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Regime sugerido para o tratamento da diarreia infantil, baseado no peso corporal em Kg.

Dia	Volume da solução de Dioralyte (ml)	Volume total em 24 h (ml)
1	150 ml x kg de peso	150 ml x kg de peso
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INFORMAÇÕES ESSENCIAIS COMPATÍVEIS COM O RESUMO DAS CARACTERÍSTICAS DO MEDICAMENTO. DENOMINAÇÃO DO MEDICAMENTO: Dioralyte, pó para solução oral. **COMPOSIÇÃO QUALITATIVA E QUANTITATIVA:** Substâncias activas g/saqueta: Glicose 3,56; Cloreto de sódio 0,47; Cloreto de potássio 0,30; Citrato dissódico 0,53. **INDICAÇÕES TERAPÊUTICAS:** Correção da perda de líquidos e electrólitos nos lactentes, crianças e adultos. Tratamento da diarreia aquosa de várias etiologias, incluindo as gastroenterites, em todos os grupos etários. **POSOLOGIA E MODO DE ADMINISTRAÇÃO:** Cada saqueta deve ser sempre dissolvida em 200 ml de água. O volume de Dioralyte reconstituído a tomar deve ser decidido pelo médico assistente, tendo em consideração o peso do doente e o estado e gravidade da situação. Um princípio básico no tratamento da diarreia é a substituição da perda de líquidos e a manutenção de uma ingestão de líquidos suficiente para repor a sua perda nas fezes. A ingestão diária deve ser baseada num volume de 150 ml/Kg de peso nos lactentes e 20-40 ml/Kg de peso nos adultos e crianças. Uma aproximação razoável é a seguinte: -lactentes - 1 a 1,5 vezes o volume alimentar habitual; - crianças - 1 saqueta após cada dejectação diarreica; - adultos - 1 ou 2 saquetas após cada dejectação diarreica. Inicialmente, podem ser necessárias maiores quantidades de Dioralyte para assegurar uma reposição precoce do equilíbrio hidro-electrolítico. Nos estádios iniciais do tratamento da diarreia, todos os alimentos, incluindo o leite de vaca e o leite artificial, devem ser interrompidos. Não se deve no entanto interromper o aleitamento materno. Nas crianças amamentadas sugere-se que se dê à criança o mesmo volume de Dioralyte do que o da alimentação normal, seguindo-se o aleitamento. Pode ser necessário, durante este período, a expressão do leite residual da mama. Após 24-48 horas, quando os sintomas desaparecerem, a dieta normal deve ser retomada gradualmente para evitar o agravamento da situação. O regime sugerido para o tratamento da diarreia infantil grave baseado no peso corporal em Kg é apresentado no quadro anterior. Quando a diarreia é acompanhada de vómitos, sugere-se ingestão frequente de pequenas quantidades de Dioralyte. No entanto, é importante que seja tomado o volume total necessário de Dioralyte. Quando o funcionamento dos rins é normal torna-se difícil superhidratar por via oral e quando existem dúvidas acerca da dosagem correcta, mais vale tomar a mais do que a menos. **CONTRA-INDICAÇÕES:** Não se conhecem contra-indicações ao Dioralyte. No entanto, existem algumas situações em que o tratamento com Dioralyte é inadequado, tais como por exemplo, situações de oclusão intestinal requerendo intervenção cirúrgica, ou em caso de vómitos persistentes e desidratação grave ou diarreia infantil grave em que será necessária uma terapêutica por via intravenosa. **ADVERTÊNCIAS E PRECAUÇÕES ESPECIAIS DE UTILIZAÇÃO:** O Dioralyte só deve ser reconstituído com água. Cada saqueta deve ser sempre reconstituída em 200 ml de água. Uma solução mais fraca do que a recomendada não contém a concentração óptima de glicose e electrólitos e uma solução mais forte do que a recomendada pode provocar desequilíbrio electrolítico. Se a diarreia não melhorar rapidamente, os doentes deverão ser reavaliados. Nos idosos, a administração de soluções contendo glicose e electrólitos deve ser cuidadosa em caso de alterações renais ou hepáticas graves ou em outras situações em que o balanço electrolítico normal se encontre alterado. Nos lactentes, deve interromper-se durante 24 horas a alimentação com leite de vaca ou leite artificial, que deverão ser reintroduzidos gradualmente quando a diarreia tiver diminuído. Não se deve interromper o aleitamento materno. **EFEITOS INDESEJÁVEIS:** Podem ocorrer náuseas ou vómitos após a administração da solução, em particular quando esta é ingerida com demasiada rapidez. Estão também descritos casos isolados de desconforto abdominal e de obstipação. Data da revisão do texto: Janeiro de 2004. **TITULAR DA AUTORIZAÇÃO DE INTRODUÇÃO NO MERCADO:** KORANGI - Produtos Farmacêuticos, Lda. Medicamento não sujeito a receita médica. Para mais informações contactar o Titular da Autorização de Introdução no Mercado

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Convention on the rights of the Child. 35 years in Portugal, reinforcing a commitment

Convenção sobre os direitos da Criança. 35 anos em Portugal, reforçando um compromisso

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The foundations for virtually every aspect of human development – physical, intellectual and emotional – are laid in early childhood.

Michael Marmot, 2010

On September 22, 2025, Portugal celebrates the ratification of the Convention on the Rights of the Child, approved by the United Nations, in partnership with the Instituto de Apoio à Criança, Escola Superior de Enfermagem de Lisboa, Sociedade de Ciências Médicas, UNICEF, Sociedade Portuguesa de Pediatria and Fundação Calouste Gulbenkian, entitled *Convention on the Rights of the Child. 35 years in Portugal, reinforcing a commitment*.

This Declaration constitutes a milestone in all areas concerning childhood and adolescence, as Article 1 defines a child as a person from birth to 18 years of age, and the remaining 53 articles establish the responsibilities of parents/guardians, the community and the government, providing legislation and policies for children.

The Convention designates the basic human rights to which children are entitled: *Provision rights* for health and well-being, including family life, food, housing and healthcare; *Development rights*, involving education, play and rest, no discrimination and freedom of thought and religion; *Protection rights* from violence, abuse or any harmful activities; *Participation rights*, including the

right to be consulted, to information, to freedom of speech and opinion, and the right to take an active role in community life.

The Convention also enshrines participation and consent, with children being true protagonists in their own lives (Article 12), and the 2025 Portuguese meeting also focuses on the right to involvement, which is why we will have a group of teenagers on the last panel that we want to hear from and involve.

In healthcare, this right is exercised through informed assent and consent. The right to informed consent from the age of 16 has been agreed upon in several European countries such as Portugal, Spain, the Netherlands, Poland, and Norway¹.

According to the Portuguese Civil Code, minors do not have the capacity to exercise rights, but parents must take their children's opinions into account in accordance with their maturity. However, the Portuguese Penal Code guarantees autonomy to minors who are 16 years of age or older and have the discernment to assess the meaning and scope of consent at the time they give it².

The UNESCO Declaration on Bioethics and Human Rights (2015) and the Oviedo Convention emphasize that there is a trend towards the progressive autonomy of minors in health matters and not just from a pre-established age (Council of Europe, 1997). There is evidence that growth is associated with gains in maturity

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and discernment, so assessing a child's capabilities is essential to avoid imposing a decision in a situation where the child is incapable or, conversely, excluding them from the decision when they are competent.

At the same time, the progressive autonomy of the child must be recognized and Amelung advocates that the ability to decide involves being aware of values, understanding facts and alternatives, and having the sensitivity to make the best and most appropriate choice³.

It is increasingly accepted and promoted that some degree of decision-making power should be given to children, which should increase as they get older and as the intervention becomes more relevant to their lives. An intermediate age range was then created, from 14 to 16 years old, in which, after clarification, the child is asked for his or her informed consent, with the consent of his or her parents/guardians being mandatory. Decision-making is a dimension of active participation, a multifaceted concept with different processes that involves the transfer of information and power. It requires a scenario in which the child is the main author⁴.

However, even a child who is considered competent lacks life experience and will find it difficult to assess the risks and appreciate the long-term consequences.

Ireland and the United Kingdom use the concept of "Gillick competence," which determines that a child who has sufficient maturity and intelligence to fully understand the nature and consequences of the intervention also has the capacity to consent to that intervention, which has become gradually more common¹.

Despite legislation, studies on hospital practices show that young people's experiences vary between hospitals and within the same hospital⁵ and that

healthcare professionals demonstrate insecurity or ignorance when communicating with hospitalized children⁶. Doctors are aware of the evidence that active participation facilitates self-esteem, and provides adaptive skills and a sense of empowerment, but there is still a gap between the theory and practice⁷. The child's education and culture, the attitude and role of parents, their communication skills, available time, and the doctors' own knowledge and sensitivity are factors that impact the process⁸.

Nevertheless, children deserve to be highly valued for the unique contribution they make simply by being children.

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Complicated acute rhinosinusitis in the pediatric population and the influence of COVID-19

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Abstract

Introduction and objectives: Complications of acute rhinosinusitis (ARS) are more common in children and are divided, in decreasing order of frequency, into orbital, intracranial, and bony. The aim is to analyze the impact of SARS-CoV-2 on complicated ARS at a tertiary children's hospital. **Methods:** A retrospective, observational study of a five-year period, categorized based on the SARS-CoV-2 pandemic into pre-COVID-19 (2018/2019), COVID-19 (2020/2021), and post-COVID-19 (2022). We included patients up to 18 years of age, who were admitted to the otorhinolaryngology (ENT) ward with ARS. Socio-demographic and clinical data were collected and analyzed. **Results:** Thirty-four children were admitted to our hospital with ARS. The incidence decreased during the COVID-19 period ($n = 5$) and increased in the post-COVID-19 period ($n = 12$). The mean Lund-Mackay score was 12.9, with no significant difference between periods. The rate of complications was 73.5% for orbital, 8.8% for intracranial, and 8.8% for bone complications. Orbital complications were more frequent in younger patients, while intracranial complications occurred more often in older children ($p < 0.05$). There were no intracranial complications in the pre-COVID-19 period and 66.7% of these occurred in the COVID-19 period. The leukocyte count and C-reactive protein (CRP) levels were higher in the nine patients requiring surgical treatment ($p < 0.013$ and $p < 0.014$), with the majority (55.6%) occurring in the post-COVID-19 period. **Discussion:** Consistent with other studies, we report an increase in severe infections since the COVID-19 pandemic. This increase could be related to the immunological impact of the social distancing measures implemented during the various lockdowns in our country throughout the first year of the SARS-CoV-2 pandemic.

Keywords: Rhinosinusitis. Sinusitis. SARS-CoV-2. Antimicrobial drug resistance.

Rinossinusite aguda complicada na população pediátrica e a influência da COVID-19

Resumo

Introdução e objetivos: As complicações da rinossinusite aguda (RSA) são mais frequentes nas crianças, e dividem-se, por ordem decrescente de frequência, em orbitárias, intracranianas e ósseas. O objetivo é analisar o impacto do SARS-CoV-2 na rinossinusite aguda complicada (RSA) num Hospital Pediátrico Terciário. **Métodos:** Estudo retrospectivo e observacional durante um período de cinco anos. Os doentes foram divididos em grupos pré-COVID (2018/2019), COVID (2020/2021) e pós-COVID (2022). Incluímos pacientes de até 18 anos, que foram admitidos na enfermaria de otorrinolaringologia por RSA. Os dados sociodemográficos e clínicos foram obtidos a partir do processo clínico. **Resultados:** Trinta e quatro crianças foram admitidas em internamento de otorrinolaringologia com RSA. A incidência diminuiu durante o período COVID ($n = 5$)

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e aumentou no período pós-COVID ($n = 12$). A média do Lund-Mackay foi de 12,9, sem diferença significativa entre períodos. A taxa de complicações foi de 73,5% para complicações orbitais, 8,8% para complicações intracranianas e 8,8% para ósseas. As complicações orbitais foram mais frequentes nos mais jovens, as intracranianas nos mais velhos ($p < 0,05$). Não houve complicações intracranianas no período pré-COVID e 66,7% delas ocorreram no período COVID. A contagem de leucócitos e a PCR foram mais elevadas nos 9 pacientes que necessitaram de cirurgia ($p < 0,013$ e $p < 0,014$), com a maioria (55,6%) ocorrendo no período pós-COVID. **Discussão:** De acordo com outros estudos, houve um aumento de infecções graves desde a pandemia de SARS-CoV-2. Esse aumento pode estar relacionado com o impacto imunológico das medidas de distanciamento social implementadas ao longo do primeiro ano da pandemia de SARS-CoV-2.

Palavras-chave: Rinossinusite. Sinusite. SARS-CoV-2. Resistência aos antimicrobianos.

Introduction

Acute rhinosinusitis (ARS) in children is defined as the sudden onset of two or more of the following symptoms: nasal blockage/obstruction/congestion; or discolored nasal discharge; or cough (daytime and night-time) for less than 12 weeks. ARS encompasses viral ARS (common cold) and postviral ARS, but only a small percentage of postviral ARS cases are caused by bacteria (ABRS)¹.

Although complications of ARS have decreased in the era of antibiotic therapy (ABT), they are more frequent in children due to their greater bone and periosteum permeability and higher frequency of upper airway infections. Complications can be divided into orbital (OC), intracranial (IC), and osseous (BC). Orbital complications are the most common and can be classified according to Chandler's classification² (Table 1). Periorbital edema, proptosis, diplopia, reduced visual acuity, severe headache, neurological symptoms/signs, or frontal swelling should alert clinicians to a potential complication³. In younger patients, orbital complications are more frequent and typically arise from the ethmoid sinus, given its relatively advanced development compared to other sinuses. Intracranial complications are more prevalent in adolescence, often originating from the frontal and sphenoidal sinuses. In both scenarios, infection can propagate through bone defects such as anatomic sutures, dehiscence, or bone necrosis, as well as retrograde thrombophlebitis in avascularized vessels⁴.

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was declared a worldwide pandemic by the World Health Organization (WHO) on Mar 11, 2020. Since its outbreak, we have started to notice an increase in severity and the need for surgery among patients hospitalized with ARS. We therefore decided to analyze whether this perception had statistical significance and explore the possible explanations.

In this study, besides analyzing the impact of the SARS-CoV-2 pandemic on the incidence of ARS

complications, we also review our experience with ARS complications in the pediatric population to gain insight into patterns of presentation, imaging, microbiological aspects, therapy, disease course, and outcomes.

Materials and methods

A retrospective, observational study conducted between January 2018 and December 2022. Patients up to 18 years of age, who were admitted to the otorhinolaryngology ward of a pediatric tertiary hospital for ARS, were included. Socio-demographic and clinical data was extracted from the electronic medical records. The statistical analysis of this data was performed using the Statistical Package for the Social Sciences (SPSS®), and p below 0.05 were considered statistically significant. Patients were divided into three groups based on the site of complication (OC, IC, and BC), age [Group one (nought to six years of age), Group two (seven to 12 years of age) and Group three (13 to 17 years of age)], and time period [pre-COVID-19 (2018 and 2019), COVID-19 (2020 and 2021), and post-COVID-19 (2022)].

Results

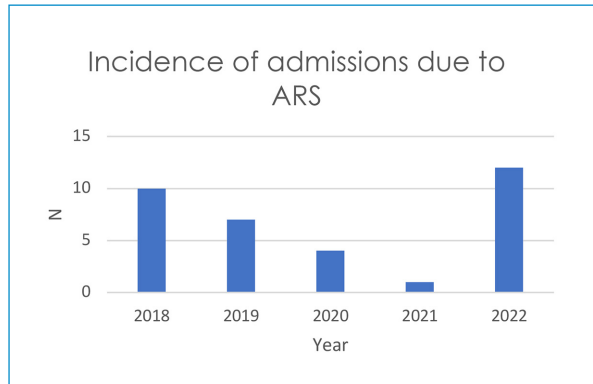
Epidemiology

Thirty-four children were admitted to the pediatric otorhinolaryngology department of our hospital due to ARS during this five-year period, and thirty-one (91%) were diagnosed with complicated ARS. The annual incidence is presented in (Fig. 1).

Out of these, 35.3% occurred in winter and 26.5% in summer. No gender differences were observed. The mean age of patients was nine years old (ranging from one to 17). The mean age of presentation was higher during the COVID-19 period (12.7 years), but this was not statistically significant ($p = 0.27$). All children had received the required Portuguese immunization scheme.

Table 1. Orbital complications classified according to Chandler's classification

Chandler's classification	Our sample
Preseptal cellulitis	32%
Orbital cellulitis = postseptal	23%
Subperiosteal abscess	15%
Orbital abscess	3%
Thrombosis of the cavernous sinus	0%

**Figure 1.** Annual incidence of admissions due to ARS during a five-year period.

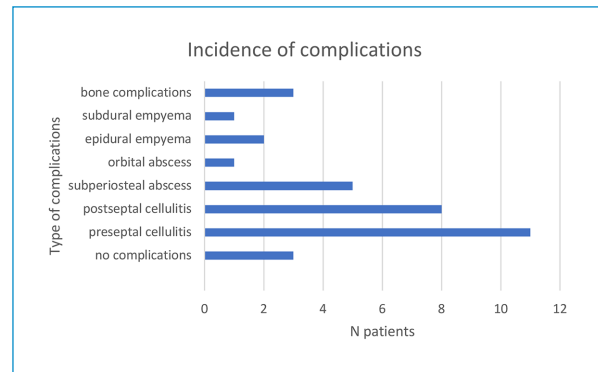
Complications

The incidence of complications is depicted in (Fig. 2). Most patients presented with OC (73.5%; $n = 25$), with the most common complication being preseptal cellulitis (Chandler I) (32.4%; $n = 11$). Only 8.3% of these OC cases occurred during the COVID-19 period. There was one BC case in each period. In contrast, most IC cases occurred during the COVID-19 period (66.7%; $n = 2$) and represented 40% of all complications during this period. Older children more frequently presented with OC and BC ($p < 0.05$) (Table 2).

The mean time before going to the emergency department was 6.9 days (ranging from one to 30) and was higher in the group without complications ($p = 0.018$). There were no significant differences related to time periods ($p = 0.671$). About 44.1% of the patients were already under ABT before admission, with 46.7% receiving amoxicillin clavulanate and 33.3% amoxicillin.

Symptoms/Signs (Table 3)

The most frequent clinical findings were rhinorrhea and palpebral edema, both of which were present in 88.2% of patients (palpebral edema was present in all

**Figure 2.** The incidence of complications.**Table 2.** Mean age in relation to types of complications

Type of complications	Mean age (years)
OC	8.1
IC	12.7
BC	15
p	0.043

OC and IC cases). Fever was documented in 83.3% of the 24 cases where it was registered, and headaches were present in 89.5% of the 19 cases where it was registered.

All ocular findings (proptosis, pain, limited extraocular movements, and visual impairment) were simultaneously present in 100% of patients with orbital abscesses, 40% of those with a subperiosteal abscess (SPA), and only 14% of those with orbital cellulitis. Among patients with proptosis, 42.9% had an SPA, 28.6% had orbital cellulitis, and the remainder had more severe complications. For those with limited extraocular movements, 45.5% had orbital cellulitis, 27.3% had an SPA, and the rest had more severe complications. A statistically significant association was found between limited extraocular movements and the need for surgery ($p = 0.028$).

Only one patient with IC exhibited altered mental status, seizures, and hemiparesis. None had meningeal irritation.

Complementary diagnostic methods and therapy

BLOOD TESTS

There were no significant differences in laboratory findings between the groups, although the values were lower in patients with no complications.

