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INFLUENZA VIRUS INFECTION IN THE PEDIATRIC POPULATION: A LITERATURE REVIEW AND REPORT

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Abstract: Caused by Influenza A, B, C or D viruses, mainly during autumn and winter. In healthy children, it usually acts as an acute, self-limited and uncomplicated disease, and may have an unfavorable presentation in a group of children with risk factors. In pediatric patients, the main risk factors include age (under 5 years and especially under 2 years), residents in long-term institutions and comorbidities, which include asthma, chronic lung diseases, neurological, hematological, renal, metabolic, cardiac and immunosuppression status. The main and most effective form of disease prevention is immunization, which has become an important public health measure in the prevention of severe cases and deaths from Influenza, however, antiretroviral medications can also be used for prevention in a certain group of people in which the vaccine is contraindicated or may react with inadequate response. According to the Ministry of Health, Influenza infection can be classified into Gripal Syndrome (GS) and Severe Acute Respiratory Syndrome (SARS) and has a national surveillance network whose main objective is to create an epidemiological profile, with identification of the virus. and creation of a flowchart, important in decision-making, with timely treatment and quality care for patients with SARS. Since the flu is a seasonal disease, with new cases expected annually, the correct diagnosis and identification of SARS, with early intervention, is fundamental for the reduction of morbidity and mortality due to Influenza, mainly in children, with adequate classification and treatment, the main points addressed in this study.
Keywords: Influenza; pediatrics; treatment; classification.

INTRODUCTION

The H1N1 flu is an illness caused by a mutation of the flu virus. Also known as type A influenza or swine flu, it became known when it affected a large part of the world's population between 2009 and 2010 (Fernandes Figueira National Institute for Women, Children and Adolescents' Health (IFF/Fiocruz). "Considering- If cases of major epidemics occur, the next pandemics may occur between 2008 and 2018 (ALONSO et al., 2007). This way, information from the past is the basis for understanding what will come in the future."

The word influenza is of Italian origin, first used in 1733 by Gagliarde, meaning "influence", disasters from heaven. Hippocrates described the first known influenza epidemic in 412 BC, and numerous epidemics occurred in the Middle Ages. Influenza epidemics have been tabulated by Hirsch since 11731. The history of influenza and epidemiological data on its morbidity and mortality show its importance over the centuries (TONIDO, 2001).

Influenza A virus was isolated in 1933 by Wilson Smith and his collaborators Christopher Andrews and Patrick Laidlaw (FORLEO et al., 2003). The influenza B virus was isolated in 1939 by Francis and the influenza C virus by Taylor in 1950. In the 20th century, three major influenza pandemics were recorded: 1918, 1957-58 and 1967-68 (Ministry of Health 2019).

In Brazil, the epidemic began in September 1918, after sick sailors disembarked in Recife, coming from Dakar. From the capital of Pernambuco, it spread to other states, following the coastal region of the country, reaching approximately 65% of the population, with an estimated 35,240 deaths (FILHO et al., 2001).

In 1947, the World Health Organization (WHO) developed an epidemiological surveillance system for influenza on all continents. Still, other pandemic outbreaks have occurred. The 1957-58 influenza pandemic, also known as the "Asian Flu", was responsible for approximately one

million deaths worldwide. It was caused by the virus A/Singapore/1/57 (H2N2), with the emergence of Hemagglutinin and Neuraminidase different from all types that circulated previously (KAMPS et al., 2006; PICKERING et al., 2006).

In April 1957, the disease was registered in Hong Kong and Singapore, and later in Japan, Indonesia, the Philippines and Indochina. In May and June, the epidemic reached Madras, Mumbai and New Delhi. In some areas, 10% to 20% of the population was affected. The disease was characterized by a moderate condition and a small number of deaths, with greater repercussions in the elderly (CHENG; LEUNG, 2007).

The global concern was in relation to the increase in hospitalizations due to severe pneumonia, cases hospitalized in atypical age groups, deaths of young patients without previous comorbidities (Ministry of Health: 2019).

