease in which we learn something every day; perhaps these recommendations can be changed, modified and updated on an ongoing basis.

We are facing a totally new deadly disease, therefore, it is of vital importance to introduce this new modality of medical consultations through the new tool called «Telemedicine» which is recommended by the World Health Organisation to improve communication and access of patients with respiratory symptoms and various pathologies in a very close way to health professionals.

own elaboration

Literature review

General concepts

In recent studies, the paediatric population becomes ill at a lower rate than adults, and the degree of paediatric involvement is small. A review from January to March 2020 found that children accounted for 1-5% of diagnosed cases. Although surveillance definitions and testing criteria have changed over time ^{1-10, 19}.

As of 2 April 2020, 149,760 confirmed cases were confirmed in the US by the CDC (Center for Disease Control and Prevention Atlanta). Only 1.7% were in children under the age of 18. Of these, 90% were acquired through exposure in the home or community, 10% associated with travel ¹⁻¹⁰.

Clinical manifestations

Clinical symptoms are similar between children and adults, but fewer children than adults with documented infection report symptoms. It is milder in children, and a minority of children report critical cases.

In 2572 laboratory-confirmed cases in children under 18 years of age reported by the CDC (data as of 2 April 2020) the average age was 11 years, ranging from 0 to 17 years. In China, the average age of cases was 7 years, ranging from 0 to 17 years.

With respect to gender, boys were more affected than girls. ¹⁰

Fever and cough are the most common symptoms in children, from a case-control study in the USA 291 children studied: 56% had fever, 54% cough, 13% respiratory distress. At least one of these symptoms was present in 73% of the total. In younger infants there may be fever without focus and minimal respiratory symptoms ¹⁰⁻¹².

In another study of 1391 children evaluated in Wuhan Hospital, China, 171 (12%) had confirmed disease by ribonucleic acid (RNA) identification, 16% were asymptomatic, 19% with upper respiratory tract infection and 65% with pneumonia. Fever occurred at some point in approximately 42%; other symptoms were cough in 49% and pharyngeal congestion in 46% ¹⁰⁻¹².

Less common symptoms are fatigue, runny nose/congestion, diarrhoea and vomiting. Similar symptomatology has been reported in China and Italy. Some of the children had only gastrointestinal symptoms ¹⁰⁻¹².

There are also cutaneous findings, but they are infrequent. Maculopapular, urticarial and vesicular rashes. There are also so-called reddish-purple nodules on the distal portion of the phalanges, called COVID fingers. Similar to the appearance of chilblains.

Laboratory

Laboratory findings in children with confirmed infection in Wuhan were variable. White blood cell count $<5.5 \times 10^9$ (5500 / microL). And 3.5% lymphocyte count $<1.2 \times 10^9$. (1200 / microL). Elevated procalcitonin (> 46 pg / ml) in 64%. And elevated CRP (> 10 mg / L) in 20% ^{10, 19}.

Imaging

Chest radiographs may be inconclusive or demonstrate bilateral consolidation. In a series of children studied 171 with confirmed

infection, chest CT findings included bilateral ground-glass opacities 33%, local irregular ?shadowing? 19% and bilateral in 12%.

Radiological findings may be present before symptoms. In a study of eight children in Italy¹, lung ultrasound was performed with findings of subpleural consolidations and single or confluent B-lines.

Frequency of serious illness in children

Severe cases of COVID were reported, but most of them have mild or moderate asymptomatic disease and recover within 1-2 weeks.

In a series of 2,135 children¹ in China involving 728 laboratory-confirmed COVID-positive children. 55% were mild or asymptomatic cases, 40% moderate (cases with clinical or radiographic evidence of pneumonia without hypoxaemia), 5% severe (dyspnoea, central cyanosis and hypoxaemia). And less than 1% were critical (acute respiratory distress syndrome (ARDS), respiratory failure and shock)²².

Potential risk factors for serious illness

Younger infants (under 1 year) and children with underlying illnesses are at increased risk of severe disease. In a study¹ in the USA of 345 confirmed children, 23% had underlying conditions.

