# Launch of a virtual pediatric gastroenterology consultation prior to the COVID-19 epidemic: A pioneering pilot project☆

## Puesta en marcha de una consulta virtual de gastroenterología pediátrica antes de la epidemia por COVID-19: Un proyecto piloto pionero

*Dear Editor:*

Virtual consultations (VCs), virtual medical visits (VMVs) and telemedicine are on the rise, especially for adult hospital-based care[1] and dermatology clinics. Although the scope of these services in paediatrics has been defined,[2] there is little experience with these modalities of paediatric care in our region. The VC is a tool that allows primary care (PC) paediatricians to consult on specific aspects with hospital-based paediatric specialists. Unlike VMVs, the interaction is between health professionals. Its purposes are to improve the appropriateness of referrals, to empower PC paediatricians and to improve patient access to hospital-based care. The aim of setting up VCs is to facilitate communication between providers and respond to complaints presented at the PC level within shorter timeframes compared to conventional care pathways. The patient can benefit from these services without having to travel, so that school and work do not need to be missed,[3] and they can be particularly useful in rural areas. Shorter waiting times may reduce diagnostic delay in certain diseases. We present the results of a pilot project introduced in the Department of Paediatric Gastroenterology and Nutrition of the Hospital Regional Universitario de Málaga in collaboration with the PC District of Malaga with the participation of 13 primary care centres.

We established which diseases had characteristics that made them more suitable for virtual consultation, although PC paediatricians could consult on any issue. The study included 13 primary care centres, some of which are near the hospital and other that are at greater distance and in rural areas. We set up a weekly schedule for these consultations. We established a maximum wait time to respond from the hospital of 7 days. After 4 months, we submitted questionnaires to assess the satisfaction of the colleagues in PC that made a VC during the period under study by means of Likert scales.

A total of 77 VCs were held in 28 weeks, corresponding to a volume of 10.1% relative to the total number of first visits (763) received in that period. We found a clear improvement in the first visits to successive visits ratio, which decreased from 2.95 at the time VCs started (October 1, 2019) to 2.28 in March 2020; a change that could be attributed to improved referrals and shorter wait times after initiation of VCs. In the opinion of the paediatric gastroenterologist, 15 referrals (19.5%) met the criteria for in-person assessment from the outset. Fig. 1 presents the diseases that led to referral. The reasons for VCs were diverse: doubts regarding drug prescription, the approach to diagnosis, consultation regarding laboratory results such as cholesterol levels or elevation of antigliadin antibodies, follow-up of chronic patients, etc. In 64 cases (83.1%) the concern was resolved, shortening the time to referral or through an electronic prescription. In the group of patients that required referral to in-person care, the performance of diagnostic tests decreased by 18.4%. The PC paediatrician needed to do more than one consultation or referral for in-person care for the same complaint in only 1 case. The low frequency of repeated consultation may be an indirect measure of the safety of this method, an aspect that has been previously analysed in other telemedicine systems.[3]

We sent the questionnaire to 20 PC paediatricians, and 17 responded. More than 75% of respondents reported being satisfied or very satisfied with certain aspects of the VCs, and had a positive perception of the accessibility, the waiting times, the development of autonomy in the follow-up of certain diseases and the convenience of the care offered to the patient by avoiding travel to the site and therefore having to miss school or work (Fig. 2). The perceived drawbacks were problems with the software and problems with communication regarding the appropriate timing and type of patient for VCs; this evinced the need to make improvements, in addition to extending the programme to every PC centre in the catchment area of the hospital to reach stronger conclusions. We did not find differences in participation between PC centres based on their distance from the hospital.

The period that we are experiencing due to the global pandemic has prompted a sharp increase in the number of professionals that are working remotely to prevent the transmission and spread of the virus.[4] As has been the case in adult care,[5] the development of paediatric VCs is an emerging reality brought on by changing times, and while under some circumstances the physical examination may be indispensable, we believe it is necessary to launch more projects like the one presented in this article. The current situation may have made patients and providers more aware of the need to introduce initiatives of this kind and may be a unique opportunity to do so. The balance between in-person and virtual health care services will be established based on patient needs, seeking to develop a more personalised approach to medical care from this perspective. It is necessary for the competent authorities to develop the legal foundations for these consultations[6] and for professionals to develop methods to analyse the quality, safety and cost-effectiveness of this care modality.