Children were considered one of the risk groups, due to the immaturity of the immune system, with a longer virus transmission time than adults9 and the occurrence of institutional outbreaks in day care centers and schools6. Little is known about how the circulation of the H1N1 influenza virus affects the child population, since there are few studies (Ministry of Health 2019).

Initial coping strategies for this global epidemic were based on containment measures through early identification, treatment and isolation of cases and following up on their close contacts (Ministry of Health 2019).

High treatment costs were reported due to the large number of hospitalizations and the need to close schools and commercial establishments (Ministry of Health 2019).

Respiratory physiotherapy in children has been successful in preventing and treating respiratory complications, with professional recognition as a member of the multidisciplinary team (Ministry of Health 2019). Among the objectives of physiotherapeutic assistance are to optimize the respiratory function; adequate respiratory support; prevent and treat pulmonary complications; maintain airway patency and favor weaning from oxygen therapy (Ministry of Health 2019)

CASE REPORT

PATIENT 1

I.S.R, female, 1 month and 11 days old, admitted with maternal report of hyaline coryza that started three days before, progressing to fever, cough and respiratory effort. On physical examination, she was tachypneic, respiratory auscultation with rude vesicular murmur, with diffuse creptations, snoring and sparse wheezing, with mild subcostal and intercostal indrawing. Chest X-ray showing rectification of costal arches, in addition to interstitial infiltrate and compromised cardiac contour on the right. Laboratory tests were requested and nebulization with 3% saline solution and fenoterol was started every 4 hours, Oseltamivir 12 mg every 12 hours, nasal lavage with 0.9% saline every 2 hours, headboard raised and respiratory isolation. On the second day of hospitalization, the infant evolved with hypoxemia, and oxygen therapy was started with oxyhood at a FiO2 of 50%, suspended after 1 day. The patient was discharged on the 6th day of hospitalization, after 5 days of oral oseltamivir, eupneic in room air, afebrile, with good breast acceptance.

PACIENT 2

HPA, male, 9 months and 10 days old, admitted with a history of productive cough, greenish rhinorrhea and measured fever (38°C) for approximately 24 hours, progressing to a decline in general condition and prostration on the day of admission. On physical examination, he was tachypneic,

respiratory auscultation with crackling rales on the right and expiratory wheezing, mild subcostal indrawing. Nebulization was started with fenoterol every 3 hours, Oseltamivir 25 mg every 12 hours, prednisolone 1 mg/kg/day, nasal lavage with 0.9% saline solution and continuous macronebulization with 10 liters of O2/minute. On the third day of hospitalization, the patient maintained tachypnea and hypoxemia, a new infectious screening was requested and antibiotic therapy with ampicillin 100 mg/kg/day was started due to radiological worsening. The patient remained hemodynamically stable, and oxygen therapy was suspended on the 5th day of hospitalization. He was discharged after seven days of hospitalization, afebrile, eupneic on room air, with good acceptance of the oral diet, with preserved physiological functions with prescription to complete antibiotic therapy at home.

DEVELOPMENT

The case reports were carried out with hospitalized patients with the clinical symptomatology of the disease. The predominant data collection technique was the clinical observation of the children, which included the analysis of symptoms, responses to drug treatment, transmission of the disease and/or performance of laboratory tests. It was highlighted that the epidemic reached the different scenarios and that the infected children required hospitalization.

REVIEW OF LITERATURE

SEASONALITY

The incidence of the disease shows a seasonal pattern in areas with a temperate climate, with well-defined peaks during the winter. In the Northern Hemisphere, the flu occurs in winter, from October to April of each year, but the peak of incidence usually occurs between December and March. In the Southern Hemisphere, influenza virus activity also occurs in autumn-winter, corresponding to the period from April to September. However, the reason for the seasonality of influenza and other respiratory viruses is still not well understood. Some authors suggest that the climate may have a direct influence on virus survival, transmission efficiency, host susceptibility, in addition to providing population agglomeration. On the other hand, in countries with a tropical climate, the epidemiology of the influenza virus is different, and it can occur at any time of the year, but epidemics tend to occur after changes in climate patterns, such as those related to the rainy season (Brazil, Ministry of Health, 2017).