Table 3. Relationship between symptoms/signs, complication type, and the need for surgery

Complication	Fever	Rhinorrhea	Nasal Obst.	Cough	Headache	Edema	Proptosis	Limited oc. mov.	Visual acuity	Mental status	NRL Clinic	Surgery
Preseptal cel.	Absent	Yes	Yes	Absent	Yes	Yes	Absent	Absent	10/10	Absent	Absent	0
Preseptal cel.	Absent	Absent	Absent	No info	No info	Yes	Absent	Absent	9/10 wc	Absent	Absent	0
Preseptal cel.	Yes	Yes	Yes	Absent	Absent	Yes	Absent	Absent	No info	Absent	Absent	0
Preseptal cel.	Yes	Yes	Yes	Yes	No info	Yes	Absent	Absent	No info	Absent	Absent	0
Preseptal cel.	Yes	Yes	Yes	Yes	Yes	Yes	Absent	Absent	10/10	Absent	Absent	0
Preseptal cel.	Absent	Yes	Yes	No info	No info	Yes	Absent	Absent	No info	Absent	Absent	0
Preseptal cel.	Absent	Yes	Yes	No info	No info	Yes	Absent	Absent	No info	Absent	Absent	0
Preseptal cel.	Absent	Yes	Yes	Yes	Yes	Yes	Absent	Absent	8/10 wc	Absent	Absent	0
Preseptal cel.	Yes	Absent	Yes	No info	No info	Yes	Absent	Absent	No info	Absent	Absent	0
Preseptal cel.	Yes	Yes	Absent	Yes	No info	Yes	Absent	Absent	10/10	Absent	Absent	0
Preseptal cel.	Yes	Yes	Yes	No info	Yes	Yes	Absent	Absent	10/10	Absent	Absent	PtT + M.Ant + A.Etm
Orbital cel.	Yes	Yes	Yes	Yes	No info	Yes	Absent	Yes	10/10	Absent	Absent	0
Orbital cel.	Yes	Yes	Yes	Yes	No info	Yes	No info	Absent	No info	Absent	Absent	0
Orbital cel.	Absent	Yes	Yes	Absent	Yes	Yes	Yes	Yes	9/10	Absent	Absent	0
Orbital cel.	Absent	Yes	Yes	No info	No info	Yes	Yes	Yes	10/10	Absent	Absent	0
Orbital cel.	Yes	Yes	Yes	No info	No info	Yes	Absent	Absent	9/10	Absent	Absent	0
Orbital cel.	Yes	Yes	Yes	No info	Yes	Yes	Absent	Absent	10/10	Absent	Absent	0
Orbital cel.	Yes	Yes	Yes	No info	No info	Yes	Absent	Yes	10/10	Absent	Absent	0
Orbital cel.	Yes	Yes	Yes	No info	No info	Yes	Absent	Yes	10/10	Absent	Absent	PtT + M.Ant + A.Etm
SPA	Yes	Yes	Yes	Yes	No info	Yes	Yes	Yes	9/10	Absent	Absent	0
SPA	Absent	Absent	Absent	Yes	No info	Yes	Absent	Absent	No info	Absent	Absent	0

(Continues)

Table 3. Relationship between symptoms/signs, complication type, and the need for surgery (*continued*)

Complication	Fever	Rhinorrhea	Nasal obst.	Cough	Headache	Edema	Proptosis	Limited oc. mov.	Visual acuity	Mental status	NRL Clinic	Surgery
SPA	Yes	Yes	Yes	Absent	Absent	Yes	Absent	Absent	No info	Absent	Absent	0
SPA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	10/10	Absent	Absent	M.Ant + DI + Abs_Oph
SPA	Yes	Yes	Absent	Absent	Yes	Yes	Yes	Yes	9/10	Absent	Absent	M.Ant + A.Etm + Abs_Oph
Orbital abs.	Yes	Yes	No info	No info	Yes	Yes	Yes	Yes	8/10	Absent	Absent	PtT + M.Ant + A.Etm + Abs_Oph
Epidural emp.	Yes	Yes	Yes	Yes	Yes	Yes	Absent	Absent	10/10	Absent	Absent	0
Epidural emp.	Yes	Yes	Yes	No info	Yes	Yes	Absent	Yes	10/10	Absent	Dizziness	M.Ant + A.Etm + P.Etm + Sph + DI
Subdural emp.	Absent	Yes	Yes	Absent	Yes	Yes	Absent	Yes	No info	Yes	T/C seizure	PtT + M.Ant + A.Etm + Cr
BC	Absent	Yes	Yes	No info	Yes	Yes	Absent	Absent	No info	Absent	Absent	0
BC	Yes	Yes	Yes	Yes	Yes	Absent	Absent	Absent	No info	Absent	Absent	M.Ant + A.Etm + DI
BC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No info	No info	Absent	Absent	M.Ant + A.Etm + Abs_Oph

A: Etm.; Abs_Oph: abscess drainage performed by the Ophthalmology team; A.Etm: anterior ethmoidectomy; BC: bone complications; Cr: craniotomy performed by the Neurosurgery team; DI: draft I; epidural emp: epidural empyema; M.Ant: maxillary antrostomy; Nasal obst: nasal obstruction; No info: no information in the clinical records; NRL clinic: neurology clinic; orbital abs: orbital abscess; Orbital cel.: orbital cellulitis; P.Etm: posterior ethmoidectomy; Preseptal cel.: preseptal cellulitis; PtT: partial turbinectomy of the middle turbinates; SPA: subperiosteal abscess; Sph: sphenoidotomy; subdural emp: subdural empyema; T/C seizure: tonic-clonic seizure; wc: with correction.

SARS-CoV-2 TEST

During the COVID-19 period, all tested negative ($n = 5$), but during the post-COVID-19 period, 6.7% ($n = 1$) tested positive and 13.3% ($n = 2$) had inconclusive results.

MICROBIOLOGY

A total of 61.8% ($n = 21$) of patients did not collect a sample for microbiology. Among the 39% ($n = 13$) who did, no microorganisms were isolated in nine of the cases (five hemocultures, three pus samples, and one rhinorrhea sample). This could be because most patients were already on ABT. When positive, the isolated bacteria were *Staphylococcus aureus* ($n = 2$), with one multi-sensitive strain in the hemoculture of a patient with no complications and one multi-resistant strain (MRSA) in the rhinorrhea of a patient with cystic fibrosis and BC, as well as *Streptococcus milleri* ($n = 2$), with one in the rhinorrhea associated with a subdural empyema and one in the pus of the orbital abscess.

IMAGING

Computed tomography (CT) scans were performed on 29 patients. The other five were assumed to have preseptal cellulitis based on clinical findings; four were $\leq$ two years of age; none of them needed surgery, and all recovered fully. The ethmoid sinus was affected in all patients and the frontal sinus was affected in 92.9% of patients. When divided by age group, the frontal sinus was affected in 100% of groups two and three, and it was also affected in all patients with BC and IC. The sphenoid sinus was affected in 60.7% of patients and in 70% of age group three (Table 4; Figs. 3 and 4). None had sinus thrombosis. The mean Lund-Mackay score was 12.9 (ranging from 3 to 24), with no significant difference observed between complication groups ($p = 0.737$) or time periods ($p = 0.953$).

Treatment

MEDICAL THERAPY

All patients were treated with a combination of intravenous ABT, systemic corticosteroid (methylprednisolone in a weaning regimen), nasal steroid (mometasone), and nasal decongestant (phenylephrine). The most frequent ABT association was ceftriaxone/clindamycin, followed by ceftriaxone/metronidazole and ceftriaxone.

SURGERY

A total of 29% ($n = 9$) of patients with complicated ARS required endoscopic sinus surgery (ESS) during hospitalization. The most commonly performed procedure was maxillary antrostomy combined with ethmoidectomy (88.9%). Among the patients who underwent surgery, 44.4% ($n = 4$) had only ESS. The remaining 55.6% ($n = 5$) required a combined approach. One of these cases involved neurosurgery performing a craniotomy to drain an epidural empyema and the others involved Ophthalmology (two with SPA, one with an orbital abscess, and one with a palpebral abscess) (Table 3).

Most (66.7%) of the surgeries occurred during the post-COVID-19 period following the increase in incidence that was observed during this period (Fig. 5). The need for surgical treatment varied significantly between the different time periods ($p = 0.039$).

Laboratory findings (CRP and leukocyte counts) were significantly higher in the group that required ESS (CRP $p = 0.014$, leukocytes $p = 0.013$). Although not statistically significant ($p = 0.130$), the Lund-Mackay score was also higher in the group that needed ESS. No patients in age group one required surgical treatment. BC and IC had higher rates of ESS ($p = 0.017$) (Fig. 6).

The average length of stay was 12.5 days (ranging from two to 46 days), although it was significantly longer for patients with IC and BC, as well as those admitted during the COVID-19 period (Table 5; Figs. 7 and 8).

No recurrences were observed within the first 30 days after discharge.

Discussion

Orbital complications

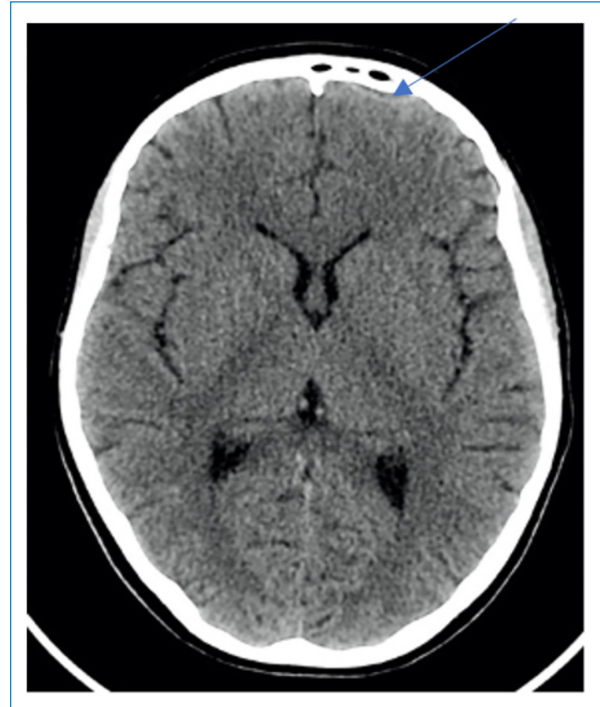
OC are the most frequent type of complications (74-85%) in pediatric patients with ARS^{4,5}. In our hospital, both inpatients and outpatients diagnosed with ocular complications of ARS are observed by the Ophthalmology team, which determines the frequency of observation according to the type of complication. Preseptal cellulitis (Chandler Type I) is typically considered the most common OC (80-90%)⁶ and the same observation was made in our study, where it was also the most frequent complication, although the percentage was lower (45.8%). This reduced number might be associated with the fact that outpatients were not included in our study and we usually manage most cases of preseptal cellulitis in the outpatient clinic. Only one patient (9.1%) with preseptal cellulitis required ESS

Table 4. Involvement percentage of each paranasal sinus

Paranasal sinus	% of patients with sinusitis
Ethmoid	100
Frontal	92.9
Maxillary	89.3
Sphenoid	60.7

**Figure 3.** CT scan, sagittal view, with an ARS complicated with Pott's puffy tumor.

on the 12th day of admission due to lack of improvement with medical treatment. This patient was older (12 years old), with significant leukocytosis ($22 \times 10^3/\mu\text{L}$) and CRP levels (15 mg/dL) upon admission. The presence of periorbital edema can complicate the diagnosis of post-septal involvement, so a CT scan is recommended in those cases. It is also recommended in cases of proptosis, ophthalmoplegia, pain with external ocular movement, deteriorating visual acuity, or central symptoms (i.e., altered mental status, seizures, or focal neurologic deficits)^{7,8}. CT scanning is not necessary in the absence of these signs, as most patients with periorbital cellulitis will respond to ABT. A failure to respond may indicate the progression of the infection. Therefore, patients showing no improvement or deterioration after 24–36 hours, or those with a fluctuating fever not resolving within 36 hours, require a CT scan⁷. In our study,

**Figure 4.** CT scan, axial view, with an ARS complicated with an epidural empyema (arrow).

the cases in which we chose not to perform imaging tests were assumed to be preseptal cellulitis after evaluation by Ophthalmology. Although we cannot completely rule out the possibility of postseptal involvement, there were no prognostic implications, as the patients responded favorably to ABT, showing improvement within the first 24 hours. The literature⁸⁻¹¹ reports that many patients with orbital cellulitis respond well to non-surgical management, and the same trend was observed in our patients, with 87.5% ($n = 7$) being treated with medical therapy alone, and only one patient requiring ESS. This patient also had significant leukocytosis ($33 \times 10^3/\mu\text{L}$) and CRP levels (26 mg/dL) on admission. Other types of orbital complications represent a minority of the cases^{5,12-16}. Among these, a subperiosteal abscess accounts for 9 to 28% of OC¹⁴. In our study, the incidence was 15%. Like orbital cellulitis, we only perform surgery at admission in patients with severe proptosis, reduced visual acuity or motility, elevated intraocular pressure, or signs of concurrent intracranial involvement. Le et al. selected a cut-off size of 3.8 mL; if the SPA volume exceeds 3.8 mL, the likelihood of surgery is 71%¹⁷. In our study, the two SPAs that required surgery had abscess volumes of 3.7 mL and 4.4 mL, while the SPAs that did not require surgery had volumes of 2.6 mL, 3.4 mL, and 4.2 mL. With these

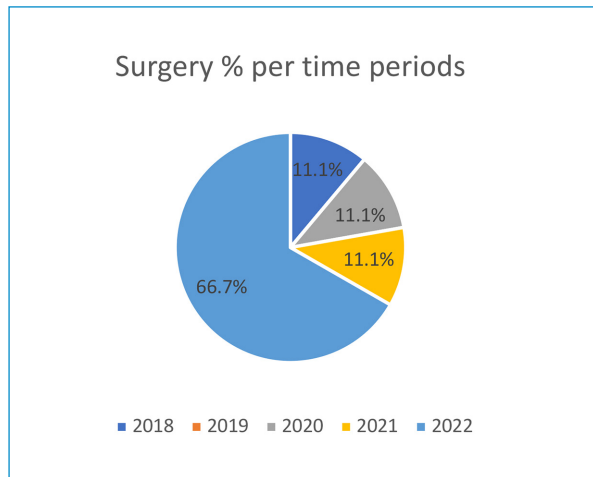


Figure 5. Variation in surgery performed across different time periods.

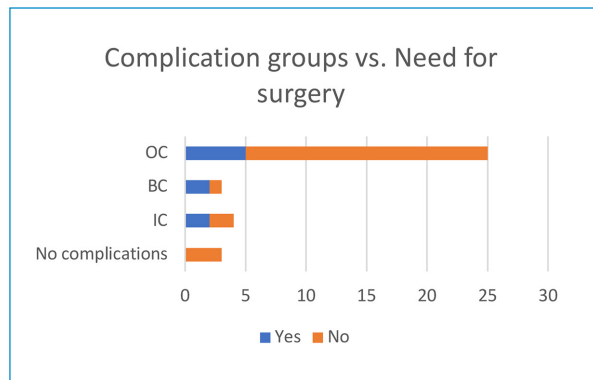


Figure 6. Surgery performed based on the type of complication.

results, we could not establish a definitive cut-off. Poor response after 24-48 hours of intravenous ABT also prompts surgical treatment¹⁴. Most of our patients (60%; $n = 3$) responded well to medical treatment and the other two (40%) required combined surgery (ENT plus Ophthalmology). As in the literature, we have published a few cases of orbital abscess, all of which involved surgical drainage^{5,12,13}.

We compared our results with those from another Portuguese hospital that analyzed postseptal orbital complications¹⁸. For this comparison, we only focused on our cases of postseptal orbital complications. The fact that they performed more surgeries (40% versus 29%) and had a higher sequelae rate (1.8% versus 0%) could be related to the difference in case types: we had more cases of postseptal cellulitis (57% versus 43.6%), while they had more orbital abscesses (18% versus 7%). Despite that, their length of stay was shorter (8.0

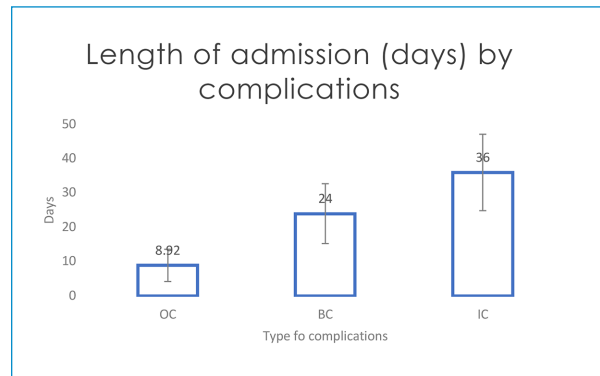


Figure 7. Length of admission according to type of complications.

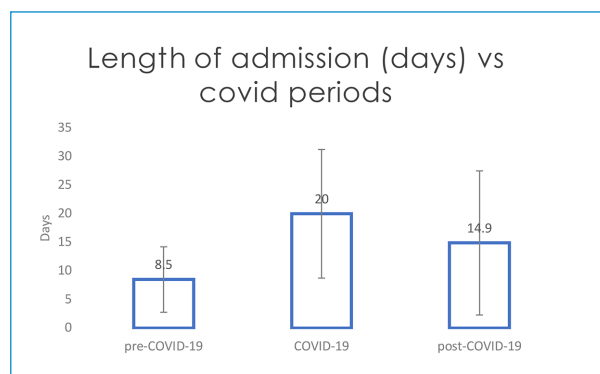


Figure 8. Length of admission according to time periods.

± 5.0 days) compared to our 11 days, which may indicate that surgery accelerates recovery. They also found an association between worse complications and higher leukocyte counts.

Intracranial complications

Children commonly exhibit a “silent” IC, which is why a high degree of suspicion is needed in cases of pediatric ARS, particularly in patients who do not respond well to medical therapy. In such cases, an MRI should be performed¹⁹. Neurological findings at presentation (i.e., changes to mental state, seizures, hemiparesis, dysarthria, facial droop, and neck stiffness) are associated with more severe complications (such as meningitis, encephalitis, cerebral abscess, subdural empyema, and sinus thrombosis) and, thus, worse outcomes¹⁹. In our study, two patients had a CT scan due to OC, which raised suspicions of intracranial involvement and prompted us to request an MRI, diagnosing an epidural empyema in one patient. The other had seizures and hemiparesis at presentation, prompting an MRI that diagnosed ARS and a subdural empyema.

Table 5. Mean length of stay according to age groups, complication groups, and time periods

Groups	Age	Complications	Time periods
Mean length of stay (days)	0-6 → 6.3 7-12 → 15.7 13-17 → 14.1	None → 7 OC → 8.9 IC → 36 BC → 24	Pre-COVID-19 → 8.5 COVID-19 → 20 Post-COVID-19 → 14.9
p	0.063	0.001	0.049

Patients with IC tend to be older. Germiller et al.¹⁹ reported a mean age of 13.2 years and this might be related to frontal sinus involvement as it was already well developed in 95% of the patients with IC. In our study, all patients were ≥ 11 years old (mean age 12.7). As in the Germiller et al. study¹⁹, epidural empyema was the most frequent form of IC. All our patients received a combination of intravenous third-generation cephalosporin along with clindamycin/metronidazole for four to six weeks. We did not use vancomycin, as reported in the literature^{19,20}. ESS is recommended as a standard procedure for most IC patients, regardless of neurosurgical drainage, due to its low morbidity and potential to expedite clinical improvement²¹. We performed ESS in 66.7% of IC cases, with 33.3% ($n = 1$) of these cases also necessitating neurosurgical drainage for the patient with subdural empyema. We found longer hospital stays, with an average of 34.5 days (ranging from 24 to 46 days)^{19,21,22}. Despite this, we report no long-term sequelae or instances of death. This could be attributed to our small sample size and the absence of severe IC cases such as intracranial abscesses.

Bone complications

BC have been on the rise in recent years, primarily due to improved diagnostic capabilities through imaging tests²³. They are more prevalent in adolescents with extensively pneumatized and vascular diploe in the frontal sinus²⁴. Patients typically exhibit edema in the frontal region (known as Pott's puffy tumor) because of infection spreading to the anterior wall. Involvement of the posterior wall can be associated with IC in a range of 29 to 85% of cases^{25,26}. Treatment consists of ABT for a min of six weeks, associated with surgical debridement of the affected bone²⁷. We reported three cases (9%), all involving the frontal sinus and affecting patients older than 11 years of age. One case involved a patient with cystic fibrosis who experienced an exacerbation of chronic rhinosinusitis with nasal polyps, in which MRSA was isolated.

Although the F508del/F508del mutation was identified, the patient had not yet started taking Orkambi® at the time of this infection. Another case was associated with an epidural empyema. Both of these cases required ESS and were the only ones treated with vancomycin. The third case involved a patient with frontal screws as a risk factor but responded well to medical therapy. None of the cases required bone debridement and all patients have recovered well.

SARS-CoV-2

During the COVID-19 period, the incidence of hospitalizations in patients with ARS decreased ($n = 5$), probably due to social distancing. Older children, who were more likely to interact despite distancing measures, were more affected. This is in line with the increased rate of severe complications (IC and BC) recorded during this period. Social lockdowns, which could potentially delay access to medical care resulting in patients presenting with worse clinical signs, are not supported by our results, as we observed no difference in the various analyzed periods. As published by Pei-Wen Wu et al.,²⁸ we also observed an increased incidence of ARS complications ($n = 12$) in the post-COVID-19 period, during which most surgeries (66.7%) took place. Immune alterations due to reduced antigenic stimulation in the autumn/winter of 2020–2021, along with more resistant microorganisms due to the overuse of broad-spectrum ABT and steroids in the treatment of COVID-19, might explain the rise in complicated infections that we observed during this period²⁹⁻³¹.

Microbiology and antibiotics

Regarding microbiology, we had only four isolates, limiting our ability to make statistical inferences. This highlights an area for improvement in our clinical practice, with a focus on tailoring antibiotic therapy based on susceptibility testing to prevent antibiotic misuse and to attempt to correlate specific microorganisms with particular complications. Since cultures take time

to grow, patients initially begin treatment empirically. We based our ABT on the susceptibility patterns of bacteria commonly isolated in complicated ARS from most studies, which aligned with our few isolates. Ceftriaxone alone was used almost exclusively for preseptal complications, given its broad-spectrum activity against gram-positive and gram-negative aerobes. Our patients with postseptal cellulitis, abscesses, or IC/BC received a combination of ceftriaxone and an antibiotic with anaerobic coverage, as anaerobes are frequently associated with this infection but are difficult to isolate, which is similar to another study conducted on the same population¹⁸. The choice between clindamycin and metronidazole was left to the discretion of the attending physician, as both penetrate well into most tissues, including abscess contents. Clindamycin acts against MRSA but requires high doses for adequate penetration into the central nervous system.

Conclusion

With the increased availability of imaging, diagnosis, and treatment of ARS, complications can be identified earlier, greatly impacting the outcomes. Ocular complications remain the most frequently diagnosed complication and tend to be identified early in the course, as patients usually seek medical care due to objective alterations found during physical examination. In contrast, although rarer, IC tend to present as silent complications and can pose a challenging diagnostic scenario, often requiring a multidisciplinary approach. Inflammatory markers appear to have a positive correlation with the need for surgery. Consistent with other studies, we report an increase in severe infections since the COVID-19 pandemic. This increase could be related to the immunological impact of the social distancing measures implemented during the various lockdowns in our country throughout the first year of the SARS-CoV-2 pandemic.

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Author contributions

F. Bartolomeu: conceptualized and designed the study, collected data, and wrote the article. J. Fonseca Neves:

assisted in designing the study and provided expertise in pediatric otolaryngology. B. Ramada: performed the statistical analysis, and validated the findings. H. Figueiredo: assisted with data collection. S. Chaves: managed the literature search. A. Miguéis: formatted the manuscript for submission. J. Miguéis: reviewed and approved the final version of the manuscript for publication.

