

ORIGINAL ARTICLE

Management of SARS-CoV-2-positive mothers and their offspring at the beginning of the COVID-19 pandemic

Abordagem de mães SARS-CoV-2 positivas e seus recém-nascidos no início da pandemia de COVID-19

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ABSTRACT

Introduction: The uncertainty in SARS-CoV-2 modes of transmission, particularly regarding vertical and peripartum transmission, led national and international organizations to recommend (although not unanimously) the separation of newborns and mothers.

Material and Methods: To characterize the management of offspring of confirmed/suspected SARS-CoV-2-positive mothers in the postpartum, an online questionnaire was sent to Portuguese Pediatric and Neonatology heads of department of the Portuguese National Health Service during April and May, 2020.

Results: Twenty-five out of forty-four questionnaires were retrieved and included in the study. Results showed that healthcare workers (HCWs) wore FFP2 masks and face shield/goggles in 88% of hospitals while assisting in the delivery of offspring of confirmed/suspected SARS-CoV-2-positive mothers. In 8% of hospitals, mothers were allowed to have a labor partner. Newborns were separated from their mothers in 56% of hospitals and were not breastfed in 68%. Five newborns (4%) tested positive for SARS-CoV-2 infection in a universe of 114 mothers with positive SARS-CoV-2 test. Newborn SARS-CoV-2 testing was performed with adequate swabs in 64% of hospitals, but the method employed varied among hospitals. Discharge criteria were also variable, with 45% of hospitals requiring a negative test result of the caregiver.

Conclusion: The use of personal protective equipment by HCPs during delivery of offspring of confirmed/suspected SARS-CoV-2-positive mothers complied with international recommendations. Although vertical transmission is a rare event, this study uncovered a 4% rate of SARS-CoV-2-positive newborns from positive mothers during the considered period. The development of national recommendations has the potential to avoid disparity of procedures among hospitals.

Keywords: COVID-19; newborn; pandemic; patient safety; SARS-CoV-2

RESUMO

Introdução: A incerteza relativa à transmissão vertical/peri-parto de SARS-CoV-2 levou entidades nacionais e internacionais a recomendar (embora não de forma consensual) a separação mãe-filho.

Material e Métodos: Caracterização da abordagem a recém-nascidos de mães com suspeita/confirmação de infecção por SARS-CoV-2, através da aplicação de um questionário online enviado aos diretores de serviço de Pediatria/Neonatologia do Serviço Nacional de Saúde Português durante os meses de abril e maio de 2020.

Resultados: Foram incluídos 25 de 44 questionários provenientes de Serviços de Pediatria e Neonatologia. Em 88% dos hospitais, os profissionais de saúde utilizaram máscaras FFP2 e viseira/óculos durante a assistência na sala de partos a recém-nascidos (RNs) de mães

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suspeitas de infeção por SARS-CoV-2. Em 8% dos hospitais, as parturientes puderam ter acompanhante durante o parto. Os RNs foram separados da mãe em 56% dos hospitais e não foram amamentados em 68%. Cinco RNs (4%) testaram positivo para SARS-CoV-2 num universo de 114 grávidas positivas para o vírus. A testagem do RN foi efetuada com zaragatoas adaptadas em 64% dos hospitais, embora com metodologias variáveis entre hospitais. Os critérios de alta também foram díspares entre instituições, com 45% dos hospitais a exigir teste negativo do cuidador.

Conclusões: A utilização de equipamento de proteção individual pelos profissionais de saúde na sala de partos durante a assistência a RNs de mães com suspeita de infeção por SARS-CoV-2 esteve de acordo com as normas internacionais. Apesar da raridade da transmissão vertical, foram identificados 4% de RNs de mães positivas para SARS-CoV-2 com teste positivo para o vírus durante o período de estudo. A elaboração de normas nacionais permitirá uma menor disparidade entre hospitais.

Palavras-chave: COVID-19; pandemia; recém-nascido; SARS-CoV-2; segurança do doente