STREAMING

In addition, the virus is highly contagious, transmitted from person to person through droplets or direct contact with objects recently contaminated by nasopharyngeal secretions. The patient is most infectious during the 24 hours before the onset of symptoms and during the most symptomatic period. The incubation period is usually 1 to 3 days, and several people become ill at the same time, especially in families with school-age children (CASTRO et al., 2010). Adults begin transmitting the virus 24 hours before the onset of symptoms, up to seven days later. Children are more contagious and transmit the virus from several days before to 10 days after the onset of symptoms (CASTRO et al., 2010).

It is between the months of May and August that influenza viruses – which cause the flu – usually circulate in the country. But in 2016, a subtype of that family started to wreak havoc earlier: H1N1. At the end of February, the Southeast region, especially the state of São Paulo, already had cases. According to the State Department of Health, until March 29,

372 episodes of infection with this virus and 55 deaths related to it were reported in São Paulo (KIM et al., 2011).

The reason for the anticipation of the outbreak is not yet clear. Even so, you need to be concerned – especially when it comes to the little ones. They are among the main targets for spreading and suffering the severe consequences of H1N1 and other influenza subtypes. "Children have a higher viral load, so they transmit the virus for longer", reveals infectologist and pediatrician Marco Aurélio Sáfadi, from Hospital Infantil Sabará, in São Paulo (WONG et al., 2013). In addition, short children are more susceptible to complications from the flu - especially those under 2 years of age. According to Gustavo Johanson, an infectologist at the Federal University of São Paulo (Unifesp), children's immune systems still cannot respond quickly to infection (WONG et al., 2013).

IMPACT ON THE CHILD

Children not only play an important role in the spread of the influenza epidemic. It is currently known that children younger than two years of age have morbidity similar to that observed in risk groups for severe influenza infection, characterized by a high rate of hospitalization, increased number of medical consultations and complications due to secondary infection (CAMPAGNA et al, 2014; YANO; TIYO, 2013). The morbidity of influenza virus infection in children in Brazil has not been systematically analyzed, however there are several published studies where this agent appears as a cause of acute respiratory infections in emergency care units in 2 to 22% of patients and as a cause of hospitalization in up to 13% of patients under five with pneumonia or bronchiolitis.

In Valença - RJ, two patients were hospitalized in August 2018, in the pediatrics of the Hospital Escola de Valença, with a confirmed diagnosis of Influenza (CAMPAGNA et al., 2014). Although the number of cases of children diagnosed/ suspected with H1N1 infection hospitalized at the Hospital Escola de Valença - RJ was relevant, in the investigated period, the relative frequency of cases of the disease with the exact number of patients attended by physiotherapy was impossible, due to several cases that were not notified.

Some studies (CÔRTE et al., (2017) show that fever, cough and rhinorrhea are the most frequent symptoms. Children younger than six months are more likely to have rhinorrhea (OR 2.03), while children between 6 and 24 months are more likely to have rhinorrhea. of hospitalization for wheezing and otitis media (OR 3.47). Another study (CÔRTE et al., (2017), which evaluated children with fever during influenza seasonality, showed that the triad cough, headache and pharyngitis have good sensitivity (80%) for diagnosis.

EPIDEMIOLOGY

Influenza virus infection has global distribution and high transmissibility. Influenza viruses are unique in their ability to cause recurrent annual epidemics and less frequently pandemics, reaching almost all age groups in a short period of time. This is possible due to its high genetic variability and adaptability. The fact that the viral genome is fragmented favors rearrangement phenomena between the different segments of two or more viruses that infect the same cell (EPIDEMIOL, 2016). Added to this is the RNA nature of the genome, which induces high mutation rates during the replication phase, especially in the genes encoding the viral surface glycoproteins, hemagglutinin (HA) and neuraminidase (NA). These mutations occur independently and usually cause the appearance of new viral variants against which the population does not yet have immunity, since previous

infection by a given strain confers little or no protection against more recently emerging viruses (Protocol for the Treatment of Influenza, 2017).