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Conflicts of interest

None.

Ethical considerations

Protection of humans and animals. The authors declare that no experiments involving humans or animals were conducted for this research.

Confidentiality, informed consent, and ethical approval. The study does not involve patient personal data nor requires ethical approval. The SAGER guidelines do not apply.

Declaration on the use of artificial intelligence. The authors declare that no generative artificial intelligence was used in the writing of this manuscript.

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Changes in pediatric emergency department utilization and health literacy: a study of non-urgent visits before and after the COVID-19 pandemic

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Abstract

Introduction and objectives: The overuse of emergency rooms puts strain on the National Health Service. The aim is to compare the pre- and post-pandemic reality and understand the impact on hospital resource consumption. **Methods:** A cross-sectional observational study was conducted on patients under 18 years of age admitted to the emergency department, who were classified as non-urgent or urgent, and a questionnaire was randomly distributed during triage. **Results:** A study of 511 questionnaires revealed no significant differences in sample profiles between the two time periods. The most common family type was nuclear, with an older child and regular health monitoring. The most concerning symptom was fever, leading to emergency room visits in under 48 hours with no prior medical observation. The primary reasons for emergency room visits were specialist observation and testing requirements. Approximately 30% of doctors thought the visit was justified. **Discussion:** Regardless of their experience and regular health monitoring, the families chose to go to the emergency room first and almost immediately. A third of the doctors thought that going to the emergency room was justified, but only a minority of the children needed interventions that would have justified going to the emergency room. To improve the rational use of the emergency room, increased awareness of health resources should be promoted amongst families and health professionals. Despite the pandemic and the decrease in emergency room visits during that time, the population's behavior has remained consistent, and literacy issues remain unresolved. To intervene in health education, new strategies must be developed.

Keywords: Overuse. Pediatric emergency. COVID-19. Health education.

Mudanças na utilização do departamento de emergência pediátrica e literacia em saúde: um estudo sobre visitas não urgentes antes e depois da pandemia de COVID-19

Resumo

Introdução e objetivos: A sobreutilização das urgências constitui um motivo de desgaste do Serviço Nacional de Saúde. Pretende-se comparar a realidade pré e pós-pandémica e perceber o impacto no consumo dos recursos hospitalares. **Métodos:** Estudo observacional transversal. Inclui utentes até aos 18 anos admitidos na urgência, triados como pouco e não

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urgentes. Questionário distribuído aleatoriamente na triagem. **Resultados:** Incluídos 511 questionários. Sem diferenças significativas no perfil das amostras estudadas nos 2 períodos. A tipologia familiar predominante foi nuclear, com um filho mais velho e vigilância de saúde regular. O sintoma mais preocupante foi febre, motivando a ida à urgência em menos de 48 horas, a maioria sem observação médica prévia. Os motivos mais frequentes para o recurso à urgência foram a observação por um especialista e necessidade de exames. Cerca de 30% dos médicos considerou a vinda justificada. **Discussão:** Apesar das famílias serem experientes e terem vigilância regular de saúde, escolheram primeiramente e quase de forma imediata recorrer à urgência. Cerca de um terço dos médicos considerou a vinda à urgência justificada, no entanto apenas uma minoria das crianças necessitou das intervenções, que poderiam justificar o recurso à urgência. A literacia para a saúde das famílias e dos profissionais de saúde deve ser uma estratégia para melhorar o recurso racional à urgência. Apesar da pandemia e da redução da afluência à urgência nesse período, o comportamento da população manteve-se semelhante e os problemas de literacia continuam por resolver. É necessário encontrar novas estratégias para intervir na educação para a saúde.

Palavras-chave: Sobreutilização. Urgência pediátrica. COVID 19. Educação para a saúde.

Keypoints

What is known

- Emergency room overcrowding is a stressful issue for the National Health Service.
- Most patients who go to the pediatric emergency room do not need this level of care.
- During the COVID-19 pandemic, there was a massive reduction in emergency room visits following multiple health information campaigns.

What is added

- The behavior of the population was similar in the pre- and post-pandemic periods.
- Patients who come to the emergency room most often belong to nuclear families with educated parents, older children, and regular health monitoring.
- It is essential that we train caregivers in the self-management of common pediatric symptoms such as fever, cough, and vomiting.

Introduction

The overuse of hospital emergency rooms is a cause of wear and tear on the National Health Service (NHS). Understanding the concept of an urgent situation and, consequently, the reasons for resorting to the emergency room is essential for its proper use. An urgent event is characterized by a clinical situation of sudden onset with a risk of failure of vital functions. At least 50% of people who use a hospital emergency room do not need this level of care¹. This has a negative impact on the quality and even the personalization of the care offered to users who really need it. These figures are even more significant in pediatric emergency departments nationwide, with around 60,000 admissions a year per hospital catchment area^{2–5}. To better characterize this volume of admissions, we need to know the level of health literacy in recognizing clinical warning signs and the socio-family background of those accompanying children who come to the hospital emergency room.

The Pediatric Emergency Department (PED) at Hospital Garcia de Orta (HGO) is a multipurpose emergency department. It admits children and adolescents up to the age of 18 (exclusive). The average number of admissions per year from 2015 to 2018 was 47,950.

During the time of the COVID-19 pandemic (2019–2021), like other specialties, there was a massive reduction in access to the PED HGO. The number of admissions to the PED HGO in 2020 was 17,877 (a 63% reduction). A greater number of children were referred, mainly through the SNS 24 Health Line.

In 2017 (prior to the COVID-19 pandemic), an observational study was carried out at the HGO Pediatrics Department on non-urgent access to the PED. The aim of this study is to compare the current situation (post-COVID-19 pandemic) with that of 2017 in order to understand the evolution of the reasons for coming to the emergency room, the sociodemographic background, and the impact of the pandemic on the consumption of hospital resources.

Methods

This cross-sectional observational study took place in two different periods. The original study was carried out from January to March 2017. The team of authors decided to replicate the study to assess the impact of the pandemic on emergency room use. The second period ran from December 2021 to May 2022. This period required more time to acquire a comparable sample due to lower compliance in the distribution and

completion of questionnaires. The study's target population consisted of users of the PED. Children up to and including the age of 17 admitted to the HGO's PED and triaged as not very urgent (green wristband) or non-urgent (blue wristband) according to the triage systems in place at the time (the Canadian Triage and Acuity Scale for the former and the Manchester Triage System for the latter) were included. Cases in which the questionnaire was not filled out clearly or where the companion had already answered the questionnaire during the study period were excluded.

The study involved applying the questionnaire developed specifically for this purpose, previously approved by the HGO Ethics Committee (Supplementary data). Informed consent was obtained from the participants. The questionnaires were distributed at the time of triage during the PED's 24 hours of operation after randomizing the periods in Microsoft Office Excel®. The function "＝RANDBETWEEN" was used, randomizing the days of the month from one to 31, and the periods of the day with one (morning), two (afternoon), and three (evening). The questionnaires were filled out by the children's and young people's caregivers. The doctor who had examined the child filled out a second questionnaire (Supplementary data), independent of the questionnaire from the companions, in which they classified the visit to the hospital emergency room as justified or unjustified based on their clinical judgment.

Socio-demographic variables were collected, relating to the child (date of birth, age, and gender), the companion (degree of relationship and age), the parents (age, education, profession, employment status), the siblings (total number of siblings, age), and the child's environment (number of cohabitants, family type, place where the child or adolescent spends the day, place where child and adolescent health surveillance is carried out, health center to which they belong, and whether or not they have a general practitioner). Clinical data was also collected, namely personal history of chronic illnesses as well as usual attitudes towards illness and ways of using health services. The medical questionnaire looked at the following: the origin of the referral; the number of previous emergency episodes; diagnostic tests; intravenous therapy; observation by other specialists; the need for hospitalization; and the final diagnosis.

The data was analyzed using SPSS v27®. The qualitative variables were described by absolute and relative frequencies, *n* (%). Normally distributed continuous variables were described by their mean and standard

deviation, *M* (SD). Non-normally distributed continuous variables were described by the median and respective interquartile range, *M* [Q1; Q3]. The normality of the variables was assessed by graphical observation of the respective histograms. The relationship between categorical variables was checked using the chi-square test or Fisher's exact test, depending on whether the assumption of the chi-square test was met. The t-test for two independent samples was used whenever the variables were continuous and normally distributed. If this was not the case, the Mann-Whitney test was used. Values of $p \leq 0.005$ were considered significant.

Results

The results refer to both study periods, the first in 2017 (period 1) and the second in 2021–2022 (period 2). In the first period, 340 questionnaires were distributed, 297 of which were included and 43 excluded. In the second period, 250 questionnaires were distributed, of which 214 were included and 36 excluded.

Sociodemographic characteristics (Tables 1 and 2)

There were no significant differences in the sociodemographic characteristics of the children between the two study periods. The median age of the child was five in both samples, and the gender distribution was similar. As for the companion, the average age was 36 in both periods, but in the first, the children were predominantly accompanied by the mother (55%) or both parents (31%), while in the second, the mother was the main companion (89%) ($p < 0.001$).

When it came to characterizing the family, there was a statistically significant difference in the maternal level of education between the two periods, with a higher frequency of secondary and higher education ($p = 0.020$). With regard to employment, the tertiary sector was the most common in both samples, and there was a decrease in the paternal unemployment rate ($p = 0.045$) and a downward trend in the maternal unemployment rate in the second period ($p = 0.565$). The nuclear family was the most representative type in both samples, and the average number of cohabitants was three in both periods.

Regarding the place where the child spent most of their day, there was a predominance of nurseries and other establishments (schools) in both periods.

Table 1. Sociodemographic characterization of the patient, their companion and the environment

Variables	2017 (n = 298)	2021 (n = 221)	p
Sex, n (%)	n = 297	n = 214	
Female	157 (52,9)	111 (51,9)	0,049 ^{a,*}
Male	140 (47,1)	103 (48,1)	
Age, Med [Q ₁ ; Q ₃]	n = 292, 5 [2; 9]	5 [2; 10]	0,410 ^b
Child's companion, n (%)	n = 290	n = 218	
Father	29 (10,0)	18 (8,3)	< 0,001 ^{a**}
Mother	159 (54,8)	194 (89,0)	
Both	91 (31,4)	4 (1,8)	
Other	11 (3,8)	2 (0,0)	
Age of the child's companion, M (sd)	n = 266, 36,7 (8,5)	n = 217, 36,4 (8,0)	0,736 ^c
Siblings, n (%)	n = 294	n = 214	
Yes	194 (66,0)	148 (69,2)	0,503 ^a
No	100 (34,0)	66 (30,8)	
No. of siblings, Med [Q ₁ ; Q ₃]	n = 191, 1 [1; 2]	n = 143, 1 [1; 2]	0,330 ^b
Older siblings, n (%)	n = 187	n = 141	
Yes	146 (78,1)	112 (79,4)	0,787 ^a
No	41 (21,9)	29 (20,6)	
Younger siblings, n (%)	n = 187	n = 141	
Yes	61 (32,6)	46 (32,6)	1,000 ^a
No	126 (67,4)	95 (67,4)	
No. of cohabitants, M (sd)	n = 294, 2,9 (1,1)	n = 187, 3,0 (1,2)	0,239 ^c
Type of family, n (%)	n = 296	n = 214	
Enlarged	37 (12,5)	32 (15,0)	0,103 ^a
Single parent	32 (10,8)	31 (14,5)	
Nuclear	213 (72,0)	148 (69,2)	
Reconstituted	14 (4,7)	3 (1,4)	
Stay with, n (%)	n = 288	n = 200	
Mother/father or grandparents	72 (25,0)	51 (25,5)	< 0,001 ^{a,*}
Kindergarten	193 (67,0)	109 (54,5)	
Others	23 (8,0)	40 (20,0)	

^aChi-square test.^bMann-Whitney test.^cT-test for 2 independent samples.^dFisher's exact test.

*Significant at 5%.

Accessibility to health services (Table 3)

With regard to the child's or adolescent's health surveillance in both periods, the majority usually routinely visited the Healthcare Center (62.8% vs. 60.7%), a private pediatrician (15.0% vs. 13.1%), or both (20.5% vs. 23.8%). It was also found that the majority had an assigned family doctor (80% vs. 76%, respectively). A minority of the sample had a chronic illness (8.0% vs. 12.7%, $p = 0.120$).

Usual attitudes toward illness and patterns of use of health services (Tables 4 and 5)

When faced with questions related to the child's health, most caregivers said they would first ask their doctor in

both periods (77.5% vs. 71.0%, $p = 0.102$), and secondly, the nurse at the health center (27.9% vs. 29.9%, $p = 0.625$).

As for the first course of action taken when they realize that the child is ill, the majority answered that they monitor the evolution of symptoms (63.4% vs. 71.0%, $p = 0.074$), and in second place, they contact the SNS 24 Health Line (30.5% vs. 29.4%). There was a statistically significant decrease in selecting the “go to the Healthcare Center” option in the second period (32.6% vs. 20.4%, $p = 0.003$).

In terms of the symptoms that prompted the visit to the emergency room, the most frequently reported were fever (37.9% vs. 33.5%), cough/nasal obstruction (35.6% vs. 32.1%), and vomiting (17.8% vs. 21.3%). There were no significant differences between the two

Table 2. Sociodemographic characterization of caregivers

Variables	2017 (n = 298)	2021 (n = 221)	p
Mother			
Age, M (sd)	n = 288, 35,7 (7,0)	n = 215, 36 (7,7)	0,679 ^c
Level of education, n (%)	n = 277	n = 200	0,006 ^{a,*}
9th grade or less	105 (37,9)	50 (25,0)	
10th to 12th	96 (34,7)	93 (46,5)	
Higher education	76 (27,4)	57 (28,5)	
Profession, n (%)	n = 232	n = 167	0,637 ^d
Primary	1 (0,4)	0 (0)	
Secondary	3 (1,3)	5 (3,0)	
Tertiary	226 (97,4)	161 (96,4)	
Student	2 (0,9)	1 (0,6)	
Unemployed, n (%)	n = 235	n = 137	0,565 ^a
Yes	78 (33,2)	41 (29,9)	
No	157 (66,8)	96 (70,1)	
Father			
Age, M (sd)	n = 266, 38,2 (7,3)	n = 174, 38,4 (7,7)	0,763 ^c
Level of education, n (%)	n = 254	n = 163	0,223 ^a
9th grade or less	116 (45,7)	61 (37,4)	
10th to 12th	109 (42,9)	78 (47,9)	
Higher education	29 (11,4)	24 (14,7)	
Profession, n (%)	n = 233	n = 144	0,637 ^d
Primary	3 (1,3)	2 (1,4)	
Secondary	50 (21,5)	29 (20,1)	
Tertiary	177 (76,0)	112 (77,8)	
Student	1 (0,4)	0 (0)	
Retired	2 (0,9)	1 (0,7)	
Unemployed, n (%)	n = 214	n = 101	0,045 ^{a,*}
Yes	32 (15,0)	7 (6,9)	
No	182 (85,0)	94 (93,1)	

^aChi-square test.^bMann-Whitney test.^c2 sample t-test.^{*}Significant at 5%.

periods. In both cases, the symptom that worried parents the most was fever (13.6% vs. 22.8%). With regard to the length of time symptoms lasted until they were admitted to the hospital, 54% of the children had been ill for less than 48 hours in the first period, while in the second period this percentage was 70% ($p = 0.008$). There was no statistically significant difference in the severity of the episode, but most parents considered their children's situation to be urgent (57.9% vs. 55.7%).

Most of the children in our sample had not undergone any medical observation prior to going to the emergency room (77.9% vs. 82.8%). When asked why they went to the hospital emergency room, observation by a specialist was the most frequent answer in both

periods (34.9% vs. 32.6%) and also the one they considered most important. Other common answers were: having been referred (22.8% vs. 31.7%, $p = 0.027$); not being able to get a same-day appointment (25.2% vs. 21.7%); and the possible need for complementary tests at the hospital (21.8% and 28.5%).

Perspective on health services (Table 6)

Regarding the priority given in triage, in the first period, most patients were triaged as non-urgent, while in the second period, most patients were triaged as not very urgent ($p = < 0.001$). The SNS 24 Health Line was responsible for around 60% of the children who were referred in both periods. Most patients did not need

Table 3. Accessibility to health services

Variable	2017 (n = 298)	2021 (n = 221)	p ^a
Child health surveillance, n (%)	n = 293	n = 214	0,742
Doctor assigned, n (%)	n = 287	n = 206	0,222
No	56 (19,5)	50 (24,3)	
Yes	231 (80,5)	156 (75,7)	
Known chronic disease, n (%)	n = 263	n = 204	0,120
No	242 (92,0)	178 (87,3)	
Yes	21 (8,0)	26 (12,7)	

^aChi-square test.

complementary tests (83.2% vs. 82.8%), intravenous therapy (99.0% vs. 99.5%), or observation by another specialty (96.0% vs. 96.8%). No patients were hospitalized during the study periods. The five most frequent diagnoses in both periods were: acute gastroenteritis, acute nasopharyngitis, acute tonsillitis, acute otitis media, and acute pain due to trauma. Around 30% of the doctors considered their visit to be justified. For this reason, a sub-analysis was carried out on the cases that were considered justified, and the main diagnoses were similar: acute gastroenteritis, acute otitis media, acute tonsillitis, acute pain due to trauma, and acute nasopharyngitis.

Discussion

Overall, there were no significant differences in the profiles of the samples studied in the pre- and post-COVID-19 periods. The experience of a particular period in history, with relevant restrictions, lockdowns, and information in the media about the seriousness of the diseases, apparently did not change the paradigm of misuse of hospital emergency rooms. Notwithstanding the reduction in the number of emergency episodes seen in the first months of the COVID-19 pandemic^{6,7}, with a reduction in episodes with low-priority triage⁸, there was a progressive increase in the use of hospital emergency rooms in the following months. Several factors have been pointed out, including difficulties in accessing primary health care^{9,10} and inadequate referrals from the SNS 24 Health Line¹¹. However, it may also correspond to an increase in cases of inappropriate use of hospital emergency services, with a return to the previous pattern of hospital resource consumption.

Socio-demographic profile of companions

In a more specific assessment, it is important to discuss some particular aspects. In the population under

study, we found that factors such as single-parent families, first child, or a smaller support network, seen as potentially responsible for greater use of hospital emergency services^{12,13}, were not the most prevalent in this sample. In both periods, there was a greater representation of nuclear families: parents with a median age of 36 years, a higher level of education, and an older child. Despite the improving trend in education and unemployment rates between the two study periods, this did not translate into a reduction in the unjustified use of hospital emergency services. It could be inferred that structural changes with an impact on health literacy have not yet taken place.

Accessibility to health services

Lack of accessibility to primary health care has historically been cited as a reason for resorting to hospital emergency services^{2,10,12,14,15}. However, in the samples studied, only 2% had no regular medical follow-up. The majority had their own family doctor; around a third had a pediatrician, and a fifth of the sample had both. It should also be noted that children with chronic illnesses accounted for only around 10% of the sample in both periods.

The lower use of health centers could be explained by the conditioned care in primary health care that was prolonged in the second study period due to the COVID-19 pandemic. There was also a statistically significant increase in cases referred to the pediatric emergency room by other health services, namely the SNS 24 Health Line. This data could support the notion that the misuse of hospital emergency rooms in the post-pandemic period was also due to the difficulty in accessing primary health care and the referral criteria of the SNS 24 Health Line¹¹.

It is also worth mentioning in this context the recent creation of the so-called green lanes in Almada and Seixal, which include care for children without a family doctor, as a response to be developed when faced with acute illness.

Table 4. Attitudes towards acute illness and pattern of use of health services

	2017 (n = 298)	2021 (n = 221)	p ^a
What do you do when you have questions about your child's health?, n (%)			
Searches for information on the internet, in books or other audiovisual media	68 (22,8)	39 (17,6)	0,156
Talks to family, friends, or neighbors	51 (17,1)	41 (18,6)	0,728
Consults to pharmacists	51 (17,1)	34 (15,4)	0,633
Speaks with the nurse at the healthcare center	83 (27,9)	66 (29,9)	0,625
Seeks advice from their family doctor or pediatrician	231 (77,5)	157 (71,0)	0,102
Other	50 (16,8)	28 (12,7)	0,215
What do you do first when you realize that your child is ill?, n (%)			
Monitor the evolution of symptoms	189 (63,4)	157 (71,0)	0,074
Start the medication that seems most appropriate to you	42 (14,1)	20 (9,0)	0,100
Call the SNS 24 Health Line	91 (30,5)	65 (29,4)	0,847
Visit the healthcare center	97 (32,6)	45 (20,4)	0,003*
Consult the pediatrician	43 (14,4)	32 (14,5)	1,000
Take the child to the pediatric emergency room	72 (24,2)	50 (22,6)	0,754
Why did you bring him to the emergency room?, n (%)			
I was referred	68 (22,8)	70 (31,7)	0,027*
My healthcare center is closed	65 (21,8)	41 (18,6)	0,380
I don't have a family doctor	27 (9,1)	32 (14,5)	0,069
I couldn't get an appointment today	75 (25,2)	48 (21,7)	0,404
I don't trust my family doctor	7 (2,3)	6 (2,7)	1,000
I want the child to be seen by a specialist	104 (34,9)	72 (32,6)	0,639
I want a second opinion	14 (4,7)	14 (6,3)	0,437
I believe tests are needed that are only available in a hospital	65 (21,8)	63 (28,5)	0,099
Because it's free	9 (3,0)	7 (3,2)	1,000
Because it's the closest facility	27 (9,1)	22 (10,0)	0,763
Because the service is faster	17 (5,7)	13 (5,9)	1,000
Because I believe the illness is serious and urgent	26 (8,7)	30 (13,6)	0,087
Because I don't know how to manage this illness	19 (6,4)	18 (8,1)	0,492
Because family or friends advised me to come	9 (3,0)	10 (4,5)	0,479
Because the school/kindergarten recommended I come	24 (8,1)	15 (6,8)	0,618
Other	33 (11,1)	15 (6,8)	0,125
Which of the above reasons do you consider most important? (n = 241; 159), n (%)			
I was referred	36 (14,9)	33 (20,8)	NA
My healthcare center is closed	24 (10,0)	7 (4,4)	
I don't have a family doctor	6 (2,5)	7 (4,4)	
I couldn't get an appointment today	23 (9,5)	8 (5,0)	
I don't trust my family doctor	0 (0)	1 (0,6)	
I want my child to be seen by a specialist	54 (22,4)	34 (21,4)	
I want a second opinion	3 (1,2)	0 (0)	
I believe tests are needed that are only available in a hospital	45 (18,7)	31 (19,5)	
Because it's free	1 (0,4)	1 (0,6)	
Because it's the closest facility	2 (0,8)	3 (1,9)	
Because the service is faster	4 (1,7)	2 (1,3)	
Because I believe the illness is serious and urgent	13 (5,4)	16 (10,1)	
Because I don't know how to deal with this illness	7 (2,9)	8 (5,0)	
Because family or friends advised me to come	1 (0,4)	1 (0,6)	
Because the school or kindergarten recommended it	5 (2,1)	1 (0,6)	
Other	17 (7,1)	6 (3,8)	

^aChi-square test.