Among the most common underlying conditions reported were: chronic lung disease including moderate to severe asthma, cardiovascular disease, immunosuppression (cancer, chemotherapy, radiotherapy, haematopoietic cell transplantation, high doses of glucocorticoids, among others).

In a cross-sectional study¹ 48 children admitted to ICU (Intensive Care Unit) in the USA, 40 children had underlying infections. The most common were of medical complexity. Developmental delay and/or genetic abnormalities in 19 children, immune suppression or malignancy in 11, and obesity in 7.

The cytokine release syndrome is thought to be important in the pathogenesis of severe COVID infections. Another explanation is that viral interference in the respiratory tract of young children leads to a lower viral load. In addition, it is also considered that the COVID-19 receptor (ACE-2) may be differentially expressed in the respiratory tract of children.

How often do children with covid require hospitalisation?

A minimal number in the paediatric population, and very few ever require ICU. In the USA among 2572 laboratory-confirmed cases in children under 18 years of age by the Atlanta CDC before 2 April 2020, the estimated hospitalisation rate ranged from 6 to 20% and the estimated ICU rate ranged from 0.58% to 2%. In another study⁽¹⁾ conducted in the Italian region of Lombardy only 4 out of 1 591 patients (less than 1 %) admitted to ICU were younger than 20 years. In another series 171 children in China with confirmed infection required intensive care and MV (mechanical ventilation) (all of them had coexisting conditions including hydronephrosis, leukaemia and intussusception)²².

- Outpatient test criteria

- The focus of the test varies according to the availability of the tests.

And given the various constraints (economic, trained human resources

as well as biochemical-pharmaceutical staff in the laboratories, etc.), we restrict them to:

- Children to evaluate COVID-19 as a possible aetiology in case of symptoms such as fever, persistent cough, respiratory distress, vomiting or diarrhoea. Immediate testing is performed if the child has the same, in addition to an underlying condition that may increase the risk of serious illness.
- Immediate testing is performed if the child has the same, in addition to an underlying condition that may increase the risk of serious illness.
- Immunocompromised condition (antineoplastic therapy recipients, recent haematopoietic cell transplant, organ transplant recipients, primary immunodeficiency, Human Immunodeficiency Virus ?HIV? infection with CD4 count below 15%).
- Chronic heart disease (cardiomyopathy, cyanotic congenital heart disease, single ventricle).
- Chronic lung disease (need for supplemental oxygenation, severe persistent asthma, non-invasive ventilation).
- Prematurity.
- Neuromuscular disease with impaired airway clearance Poorly controlled type 1 diabetes mellitus.
- Severe Obesity (Body Mass Index greater than or equal to 120% of the 95th percentile) Known exposure of a COVID-positive patient within the previous 14 days.
- Other respiratory pathogens should also be screened for: (Influenza, RSV, Mycoplasma pneumoniae)10.22.

Grupo	Age	Blood pressure	
		Systolic	Diastolic
Newborn	Birth - 6 weeks	70-100	/ 50-68
Infant	7 semana - 1 año	84-106	/ 56-70
Older infant	1 - 2 years	98-106	/ 58-70
Preschool	2 - 6 years	99-112	/ 64-70
School-age	6 -13 years	104-124	/ 64-66
Teenager	13 - 16 years	118-132	/ 70-82
Adult	16 years and older	110-140	/ 70-90

Table 2
Heart rate
own elaboration

Treatment

An assessment of severity should be made. For cases with mild or moderate disease: no need for supplemental oxygen. Severe illness: oxygen requirement from the start, ventilatory support (invasive or non-invasive). Critical illness: need for ICU for MV, risk of sepsis, multi-organ failure, rapidly worsening clinical course.

Hospital management.

Children with COVID and severe or critical lower respiratory tract disease usually require hospitalisation.

Provision of respiratory support (supplemental oxygen), ventilatory support. Because ventilatory status may change after a week of symptoms.