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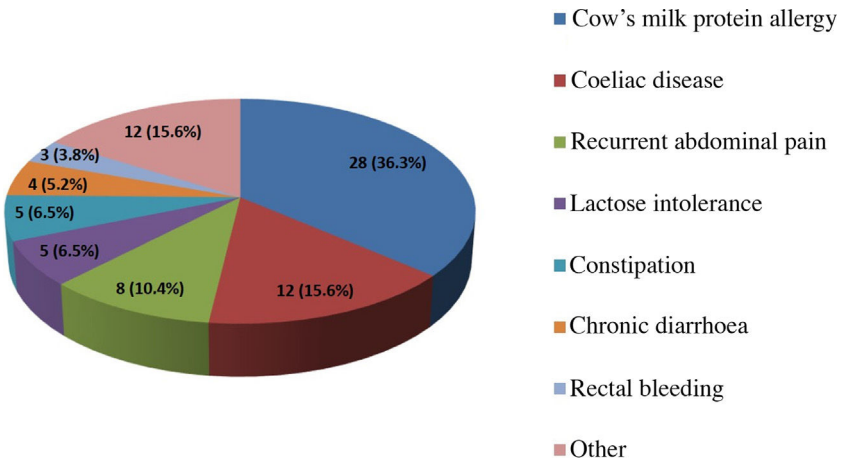


**Figure 1** Reasons for referral for virtual consultation.

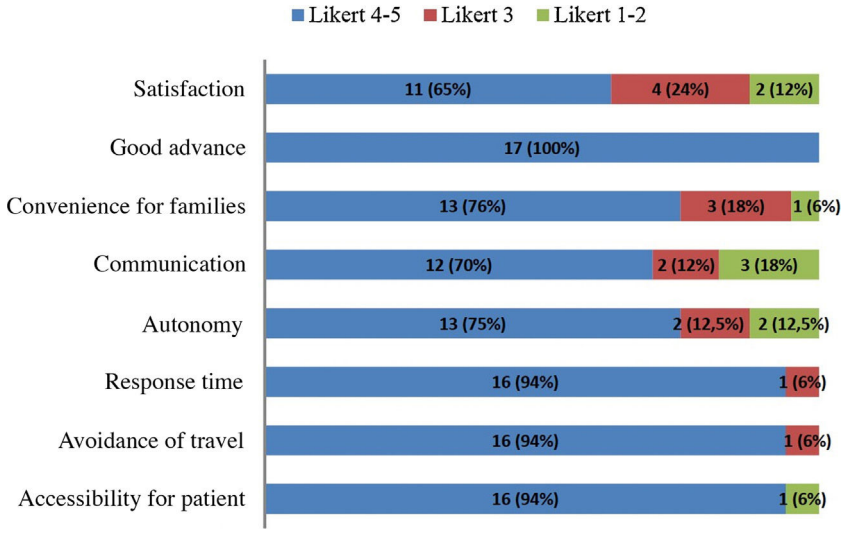


**Figure 2** Results of the survey.

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## Conflicts of interest

The authors have no conflicts of interest to declare.

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## References

1. Pascual-de la Pisa B, Palou-Lobato M, Márquez Calzada C, García-Lozano MJ. Effectiveness of interventions based on telemedicine on health outcomes in patients with multimorbidity in primary care: a systematic review. Aten Primaria. 2019, http://dx.doi.org/10.1016/j.aprim.2019.08.004.
2. Burke BL Jr, Hall RW, Dehnel PJ, Alexander JJ, Bell DM, Bunik M, et al. Telemedicine: pediatric applications. Pediatrics. 2015;136:e293–308.
3. Haimi M, Brammli-Greenberg S, Baron-Epel O, Waisman Y. Assessing patient safety in a pediatric telemedicine setting: a multi-methods study. BMC Med Inform Decis Mak. 2020;20.
4. Verstraete SG, Sola AM, Ali SA. Telemedicine for pediatric inflammatory bowel disease in the era of COVID-19. J Pediatr Gastroenterol Nutr. 2020;70:e140.
5. Hanlon P, Daines L, Campbell C, McKinstry B, Weller D, Pinnock H. Telehealth interventions to support self-management of long-term conditions: a systematic metareview of diabetes, heart failure, asthma, chronic obstructive pulmonary disease, and cancer. J Med Internet Res. 2017;19:e172.
6. Krynski L, Ghersin S, Valle M Del, Cardigni G, Maglio I, Kilidjian R. Communication through electronic media in pediatrics. Use recommendations. Arch Argent Pediatr. 2019;117:S175–9.