*Significant at 5%.

NA: not applicable.

Attitudes towards acute illness

The analysis of the sample also shows the immediacy of resorting to hospital emergency services. More than 60% of caregivers reported monitoring the progress of symptoms when their child became ill. However, in the first period of the study, around 60% of the children had

been ill for less than 48 hours. In the second period, this trend worsened and was statistically significant, with 70% of the children having been ill for less than 48 hours.

Answering the question, "What do you do when you have questions about your child's health?", despite the fact that the most common response was "go to the

Table 5. Patient’s current symptoms and their duration

	2017 (n = 298)	2021 (n = 221)	p ^a
What are the child’s current symptoms?, n (%)			
Fever	113 (37,9)	74 (33,5)	0,310
Cough/nasal congestion	106 (35,6)	71 (32,1)	0,454
Difficulty breathing	40 (13,4)	19 (8,6)	0,095
Sore throat	46 (15,4)	31 (14,0)	0,709
Earache	35 (11,7)	18 (8,1)	0,191
Skin rash	31 (10,4)	23 (10,4)	1,000
Vomiting	53 (17,8)	47 (21,3)	0,368
Diarrhea	35 (11,7)	37 (16,7)	0,123
Stomach pain	50 (16,8)	39 (17,6)	0,815
Headache	38 (12,8)	25 (11,3)	0,684
Trauma/fall	29 (9,7)	26 (11,8)	0,474
Other	49 (73,1)	40 (69,0)	0,693
Which symptom worries you the most? (n = 199; 162), n (%)			
Fever	27 (13,6)	37 (22,8)	0,413
Cough/nasal congestion	17 (8,5)	7 (4,3)	
Difficulty breathing	11 (5,5)	8 (4,9)	
Sore throat	9 (4,5)	5 (3,1)	
Earache	20 (10,1)	9 (5,6)	
Skin rash	16 (8,0)	16 (9,9)	
Vomiting	18 (9,0)	17 (10,5)	
Diarrhea	4 (2,0)	2 (1,2)	
Stomach pain	13 (6,5)	14 (8,6)	
Headache	3 (1,5)	3 (1,9)	
Trauma/fall	21 (10,6)	16 (9,9)	
Other	40 (20,1)	28 (17,3)	
How long has this symptom lasted?, n (%)			
< 12h	45 (16,5)	55 (26,6)	0,008*
12-24h	60 (22,1)	48 (23,2)	
24-48h	43 (15,8)	42 (20,3)	
2-7 days	90 (33,1)	43 (20,8)	
1-2 weeks	17 (6,3)	12 (5,8)	
> 2 weeks	17 (6,3)	7 (3,4)	
How serious do you think the current situation is?, n (%)			
Not urgent	15 (5,8)	19 (9,4)	0,434
Not very urgente	84 (32,4)	66 (32,5)	
Urgent	150 (57,9)	113 (55,7)	
Very urgent	10 (3,9)	5 (2,5)	
Was the child seen by another doctor before going to the emergency room?, n (%)			
Yes	60 (22,1)	36 (17,2)	0,207
No	212 (77,9)	173 (82,8)	
If yes, by whom?, (n = 96), n (%)			
Family doctor	35 (59,3)	25 (71,4)	0,221
Pediatrician	8 (13,6)	6 (17,1)	
Other	16 (27,1)	4 (11,4)	

^aChi-square test.

*Significant at 5%.

family doctor or pediatrician,” only 20% of the children had been seen by a doctor before being seen in the emergency room. This data suggests that regardless of the existence of a support network, most caregivers chose to go to the pediatric emergency room first. When asked about the “first course of action when they realize their child is ill,” there was a statistically significant decrease in selecting “go to the Healthcare Center”.

Among the reasons that seem to have had the greatest influence on the decision to go to the emergency room in this study were observation by a specialist and the need for complementary diagnostic tests in both periods, findings that are similar to those of other reported studies⁴. These reasons should be strategic targets for resolving undue access to hospitals, with the aim of strengthening trust in primary health care.

Table 6. Perspective of health services

	2017 (n = 298)	2021 (n = 221)	p ^a
Triage, n (%)	n = 291	n = 186	
Blue	242 (83,2)	4 (2,2)	< 0,001 [*]
Green	49 (16,8)	178 (95,7)	
Yellow	0 (0)	4 (2,2)	
Referenced by, n (%)	n = 46	n = 17	
SNS 24 line	27 (58,7)	10 (58,8)	0,662 ^b
Pediatrician	4 (8,7)	0 (0)	
Healthcare center	15 (32,6)	7 (41,2)	
Non-referenced	252 (85)	204 (92)	
No. of previous emergency episodes, Med [Q1; Q3]	n = 276, 6 [2; 14]	n = 167, 4 [2; 10]	0,019 ^{c,*}
Performed complementary exams, n (%)			
No	248 (83,2)	183 (82,8)	0,906 ^a
Yes	50 (16,8)	38 (17,2)	
Did intravenous therapy, n (%)			
No	295 (99,0)	220 (99,5)	0,640 ^b
Yes	3 (1,0)	1 (0,5)	
Was seen by another specialty, n (%)			
No	286 (96,0)	214 (96,8)	0,646 ^a
Yes	12 (4,0)	7 (3,2)	
Hospitalized, n (%)			
No	298 (100,0)	221 (100,0)	NA
Yes	0 (0)	0 (0)	
Do you consider this visit justified, n (%)			
No	200 (67,1)	141 (63,8)	0,455 ^a
Yes	98 (32,9)	80 (36,2)	
Most frequent diagnoses, n (%)	n = 278	n = 173	
Acute gastroenteritis	35 (12,2)	37 (20,8)	0,037 ^{a,*}
Acute nasopharyngitis	52 (18,1)	17 (9,6)	
Acute tonsillitis	22 (7,6)	11 (6,2)	
Acute otitis media	20 (6,9)	9 (5,1)	
Acute pain due to trauma	9 (3,1)	6 (3,4)	
Acute conjunctivitis	8 (2,9)	4 (2,3)	
Chickenpox	6 (2,2)	6 (3,5)	
Abdominal pain	5 (1,8)	6 (3,5)	
Sprain	4 (1,4)	6 (3,5)	
Fever	8 (2,9)	1 (0,6)	
Other	109 (39,2)	70 (40,4)	
Most frequent diagnoses in visits considered justified n (%)	98 (100)	76 (95)	
Acute gastroenteritis	5 (5,3)	15 (20,5)	NA
Acute otitis media	9 (9,5)	5 (6,8)	
Acute tonsillitis	8 (8,4)	3 (4,1)	
Acute pain due to trauma	5 (5,3)	3 (4,1)	
Acute nasopharyngitis	5 (5,3)	2 (2,7)	

^aChi-square test.^bFisher's exact test.^cMann-Whitney test.^{*}Significant at 5%.

NA: not applicable.

Although around 60% of cases consider the situation to be urgent or very urgent, only around 10% mention the seriousness or urgency of the illness as one of the reasons for coming. The most common pediatric symptoms (such as fever, cough, and vomiting) continue to be the three main reasons that unduly bring children to

the emergency room. The perception of serious illness in low-severity situations, the use of emergency services within the first 48 hours of symptoms, and the identification of common symptoms in pediatric age show a lack of health literacy and immediacy in the search for a quick resolution to acute illness^{4,10,16}.

Perspective of health services

From the health services perspective, a significant proportion of the episodes in both study periods (32.9% vs. 36.2%, respectively) were considered justified. In an attempt to identify children categorized as non-urgent who could be referred for emergency observation, four questions were inserted into the questionnaire given to doctors. These questions revealed that less than 20% of patients underwent complementary diagnostic testing, less than 5% were seen by another specialty, only 1% underwent intravenous therapy, and no patients were hospitalized. After verifying that the total number associated with the aforementioned conditions did not correspond to all the cases considered by the doctors to be worthy of coming to the emergency room, we proceeded to analyze the diagnoses made in these cases. It was found that most of the diagnoses corresponded to non-urgent illnesses that could be managed at home and in primary health care. The doctor's degree of differentiation may have influenced this data, but the results suggest that doctors also lack literacy when it comes to the reasons for resorting to a hospital emergency room. Referral criteria should be strengthened, and investment should be made in the training of health professionals.

Limitations

The study has methodological limitations inherent to its observational nature, based on the application of surveys, with the possibility of bias in the information provided for various reasons: the possible influence of responses after information provided in triage or when returning to the emergency doctor; the possible preference for the most differentiated companion; the potential lack of representation of illiterate users; the subjectivity of the doctor's assessment of the justification for coming to the emergency room, as well as their differentiation. Another limitation is the change in the triage system between the study periods.

We are currently experiencing an increase in emergency department overcrowding due to a lack of human resources in hospitals and primary health care, which has resulted in fewer available emergency rooms and consultations. It would be interesting to extend this study to the present day in order to characterize existing health-care availability. However, the reality we are currently experiencing in healthcare is an extraordinary situation.

Conclusion

During the COVID-19 pandemic, there were multiple health information campaigns, particularly on the

reasons and risks of going to the emergency room and managing common symptoms at home. These campaigns resulted in a considerable overall reduction in the number of admissions. After the pandemic, it would have been expected that the population would maintain this behavior, going to the emergency room only in cases of serious illness.

However, in this study, we found that there were no significant differences in the samples studied. The users who make the most use of the emergency room belong to nuclear families with educated and employed parents, older children, and regular child health monitoring. Notwithstanding the improvement in education and employability indicators, there was no improvement in health literacy. Parents are afraid of common pediatric symptoms such as fever, coughing, and vomiting, which makes them go almost immediately to the pediatric emergency room, regardless of having a health support network in the community. These symptoms need to be given greater prominence in health education interventions, and confidence in using primary health care needs to be strengthened. A significant proportion of situations were considered by emergency doctors to be justified, which contributes to resorting to the emergency room as the main option. Training on hospital referral criteria needs to be reviewed and strengthened.

Despite the pandemic and the reduction in emergency room visits during this period, the population's behavior has remained similar, and health literacy problems remain unresolved. The aim should be to empower caregivers to self-manage their child's illness. Larger, prospective studies are needed to objectively demonstrate and quantify the impact of health education strategies on the consumption of hospital resources for the justified reorganization of health systems.

Supplementary data

Supplementary data are available at DOI: 10.24875/PJP.24000031. These data are provided by the corresponding author and published online for the benefit of the reader. The contents of supplementary data are the sole responsibility of the authors.

Author contributions

M. Filomena Cardosa: conception and design of the study; acquisition of data from patients, research studies and literature; analysis and interpretation of data from patients, research studies and literature; drafting the article; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work.

Z. Shchomak: conception and design of the study; acquisition of data from patients, research studies and literature; analysis and interpretation of data from patients, research studies and literature; drafting the article; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work. R. Guerreiro: conception and design of the study; acquisition of data from patients, research studies and literature; analysis and interpretation of data from patients, research studies and literature; drafting the article; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work. A. Teixeira: analysis and interpretation of data from patients; drafting the article; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work. P. Pereira: analysis and interpretation of data from patients; drafting the article; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work. F. Nunes: conception and design of the study; analysis and interpretation of data from patients; drafting the article; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work. B. Sanches: conception and design of the study; analysis and interpretation of data from patients; drafting the article; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work.

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Conflicts of interest

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Ethical considerations

Protection of humans and animals. The authors declare that no experiments involving humans or animals were conducted for this research.

Confidentiality, informed consent, and ethical approval. The authors have followed their institution's confidentiality protocols, obtained informed consent from patients, and received approval from the Ethics Committee. The SAGER guidelines were followed according to the nature of the study.

Declaration on the use of artificial intelligence. The authors declare that no generative artificial intelligence was used in the writing of this manuscript.

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Will war be a family discussion topic? Children and adolescents awareness and family topic conversation on war news: a cross sectional study in Portugal following the emergence of the Russia-Ukraine conflict

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Abstract

Introduction and objective: Since the September 11 attacks took place, several studies have been carried out, looking at the impact that news about traumatic events has on the population not directly exposed. The aim is to determine to what extent children and adolescents have access to the news and whether the topic of war is discussed within the family. **Methods:** Cross-sectional, observational study, with questionnaires to parents of children and adolescents between five and 17 years old, between October and December 2022. The sample was divided into two groups: group I (GI) with children aged from five to 11 and group II (GII) with adolescents from 12 to 17. **Results:** We obtained 97 questionnaires (response rate of 91.5%) of which 46.4% were from GI and 53.6% from GII. More than half of the parents already permitted limited access to the news for their children, with differences between the groups (68.9% GI vs. 38.5% GII, $p = 0.003$), and the main restricted news items were those of a violent nature (74.5%). Nearly all the children and adolescents became aware of the Russia-Ukraine conflict, mostly through television (81.4% GI vs. 90.4% GII, $p = 0.204$), the internet (23.3% GI vs. 55.8% GII, $p = 0.001$), and school (74.4% GI vs. 53.8% GII, $p = 0.039$). The topic of war was addressed by 80.4% of the parents, and the most commonly expressed feelings by their children were sadness and concern, with GI frequently expressing fear and GII indignation. **Discussion:** The majority of the children and adolescents were aware of the ongoing conflict, and the issue was frequently addressed at home. Television continues to be the main source of access to information.

Keywords: Armed conflicts. Mental health. Media exposure.

Será a guerra um tema de conversa em família? Perceção das crianças e adolescentes e conversação familiar sobre a guerra: um estudo transversal em Portugal após o surgimento do conflito Rússia-Ucrânia

Resumo

Introdução e objetivos: Desde o atentado do 11 de setembro que se tem vindo a estudar a influência que notícias sobre eventos traumáticos têm na população não diretamente exposta. O objetivo é determinar como crianças e adolescentes têm acesso a notícias e se a temática da guerra é discutida em família. **Métodos:** Estudo transversal, observacional, com aplicação de questionários a pais de crianças e jovens entre os 5 e os 17 anos entre outubro e dezembro de 2022. A amostra foi

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dividida num grupo I (GI) com filhos entre os 5 e os 11 anos e num grupo II (GII) entre os 12 e os 17 anos. **Resultados:** Obtivemos 97 questionários (taxa de resposta de 91,5%), 46,4% do GI e 53,6% do GII. Mais de metade dos pais limitou o acesso a notícias aos filhos com diferenças entre os grupos (68,9% GI vs. 38,5% GII, $p = 0,003$), sendo as principais notícias restritas as de caráter violento (74,5%). Quase a totalidade das crianças e jovens tinha tido conhecimento do conflito Rússia-Ucrânia, maioritariamente através da televisão (81,4% GI vs. 90,4% GII, $p = 0,204$), internet (23,3% GI vs. 55,8% GII, $p = 0,001$) e escola (74,4% GI vs. 53,8% GII, $p = 0,039$). A temática da guerra foi abordada por 80,4% dos pais, e os sentimentos mais manifestados pelos filhos foram a tristeza e a preocupação, sendo no GI frequentemente manifestado o medo e no GII a indignação. **Discussão:** A maioria das crianças e jovens tiveram conhecimento do conflito decorrente, tendo sido frequente a abordagem do tema em casa. A televisão continua a ser a principal fonte de acesso à informação.

Palavras-chave: Conflitos armados. Saúde mental. Exposição aos media.

Keypoints

What is known

- There are currently more than 100 active armed conflicts spread across all continents.
- The conflicts between Russia and Ukraine and between Israel and Palestine are two of the biggest humanitarian emergencies since the Second World War.
- Exposure to news about armed conflicts can have consequences even on those not directly exposed to the conflicts (children included).

What is added

- More than half of the parents admitted to having already restricted the access to specific news items for their children.
- The topic of war had already been discussed at home by most of the families.
- The main feelings expressed by children when discussing the topic of war were sadness and concern.

Introduction

Most authors define armed conflict as any form of violence involving weapons that opposes governments, organized groups, and/or civilians within the same State or in different States, regardless of the intensity or cause of the confrontation¹.

Recently, Europe has been the site of some of the largest armed conflicts in history, with the conflicts between Russia and Ukraine and between Israel and Palestine becoming two of the biggest humanitarian emergencies since World War II. The conflict between Russia and Ukraine emerged in February 2022 and more than two years later, there are still 5.9 million refugees, of which 33% are children, and 14.6 million people requiring multisectoral humanitarian assistance².

However, since there are more than 100 armed conflicts currently active across all continents, most of which are in African territory, the attention given by the media to this conflict does not reflect the real dimension of the problem^{3–5}. It is a well-known fact that almost all individuals directly exposed to armed conflicts or other humanitarian emergencies will experience some type of psychological stress, with adolescents and young adults being the population

most susceptible to the subsequent development of depression, anxiety, and behavioral changes^{6,7}.

Given the important role assumed by the media in the 21st century (namely the television and social networks), which is even more visible in traumatic events such as armed conflicts and the COVID-19 pandemic, the number of studies on the impact that the images and the news transmitted may have on the mental health of people not directly exposed to those events has significantly increased. The greatest development in studies within this area occurred after the September 11 attacks in the United States of America, where a positive correlation was found between the number of hours spent watching the news and the development of depressive symptoms and post-traumatic stress^{8–10}. Also, a 2014 study carried out in the Gaza Strip after one of the periods in which more missiles were launched into the territory showed that, at that time, there was not only an increase in news consumption, but also a positive relationship between the time spent viewing the news and viewers' development of anxiety symptoms¹¹.

Since it is known that this increase in psychopathology also occurred in children and adolescents, a 2016 study proved that parents played an important role in reducing symptoms of anxiety and suffering in general when they mediated television exposure, which

corroborated their crucial role in children's responses to trauma¹².

Therefore, the objectives of this study were to determine to what extent children and young people had access to news of a violent nature (such as those referring to the Russia-Ukraine conflict) and to investigate whether the topic of war was discussed within the family.

Methodology

A cross-sectional, descriptive, observational study was carried out, which evaluated the approach to the topic of war between parents and children, as well as the reactions and feelings expressed by both and the way in which they access information. The study was carried out in the Outpatients Department and in the Pediatrics Ward of a Portuguese level I hospital, using a questionnaire to be answered by parents of children and adolescents during the period between October and December 2022. This questionnaire did not undergo a validation process and is available in Supplementary material. The inclusion criteria were having children between five and 17 years old and proficiency in the Portuguese language and the exclusion criteria were difficulty in mastering the Portuguese language and inability to respond to the questionnaire.

The questionnaires were delivered in person by the authors of the study in these two hospital areas to parents who met the criteria and who agreed to participate in the study after its purpose was explained to them. Written informed consent was also obtained. The questionnaires were later placed in two separate boxes, where the questionnaire and the informed consent were kept separately to ensure anonymity.

The questionnaire was divided into four sections: (1) sociodemographic identification of the father/mother, (2) sociodemographic identification of the child/adolescent, (3) forms of access to information/news, and (4) discussion of the topic of war at home.

The sample was subsequently divided into two groups, according to the age of the children, considering for this purpose the child they were accompanying during the consultation or hospitalization: Group I (GI) relating to children aged five to 11, and Group II (GII) relating to children aged 12-17.

The statistical analysis was performed using SPSS®, version 27.0. A descriptive analysis of sociodemographic variables was carried out and the Chi-square and Fisher tests were used. The value considered statistically significant was $\alpha = 0.05$.

The study was approved by the hospital's Ethics Committee.

Results

Sociodemographic characterization of the sample

One hundred and six questionnaires were handed out and 97 responses were returned, which represents a response rate of 91.5%. There were four parents of Ukrainian nationality among those who refused to respond.

The sample from the 97 participants had a median age of 43 years [39-46], 67.1% had secondary school education or higher and 81.4% were of Portuguese nationality. With respect to the children, 59.8% were male, with a median age of 12 years [8-15]. GI accounted for about 46.4% of the sample and GII 53.6% (Table 1).

Access to information

More than half of the parents (52.6%) admitted to having already allowed limited access to the news on specific topics for their children, with this limitation being greater in GI (68.9% GI vs. 38.5% GII, $p = 0.003$). The way they did this was essentially by changing the television channel (64.7%) or controlling social media content (52.9%). When asked about the main types of news items that were restricted, among four options given (news of a violent nature, news about natural disasters, news about health, and news of a sexual nature), the main types of restricted news items were those of a violent nature (74.5%), followed by those of a sexual nature (45.1%), with no statistically significant differences between the groups.