Provision of solution and electrolyte support. Provision of empirical antibiotics as indicated for community-acquired or healthcare-associated pneumonia. Subsequent antibiotics should be adjusted by culture and/or other microbiological tests. Bacterial co-infections may be rare. Viral co-infections are more common than bacterial co-infections according to Heimdal I, Moe N, Krokstad S, et al. Human coronavirus in hospitalised children with respiratory tract infections: a 9-year population-based study from Norway. *J Infect Dis.* 2019;219(8):1198-1206.

Cytokine release syndrome monitoring should also be done by monitoring BP (to detect hypotension), oxygen saturation (to detect hypoxaemia), C-reactive protein, D-dimer, ferritin, lactate dehydrogenase two to three times per week, and interleukin 6 (should be monitored twice per week if elevated at the beginning of the study) ¹⁰.

Application of drug therapy

Drug therapy should be reserved for children with confirmed infection if evidence is available.

Potential indications: the decision should be individualised according to disease severity, clinical course, and underlying conditions that may increase the risk of progression. For the choice of pharmacological agent:

Remdesivir:

Scientifically proven evidence for use in paediatrics is still lacking, it is preferred to other antiviral agents because emerging data from randomised comparative trials and case series in adult patients suggest that it may be beneficial and appears to be well tolerated. It is dosed according to weight:

v ≥ 3.5 kg to <40 kg: Intravenous (IV) loading dose of 5 mg/kg on day 1, followed by 2.5 mg/kg IV every 24 hours for 5 to 10 days (5 days for those with a rapid clinical response). v ≥ 40 kg: loading dose of 200 mg IV on day 1, followed by 100 mg IV every 24 hours for 5 to 10 days (5 days for those with a rapid clinical response) ¹⁰.

Remdesivir is a nucleotide analogue prodrug that inhibits RNA-dependent RNA polymerase and has activity against coronaviruses. In the US, the Food and Drug Administration (FDA) issued an emergency use authorisation. In patients with oxygen saturation less than or equal to 94% on air (FiO₂ 0.21), requirement for supplemental oxygen, mechanical ventilation. Adverse effects include: nausea, vomiting, elevated Glutamic oxaloacetic transaminase (GPT) and Glutamic pyruvic transaminase (GOT) and Aspartate aminotransferase (AST) as well as Alanine aminotransferase (ALT) ¹³.

Hydroxychloroquine and chloroquine:

Efficacy in the treatment of COVID is uncertain, hydroxychloroquine is used only in hospitalised patients in a clinical trial setting and is not licensed for prescription. Hydroxychloroquine without azithromycin is an alternative to remdesivir, but given the lack of proven benefits and potential risks. It is used ONLY IN CLINICAL TRIAL CONTEXT. Hydroxychloroquine should be avoided in children with underlying QTc-segment abnormalities and those requiring other drugs with

potential for serious drug interaction with hydroxychloroquine. The dosage depends on the weight:

v 13 mg/kg (maximum: 800 mg) orally, followed by 6.5 mg/kg (maximum: 400 mg) at 6, 24 and 48 hours after the initial dose (duration may be extended up to five days depending on the caso). v 6.5 mg/kg per dose (maximum: 400 mg per dose) orally twice daily on day 1, followed by 3.25 mg/kg (maximum: 200 mg/dose) orally twice daily for up to five days.

Hydroxychloroquine is thought to alter endosomal and lysosomal pH, inhibiting viral replication and spread. Its mechanism of antiviral effectiveness is uncertain. The FDA also issued an emergency use authorisation to allow use in hospitalised adolescents or adults. Studies of hydroxychloroquine were limited by small sample size and have included mainly adult patients. Because of its uncertain efficacy, in addition to its possible CARDIAC TOXICITY, chloroquine is avoided in combination with hydroxychloroquine and azithromycin.

Lopinavir and ritonavir

Not recommended for use due to lack of efficacy and unfavourable pharmacodynamics.

Adjuvant therapy

Decisions are made to use them for immune-mediated complications in case of severity of the disease. Immunomodulators (glucocorticoids, IL-6 inhibitors such as Tocilizumab), Interferon beta 1b, convalescent plasma from recovered patients, etc. are not used. Except in the context of a clinical trial (benefits and risks are uncertain). No data are available on the use of vitamin A. Vitamin A was used as an adjuvant in the treatment of measles because it has been associated with decreased morbidity and mortality from measles pneumonia. Vitamin A is thought to be associated with impaired humoral and cell-mediated immunity.