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## Meconium aspiration syndrome: Poor outcome predicting factors☆

## Síndrome de aspiración meconial: factores sugerentes de mala evolución

*Dear Editor:*

Meconium aspiration syndrome (MAS) was first described by Cleary and Wiswell as respiratory distress in an infant born through meconium-stained amniotic fluid (MSAF) whose symptoms cannot be otherwise explained.[1] Although the incidence of MSAF in term births is of 10% to 16%, the incidence of MAS in pregnancies with MSAF is low, ranging from 0.10% at 37 weeks' gestation to 0.31% at 41 weeks.[2]

Its pathophysiology is complex and has yet to be fully elucidated, with the available evidence suggesting that mild and severe presentations of MAS are not part of a single disease spectrum but could involve different aetiologies and risk factors, with severe MAS presenting with other problems in addition to meconium aspiration such as infection or chronic asphyxia.[3,4] The risk factors associated with severe MAS have been classified into maternal, intrapartum and neonatal factors,[2] and many studies have been devoted to the subject, some with contradictory results.[5]

The presence of MSAF in itself does not explain severe cases of MAS, and given the importance of early diagnosis, we decided to carry out a study with the aim of identifying factors associated with more severe presentations of MAS in our catchment population.

We conducted a retrospective descriptive study including all cases of MAS managed in the neonatal intensive care unit (NICU) of our hospital between January 2012 and May 2018. We collected data by reviewing obstetric and neonatal electronic health records in our hospital's system. We classified the risk factors under study into three groups: maternal variables, intrapartum variables and neonatal variables (Table 1). We classified MAS cases by severity into 2 categories using the scheme proposed by Cleary and Wiswell[1]: severe, defined as requiring mechanical ventilation (MV) for 48 h, and nonsevere (mild/moderate), defined as not requiring MV or MV lasting less than 48 h. We performed the statistical analysis with the software SPSS (version 23).

During the study period, the hospital managed a total of 31 324 deliveries and 48 cases of MAS, corresponding to an incidence of 0.15%. Of all cases, we were able to collect data for 29 patients, 51.7% female and 48.3% male. In terms of severity, 52% of the cases of MAS were severe ($n = 15$) and 48% nonsevere ($n = 14$). In the group of severe MAS, 1 patient died (6.6%) and 3 (20%) had long-term neurologic sequelae.

None of the maternal variables under study (maternal age, primiparity or duration of pregnancy), was associated significantly with severe MAS.

When it came to the intrapartum variables, intrapartum fever, the Apgar scores and resuscitation with intubation, chest compressions or vasoactive drugs were not significantly associated with severe MAS in our sample, either.

The intrapartum variables significantly associated with severe MAS were urgent caesarean section due to non-reassuring foetal status (NRFS) and the total duration of rupture of membranes (ROM).

The neonatal variables associated with severe MAS were the pH at admission, contrary to previous studies that did not find a significant association,[2] a high fraction of inspired oxygen ($FiO_2$) at admission (28.6% of infants with severe MAS required a $FiO_2$ of 30%–60% and 85.7% a $FiO_2 > 60\%$), the need of surfactant and treatment with inhaled nitric oxide (iNO).

Although the association with the need for surfactant and with treatment with iNO were statistically significant, we did not consider these factors predictors of poorer outcomes, as their use intrinsically implies more severe MAS and therefore this would be an expected association.

In the multivariate logistic regression analysis performed to identify predictors of severe MAS, the only variable that remained significant for prediction of severe disease after adjusting for all other variables ($P < .01$). We generated receiver-operating characteristic (ROC) curves to establish the optimal cut-off points for the $FiO_2$ at admission, the pH at admission and the total duration of ROM (Fig. 1).

Based on our findings, patients with a diagnosis of MAS that required urgent caesarean delivery due to NRFS, duration of ROM of less than 6 h, a $FiO_2$ at admission greater than 35% and a pH at admission of less than 7.22 are at higher risk of developing severe disease, and $FiO_2$ was the best predictor after adjusting for the rest of the variables. These conclusions must be interpreted with caution, as the main limitation of the study was its small sample size.

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