Parents admitted watching the news together with their children in more than half of the sample (68.0%), with no statistically significant difference between the groups (66.6% GI vs. 69.2% GII, $p = 0.787$). When there were news items related to armed conflicts/war or other types of violence, 52.5% of the parents did not switch channel and addressed the subject on their own initiative, 29.8% did not switch channel but only talked about the subject if their children raised questions, and 17.7% switched channels.

Almost the entire sample (97.9%) admitted that their children had become aware of the Russia-Ukraine conflict mostly through television (81.4% GI vs. 90.4% GII, $p = 0.204$), the internet (23.3% GI vs. 55.8% GII, $p = 0.001$), and school (74.4% GI vs. 53.8% GII, $p = 0.039$).

Table 1. Sociodemographic characterization of the sample

Group	Variable	
Sociodemographic characterization of the participants (parents)	Number of participants (n)	97
	Relationship of the accompanying person, n (%)	
	Mother	83 (85.6)
	Father	14 (14.4)
	Age (years)	
	Median	43
	Minimum	26
	Maximum	57
	Education, n (%)	
	1st cycle	5 (5.2)
Sociodemographic characterization of the children	2nd cycle	6 (6.2)
	3rd cycle	18 (18.6)
	Secondary	38 (39.2)
	Bachelor's degree	25 (25.8)
	Master's degree	2 (2.1)
	Unknown	3 (3.1)
	Nationality, n (%)	
	Portuguese	79 (81.4)
	Brazilian	7 (7.2)
	Other	2 (2.1)
	Unknown	9 (9.3)
	Gender, n (%)	
	Female	39 (40.2)
	Male	58 (59.8)
	Age (years)	
	Median	12
	Minimum	5
	Maximum	17
	Group, n (%)	
	GI (5-11 years)	45 (46.4)
	GII (12-17 years)	52 (53.6)
	Siblings, n (%)	
	Yes	78 (80.4)
	No	19 (19.6)

Discussion of the topic of war at home

The topic of armed conflicts had been addressed by 78 parents (80.4%). The approach to the topic was independent of the age group (77.8% GI vs. 82.7% GII, $p = 0.543$) and the presence of siblings (76.9% vs. 94.7%, $p = 0.079$). The main feelings expressed by the children when the topic was approached were sadness and concern, with GI also frequently expressing fear and GII displaying indignation (Table 2).

The subject was approached without difficulty by around 77% of parents, regardless of their children's age group (71.4% GI vs. 81.4% GII, $p = 0.299$) or their level of education ($p = 0.211$). About 20.5% of parents

found it difficult to answer their children's questions, and 2.6% had changed the subject. The questions most commonly asked by the children, among those presented in the questionnaire, are represented in table 3.

Out of the 19.6% who had not discussed the topic of war with their children, 61.1% justified this by pointing out that their children had not asked, 22.2% did not think it was appropriate, and 11.1% did not know how to approach the subject.

Discussion

In this study, we noticed that regardless of age, almost all children and adolescents were aware of the ongoing conflict, with television being the predominant means of accessing information, including among the adolescent population. This finding goes against some studies in the area reporting that the main source of news for this conflict was the internet, although it is important to highlight that these studies were not conducted using questionnaires or based on parents' perceptions¹³. Even so, most of the parents stated that they limited access to violent news, especially among the younger population.

Most parents had also chosen to address the issue of armed conflicts with their children when the first news about the Russia-Ukraine conflict emerged, and the ease or difficulty they had in approaching this subject had no relation to either the age of the children or the parents' level of education.

When the topic was approached, feelings of worry and sadness were very common in both age groups, with the younger age group expressing fear more frequently. An article reviewing the impact of terrorism on young people confirms that at younger ages it becomes more difficult for children to regulate their emotions after viewing traumatic images, and thus fear becomes a common feeling. The same article states that adolescents, despite being equally affected by the images, are able to develop more elaborate critical thinking addressing the themes of justice, politics and theology¹⁴. This explains why indignation was also more common in the 12-17 age group in our sample.

We realize that even the youngest age groups are becoming aware of the conflicts that are taking place today and feel the need to talk about them. Taking into account the studies that positively correlate exposure to these events through the media and the development of symptoms of depression and anxiety^{11,12}, it is essential to train parents to address these issues with their children in order to reduce the impact that these

Table 2. Feelings expressed by children when discussing the topic of war at home (n = 78)

Feelings	Group 1, (n = 35)	Group 2, (n = 43)	p
Fear	28.6%	4.7%	0.004
Concern	82.9%	62.8%	0.050
Empathy	31.4%	11.6%	0.031
Indignation	11.4%	32.6%	0.028
Indifference	0%	11.6%	N/A
Sadness	51.4%	44.2%	0.524

Table 3. Questions asked by children when discussing the topic of war at home, among those presented in the questionnaire (n = 78)

Questions	Group 1, (n = 35)	Group 2, (n = 43)	p
What is war?	40.0%	4.7%	<0.001
How long will it last?	54.3%	46.5%	0.495
Will they attack us too?	54.3%	39.5%	0.194
Are we going to die?	17.1%	7.0%	0.162
Why do wars happen?	57.1%	34.9%	0.049

news items could have on their mental health and to give them the support they need.

It has been proven that consumption of the news increases in times of armed conflict, so it is also up to us, as health professionals, not only to train parents to address the issue but also to inform them about the potential harmful effects of contact with these events through the media^{15,16}.

We cannot fail to mention some of the limitations of the study, such as the small sample size, the refusal to participate in the study of some parents who met the eligibility criteria, and the use of a non-validated questionnaire.

It is also important to say that the study took place at an early stage of the conflict between Russia and Ukraine, at a time when images were not only frequently broadcasted but people also felt significantly impacted by them, a situation that has faded over time.

Supplementary data

Supplementary data are available at DOI: 10.24875/PJP.24000054. These data are provided by the corresponding author and published online for the benefit of the reader. The contents of supplementary data are the sole responsibility of the authors.

Author contributions

M. Sousa Santos: conception and design of the study, report and review; acquisition of data either from patients, research studies, or literature; analysis or interpretation of data either from patients, research studies, or literature; drafting the article; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work.

A.C. Alves: conception and design of the study, report and review; acquisition of data either from patients, research studies, or literature; analysis or interpretation of data either from patients, research studies, or literature; drafting the article; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work.

E. Machado Guimarães: conception and design of the study, report and review; acquisition of data either from patients, research studies, or literature; analysis or interpretation of data either from patients, research studies, or literature; drafting the article; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work.

M. Manuel Zarcos: conception and design of the study, report and review; drafting the article; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work.

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Ophthalmia neonatorum: should old ways play a role in new realities?

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Abstract

Introduction and objectives: Neonatal conjunctivitis (NC) prophylaxis was introduced in 1980, reducing its incidence from 10 to 0.3%. However, the epidemiology has evolved in developed countries, with *Neisseria gonorrhoeae* becoming rare and *Chlamydia trachomatis* emerging as a prominent cause. Its necessity in developed countries is currently under debate. In our center, before 2006, prophylaxis was carried out on all newborns. Given the lack of cases of blindness due to gonococcal NC, our hospital has not carried out neonatal eye prophylaxis since 2007. The aim is to evaluate our center's experience over the last 15 years. **Methods:** A retrospective observational study was carried out. All ocular exudate samples were collected between 2008 and 2022. Among the identified cases of gonococcal conjunctivitis, clinical information was collected. **Results:** During this period, a total of 30,417 babies were born in our maternity hospital, and 112 ocular exudates were included. We identified only two cases of gonococcal conjunctivitis, both of which were quickly diagnosed and effectively treated, and there were no cases of gonococcal blindness. The incidence of gonococcal conjunctivitis in this population was 0.06 cases per 1,000 live births. No cases of blindness due to gonococcal infection were identified. **Discussion:** The need for prophylaxis for CN should be discussed. Currently, the indication for it in developed countries is debatable. We believe it is essential to draw up universal guidelines that standardize the existence of possible screening, prophylaxis and its protocol, its application criteria, and the treatment of neonatal conjunctivitis.

Keywords: Infant health. Conjunctivitis. Antibiotic prophylaxis.

Oftalmia neonatal: os métodos antigos devem desempenhar um papel nas novas realidades?

Resumo

Introdução e objetivos: A profilaxia da conjuntivite neonatal (CN) foi introduzida em 1880, reduzindo a sua incidência de 10 para 0,3%. No entanto, a epidemiologia evoluiu nos países desenvolvidos, com a *Neisseria gonorrhoeae* a tornar-se rara e a *Chlamydia trachomatis* a emergir como uma causa proeminente. Atualmente, a sua realização em países em desenvolvimento encontra-se em discussão. No nosso centro, antes de 2006, a profilaxia era efetuada em todos os recém-nascidos (RN). Dada

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a ausência de casos de cegueira devido à CN gonocócica, o nosso hospital não efetua profilaxia ocular neonatal desde 2007. O objetivo é avaliar a experiência do nosso centro nos últimos 15 anos. **Métodos:** Foi efetuado um estudo observacional retrospectivo. Todas as amostras de exsudado ocular foram recolhidas entre 2008 e 2022. Entre os casos identificados de conjuntivite gonocócica, foi recolhida informação clínica. **Resultados:** Durante este período, nasceram um total de 30 417 bebés na nossa maternidade, tendo sido incluídos 112 exsudados oculares. O estudo identificou apenas dois casos de conjuntivite gonocócica, ambos rapidamente diagnosticados e eficazmente tratados, e não se registaram casos de cegueira. A incidência de conjuntivite gonocócica nesta população foi de 0,06:1000 nados vivos. Não foram identificados casos de cegueira devido a infeção gonocócica. **Discussão:** A necessidade de profilaxia para a CN deve ser discutida. Atualmente, a sua indicação nos países desenvolvidos é discutível. Consideramos essencial a elaboração de diretrizes universais que uniformizem a existência de um possível rastreio, a profilaxia e o seu protocolo, os seus critérios de aplicação e o tratamento da conjuntivite neonatal.

Palavras-chave: Saúde neonatal. Conjuntivite. Profilaxia antibiótica.

Keypoints

What is known

- Neonatal conjunctivitis was the most significant cause of neonatal blindness before the 1980s.
- Neonatal antibiotic prophylaxis dramatically reduced the incidence of gonococcal conjunctivitis.
- Today, prophylaxis remains a common practice throughout the world.

What is added

- The prevalence of *Neisseria gonorrhoeae* was low in our group.
- With timely treatment and diagnosis, there is a low risk of serious complications from gonococcal conjunctivitis.
- There were multiple agents identified in ocular exudates, with *Neisseria gonorrhoeae* accounting for only 1.5% of cases.

Introduction

Ophthalmia neonatorum (ON), also known as neonatal conjunctivitis, is an ocular surface disease characterized by inflammation of the conjunctiva that occurs in the first 28 days of life^{1,2}. Its incidence is around 1.6 to 12% and it varies geographically and in different clinical environments^{2,3}. Its origin can be infectious or chemical. Infectious conjunctivitis is usually contracted from infected mothers during delivery, or from caregivers and can be either viral or bacterial⁴. Bacterial conjunctivitis can be caused by non-sexually transmitted bacteria, which are responsible for 30 to 50% of infections, or by sexually transmitted bacteria such as *Chlamydia trachomatis* and *Neisseria gonorrhoeae*. The latter can cause corneal perforation and vision loss within 24 hours if left untreated. Chemical conjunctivitis is caused by topical antibiotics such as silver nitrate, gentamycin, erythromycin, or tetracycline²⁻⁵.

Before 1880, ON by *Neisseria gonorrhoeae* was the main cause of permanent blindness in neonates. Back then, Dr. Credè, a German obstetrician, implemented prophylaxis of ON in newborns after birth with excellent results, by instilling one drop of 2% silver nitrate into each eye⁶. As a result, Credè reduced the incidence of neonatal gonococcal conjunctivitis from 10 to 0.3%, which was a huge achievement considering the fact

there was no effective treatment available for *Neisseria gonorrhoeae*^{3,7}. This practice eventually spread around Europe and America. However, the concentration of silver nitrate used was reduced to 1% due to increased chemical conjunctivitis⁸.

As the incidence of *Neisseria gonorrhoeae* decreased, countries such as Denmark, Sweden, the United Kingdom (UK) and, more recently, Canada, have abandoned the universal prophylaxis, since the risk of infection from this bacterium was considered extremely low⁶. In the UK, prophylaxis was abandoned in the 1950s, and no cases of blindness due to ON by *Neisseria gonorrhoeae* were recorded in the subsequent 25 years⁹. However, over the last 20 years, *Chlamydia trachomatis* has become progressively widespread in many countries, becoming more prevalent than *Neisseria gonorrhoeae*^{7,10}. With this change of epidemiology and antibiotic evolution, other antibiotics became available for prophylaxis, such as povidone-iodine, erythromycin, 1% tetracycline, and fusidic acid, among others. In fact, a Cochrane review from 2021 identified 14 different prophylactic regimens involving 12 different agents¹⁰. Nonetheless, there is limited data about an effective antibiotic that prevents *Chlamydia trachomatis* conjunctivitis^{10,11}. Table 1 summarizes the main prevention practices for neonatal conjunctivitis worldwide.

Table 1. Current practices of health institutions/countries for ocular prophylaxis in newborns

Institution/country	Suggested practice
American Academy of Pediatrics	0.5% erythromycin prophylaxis is recommended for all newborns. If erythromycin ointment is not available, 1% azithromycin ophthalmic solution is recommended. If that is not available, 0.3% ciprofloxacin ophthalmic ointment may be considered.
Centers for Disease Control and Prevention	Ocular prophylaxis with erythromycin ointment as a single agent is recommended for all neonates.
Canadian Pediatric Association	The recommendations are to screen all pregnant women, treating the mother, and prophylaxis with erythromycin if necessary. Routine prophylaxis is not recommended.
World Health Organization	Ocular prophylaxis to all newborns with one of five different agents is recommended: tetracycline hydrochloride 1% eye ointment, erythromycin 0.5% eye ointment, povidone-iodine 2.5% solution (water-based), silver nitrate 1% solution, and chloramphenicol 1% eye ointment.
Portuguese Society of Neonatology	Only perform in at-risk groups with oxytetracycline. At-risk groups are not well defined.
Turkish Neonatology Society	Since 0.5% erythromycin and 1% tetracycline eye drops are not available in the country, the recommendation is to use 0.3% gentamicin or 0.3% tobramycin instead.
Brazilian Society of Pediatrics	Prophylaxis for all newborns with 2.5% povidone, 0.5% erythromycin ointment or, alternatively, 1% tetracycline. The use of 1% silver nitrate should only be used if the other substances are unavailable.
Italy	Prophylaxis for all newborns, but no current available guidelines.
Denmark, United Kingdom, New Zealand, Norway	No prophylaxis.

As previously stated, there are multiple different practices for prophylaxis worldwide, depending on the epidemiology, level of medical pre-natal care, and the availability of antibiotics. Currently, the WHO recommends topical ocular prophylaxis for prevention of gonococcal and chlamydial conjunctivitis for all neonates, through application on both eyes of 1% tetracycline hydrochloride, 0.5% erythromycin, 2.5% povidone iodine, 1% silver nitrate, or 1% chloramphenicol immediately after birth¹². However, it is important to bear in mind that WHO recommendations apply to every nation in the world, including countries with a high level of gonococcal infections.

Currently, in Portugal, there is a lack of guidance on this subject. Thus, there is no universal screening of these agents in pregnant women, nor are there clear indications for prophylaxis (who, when, and with what). For these reasons, the decision to screen during pregnancy and for neonatal prophylaxis is left to the discretion of each maternity hospital.

In our center, a maternity hospital equipped with a level III Neonatal Intensive Care Unit (NICU), prior to 2006, prophylaxis was performed in all neonates with topical fusidic acid. In 2006, after a review of the

literature, there was a transitional period lasting one year in which prophylaxis was only implemented in newborns admitted to the NICU or the Special Care Unit, neonates born from unsupervised pregnancies, in the case of prolonged rupture of membranes, and in the case of any suspected maternal infection. During that time, no cases of gonococcal conjunctivitis were diagnosed, and, therefore, since 2007, our hospital does not perform neonatal ocular prophylaxis.

In view of this, the authors aim to evaluate the experience of our center for the past 15 years without prophylaxis for ON. During this time, unlike other national centers, no neonatal conjunctivitis prophylaxis was carried out at our center. The aim of analyzing the period since this change was to see if *N. gonorrhea* infections and, more importantly, serious consequences of this infection were found. We believe that this could be of clinical importance in changing common practice in Portugal and Europe.

Methods

A retrospective observational study was performed. We collected all ocular exudate samples during the

period from 2008 to 2022, a total of 15 years. During this period, swabs were taken from the external ocular exudate of all patients admitted for or with neonatal conjunctivitis, or previously hospitalized patients with clinical onset of conjunctivitis. The collection was carried out by the nursing team of the neonatal intensive care unit. *Neisseria gonorrhoeae* was identified by exudate culture. Cases of *Chlamydia trachomatis* were not analyzed since it does not grow by culture and the polymerase chain reaction (PCR) method was not available at that time.

Among the identified cases of gonococcal conjunctivitis, we analyzed the time of onset, the antimicrobial therapy administered, clinical evolution, complications, and maternal history of known sexually transmitted infection. Descriptive analysis was used.

Results

In the past 15 years, a total of 30,417 babies were born in our maternity unit. This study included a total of 112 ocular exudates. An agent was detected in all the exudates collected. Table 2 shows the agents identified and their frequency. A contaminating agent was assumed in 39 (34.8%) of the samples and no therapeutic action was taken.

Of these, only two were positive for *Neisseria gonorrhoeae* (Table 3).

The first case, identified in 2011, was a healthy baby girl born at 40 weeks of gestation by eutocic delivery. There was no known maternal history of sexually transmitted infection. Clinical signs of conjunctival hyperemia and abundant purulent exudate become visible on the fourth day of life. She was treated with a single dose of intravenous ceftriaxone 125 mg with clinical resolution. No long-term sequelae were recorded.

The second positive culture belonged to a previously healthy boy, also born by eutocic delivery at 37 weeks in 2018. There was also no known maternal history of sexually transmitted infection. The clinical signs appeared on the first day of life. He was also treated with intravenous ceftriaxone 125 mg, with complete resolution and no long-term sequelae.

Both individuals were born in our center. Therefore, in 15 years, out of 30,417 live births, two cases of gonococcal conjunctivitis were identified.

Discussion

We report our experience over a 15-year period, after ocular prophylaxis was no longer recommended in our center. During this period, only two cases of

Table 2. Microbiological agents identified in ocular exudate cultures, their frequency, and percentage

Microbiological agent identified	Frequency	Percentage
<i>Escherichia coli</i>	34	25.8
<i>Staphylococcus aureus</i>	22	16.7
<i>Streptococcus sp.</i>	16	12.1
<i>Staphylococcus epidermidis</i>	13	9.8
<i>Haemophilus influenzae</i>	9	6.8
<i>Pneumococcus</i>	5	3.8
<i>Streptococcus mitis</i> / <i>Streptococcus oralis</i>	4	3
<i>Staphylococcus hominis</i>	3	2.3
<i>Enterobacter cloacae</i>	3	2.3
<i>Enterococcus faecalis</i>	3	2.3
<i>Klebsiella pneumoniae</i>	3	2.3
<i>Staphylococcus haemolyticus</i>	2	1.5
<i>Neisseria gonorrhoeae</i>	2	1.5
<i>Streptococcus Grupo C</i>	1	0.8
<i>Streptococcus mitis</i>	1	0.8
<i>Citrobacter koseri</i> (<i>diversus</i>)	1	0.8
<i>Corynebacterium sp.</i>	1	0.8
<i>Haemophilus parainfluenzae</i>	1	0.8
<i>Klebsiella oxytoca</i>	1	0.8
<i>Morganella morganii ssp morganii</i>	1	0.8
<i>Pseudomonas aeruginosa</i>	1	0.8
<i>Serratia marcescens</i>	1	0.8
<i>Staphylococcus capitis</i>	1	0.8
<i>Staphylococcus coag. negativo</i>	1	0.8
<i>Streptococcus pneumoniae</i>	1	0.8
<i>Streptococcus vestibularis</i>	1	0.8

gonococcal conjunctivitis were diagnosed. Both were identified rapidly and treated promptly, with complete resolution of symptoms and no sequelae. Therefore, no cases of gonococcal blindness were recorded.

We can all agree that Credé's prophylaxis was revolutionary. Back then, the incidence of *Neisseria*

Table 3. Identified cases of gonococcal conjunctivitis between 2008 and 2022

Year of diagnosis	Sex	Gestational age	Age of onset	Type of birth	Maternal STI history	Supervised pregnancy	Treatment	Sequelae
2011	Female	40w	4 days	Eutocic	Unknown	Yes	Ceftriaxone 125 mg	None
2018	Male	37w + 4d	1 day	Eutocic	Unknown	Yes	Ceftriaxone 125 mg	None

STI: sexually transmitted infection.

gonorrhoeae was high, and adequate treatment was not available.

Nevertheless, with the evolution of modern medicine, our reality has shifted substantially, mainly in developed countries. The prevalence of ophthalmia neonatorum and the causative organisms vary across the world, and it has become rare in high-income countries, mainly due to increased knowledge about sexually transmitted infections (STIs) and better treatment, higher standards of maternal healthcare, and ocular prophylaxis at birth. For example, in the United States, *Neisseria gonorrhoeae* has a prevalence of 0.3 per 1,000 live births⁷. However, gonococcal infection is increasing in the population, and this should be taken into account in newer guidelines¹³.