Outpatient management of children COVID-19

Children with suspected or confirmed COVID who have mild symptoms such as fever, cough, pharyngitis and others should generally be treated at home unless they have a chronic condition that increases the risk of disease severity.

Management focuses on prevention of transmission to others by isolation, monitoring for clinical deterioration. In France, a report¹ of a cluster of cases suggests the possibility that children do not transmit COVID as efficiently as other age groups¹⁶.

Monitoring clinical deterioration

Caregivers of children managed at home should be counselled about symptoms that may occur suddenly after about a week of symptoms and the need to reassess for severe respiratory failure, difficulty breathing (in infants: wheezing, central cyanosis, inability to breastfeed, etc.), chest pain or pressure, cyanosis, findings associated with shock (cold, clammy, mottled skin, confusion, difficulty waking, oliguria/anuria).

When to discontinue home isolation

The optimal duration of isolation is uncertain, the length of time a person remains infectious is uncertain, the duration of viral shedding is

variable. In a study⁽¹⁾ conducted at the Wuhan Children's Hospital in China, 110 children, the median duration of viral shedding was 15 days from onset of illness (interquartile range 11 to 20 days). The duration was longer in symptomatic children than in asymptomatic children (17 vs. 11 days)¹⁶.

Avoid self-medication without medical evaluation and judgment: hydroxychloroquine and other investigational agents should be used only under the supervision of a health care professional. Misuse of non-pharmaceutical forms of investigational agents (e.g. chloroquine phosphate used in home aquaria or ivermectin intended for animals)

CAN CAUSE SERIOUS TOXICITY AND EVEN DEATH.

Hygiene and social distancing

Prevention of transmission focuses on these two aspects. It is also recommended that the purchase of household items and/or food should be disinfected and cleaned with antiseptic agents, the use of face masks is mandatory if children need to leave the house, the use of gloves only if caring for sick people and/or if a thorough cleaning process of the home is being carried out, avoiding public transport and preferably using private transport¹⁸.

Preferably keep family members 2 metres apart (especially people over 65 or with associated illnesses), if separation is not possible, a face mask should be worn by the suspect or infected person. Complete separation to pets, separate rooms, bathrooms, avoid sharing personal items (pillows, blankets, utensils, cups, etc.). In addition, complete disinfection of surfaces is suggested^{14, 18}.

Monitoring and medical supervision appointments

The CDC and the American Academy of Paediatrics (AAP) encourage prioritisation of newborn care and vaccination of children up to 24 months of age. Disruption of immunisation services increases the risk of outbreaks of vaccine-preventable diseases.

It is also important to schedule home visits, telemedicine, office space, home visits, among others. For example, schedule visits to healthy children in the morning (weight control, growth, development and administration of vaccines, etc.) and illness visits in the afternoon (in case of symptoms compatible with COVID-19 or other symptoms compatible with another disease).

Use of fabric face masks

The CDC recommends that children over 2 years of age wear cloth face masks (masks or homemade bandanas) when in public places where social distancing is difficult to achieve. The same masks are not recommended for children younger than 2 years because of the risk of choking asfixia.¹⁸ Avoid exposure in playgrounds due to possible virus transmission in asymptomatic or pre-symptomatic individuals within the incubation period. A 2-metre separation from them should also be mandatory¹⁸.

Use of hand sanitiser - alcohol hand gel

It is preferable to wash hands with soap and water when available for hand hygiene, alcohol-based hand sanitiser is safe for use by

children, however, adult supervision is necessary to avoid ingestion and alcohol poisoning in children and its most characteristic symptoms (hypoglycaemia, confusion, vomiting, convulsions, bradypnoea (less than 8 breaths/minute) and irregular breathing, cyanosis or skin pallor, hypothermia, loss of consciousness, among others). Children under 6 years of age should also be supervised ¹⁸.