INTRODUCTION

Neonatology has been a challenging area in the context of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), mainly due to the frailty of the newborn and mother and to the scarcity of evidence about the infection.⁽¹⁾ SARS-CoV-2 can be transmitted through respiratory droplets containing the virus and close contact to infected secretions.⁽²⁻⁵⁾ Airborne transmission is only partially understood, with doubts of whether it is a mode of viral transmission only during aerosol-generating procedures or represents a continuous risk.^(5,6) Cases of vertical transmission were assumed to be possible, with the first case of transplacental transmission described in March 2020 in a French newborn of an infected mother during the third pregnancy trimester.⁽⁷⁾ Transmission through breastfeeding was also suspected, with recommendations to avoid breastfeeding due to the risk of infection of the newborn through maternal milk at the beginning of pandemic.^(8,9) This risk of transmission of SARS-CoV-2 was considered to be present, not only in maternal milk, but also in the mother's skin and respiratory secretions. These were the reasons indicated to justify the adoption of restrictive measures (such as avoiding skin-to-skin contact and breastfeeding or keeping separated rooms for the mother and newborn) when the mother was suspected of SARS-CoV-2 infection, jeopardizing mother-infant bonding.⁽¹⁰⁾

Additionally, there was also few evidence about the adequate personal protective equipment that a HCW should use when assisting a newborn during delivery.^(5,11) Aerosol formation during airway management in neonatal resuscitation is documented, thus maximum protection is required.⁽⁵⁾

The aim of this study was to characterize the management of offspring of mothers with suspected or confirmed COVID-19 infection in post-partum in Neonatology and Pediatric Departments of the Portuguese National Health Service during April and May, 2020.

MATERIAL AND METHODS

A questionnaire was developed primarily to describe how national Pediatric Departments adjusted to the COVID-19 pandemic during its first months, i.e., in April and May 2020. The questionnaire contained unvalidated anonymous questions of short answer and multiple choice based on the national guidance available at the time. The questionnaire was sent online to 44 national hospitals with Pediatric and Neonatology Departments, to be answered by their heads of Department. Participants were informed of the study aims and the voluntary and anonymous nature of the questionnaire through e-mail, also receiving a link to the questionnaire. Consent for participation was assumed when an answered questionnaire was received.

Data retrieved comprised several aspects of the functioning of hospital departments and respective adjustments to the COVID-19 pandemic, but for study purposes, only questions regarding Neonatal care were considered, including the use of personal protective equipment by professionals in the delivery room and management of offspring of mothers with suspected/confirmed SARS-CoV-2 infection, including their place of hospital stay and need for treatment, testing procedures, feeding precautions, and discharge criteria.

Questionnaires received until June 30, 2020 were analyzed, and those with more than 50% of unanswered questions were excluded.

Data were presented as mean and standard deviation or median and 25th-75th percentiles, according to variables' distribution. Statistical analysis was performed using IBM SPSS® Statistics for Windows, Version 26.0.

RESULTS

A total of 25 valid questionnaires from hospitals with neonatal care were retrieved. Among 114 SARS-CoV-2-positive mothers, five

newborns were also positive (4%). The clinical presentation was not addressed. Newborns were tested with an appropriated pediatric swab in 64% of hospitals. The testing methodology consisted of an oral and nasal swab in both nostrils in 44% of centers, and of an oral and nasal swab in only one nostril in 32%.

In the delivery room, HCWs used face shield/goggles and respirator in 88% of hospitals, and a fluid-resistant gown in 72%.

The presence of a labor partner was allowed in two hospitals (8%), but in the majority (56%) the newborn was separated from the mother.

Considering only SARS-CoV-2-positive mothers, breastfeeding was

possible in 32% of hospitals (**Table 1**). Mothers expressed breast milk in 15 hospitals (60%), but it was not used and therefore wasted until the mother was free of infection in 47% and used to feed the newborn in 33%. In two hospitals (8%), mothers could choose between feeding or not the newborn with expressed breast milk.

As criteria for newborn discharge, 45% of Departments required a SARS-CoV-2-negative test of the father or caregiver, whereas 23% additionally required SARS-CoV-2-negativity of the mother. At the time of this study, cure of COVID-19 infection was assumed when an asymptomatic woman had two negative tests (with 24-hour interval).

Table 1 - Management of newborns from SARS-CoV-2-confirmed or -suspected mothers in Portuguese Neonatology Departments (n=25)

	n (%)	
Presence of the partner during delivery	2 (8%)	
Separation of newborn and mother after birth	14 (56%)	
Breastfeeding of the newborn	8 (32%)	
Use of expressed breast milk	15 (60%)	
Destination of expressed breast milk	Wasted until mother was cured	7 (47%)
	Used to feed the newborn (always)	5 (33%)
	Used to feed the newborn (according to maternal will)	2 (13%)
	NS	1 (7%)
Criteria for newborn discharge	SARS-CoV-2-negative father/caregiver	10 (45%)
	Cured mother*+ Negative father/caregiver	5 (23%)
	Asymptomatic mother	3 (14%)
	Cured mother*	3 (14%)
	Asymptomatic mother + Negative father/caregiver	1 (5%)

NS, not specified

Cure was considered when the mother was asymptomatic and had two negative tests with 24-hour interval.