Besides the epidemiological shifts, nowadays, the diagnosis of this pathogen has become increasingly rapid and precise, with a PCR of *Neisseria gonorrhoeae* now available within 90 minutes¹⁴. In addition, treatment for ON by *Neisseria gonorrhoeae* with a single dose of ceftriaxone is effective and fast¹⁵. Added to this, the fact that in Portugal the national health system is free and accessible to all ensures treatment is easily available. Although routine screening for *Neisseria gonorrhoeae* during pregnancy is not performed in many countries, a structured surveillance care for all pregnancies can be an opportunity to raise awareness about STIs among women and to treat those with symptoms and their partners¹⁶.

In this discussion, it is also important to bear in mind that neonatal conjunctivitis prophylaxis does not seem to have an effect on conjunctivitis caused by *chlamydia trachomatis*, currently the main sexually transmitted agent causing infection^{10,11}. Therefore, it would probably be more advantageous to treat maternal infection before delivery.

The side effects of antibiotic therapy should also be taken into account, such as chemical conjunctivitis², antimicrobial resistance¹⁷, and changes in the ocular surface microbiota¹⁸.

No antimicrobial regime appears to be superior nor is any antibiotic particularly effective against *Neisseria gonorrhoeae* and Chlamydia, therefore, the drafting of a protocol is highly debatable. Moreover, recent data

on prevention of adverse outcomes, such as blindness or visual compromise is lacking^{10,11}.

Lastly, the costs associated with routine prophylaxis should be considered. Although it is economical individually, on a population level it is expensive. In addition to the costs of the prophylaxis, the costs of adverse side effects should also be taken into consideration. A study in Canada determined that for this intervention to be cost-effective the prevalence of gonorrhea infection would need to be 5.5 times higher, and the number needed to treat one case of ophthalmia neonatorum blindness was 500,000 newborns¹⁹.

For these reasons, the need for ON prophylaxis must be addressed since there are no current guidelines in most European countries. It is highly acceptable that in low and middle-income countries and areas of high risk of untreated maternal gonococcal infection, neonatal ocular prophylaxis must be performed. However, the indication to perform it in high-income countries is debatable⁵.

Considering that, it should be discussed whether STI screening in pregnancy is a more cost-effective prophylaxis, given the fact that we are preventing neonatal conjunctivitis through screening and treating STIs in sexually active adults. Besides that, this strategy avoids the unnecessary administration of antibiotics to newborns and their potential side effects. This approach was adopted by some countries, like Canada, after suspending neonatal prophylaxis⁸.

The authors argue that, based on epidemiology, the limited effectiveness of neonatal prophylaxis, and diagnostic developments, the best approach would be to screen pregnant women for these agents, allowing them and their partners to be treated, considerably reducing the risk of neonatal infection, while at the same time reducing the transmission of these agents. We also believe that whatever strategy is adopted, it should always take into account migratory movements, the number of unsafe pregnancies, and promiscuity, and that data should be monitored continuously.

Currently, the national guidelines recommend the use of ocular prophylaxis in at-risk subpopulations such as unsupervised pregnancies or parents with risk factors for sexually transmitted diseases. However, these factors are not clearly defined²⁰.

Overall, we believe that it is crucial to build universal guidelines to standardize the existence of possible screening, prophylaxis, and its protocol, its criteria for implementation, and treatment of neonatal conjunctivitis.

Author contributions

C. Gomes Pereira: conception and design of the study, report, review or other type of work or paper; acquisition of data either from patients, research studies, or literature; analysis or interpretation of data either from patients, research studies, or literature; drafting the article; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work. J. E. Batista: acquisition of data either from patients, research studies, or literature; analysis or interpretation of data either from patients, research studies, or literature; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work. G. Torres: acquisition of data either from patients, research studies, or literature; analysis or interpretation of data either from patients, research studies, or literature; drafting the article; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work. S. Monteiro Cunha: critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work. P. Mota: acquisition of data either from patients, research studies, or literature; drafting the article; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work.

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Ethical considerations

Protection of humans and animals. The authors declare that no experiments involving humans or animals were conducted for this research.

Confidentiality, informed consent, and ethical approval. The authors have followed their institution's confidentiality protocols, obtained informed consent from patients,

and received approval from the Ethics Committee. The SAGER guidelines were followed according to the nature of the study.

Declaration on the use of artificial intelligence. The authors declare that no generative artificial intelligence was used in the writing of this manuscript.

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Recovery of repressed memories after herpetic encephalitis: a case report

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Abstract

Introduction: Encephalitis is an inflammation of the brain parenchyma that causes neurological dysfunction. Etiologies are heterogeneous but among infectious causes, viruses are the most common, with the herpes simplex virus accounting for most of the identified cases. Diagnosis can be challenging because of the many ways in which it can present itself. Sequelae are mainly represented by cognitive and behavioral changes and memory loss. **Case report:** We report the case of an adolescent with HSV encephalitis who recovered from an acute life-threatening event but instead of memory loss, he presented the disclosure of repressed memories related to earlier dissociative amnesia. **Discussion:** Injury in the hippocampus and amygdala fields has probably disrupted an inhibition process and consequently the recall of emotionally repressed memories. This case illustrates the possibility of a second life-threatening event inducing a rearrangement in the memory of a previous similar event.

Keywords: Encephalitis. Memory. Recovery. Trauma.

Recuperação de memórias reprimidas após encefalite herpética: caso clínico

Resumo

Introdução: A encefalite é uma inflamação do parênquima cerebral que causa disfunção neurológica. As etiologias são heterogêneas, entre as causas infecciosas os vírus são as mais comuns, o Vírus Herpes Simples (VHS) contribuindo para a maioria dos casos identificados. Devido à possibilidade de múltiplas apresentações clínicas o diagnóstico pode ser desafiante. As sequelas são maioritariamente representadas por alterações cognitivas, comportamentais e perda de memória. **Relato do caso:** Este relato descreve o caso de um adolescente que na recuperação após uma encefalite por VHS, em vez de perda de memória, apresentou revelações de memórias reprimidas relativas a um evento antigo em relação ao qual apresentava uma amnésia dissociativa. **Discussão:** A hipótese é de que as lesões ao nível do hipocampo e amígdala terão intercetado um processo inibitório previamente instalado, permitindo o acesso a memórias reprimidas. Este caso introduz a possibilidade de um segundo evento ameaçador induzir um rearranjo na memória de um prévio evento semelhante.

Palavras-chave: Encefalite. Memória. Recuperação. Trauma.

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Keypoints

What is known

- Acute life-threatening events can initiate rearrangements in previously-organized neuronal schemas.
- Recovery after HSV encephalitis can include cognitive issues, behavioral changes, seizures, attention and concentration deficits, speech disorders, and memory loss.

What is added

- Instead of memory loss, this patient presented the disclosure of repressed memories related to earlier dissociative amnesia.

Introduction

Encephalitis is an inflammation of the brain parenchyma that causes neurological dysfunction. Etiologies are heterogeneous but can be divided into two categories: infectious, stemming from direct invasion of the brain by pathogens; and immune-mediated, resulting from an attack of the nervous system through an immune response¹. Among infectious causes, viruses are the most common, with the herpes simplex virus (HSV) accounting for 50-75% of identified viral cases² and 30-40% of cases with an identified cause³, the most frequently identified cause in developed countries³. Nonetheless, in more than half of the cases, the origin remains unknown^{1,4}. HSV encephalitis is the only viral encephalitis with an effective antiviral treatment⁵.

Herpes simplex encephalitis (HSE) is an acute, potentially fatal illness. There are two types of HSV: 1 and 2. Type 1 (HSV-1) is commonly associated with orofacial manifestations and most HSE cases are in children older than six years of age⁶. Type 2 (HSV-2), however, is mostly associated with genital forms of infection and is responsible for most HSE cases in newborns⁶.

Because of the many ways in which it can present itself, some of which are mild, diagnosis is often delayed, which can be life threatening. The most common presentations include oral and genital mucocutaneous lesions⁷. In a diagnostic evaluation, a detailed history and physical examination searching for neurological signs is urgent and required. Some presentations induce medium- or even low-level alarm in clinicians, and evident signs of encephalopathy can be challenging to detect.

A cerebrospinal fluid (CSF) HSV PCR is the best diagnostic tool for HSE diagnosis but occasionally it can give a false negative result in early presentations, mostly during the first four days of illness⁵. Acyclovir is the treatment of choice for HSE and can be started empirically⁵.

Most patients with viral encephalitis have a positive prognosis and make a full recovery⁸. The fatality rate of HSE is below 20% when antiviral treatment is

administered⁵, but serious consequences may remain, particularly in children, even if they have been correctly diagnosed and treated⁹. Problems can include cognitive issues, behavioral changes, epilepsy, attention and concentration deficits, speech disorders, and memory loss (mostly anterograde amnesia)^{8,9}.

We report the case of HSE in a 16-year-old boy who recovered from an acute event but instead of loss of memory, the adolescent presented with an emergence of heavy emotional childhood memories that had previously been lost, recovering from earlier dissociative amnesia.

Case report

A 16-year-old male, high school student, was admitted to our hospital through the emergency department following a six-day history of headache and vomiting with progressive prostration. There had been no recent travel or head injury. The family described abnormal behavior with episodes of confusion in the few days before. He had headaches in the frontotemporal location, with an intensity of 4/10, suggestive of migraine, which decreased in severity in response to oral analgesics. He had no fever before arriving at the hospital (his axillar temperature never exceeded 37 °C). During the neurological examination, the patient's eyes remained closed. He was responsive but exhibited dysarthria and was only partially oriented. No other neurological signs were observed, and there were no signs of meningeal irritation. In the mental status examination, the patient appeared withdrawn, avoiding eye contact, consistently keeping his eyes closed, and frequently appearing drowsy. While he demonstrated orientation to person, his orientation to time and place seemed impaired. His speech was markedly slow and slurred, appearing to drag, yet he remained responsive to questions. The patient's demeanor was generally apathetic, characterized by a flat mood and blunted affect. Assessment of humor and thought content was challenging, as was the evaluation of the patient's sensory perception, with no apparent evidence of

alterations. Poor personal hygiene and refusal to eat were evident. The adolescent was placed in clinical observation and after four hours he became non-responsive to stimuli. He subsequently showed minimal improvement after mannitol was administered.

During evaluation, his blood sample showed normal renal and liver profiles, an erythrocyte sedimentation rate of 13 mm/h (1-20), C-reactive protein 0.63 mg/dL (< 0.5), lymphocytes $0.83 \times 10^9/L$ (1.50-4.80), eosinophils $0.01 \times 10^9/L$ (0.02-0.55), glucose 102 mg/dL (60-100), and the rest was normal. A lumbar puncture (LP) demonstrated a CSF protein level of 92 mg/dL (15-40), and normal CSF glucose and lactate levels. At the cytological examination, the total cell count was $120/mm^3$, predominantly mononuclear.

Magnetic resonance imaging suggested encephalitis with predominant damage on the right, affecting the right temporal lobe and limbic structures, with marked atrophy of the right insular cortex, involving the right internal frontobasal region, and the anterior temporal lobe (as seen in the series of images in Fig. 1), and HSV-1 was detected in the LP. He was initially treated with empirical schemas and, after the pathogen was detected, with acyclovir and levetiracetam.

Two days after admission, during an electroencephalogram, the young male suffered a prolonged electro-clinical seizure with an initial right occipital ictal pattern (Fig. 2). Progress was positive, with no record of further seizures, and only some sleep-related issues and episodic anxiety.

During hospitalization, he began a physical and neurological rehabilitation program due to autonomous walking deficits and daytime bladder sphincter incontinence, which improved significantly. The adolescent was discharged with no significant neurological sequelae except for sporadic episodes of diurnal enuresis.

The adolescent was being followed up by child and adolescent psychiatry and psychology, with no other relevant health history. He began receiving psychiatric support at the age of four following a road accident with his mother. Although the child had not suffered any injuries, his mother died at the scene. In subsequent years, the boy always denied remembering the event. He had notorious difficulties in expressing himself emotionally, physically, and verbally, and possessed few emotional management strategies. The child also demonstrated persistent sleep-related problems. He suffered from bullying for years at school, being consistently unable to defend himself from physical and verbal attacks. By the age of 10, he developed depressive symptoms and reported consistently missing his

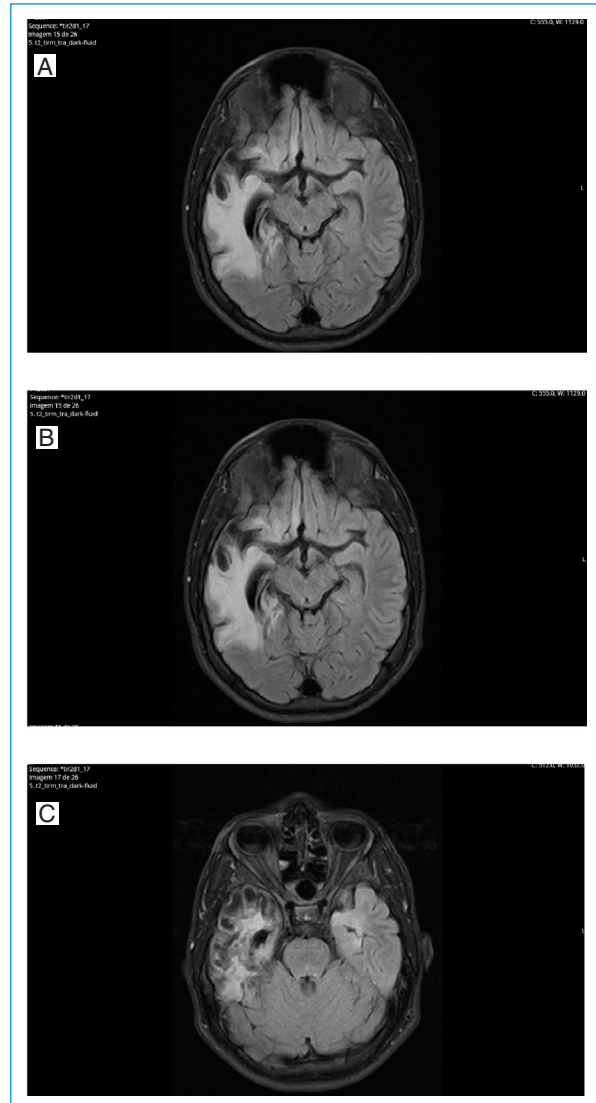


Figure 1. A, B and C: brain MRI images depicting predominant damage on the right side, affecting the right temporal lobe and limbic structures. There is marked atrophy of the right insular cortex, involving the right internal frontobasal region, and the anterior temporal area. There is also involvement of the left insular and periventricular regions, although less pronounced. Significant dilation is noted due to the retraction of the temporal horn of the right ventricle, with particularly relevant encephalomalacia observed in the anterior and inferior temporal areas on the right side.

mother. During adolescence, he gradually became more isolated, with a small number of friends and became even more introverted. At 15 years old, he also presented with obsessive symptoms. Up until the time of the most recent event, the adolescent in question had only been diagnosed with depressive and obsessive-compulsive disorder and social anxiety.

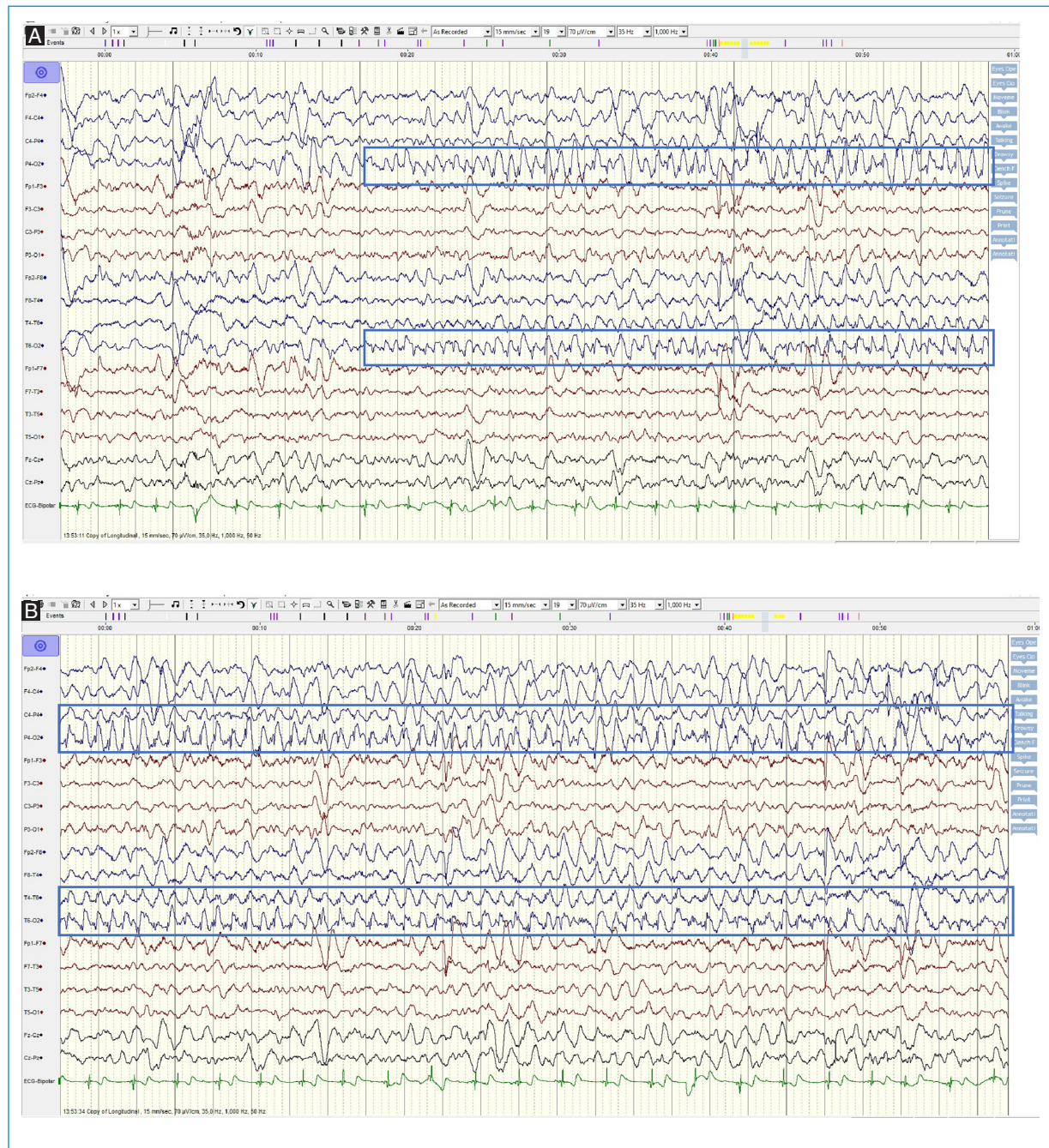


Figure 2. A and B: electroencephalogram in bipolar montage illustrating electroclinical seizure with an initial right occipital ictal pattern (inside square).

During his recovery from the encephalitis, the adolescent disclosed that he suddenly began to remember the traumatic event that he had suffered 12 years earlier with his mother. During that time, he claimed he could remember frames from the car accident and even his mother's last words to him. He became deeply interested in the subject of his deceased mother and considering this he tried, together with his family, to find

out more details about her, namely her interests, hobbies, and personality.

This event has provided access to a new understanding of the patient's psychiatric history, revealing information previously hidden from clinical exploration. The intensity of the traumatic event experienced in childhood may have led to the repression of memories of the incident, due to the psychological impact that it

represented, which probably exceeded the child's capacity to process it at the time. This may have contributed to the adolescent's inability to verbalize and recall specific details of the traumatic event until now. Repressed memories can emerge following triggers, in this case after a medical event. As a result of this memory recovery process, flashbacks of the traumatic event became possible. This paradigm shift in the patient's history has led to a reformulation of the previously assessed psychiatric symptoms. By integrating these into the newly revealed trauma dimension, it has been possible to understand the emotional and cognitive symptoms represented by obsessions, compulsions, depression, and social anxiety as an indirect expression of unresolved emotional conflict. As a result, trauma intervention played a crucial role in enhancing the young individual's interpersonal functionality, which had been previously impaired due to the persistence of repressed memories, potentially underlying the complexity of the patient's clinical manifestation.

The emergence of repressed memories allowed him to integrate all his experiences into his identity. He now felt emotionally more available after internalizing the past traumatic experience, but also capable of a new vision of the future, leading him to improve his communication skills and social interaction.

Discussion

Recovery of repressed memories in the context of post-encephalitis is very rare but theoretically possible. To our current knowledge, there are no documented instances in the literature of recovered repressed memories following cases of encephalitis.

Long-term memory can be declarative (conscious/explicit) and non-declarative (unconscious/implicit)¹⁰. The hippocampus is the brain structure involved in memory storage and functioning¹⁰, the amygdala is a brain structure located near the hippocampus, and these two structures are part of the limbic system¹¹. The amygdala can be involved in the integration of sensory and cognitive information relating to feelings such as fear, with important connections with the prefrontal cortex responsible for emotional regulation¹¹. Fear is learned during stressful experiences associated with emotional trauma¹¹. The limbic system is involved in associating a stimulus (real or psychologically representative) with a fearful situation (or representative of fear)¹¹.

Trauma integrates biopsychosocial domains. In the case exposed here, the retrieval of repressed memories was probably the turning of the content of the

dissociative amnesia into effective and available forms of memory. Dissociative amnesia represents a failure in the ability to remember autobiographical information alongside an absence of structural brain damage, and even though certain frames of memory are not accessible, they are not lost or forgotten^{12,13}. Although dissociation may be a protective mechanism in the acute management of trauma, it may not be beneficial in the long-term development of the person as this functional avoidance may impact other areas of the individual and prevent them from experiencing events fully and progressing in their lives¹⁴.