Another focus on children

Confinement

Home confinement can improve parent-child relationships, but it can also affect children's physical and mental health. They may be less physically active, spend time with electronic devices, eat a poorer quality diet. Mental health stressors include fear of infection, boredom and social isolation.

Adverse mental and physical health effects can be mitigated and parent-child relationships improved by modelling healthy parenting behaviours, involving children in family activities, promoting self-discipline and self-reliance skills, and having direct and developmentally appropriate conversations with children. For example, about the pandemic, effects, causes and how we can prevent disease.

Health workers should consider the potential for domestic violence and look for signs of parental stress, irritability, depression, among others. Social and psychological support should be offered. Look for coping strategies (breathing techniques, calling a friend or relative, recreational games, etc.).

Telemedicine application and approach

Objetives

Develop a telecommunication system with an association of health professionals aimed at patients with mild respiratory symptoms and in regular/good general condition without risk of exposure to hospital environments in order not to overload the health system. So that those who appear to have a serious clinical condition can be transferred to authorised hospitals and centres.

Definition of symptoms of COVID-19 in paediatrics: patient with odynophagia, rhinorrhoea, fever, diarrhoea, body spots (known as ? Sabañón? which are lesions on the feet mostly seen in ?cold? climates, this is related to COVID-19 which could be inflammation of blood vessels and/or micro thrombi lodged in the distal extremities causing a decrease in blood supply to the affected site), myalgia, cough and dyspnea.

Questions to be asked in the teleconsultation

Age How do you consider your child's condition: good general condition, fair or poor general condition? How long ago the symptoms started? Did you have a fever? (Measured with thermometer, number of times and for how many days). Very fast or shallow breathing (on video call), Observe central or peripheral cyanosis. Level of consciousness, irritability, confusion. Is there food refusal? Signs of dyspnea such as: intercostal retractions, nasal flaring, expiratory whining? Personal pathological history: Basic or major illnesses (asthma, heart disease or

immunosuppressed). Use of current medications or treatments, previous surgeries.

Outline of medical care

Virtual medical examination, where the host is the doctor who welcomes the patient (?Hello, my name is ... I ??am a doctor from the telemedicine team, and I am ready to help you?). Mobile phone in upright position with front camera activated, good lighting with patient preferably seated or lying down in front of guardian/caregiver in case of infant/infant voice call only. Observe breathing pattern for 30 seconds and multiply by 2, this will depend on age (Table 1). If there is variability in breathing, count by 60 seconds.

Observe shortness of breath. Clinical signs to observe:

Alterations of the respiratory system:

Difficulty in breathing. Snoring. Central cyanosis. Nasal flaring. Intercoastal retraction. Intercoastal and/or subcoastal retraction. Paradoxical movement of the abdomen (abdominal breathing). Bradypnoea/Tachypnoea, irregular breathing rhythm. Pulse oximetry saturation (if you have one at home) less than 90%. Facies of the patient, among other clinical findings to classify the degree of disease.

Decision-making

Low risk and good general condition without warning symptoms: advise on warning symptoms and discharge. Monitor changes. Intermediate risk (with associated risk factor) and good general condition: make a new follow-up contact in 48 hours. High risk and good general condition: new contact within 24 hours. Note: High-risk patient means a patient with actual or potential impairment of vital functions. Patients with signs of severity and fair/poor general condition: seek URGENT medical attention at the nearest hospital, preferably one that is suitable for patients with suspected COVID-19.

Signs of seriousness

Severity criteria in patients suspected of having COVID-19

Poor general condition or good general condition with risk factors
Fever > 3 days Shortness of breath on small and minimal exertion Signs of dehydration Altered respiratory frequency according to age (Table 1)

Age	Frequency
1 to 12 months	30 to 53 breaths per minute
1 to 2 years	22 to 37 breaths per minute
3 to 5 years	20 to 28 breaths per minute
School-Age	18 to 25 breaths per minute
Teenager	12 to 20 breaths per minute

Table 1
Respiratory frequency
own elaboration

Additional warning signs and symptoms:

Lack of appetite for breastfeeding or fluid intake Worsening of the clinical condition of the underlying disease(s) Changes in mental state such as confusion and lethargy Seizures

High-risk patients

A patient who presents one or more of the following conditions.