Influenza epidemics of varying severity have occurred systematically every 1 to 3 years, predominantly in winter. Influenza pandemics - which affect large numbers of the population - have occurred irregularly, usually 30 to 40 years apart (Influenza Treatment Protocol, 2017).

FLU SYMPTOMS

Flu symptoms are characterized by sudden onset of fever over 38º, chills, sore throat, runny nose, myalgia, severe headache, cough, weakness, general discomfort and, in some cases, nausea, vomiting, diarrhea and burning eyes, which persist for 7 to 10 days, and may cause inflammation of the upper respiratory tract (RASIA; LINO, 2014).

It usually occurs in winter outbreaks, affecting people of all ages, being more severe in children and the elderly. In elderly people who already have another primary disease, such as diabetes, heart disease, chronic lung disease, immunological disorders and others, they may have complications such as pneumonia due to bacterial superinfection of Streptococcus pneumoniae, Haemophilus Influenzae, Staphylococcus aureus. These infections usually cause an increase in hospitalizations of these elderly patients, causing high morbidity and mortality. Most deaths associated with Influenza refer to the age group of people over 60 years old (HANNOUN, 2013).

The age group has an influence on the risk of lethality due to Influenza. While it has a higher incidence of infections in young people, it has a more expressive incidence of lethality in the elderly and in immunosuppressed individuals, or who have chronic diseases or other serious clinical complications with bacterial infections (NEVE et al., 2014).

One of the most common complications caused by Influenza is pneumonia, along with some factors such as aging, nutritional deficiency, immunosuppression that can lead to and hinder the body's defense against viral infection (NEVE et al., 2014).

TRANSMISSIONS, PREVENTION AND TREATMENT

Influenza virus transmission occurs from person to person through direct or indirect contact. Direct transmission occurs through droplets, in the act of talking very close to the infected person, contact with mucous membranes, secretions, sneezing and coughing. An infected individual can transmit the virus 24 to 48 hours before symptoms appear (GOMES et al. 2013). During the symptomatic period, transmission occurs from 24 to 72 hours, starting to decrease on the fifth day of this period. Indirect transmission occurs through touching contaminated objects, surfaces followed by touching the eyes, nose and mouth (COSTA et al., 2016).

Prevention against flu or Influenza include vaccination with inactivated or live attenuated vaccines, or administration of antiviral drugs. The effectiveness of the flu vaccine is 70% to 90% in healthy young adults, and protection lasts for a few months, due to the great ability of the virus to mutate. For this reason, revaccination is annual. Already, antiviral drugs can be used as therapeutic and prophylactic. The use of antivirals to prevent the disease must be administered continuously in periods of flu outbreaks (COSTA et al., 2016).

VACCINE

In 1930, the influenza virus was first isolated from pigs, and in 1933 it was isolated from humans by Smith, Andrews, and Poidlaw who inoculated filtrate from human throat washes

into ferrets. This led to the development of the first flu vaccine, with a single type of virus, Influenza A, or monovalent vaccine. In 1942, the second flu vaccine was developed, a bivalent vaccine, after the discovery of another type of Influenza B virus. With the advancement of technology and new discoveries, it was possible to determine that the Influenza virus was mutating and new vaccines were developed, based on in viral types circulating in previous years (TREGONING et al., 2018).

Currently, there are 26 licensed inactivated vaccines for Influenza, 13 of which are manufactured for each season. Large pharmaceutical industries such as GSK, Sanofi, Pfizer and Abbott and smaller companies such as Protein Sciences, Mylan, Microgen, Sinovac, Seqirus (BALLALAI, 2013; VIEIRA, 2013).

Most vaccines are produced in embryonated eggs, by three manufacturing processes to inactivate the virus: whole virus, divided (by detergent), and subunits (hemagglutinin and neuraminidase) that are further purified, removing other viral proteins. In Brazil, the Butantan Institute manufactures trivalent Influenza vaccine (fragmented and inactivated), intended for the Ministry of Health, for flu vaccination campaigns (CARNEIRO et al., 2010).