Dissociative amnesia and repressed memories are often associated with retrieval inhibition and there is an association between trauma and dissociation¹⁵. Retrieval inhibition is a phenomenon where a specific memory is inhibited¹⁵. There is one study that showed an association between dissociative amnesia, decreased activation of the hippocampus, and increased activation of prefrontal cortex activity¹⁶ which could represent a possible association between emotional regulation and repressed memories/dissociated memories¹⁵.

Conclusion

Under certain circumstances, the rearrangement of some areas of the brain can induce unexpected results due to the extreme neuroplastic capacity of the brain tissues. In the case report described here, the injury occurred around the hippocampus and the amygdala and has probably disrupted an emotional inhibition process relating to fear induced by psychological stimuli and the consequent recall of repressed memories. This clinical case demonstrates the close interaction between emotions and memory and the possibility of a second life-threatening event inducing recovery from an earlier one.

Author contributions

A.R. Figueiredo: conception and design of the study, report, review or other type of work or paper; acquisition of data either from patients, research studies, or literature; analysis or interpretation of data either from patients, research studies, or literature; drafting the article; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work. P. Moniz: acquisition of data either from patients, research studies, or literature; analysis or interpretation of data either from patients, research studies, or literature; critical review of the article for important intellectual content; final approval of the version to be published;

agreement to be accountable for the accuracy or integrity of the work. C. Pereira: acquisition of data either from patients, research studies, or literature; analysis or interpretation of data either from patients, research studies, or literature; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work. M. Laureano: acquisition of data either from patients, research studies, or literature; analysis or interpretation of data either from patients, research studies, or literature; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work.

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Conflicts of interest

None.

Ethical considerations

Protection of humans and animals. The authors declare that no experiments involving humans or animals were conducted for this research.

Confidentiality, informed consent, and ethical approval. The authors have followed their institution's confidentiality protocols, obtained informed consent from patients, and received approval from the Ethics Committee. The SAGER guidelines were followed according to the nature of the study.

Declaration on the use of artificial intelligence. The authors declare that no generative artificial intelligence was used in the writing of this manuscript.

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IgA vasculitis and acute hemorrhagic edema of infancy: a comparative analysis of two case reports

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Abstract

Introduction: Acute hemorrhagic edema of infancy (AHEI) is sometimes considered a milder variant of immunoglobulin A vasculitis (IgAV). This paper presents two clinical cases, aiming to explore the overlaps and differences between these two pathologies. **Case report:** A four-year-old initially presented with odynophagia, fever, and arthralgia. The diagnosis of IgAV was established following the development of purpura. A nontoxic five-month-old girl, initially diagnosed with viral exanthema, presented with fever, mild respiratory symptoms, and a maculopapular rash on the torso. Gradual progression to purpuric lesions and acral edema led to the diagnosis of AHEI. **Discussion:** While IgAV and AHEI share some clinical and histological features, their immunofluorescence patterns differ significantly. IgA deposition is observed in nearly 100% of IgAV cases but only in 10–35% of AHEI cases. This disparity may be attributed to the natural immaturity of the immune system in younger infants, potentially explaining the differences between these two diseases.

Keywords: IgA vasculitis. Henoch-Schönlein purpura. Acute hemorrhagic edema. Pediatrics. Purpura. Leukocytoclastic vasculitis.

Vasculite por IgA e edema hemorrágico agudo da infância: uma análise comparativa de dois relatos de caso

Resumo

Introdução: O Edema Hemorrágico Agudo da Infância (EHA) e a Vasculite de Imunoglobulina A (VIgA) parecem representar um espectro distinto da mesma condição. Pretende-se explorar as semelhanças e diferenças entre essas patologias a partir de casos clínicos. **Relato do caso:** Um menino de quatro anos com oligoartrite foi diagnosticado com VIgA após o aparecimento de púrpura. Uma lactente com bom estado geral, febre, sintomas respiratórios e exantema maculopapular foi inicialmente diagnosticada com exantema viral e, após progressão das lesões cutâneas para equimoses e aparecimento de edema acral, com EHA. **Discussão:** Apesar da VIgA e o EHA partilharem características clínicas e histológicas, a imunofluorescência difere. A deposição de IgA é observada em cerca de 100% dos casos de VIgA e em 10–35% dos casos de EHA. Esta disparidade pode ser atribuída à imaturidade do sistema imunitário em idades mais jovens, podendo explicar algumas diferenças entre estas duas patologias.

Palavras-chave: Vasculite a IgA. Púrpura Henoch-Schönlein. Edema hemorrágico agudo da infância. Pediatria. Púrpura. Vasculite leucocitoclástica.

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Keypoints

What is known

- Immunoglobulin A vasculitis (IgAV) and acute hemorrhagic edema of infancy (AHEI) are forms of leukocytoclastic vasculitis that affect small vessels.
- IgAV primarily affects older children (four to seven years of age), presenting with palpable purpura, arthralgia, abdominal pain, and nephritis.
- AHEI typically occurs in infants under two years of age, presenting with fever, limb edema, and purpuric lesions.
- Both conditions involve immune complex-mediated vasculitis, with IgA deposition being prominent in IgAV and varying in AHEI.
- Histologically, both exhibit leukocytoclasia and vessel wall immune deposits; IgA deposition is more consistent in IgAV. AHEI shows distinctive C1q deposition.

What is added

- Detailed case reports providing insights into the varied presentations of IgAV and AHEI.
- Comprehensive comparison of IgAV and AHEI, highlighting their similarities and differences.

Introduction

Immunoglobulin A vasculitis (IgAV), formerly known as Henoch-Schönlein purpura, and acute hemorrhagic edema of infancy (AHEI), also referred to as Finkelstein or Seidlmayer disease, are forms of leukocytoclastic vasculitis that affect small vessels¹. The incidence of IgAV is three to 27 cases per 1,000,000 children, with some experts suggesting that AHEI might be a milder form of IgAV, comprising 2.5%-7% of IgAV cases. The relationship between the two conditions remains unclear²⁻⁴.

The classic presentation of IgAV includes palpable purpura, articular complaints, abdominal pain, and nephritis while AHEI typically presents with fever, limb edema, and purpura or ecchymosis in nontoxic patients^{1,4}.

This paper aims to explore the similarities and differences between IgAV and AHEI through the presentation of two clinical cases.

Case report

Immunoglobulin A vasculitis

A four-year-old boy presented with a two-day history of fever and odynophagia and was clinically diagnosed with acute tonsillitis. He received empiric treatment with oral amoxicillin/clavulanic acid and the symptoms resolved within 24 hours. Four days later, he developed tibiotarsal joint pain, resulting in a limp. At the pediatric emergency department (ED), the physical examination and laboratory studies, including complete blood count (CBC) and C-reactive protein (CRP), were normal. His condition improved with oral ibuprofen over a few hours and he was discharged.

Two days later, he returned to the ED with recurring knee joint and lower back pain. Mild periarticular swelling was noted in both knees, but there were no signs of joint effusion. The parents reported a liquid bowel movement three days earlier but said there were no further gastrointestinal (GI), urinary, or other symptoms. Bloodwork showed a mildly elevated erythrocyte sedimentation rate (ESR) (39 mm/1st hour) and CRP (0.970 mg/dL), while the CBC, serum urea, and creatinine levels, as well as the urinalysis, were normal. Partial pain relief was achieved with oral ibuprofen and the patient was admitted for further investigation and surveillance.

Antibiotic treatment was discontinued due to concerns regarding serum sickness disease and treatment with ibuprofen led to the rapid improvement of the arthralgia overnight. Additional articular imaging was deemed unnecessary. On the first day after admission, scattered petechiae were observed on the lower limbs (Fig. 1A) and tibiotarsal region (Fig. 1D). Ecchymotic lesions and palpable purpura were noted in the popliteal region (Fig. 1C), tibiotarsal joints (Fig. 1B), and wrist. A diagnosis of IgAV was considered. Over the next 48 hours, the rash expanded slightly before gradually resolving. He had a normal daily urinalysis, a max ESR of 43 mm/1st hour, a mildly elevated immunoglobulin A (IgA) titer (230 mg/dL), elevated Antistreptolysin O titer (ASOT) (341 U/ml), and a normal coagulation study. He was discharged home within three days on oral nonsteroidal anti-inflammatory drugs (NSAIDs).

The patient has been followed up for over a year with no recurrence of symptoms, maintaining a normal urinalysis and blood pressure.

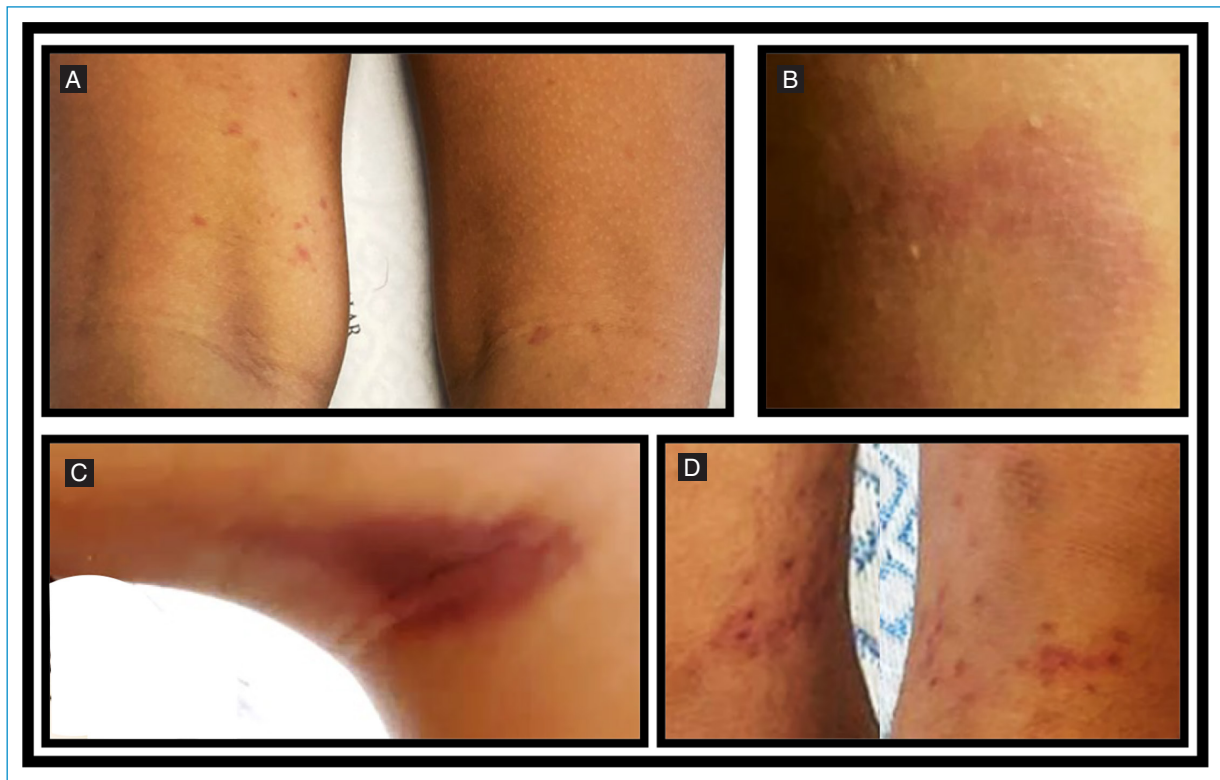


Figure 1. Cutaneous manifestations of IgA vasculitis. Petechia in the lower limbs (A) and tibiotarsi region (D). Ecchymosis in the tibiotarsi (B) and popliteal region (C).

Acute hemorrhagic edema of infancy

A five-month-old girl presented with low-grade fever, mild upper respiratory symptoms, and a maculopapular rash on the torso. She was diagnosed with an acute viral infection at a local pediatric ED and discharged with symptomatic treatment. Four days later, she was reevaluated due to persistent symptoms. Laboratory tests, including CBC and inflammatory markers, were unremarkable and she was again discharged with symptomatic treatment.

The following day, due to persistent fever, she was brought to our ED. On admission, she had a fever (axillary temperature 38.3 °C), a nontoxic appearance, and a maculopapular rash with purpuric lesions involving the face, arms, and legs, along with acral and facial edema (Figs. 2A and 2B). Laboratory tests were repeated due to the persistent fever, showing negative inflammatory markers and normal serum urea and creatinine levels. She was diagnosed with AHEI and influenza infection and admitted overnight for observation.

During admission, she maintained a good clinical status and became afebrile. The cutaneous manifestations

improved rapidly, with lesions almost completely resolved within 24 hours, making further investigation unnecessary. She was discharged the following day, with complete clinical resolution achieved within five days.

Discussion

Etiology and pathophysiology

IgAV is characterized by the presence of aberrantly glycosylated IgA, which forms immune complexes (ICs) either with IgA itself or with antiglycan antibodies. These ICs can deposit in the glomerular mesangium and vascular walls, triggering an inflammatory response mediated by inflammatory mediators and complement activation⁵⁻⁷. This mechanism is certainly relevant to the first case presented, where elevated IgA levels were noted.

While the exact cause remains unclear, various infectious and chemical triggers have been implicated. Approximately half of IgAV cases are preceded by infections, with *Streptococcus spp* being identified in around 17% of cases^{2,8-10}.

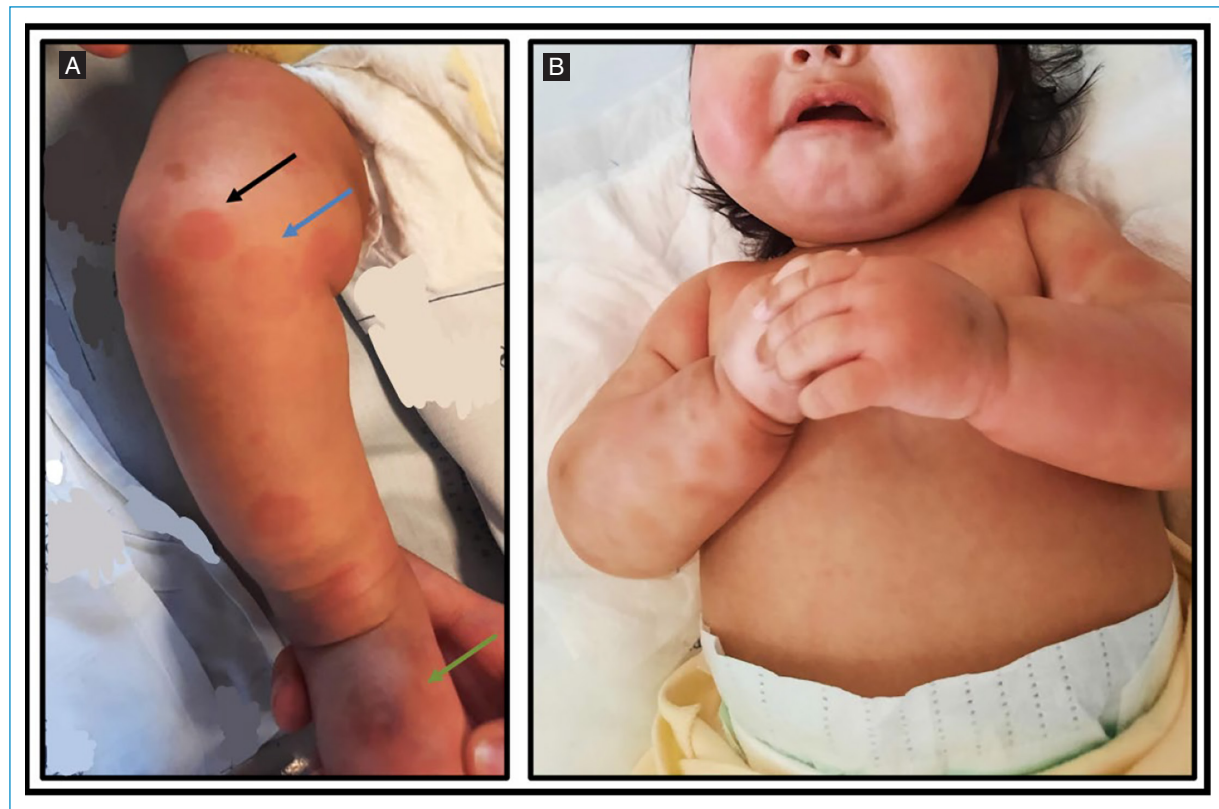


Figure 2. Cutaneous manifestations of acute hemorrhagic edema of infancy. **A:** macular lesions (black arrow), targetoid lesions (blue arrow), and purpuric lesions (green arrow) in the right lower limb. **B:** macular, rosette-like lesions and ecchymosis on the face, upper limbs, and torso; edema of the face and distal aspect of the upper limbs.

Similarly, AHEI involves immune-complex mediated mechanisms and is frequently associated with preceding infections. Rates of infectious triggers have been reported in up to 75% of cases¹¹. Indeed, in both cases reported an upper respiratory tract infection functioned as a triggering factor.

Histology and immunofluorescence

In this case of IgAV, the patient exhibited petechiae and palpable purpura and although a biopsy was not conducted, IgAV is known to correlate histologically with key features, including infiltration of neutrophil granulocytes in small superficial vessels, leukocytoclasia, and erythrocyte extravasation into the surrounding dermis. The progression of the rash during hospitalization was likely associated with inflammatory processes such as leukocytoclasia. Similar histological findings are observed in AHEI, affecting capillaries and post-capillary venules in the upper and middle dermis. The transient nature of the rash in AHEI patients, as seen in the case of the five-month-old girl presented, may

indicate a less severe inflammatory response compared to IgAV. Both conditions can exhibit fibrinoid necrosis¹²⁻¹⁴.

Immunofluorescence typically reveals strong IgA deposition in IgAV, whereas IgA deposits are detected in only 10 to 35% of AHEI biopsy specimens, suggesting a milder or differently mediated immune response compared to IgAV¹⁵. This discrepancy contributes to the ongoing debate regarding whether AHEI represents a mild variant of IgAV or a distinct entity^{3,13,15}. This could explain the rapid resolution of cutaneous symptoms and lack of systemic involvement in the AHEI patient. Perivascular deposits of IgM, fibrinogen, and C3 can be present in both conditions, but C1q deposition is unique to AHEI. In IgAV, vessel wall immune deposits include IgA1, C3, C3c, C3d, and varying amounts of IgG and IgM, with minimal or absent C1q or C4^{6,7,16}. The pathophysiology of these conditions supports shared features, such as purpuric lesions as presented by the patients described, however, the unique deposition of C1q in AHEI could reflect an alternative immune pathway. Some authors propose that

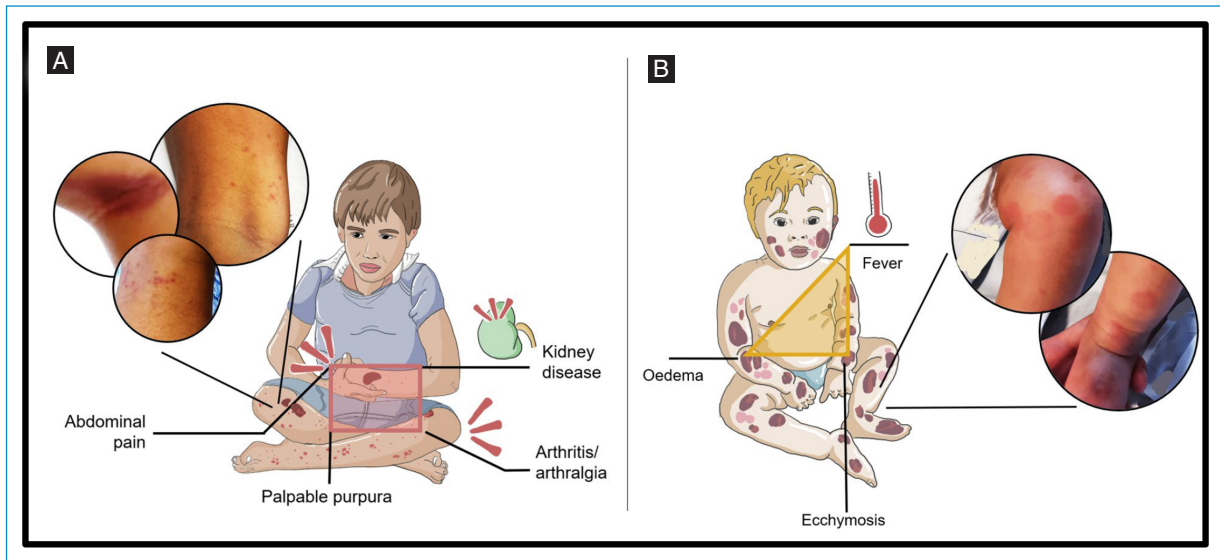


Figure 3. **A:** the classic presentation of immunoglobulin A vasculitis includes a tetrad of symptoms: palpable purpura with no thrombocytopenia or coagulopathy, acute-onset arthritis/ arthralgia, abdominal pain, and kidney disease. **B:** the clinical presentation of acute hemorrhagic edema of infancy typically consists of a triad of fever, edema, and rosette-shaped, annular, or targetoid-shaped purpura/ecchymosis in a nontoxic appearing patient.

these differences may stem from the immaturity of the immune system, particularly in IgA production. IgA levels in younger children are notably lower, reaching only 19 and 25% of adult levels by 12 and 24 months, respectively, which aligns with the typical onset of AHEI before the age of two years, as in the case presented. Interestingly, there is a documented overlap between IgAV and AHEI in children aged two to four years, which may indicate a progressive maturation of the immune system¹⁷.

Clinical presentation and diagnosis

IgAV and AHEI predominantly affect pediatric patients. While AHEI typically presents in children under two years of age, IgAV peaks between four and seven years of age, which is consistent with the cases reported. Although the case of AHEI presented involved a female patient, the literature reports a male predominance in both AHEI and IgAV².