Cardiovascular disease Type 1 diabetes Chronic lung disease (e.g. asthma) Chronic renal failure Immunosuppressed: transplant recipients, history of recent chemotherapy, use of immunosuppressive dose of corticosteroid (>2 mg/kg or >20 mg/day for more than two weeks)

Autoimmune diseases

Influenza syndrome

A person who has fever of sudden onset, accompanied by cough or sore throat or shortness of breath, in the absence of another specific diagnosis. In children under 2 years of age, it is also considered as a case of influenza syndrome: sudden onset fever and high respiratory symptoms (cough, rhinorrhoea, nasal congestion, etc.) in the absence of another specific diagnosis.

Severe acute respiratory syndrome

A person of any age, with a case of influenza syndrome and showing the following signs of severity: Oxygen saturation (SpO₂) <95% without supplemental oxygen. Signs of respiratory distress or increased respiratory rate assessed according to age. In children, in addition to the above elements, note nasal flaring, central cyanosis, intercostal retractions, dehydration and lack of appetite. Deterioration of the clinical condition of the underlying disease. Hypotension (Table A).

Age	Frequency in wakefulness	Frequency sleeping
Newborn	100 a 205 Bpm/min	90 a 160 Bpm/min
1 to 12 months	100 a 180 Bpm/min	90 a 160 Bpm/min
1 to 2 Years	98 a 140 Bpm/min	80 a 120 Bpm/min
3 to 5 Years	80 a 120 Bpm/min	65 a 100 Bpm/min
School-age	75 a 118 Bpm/min	58 a 90 Bpm/min

Table A.

Vital signs, blood pressure section

own elaboration

Stratification of the severity of suspected cases should be performed in medical consultation as follows:

A. Mild cases. Those who can be monitored completely within the framework of the nearest clinics or health posts due to the lesser severity of the case, in any case also keep surveillance at home (as appropriate).

B. Severe cases. Those who are in a more complex situation and therefore require stabilisation and referral to referral/emergency centres/hospitals for prompt and immediate assessment.

In the medical consultation, after confirming the presence of an influenza syndrome, it is essential to stratify the severity of the case in order to quickly identify the suspicion of severe acute respiratory syndrome.

Therapeutic management

Mild cases: should be treated with non-pharmacological measures, e.g. rest, hydration, adequate nutrition, analgesics for 14 days from the date of symptom onset. Given the possibility of flu-like syndrome due to other viruses, such as influenza, the use of oseltamivir is indicated in cases of flu-like syndrome. Table 3 shows the dosage of oseltamivir ²³.

Pharmacological measures	Clinical measures
<ul style="list-style-type: none"> - Prescription of drugs for symptom control if there are no contraindications, with the possibility of intercalating antipyretic drugs in cases of difficult fever control. - Oral antipyretic: Paracetamol (200 mg/ml or 500 mg/capsule), every 4-6 hours or 6-8 hours depending on the frequency of fever or pain. - Children: 10-15 mg/kg/dose (maximum 5 doses per day) - Adults: 500-1000 mg/dose (max. 3mg/day) - Oseltamivir: The use of oseltamivir is recommended for INFLUENZA GRIPAL SYNDROME with risk of complications. This recommendation is independent of the patient's vaccination status. The drug should be initiated within 48 hours after the onset of symptoms. It is reinforced that it is necessary for the patient to seek medical help in cases of deterioration, even with the use of oseltamivir. - Note: Dosage should be adjusted in case of renal insufficiency. - Note 2: In complicated cases it can be used at any time of the disease. - Note 3: USE SHOULD ONLY BE CONSIDERED BY A PHYSICIAN. IT SHOULD NOT BE SOLD OVER-THE-COUNTER. - Adults: 75mg every 12 hours for 5 days. - Child over 1 year of age: 15 kg 30 mg, 12/12h, 5 days > 15 kg to 23 kg 45 mg, 12/12h, 5 days > 23 kg to 40 kg 60 mg, 12/12h, 5 days > 40 kg 75 mg, 12/12h, 5 days - Child under 1 year of age: <ul style="list-style-type: none"> 0 to 5 months 3 mg/kg, 12/12h, 5 days 6 to 11 months 3.5 mg/kg, 12/12h, 5 days 	<ul style="list-style-type: none"> - Home isolation for 14 days from the date of symptom onset - Review every 24 hours in people over 60 years of age and with risk comorbidities and every 48 hours in others, preferably by telephone. If necessary, perform face-to-face care, ideally at home. Maintain rest, balanced diet and good fluid supply. - Isolation from household contacts for 14 days

