An Pediatr (Barc). 2017;xxx(xx):xxx–xxx

analesdepediatría

www.analesdepediatria.org

ORIGINAL ARTICLE

Streptococcus pyogenes infection in paediatrics: from pharyngotonsillitis to invasive infections☆

David Espadas-Maciá[a], Eva María Flor Macián[a,*], Rafael Borrás[b], Sandrine Poujois Gisbert[b], Juan Ignacio Muñoz Bonet[a]

[a] *Unidad de Cuidados Intensivos de Pediatría, Hospital Clínico Universitario de Valencia, Valencia, Spain*
[b] *Departamento de Microbiología, Hospital Clínico Universitario de Valencia, Valencia, Spain*

Received 12 October 2016; accepted 24 February 2017

KEYWORDS
Streptococcus pyogenes;
Paediatrics;
Invasive infection;
Acute pharyngeal tonsillitis

Abstract
Background: *Streptococcus pyogenes* or Group A Streptococci (GAS) cause many infections in infancy. Changes in its epidemiology have been described in recent years, including an increase in invasive infections (iGAS).
Methods: A retrospective-descriptive study was conducted on children less than 15-years-old, with GAS infections, in particular iGAS, and their complications from February 2004 to April 2014.
Results: A total of 2192 positive cultures were obtained of which 92.7% were pharyngeal cultures. Twenty-nine patients were admitted to hospital: 4 with suppurative complications, 7 post-infective, 14 iGAS, and 4 probable iGAS cases. There were no differences in the frequency of GAS isolations/year. Non-invasive isolates were more frequent in winter and spring ($P < .001$), and 68.3% were in patients younger than 5 years.

The incidence of iGAS was 2.1/100 000 children/year. There was no seasonality, and it was more frequent in younger children ($P = .039$). The most common diagnosis was pneumonia (6/14). Eight patients required intensive care. They were treated empirically with second or third-generation cephalosporin or with intravenous penicillin, and pneumonia required longer treatment times ($P = .016$). All GAS isolates were sensitive to penicillin, and 10.6% were resistant to erythromycin. The time spent in hospital was longer for iGAS than other cases ($P = .028$). No patients died.
Conclusions: Pharyngotonsillitis caused by GAS is common in childhood, and its incidence is increasing in children younger than 5 years. At the moment, post-infectious complications are rare. Invasive infections are the most severe forms of presentation, and are more common in younger children.

☆ Please cite this article as: Espadas-Maciá D, Flor Macián EM, Borrás R, Poujois Gisbert S, Muñoz Bonet JI. Infección por estreptococo pyogenes en la edad pediátrica: desde faringoamigdalitis aguda a infecciones invasivas. An Pediatr (Barc). 2017. https://doi.org/10.1016/j.anpedi.2017.02.011

* Corresponding author.
E-mail address: eva.florm@gmail.com (E.M. Flor Macián).

PALABRAS CLAVE
Streptococcus pyogenes;
Pediatría;
Infección invasiva;
Faringoamigdalitis aguda

Infección por estreptococo pyogenes en la edad pediátrica: desde faringoamigdalitis aguda a infecciones invasivas

Resumen
Introducción: *Streptococcus pyogenes* o estreptococo del grupo A (EGA) causa numerosas infecciones en la infancia. En los últimos años se han descrito cambios en su epidemiología, con un aumento de las infecciones invasivas.
Métodos: Estudio retrospectivo-descriptivo en menores de 15 años con infección por EGA y sus complicaciones, desde febrero de 2004 a abril de 2014.
Resultados: Se obtuvieron 2.192 cultivos positivos, siendo el 92,7% faringoamigdalares. Ingresaron 29 pacientes: 4 complicaciones supurativas, 7 postinfecciosas, 14 infecciones invasivas y 4 probables. No hubo diferencias en la frecuencia de aislamientos de EGA/año. Los aislamientos no invasivos fueron más frecuentes en invierno y primavera ($p < 0{,}001$), siendo el 68,3% de los pacientes menores de 5 años.
La incidencia de infecciones invasivas fue de 2,1/100.000 niños/año. No mostraron estacionalidad y ocurrieron en niños de menor edad ($3{,}3 \pm 2{,}2$ vs. $4{,}9 \pm 2{,}9$ años, $p = 0{,}039$). El diagnóstico más frecuente fue la neumonía (6/14) y el lugar de aislamiento fue la sangre (8/14). Ocho precisaron cuidados intensivos. Se trataron empíricamente con cefalosporinas de segunda/tercera generación o penicilina intravenosas. Las neumonías precisaron mayor tiempo de tratamiento que el resto ($13{,}8 \pm 3{,}5$ vs. 11 ± 2 días, $p = 0{,}0016$). Todos los EGA fueron sensibles a penicilina, el 10,6% resistentes a eritromicina. El tiempo de ingreso fue mayor en las infecciones invasivas (13 ± 5 vs. $8{,}7 \pm 4{,}4$ días, $p = 0{,}028$). Ningún paciente falleció.
Conclusiones: La faringoamigdalitis por EGA sigue siendo frecuente en la infancia y su incidencia está aumentando en menores de 5 años. En la actualidad, las complicaciones postinfecciosas son raras. Las infecciones invasivas son las formas de presentación más grave y son más frecuentes en niños de menor edad.

Introduction

Group A β-haemolytic streptococcus (GAS), or *Streptococcus pyogenes*, is one of the most frequent pathogens in the paediatric age group. It produces disease of varying severity, from acute pharyngitis (AP) and its suppurative complications to forms associated with a high mortality, including post-infection complications (rheumatic fever [RF] and post-streptococcal glomerulonephritis [PSGN]) and invasive disease.[1,2]

In the past few decades, there has been a generalised increase in the incidence of invasive disease in Europe and North America, the cause of which has yet to be determined.[3] In Europe, the incidence is of 2.79 cases per 100 000 inhabitants per year,[3] with an estimated incidence in the paediatric population of 0.12–3.1 per 100 000 children per year.[4–7] The mortality in children ranges from 3.6% to 8.3%,[8] but it can reach 26.8% for its most severe form, streptococcal toxic shock syndrome (STSS).[9]

The main risk factors for invasive disease are extreme age (age < 5 years or >65 years), immunosuppressed states, varicella, diabetes, and skin lesions.[3,5,9–12] Its most frequent presentations are occult bacteraemia[4,5] or cellulitis,[3,7] and GAS is most frequently isolated from blood samples.[4,7]

The studies on invasive disease conducted in Europe mainly involved adult patients,[7,12] and the few paediatric case series published in Spain focused on STSS.[9] The aim of our study was to assess the frequency of infection by GAS, its complications and especially invasive disease in the paediatric population served by our hospital.

Materials and methods

We conducted a retrospective descriptive study of children aged less than 15 years with infection by GAS managed in the Department of Paediatrics of the Hospital Clínico Universitario of Valencia (Spain) between February 2004 and April 2014. This is a tertiary referral hospital with 79 paediatric beds that manages an average of 25 522 emergency visits and 2748 paediatric admissions per year. Its catchment area includes 52 735 children, although the paediatric intensive care unit (PICU) receives patients from other health areas. The study was approved by the ethics committee of the hospital.

Cultures that were positive for GAS were recorded in the Department of Microbiology database, including those with isolation of non-invasive strains from samples obtained in primary care facilities and submitted to our hospital. The decision to order culture or rapid antigen detection testing (RADT) for the diagnosis of AP was made on a case-by-case basis. We also reviewed the health records of patients admitted to hospital.