Figure 3 illustrates the classical presentations of IgAV and AHEI^{1,2,4}. The four-year-old patient in this case exhibited three of the four hallmark symptoms of IgAV: skin involvement, gastrointestinal involvement, and arthralgia. Despite initial cutaneous presentation being characteristic petechiae and palpable purpura, the cutaneous symptoms emerged later than usual, complicating the diagnosis as they are seen in roughly

three-quarters of patients at the time of diagnosis¹⁸. It should be noted that IgAV may initially manifest with erythematous, macular, or urticarial lesions that evolve into ecchymoses, petechiae, and palpable purpura, often symmetrically distributed in gravity-dependent areas¹. Facial involvement, which was absent in this case, is rare and does not occur in isolation. The presence of arthralgia in the patient with IgAV aligns with existing literature, which indicates that arthralgia or arthritis affects 70–90% of patients. When arthritis is present, it typically exhibits a transient, oligo-articular pattern, with a predilection for the lower limbs, as observed in this case². In our report, arthralgia was the sole initial presenting symptom of IgAV and can occur in about 15% of patients². Skin edema can mimic a swollen joint. Gastrointestinal manifestations are frequent, occurring in up to 72% of patients. It is usually mild, as in the case described, usually manifesting by colicky abdominal pain but acute life-threatening GI bleeding and intussusception can occur². Renal involvement, seen in 40–50% of IgAV cases, is typically asymptomatic and requires active screening, with microscopic hematuria and proteinuria being common findings². Other manifestations include orchitis and neurologic symptoms².

In contrast, AHEI initially resembles a nonspecific viral exanthem and progresses with monomorphic lesions on the extremities, face, and scrotum. The initial

maculopapular rash observed in the AHEI case described exemplifies the typical progression from a “viral-like” exanthem to the characteristic cutaneous manifestations of AHEI, highlighting the challenges associated with differential diagnosis. Localized edema of affected areas is more frequent in AHEI than in IgAV, as noted in the patients presented¹⁹. Unlike in IgAV, noncutaneous involvement is rare in AHEI and the lack of systemic disease was classically considered a clinical criterion for diagnosis. However, some authors have reported arthritis, GI bleeding, and orchitis in AHEI⁴.

The diagnosis of both IgAV and AHEI primarily relies on clinical presentation. In atypical cases, a skin biopsy may be warranted². Laboratory tests such as platelet count and coagulation studies help rule out other causes of cutaneous hemorrhagic diseases like immune thrombocytopenia. In IgAV, serum IgA levels are elevated in 50-70% of patients and the initial urinalysis is typically normal, with proteinuria and/or hematuria potentially developing later^{2,8}.

Laboratory findings in AHEI are generally nonspecific, although leucocytosis, thrombocytosis, and eosinophilia may be observed²⁰. The characteristics of the two diseases are summarized in [Table 1](#).

Differential diagnosis

Regarding the patient with IgAV, poststreptococcal reactive arthritis could have been considered as there was prior acute tonsillitis, an elevated ASOT and lower limb joint complaints in a symmetrical distribution. However, the prompt overnight response to NSAIDs and further cutaneous manifestations made this condition less likely²¹. A serum sickness-like reaction was also contemplated due to the presentation of arthralgias occurring within two to seventeen days following amoxicillin/clavulanic acid administration. Despite this temporary correlation, typical features such as lymphadenopathy, urticarial rash, or fever were absent²². Additionally, a viral etiology, specifically parvovirus B19 infection, could have been considered given its potential to manifest primarily with arthropathy. In children, parvovirus B19 infection can present with symmetric arthralgia affecting the knees and ankles, similar to the pattern observed in this case. The absence of an erythema infectiosum rash made this diagnosis less likely²³. The papular-purpuric “gloves and socks” syndrome typically presents with erythema and a petechial or purpuric rash but classically affects the hands and feet, which contrasts with the observed distribution in this patient.

In the case of the five-month-old with AHEI, consideration was given to the possibility of a nonspecific viral

exanthem, which has been termed the “great imitator” by K. Nicole et al. The progression of clinical features over time played a crucial role in the diagnosis of AHEI.

Given the predominantly cutaneous manifestations of these conditions, it is crucial to consider child abuse in the differential diagnosis, as bruising is the most commonly reported injury associated with abuse in infants²⁴. Additionally, vigilance for serious hematologic disorders, such as hematological malignancies, is essential.

Treatment

Supportive care plays a pivotal role in the management of both IgAV and AHEI, as illustrated by the treatment approaches in the clinical cases reported. Both the boy with IgAV and the girl with AHEI benefited from vigilant monitoring and analgesic/antipyretic support for symptom relief⁵.

For the patient with IgAV, scheduled analgesia with NSAIDs was a cornerstone of treatment, as NSAIDs are the mainstay for managing arthralgia and arthritis. While corticosteroids may be considered for the symptomatic relief of severe abdominal pain and IgAV nephritis, these were not applicable in this case. Moreover, corticosteroids do not appear to prevent the onset of renal disease or abdominal complications, nor do they alter recurrence rates, and should not be used for empirical prophylaxis of kidney or GI complications^{25,26}. In more severe cases, therapy with corticosteroids seems to reduce the severity and duration of abdominal pain during the first two weeks of treatment, but it does not reduce the risk of abdominal surgery²⁵. Intravenous methylprednisolone could be administered in life-threatening situations, when the oral route is not tolerated or if there is no response to oral therapy. Renal involvement grants a multidisciplinary approach involving a pediatric nephrologist²⁵.

Given the typically self-limited and benign nature of AHEI, the primary focus of treatment is supportive care²⁰. In the case presented, there was only a need for on-demand paracetamol.

Hospital admission should be decided on an individual basis, however Masarweh et al. propose six criteria that should be considered when evaluating the need for admission: 1) orchitis; 2) moderate to severe abdominal pain; 3) arthritis in three or more joints; 4) proteinuria; 5) inability to ambulate independently; 6) evidence of gastrointestinal bleeding²⁷. The patient with IgAV was admitted before a definitive diagnosis was established, for further investigation and monitoring while the five-month-old girl was admitted for parental reassurance and observation.

Table 1. Clinical characteristics, diagnosis, and management of immunoglobulin A vasculitis and acute hemorrhagic edema of infancy

Characteristic	IgA vasculitis	Acute hemorrhagic edema of infancy
Epidemiology	Male predominance	
	Common in children aged two to 11 years	Typically affects children aged four to 24 months
Pathophysiology	Immune-complex mediated mechanisms	
Histology	Neutrophil infiltration of vessels, leukocytoclasia, erythrocyte extravasation, and fibrinoid necrosis can occur	
Immunofluorescence	Strong IgA deposition Minimal or absent C1q deposition	IgA deposits in 10 to 35% of biopsies C1q deposition
Clinical Presentation	Classical clinical tetrad: palpable purpura with no thrombocytopenia or coagulopathy, acute-onset arthritis/ arthralgia, abdominal pain, and kidney disease. Orchiditis may be present	Classical clinical triad: fever, acral edema, and rosette-shaped, annular, or targetoid-shaped purpura/ecchymosis in a generally nontoxic appearing patient. Limited systemic symptoms
Triggers	Often follows an upper respiratory tract infection or other viral illnesses	
Diagnosis	Mainly clinical diagnosis	
Treatment	Supportive care; NSAIDs for pain management Corticosteroids may be considered in severe cases	Supportive care
Prognosis	Generally favorable prognosis Renal involvement is linked to long-term morbidity and mortality	Self-limited disease with spontaneous and complete resolution
Recurrence	25% of patients	Typically a one-time occurrence

Follow-up

For the patient with IgAV presented, follow-up should include a urinalysis and blood pressure assessment repeated weekly during the first month, every two weeks in the second and third month, every month from the fourth to sixth month and then on months nine and 12²⁸. Recurrence is seen in 25% of patients. Long-term renal complications, such as chronic kidney disease (CKD), a cause of morbidity and mortality among children with IgAV, functions as a prognostic factor^{28,29}. A lower glomerular filtration rate at presentation and nephritic or nephrotic syndrome in the acute period of IgAV are poor prognostic features, with the risk of progressing to CKD being 41% in those patients vs. 15% in those with microscopic urine abnormalities².

Despite the rapid progression of cutaneous lesions, AHOI is a self-limited disease with spontaneous and complete resolution occurring in one to three weeks. Patients rarely have recurrent attacks and complications³⁰.

The differing outcomes between the cases reported (the boy with IgAV requiring long-term follow-up and the girl with AHOI who recovered quickly without the need for prolonged follow-up) underscore the importance of differential diagnosis in pediatric vasculitis.

Neither of the patients presented experienced a recurrence of the disease.

Author contributions

All authors: conception and design of the study, report, review or other type of work or paper; acquisition of data either from patients, research studies, or literature; analysis or interpretation of data either from patients, research studies, or literature; drafting the article; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work.

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Ethical considerations

Protection of humans and animals. The authors declare that no experiments involving humans or animals were conducted for this research.

Confidentiality, informed consent, and ethical approval.

The authors have followed their institution's confidentiality protocols, obtained informed consent from patients, and received approval from the Ethics Committee. The SAGER guidelines were followed according to the nature of the study.

Declaration on the use of artificial intelligence. The authors declare that no generative artificial intelligence was used in the writing of this manuscript.

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Ankyloblepharon filiforme adnatum: from curiosity to early treatment

Anquilobléfaro filiforme congénito: da curiosidade ao tratamento precoce

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Keypoints

What is known

- Ankyloblepharon is a rare congenital malformation of the eyelids.
- Physical examination is diagnosis and early treatment is recommended.

What is added

- Physical examination displayed as in the image is enough to make the diagnosis.
- Awareness of this condition is key to answer parents doubts and to promptly treat it.

Ankyloblepharon filiforme adnatum (AFA) is defined as the partial or complete fusion of the eyelids. It is a rare condition, with an estimated incidence of 4.4 per 100,000 neonates¹, that can interfere with vision and increase the risk of amblyopia. Currently, the widely accepted theory is that this condition is due to temporary epithelial cell cycle arrest and rapid mesenchymal proliferation, which leads to the abnormal fusion of the eyelids². AFA may be associated with other malformations, such as central nervous system and/or cardiac anomalies, or it may occur as an isolated condition³. Physical examination is key for diagnosis, and early treatment is essential to prevent future complications.

The neonate was full term, and the pregnancy was monitored and uneventful. She was born via eutocic delivery at 40 weeks and five days with an Apgar score of 9/10/10 at the 1st, 5th and 10th minutes after birth, weighing 4090 grams (P85 – 97), measuring 50 cm in length (P50 – 85), and with a head circumference of 35.5 cm (P85).

During the physical examination at birth, a fibrous band of tissue was observed in the left eye that extended from the upper eyelid to the lower (Fig. 1), limiting the interpalpebral opening and confirming the diagnosis of congenital filiform ankyloblepharon. On the first day of life, this fibrous adhesion was successfully sectioned off with a cold blade, and no complications were observed. Local anesthesia or ophthalmic ointments were not required, and both short- and long-term outcomes were excellent (Fig. 2)⁴. Oculomotricity, pupillary reflexes, and ocular opening after the intervention were all normal. No other malformations were suspected during the remaining objective examination.

In conclusion, AFA can present as an isolated ocular anomaly or as a manifestation of a multisystemic syndrome. Objective examination, coupled with the recognition of this condition, is crucial for diagnosis, and early treatment can prevent complications that would otherwise be avoidable.

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Figure 1. A fibrous band tissue extending between the upper and lower eyelids of the left eye.



Figure 2. 2-year-old child after neonatal ankyloblepharon section.

Previous presentations

This case was presented at the 22nd Congresso Nacional de Pediatria.

Author contributions

M. Rui Correia: conception and design of the study, report, review or other type of work or paper; acquisition of data either from patients, research studies, or literature; analysis or interpretation of data either from patients,

research studies, or literature; drafting the article; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work. J. Queirós: conception and design of the study, report, review or other type of work or paper; acquisition of data either from patients, research studies, or literature; drafting the article; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work. A. Barros: drafting the article; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work. H. Morgado: conception and design of the study, report, review or other type of work or paper; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work.

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Ethical considerations

Protection of humans and animals. The authors declare that no experiments involving humans or animals were conducted for this research.

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Declaration on the use of artificial intelligence. The authors declare that no generative artificial intelligence was used in the writing of this manuscript.

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A perianal mass presenting at birth

Uma massa perianal ao nascimento

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Keypoints

What is known

- Perianal masses are rare findings in newborns and have a broad range of clinical presentations.
- Congenital perianal masses must raise suspicions of concomitant gastrointestinal and urogenital malformations.

What is added

- Perianal macro-lesions in girls are rare in incidence and even more rare as an isolated finding, with no other malformations.
- Pedunculated lesions, outside the mid-line, with no clinical symptoms of anorectal malformation, can be treated conservatively, with no need for imaging tests.

A female term newborn, with no remarkable morphological ultrasonography and no intercurrent conditions during gestation, was observed after vaginal birth revealing a pedunculated ovoid elastic perianal lesion with a diameter of 2 cm. Urine and stool output were adequate during inpatient admission, and no other malformations were detected during subsequent clinical examinations. Following a discussion with the pediatric surgery department, a cerclage with silk thread was performed. The lesion presented progressive ischemia and involution before dropping off after three days. At the two-month-old follow-up appointment, no scar was detected in the excision area, and no other intercurrent conditions were recorded. The histopathology analysis revealed a 0.9 cm hamartoma.

Neonatal perianal masses are a rare finding and can vary in presentation. Other medical disorders are frequently found when perianal masses are congenital¹. While these masses can alarm parents in regard to cosmetic concerns, they also present a challenge for

healthcare providers in the differential diagnosis of complex clinical conditions such as rectovaginal fistula in females, abscesses, sacrococcygeal teratomas, and abnormalities in the gastrointestinal tract²⁻³. Neonatal hamartomas are considered benign tumors and can affect multiple organs or body systems, including the skin². The most common cutaneous subtypes are epidermal nevi, congenital melanocytic nevi, and vascular malformations. Pedunculated lesions are a rare presentation, particularly in the perianal area, where mid-line lesions or masses arising from the vulva are more frequent. Mass excision can be performed as the definitive treatment, with no sequelae or risk of recurrence. If there are no obstructive symptoms, elective excision can be scheduled^{1,4}.

This case is unique because of its rarity in terms of the location of the lesion and the simplicity of the treatment, with definitive excision in the first days of life and a favorable final cosmetic outcome. Also, no further congenital abnormalities were diagnosed, supporting

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Figure 1. Macroscopic aspect of the pedunculated lesion in the right perianal area upon first clinical examination after birth

the benign character of hamartomas, and providing a good long-term outcome for the patient.

Author contributions

I. Silva Costa: idea behind and design of the study, report, review or other type of paper; data acquisition from patients, research studies, or literature; analysis or interpretation of data from patients, research studies, or literature; drafting the article; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be held accountable for the accuracy or integrity of the paper. B. Vala and R. Henriques: idea behind and design of the study, report, review or other type of paper; critical

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Ethical considerations

Protection of humans and animals. The authors declare that the procedures followed complied with the ethical standards of the responsible human experimentation committee and adhered to the World Medical Association and the Declaration of Helsinki. The procedures were approved by the institutional Ethics Committee.

Confidentiality, informed consent, and ethical approval. The authors have followed their institution's confidentiality protocols, obtained informed consent from patients, and received approval from the Ethics Committee. The SAGER guidelines were followed according to the nature of the study.

Declaration on the use of artificial intelligence. The authors declare that no generative artificial intelligence was used in the writing of this manuscript.

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Assessment of the diagnostic accuracy of various artificial intelligence platforms: new technologies, better diagnostic accuracy?

Avaliação da precisão diagnóstica de diversas plataformas de inteligência artificial: novas tecnologias, melhor precisão diagnóstica?

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Dear Editor,

Artificial intelligence (AI) stands as a transformative force across various domains in our daily lives, profoundly influencing numerous professional fields^{1,2}. From virtual assistants that streamline everyday tasks to sophisticated data analysis systems, artificial intelligence is becoming increasingly part of our daily activities. Medicine is no exception, and the gradual incorporation of AI into our practice seeks to mitigate its limited experience and potential errors within this realm².

These platforms hold the promise of revolutionizing clinical practice by enhancing diagnosis, treatment, and patient management. They could be considered as diagnostic aids, serving as a kind of “second opinion” in clinical settings. However, uncertainties and reservations persist regarding their efficacy and how they might assist medical professionals in their work.

In order to better understand whether AI platforms could potentially surpass human performance in diagnostic tasks, the authors based their opinion on a study that aimed to assess the viability of these technologies as reliable diagnostic tools. For this purpose, a selection of 100 clinical cases (including medical history, signs and symptoms, and the results of complementary diagnostic tests) published in the *Portuguese Journal*

of *Pediatrics* between 2019 and 2023 was analyzed and entered into three AI platforms to determine the correct diagnosis for each scenario. The results (Fig. 1) indicated that ChatGPT[®] achieved the highest diagnostic accuracy, with a success rate of 64.77%, followed by Bing[®]. In contrast, Gemini[®] exhibited the lowest level of diagnostic precision. Based on these findings, ChatGPT[®] outperformed the other platforms in diagnostic accuracy. However, when considering error rates, the performance across all three platforms displayed relatively comparable results.

There is no doubt that AI has the potential to become a valuable asset in the field of medicine. Nevertheless, it is essential to acknowledge that it still has certain limitations. The effectiveness and accuracy of its interventions are intrinsically tied to the quality and breadth of the information provided by the user^{1,3}.

In other words, the more objective and detailed the collection of medical history, the higher the likelihood of success for the platform.

However, there remains a crucial “component” that cannot be encapsulated in words: clinical intuition. This limitation represents a fundamental drawback of this technology, not only in healthcare but across various domains.

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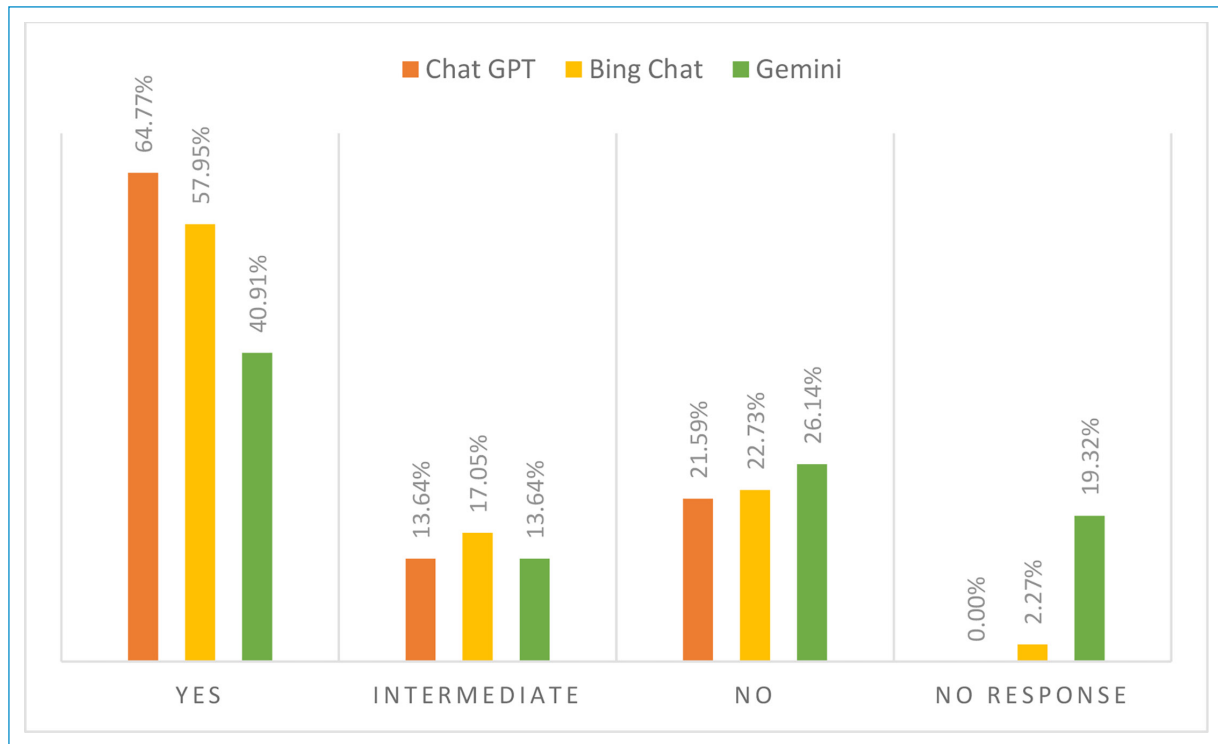


Figure 1. Distribution of responses across the three artificial intelligence platforms.

No matter how advanced AI becomes, can it ever fully replace physicians until it overcomes this limitation, or will it remain a complementary tool in clinical practice? To what extent is it justifiable to rely on a tool whose diagnostic capability depends solely on the most comprehensive objective data, while disregarding the sensory and intuitive inputs integral to a clinical consultation? Furthermore, from an ethical standpoint, is it acceptable or viable to use a platform with such diagnostic capabilities, knowing it could potentially fail in nearly a third of cases?

These questions remain unanswered, and only time will reveal whether these platforms will ever replace healthcare professionals or whether they will remain as auxiliary tools to enhance clinical outcomes.

Author contributions

C. Gomes: conceptualization; formal analysis; investigation; methodology; resources; writing. P. Azevedo: formal analysis; methodology; resources; writing. Ana I. Duarte: conceptualization; supervision; validation; writing.

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Protection of humans and animals. The authors declare that no experiments involving humans or animals were conducted for this research.

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