Table 3.
Therapeutic management
own elaboration

Severe cases: stabilisation and referral to referral centre or emergency centre. Cases classified as severe should be stabilised and referred to emergency or hospital services according to the organisation of the local Health Care Network.

Seek information from the Health Department of your municipality on emergency and/or hospital services that have been defined as Referral Centres for COVID-19 in your region. Referral will be the responsibility of the primary care team where the case classification occurred.

The need for priority reception of this citizen must be articulated in the local health network, guaranteeing adequate health transport ²³.

Patient isolation

Stay in an isolated, well-ventilated room. If it is not possible to isolate the patient in a single room, keep at least 1 metre away from the patient. Sleep in a separate bed (exception: breastfeeding mothers should continue breastfeeding with the use of a mask and hygienic measures such as constant hand washing). Limit patient movement around the house. Shared living areas (e.g. kitchen, bathroom, etc.) should be well ventilated. Use of masks all the time. If the patient does not tolerate staying for a long time, perform respiratory physiotherapy measures, inhalation therapy with bronchodilators and more frequently change the mask whenever it is wet or damaged. When going to the toilet or other mandatory and commonly used environments, the patient must wear a mask. Perform frequent hand hygiene with soap and water or alcohol gel, especially before eating or cooking and after using the toilet. Restricting visits to the patient. The patient is only allowed to leave the house in case of emergency.

Caregiver precautions

The caregiver should wear a mask and should not touch it when near the patient. If the mask is wet, it should be changed immediately.

After removing the mask, the caregiver should wash his/her hands. Hand hygiene should be performed whenever hands appear soiled, before/after patient contact, before/after toileting, before/after cooking and eating or whenever deemed necessary. Alcohol gel can be used when hands are dry and soapy water when hands are greasy or dirty. When washing hands with soap and water, the use of disposable paper towels is preferred. If this is not possible, a cloth towel is recommended and should be changed whenever it is wet ²³.

Discussion

Multiple systematic reviews of scientific articles published in medical journals were carried out, where a series of clinical epidemiological data were obtained with several results mentioned in the development of this paper.

No conflict of interest is declared.

Conclusion

Coronavirus disease 2019 (COVID-19) is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The understanding of COVID-19 is evolving further every day. The World Health Organisation (WHO) and the US Centers for Disease Control and Prevention (CDC) have issued interim guidance. Children of all ages can contract COVID-19, although they appear to be affected less frequently than adults.

COVID-19 in children is usually mild, although severe cases have been reported, including cases with hypotension and multisystem involvement. In case series of children with COVID-19, the most common symptoms are fever and cough. Other symptoms include shortness of breath, myalgia, rhinorrhoea, headache, nausea/vomiting, abdominal pain, diarrhoea, sore throat, fatigue and loss of smell or taste. Additional symptoms reported in adults include chills or chills. Laboratory data are usually normal, but may include leukopenia, lymphocytopenia, and increased procalcitonin or C-reactive protein. In imaging, chest X-rays may be inconclusive, CT scans have been shown to be more specific. There is differentiation according to the stage of disease presentation in each individual and potential risk factors for acquiring the disease. The treatment to be chosen is according to the degree of presentation of the disease, and the indication for hospitalisation of the patient and/or home management, where biosecurity and isolation measures will also be applied, as well as hygiene and social distancing. Telemedicine in this new pandemic era has become very important, as the digital connection between doctor and patient has enabled early identification of the disease and other pathologies, diagnosis, treatment and follow-up for a successful approach.

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