FINAL CONSIDERATIONS

In view of the review carried out, it can be concluded that influenza A H1N1 is a public health problem that is assisted in primary care. The actions performed in health units must be carried out effectively with visits to avoid overcrowding of reference units and epidemics. And Nursing care is relevant in the context of influenza, as it ranges from prevention and vaccination, as well as early identification through signs and symptoms, and in suspected or confirmed cases, care is needed to isolate and spread the disease, specific care in the aggravation (SRAG) and care for the minimization of the user's symptoms.

Influenza is still a threat to global public health, causing thousands of deaths every year, and presenting a rapid form of dissemination, which makes vaccination strategies difficult. Epidemics occur because of viral antigenic variation, protection for these circulating strains, and the degree of virulence of these new viruses. Currently, two subtypes of the Influenza A virus, H1N1 and H3N2, are circulating in the world. Influenza vaccines are immunogenic and improve the immune response against the virus.

Improving the understanding of causality and pathogenesis is one of the challenges for future research, which must include, above all, the biology, immunobiology and immunopathology of vaccine-preventable diseases, with special attention to the analysis of the medium and long-term impact of different vaccination strategies, as well and its performance in terms of risk and benefit. It is believed that it was possible to survey some relevant aspects of the epidemiological profile of the disease. However, many aspects of the disease are contradictory or unknown, indicating the need for more studies with clinical and epidemiological approaches, which could contribute to subsidize the construction of policies to face the problem that involves the planet in its cultural, economic and diverse diversity. sanitary structure.

Thus, an increase in studies is suggested, including works with a qualitative approach, studies that reveal the circulation profile of the influenza A H1N1 virus, the behavior pattern of this disease, as well as the strategies to contain the propagation of the pathology. It is believed that research on actions aimed at qualifying and humanizing assistance to those affected by the disease and actions to prevent

it would also be important.

It is expected that the experience of experiencing the AH1N1 influenza pandemic in the city of Valença - RJ has sensitized society, including authorities and researchers to the importance of preventive measures, as well as to the need for investment in research and interventions in order to avoid the recurrence of new outbreaks of AH1N1 influenza.

Even with the occurrence of possible adverse events after the application of vaccines, such as what happened at the Hospital Escola de Valença - RJ, it is understood that the continuity and expansion of the NIP is of fundamental importance, since historically much has already evolved in the control and/or in the morbidity and mortality of vaccine-preventable diseases. Public policies need to be expanded, involving health professionals, regarding priority and interest in discussing possible adverse events from vaccines.

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ANNEXES

	Influenza A	Influenza B	Influenza C
Genetics	8 segments	8 segments	7 segments
Structure	11 proteins	11 proteins	9 proteins
Host	Humans, pigs, horses, birds, other marine and land mammals.	Humans, marine mammals	Humans and pigs
Genetic/Antigenic Evolution	Antigenic shift e drift	Antigenic drift	Antigenic drift
Epidemiological characteristics	Causes epidemics and can cause pandemics	It causes epidemics and does not cause pandemics.	No marked seasonality.

Table 1 - Differences between Influenza A, B and C

Fonte: Revista de Epidemiologia de São Paulo – SP – 2018

Age	Manifestation	Frequência
Less than 5 years	afebrile URTI feverish URTI Acute Otitis Media Pneumonia laryngotracheobronchitis bronchiolitis “Sepsis Like” paintings	+ +++ ++ + + + +
Over 5 years	afebrile URTI Flu syndrome (fever, cough, headache, myalgia, fatigue) Acute Otitis Media pneumonia myositis Myocarditis encephalopathy	+ +++ ++ + + Rare Rare
+++: Most common manifestations **++: Common manifestation** **+: Infrequent manifestation**		

Tabela 2 – Manifestação da Influenza em crianças

Source: Journal of epidemiology of São Paulo - SP - 2018