DISCUSSION

During the delivery of newborns of suspected or confirmed SARS-CoV-2-positive mothers, HCWs are advised to use contact and droplet PPE with mask, face-shield or goggles, gown, and gloves.^(5,10,12,13) If an aerosol-generating procedure, like intubation, is being considered, a respirator should be used.^(10,12,13) The results of this study are in line with these recommendations, showing that most Pediatric and Neonatology departments protected their HCWs with respirators (88%), face-shield or goggles (88%), gown (72%), and long-sleeved gloves (80%). A high use of shoe covers (80%) was also reported.

Neonates born from infected mothers are mostly SARS-CoV-2 negative.⁽¹⁾ Few studies have reported the presence of the virus

in maternal milk, and some reported the passage of maternal antibodies, capable of neutralizing SARS-CoV-2.^(8,9,14) In the early days of the pandemic and at the time of this study, Chinese and Spanish guidelines stated that newborns should be isolated from the mother after birth and fed with formula milk, completely avoiding maternal contact.^(1,2,10) On the other hand, some entities, such as World Health Organization and the United States Centers for Diseases Control and Prevention, strongly advised close contact between the mother and the newborn, as well as breastfeeding according to respiratory hygiene rules.^(1,10,15) At the time, national guidelines were not yet available, and each Pediatric and Neonatology Departments adapted international recommendations according to their individual reality. Most Portuguese Neonatology departments surveyed in this

study followed Chinese-like guidelines, separating newborns from their SARS-CoV-2-infected or -suspected mothers. Still, newborns were not separated from their mothers in 44% of hospitals, raising doubts about the surveillance provided in these cases. Not allowing breastfeeding or the presence of partners during delivery were measures adopted by most hospitals (68% and 92%, respectively). On the other hand, measures like allowing the use of expressed breast milk and separating mothers from newborns after birth varied considerably among centers.

At present, Portuguese authorities do not dictate such strict measures, allowing the newborn to remain in the same room as the mother with a distance of two meters or in a closed incubator, and the use of breastfeeding or expressed breast milk depending on the mother's clinical condition and will.⁽¹⁶⁾ When vaccination of pregnant women started, an Israeli study reported the passage of IgA and IgG antibodies in human milk, with no significant adverse effects observed in child or in mother.⁽¹⁷⁾ This suggests the potential protective effect of maternal vaccination on breastfeeding infants, which may lead to increased rates of breastfeeding when mothers are correctly informed.⁽¹⁷⁾

In the early COVID-19 pandemic phase, scientific reports were sometimes conflicting about vertical transmission of the virus. Despite strict measures adopted in Neonatology Departments, 4% of neonates born from infected mothers tested positive. This is consistent with a Moroccan study reporting 7% of positive newborns from SARS-CoV-2-positive mothers and with a study from the Spanish National Registry reporting 3% of positive newborns from SARS-CoV-2-positive mothers in the first test (first 24 hours).^(4,18)

Offspring of SARS-CoV-2-positive mothers should be tested with nasopharynx, oropharynx, and/or rectum swabs after 24 hours of life.⁽¹⁰⁾ The Directorate-General of Health (Direção-Geral da Saúde - DGS) states that specimens should be collected from two anatomic locations for testing.⁽¹⁶⁾ Most departments inquired in this study (76%) tested newborns with swabs from the oropharynx and one or two nostrils, with the oropharynx being more consensual than the nasopharynx. Criteria for discharge were not unanimous among hospitals, with most Neonatology Departments requiring a healthy negative caregiver.

The main limitations of this study were the use of an online questionnaire, the fact that heads of department were not questioned about newborn symptoms, the possible bias associated with different analyses and interpretation of questions in the questionnaire, and questions that were left unanswered in the questionnaire, not allowing the analysis of other potentially relevant topics.

CONCLUSIONS

In the first months of the COVID-19 pandemic, Pediatric and Neonatology Departments throughout the country had to define practical recommendations for the management of newborns from

SARS-CoV-2-suspected or -confirmed mothers, adapting international guidelines. This study shows that diverse measures were adopted in different hospitals regarding the admission of mothers and newborns, presence of the partner during delivery, newborn testing methodology, feeding options, and discharge criteria. In addition, the study highlights the relevance of national guidelines subsequently developed.

AUTHORSHIP

Mariana Lopes Costa - Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Software; Visualization; Writing (original draft)

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