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ORIGINAL ARTICLE

Cerebrovascular risk factors seen in a university hospital☆

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KEYWORDS
Stroke;
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Abstract
Introduction: Risk factors (RFs) in paediatric stroke differ from those of adults, and they include a wide range of diseases such as heart disease, infections, leukemias, and inborn errors of metabolism.
Objectives: To describe RF for ischaemic stroke in a paediatric population, and to examine the relationship of RF with age, sex and type of stroke.
Patients and methods: An analysis was performed on a database of 114 children and adolescents with ischaemic stroke from January 2003 to July 2012. Risk factors were stratified into 6 categories and ischaemic strokes were classified as arterial and venous. We compared the RF with age, sex, and type of stroke (chi^2 and OR).
Results: The median age was 2.5 years, with 74 (62.2%) males. No RF was identified in 7.9% of patients, and 67% had more than one RF. The most common RFs were acute systemic diseases (56.1%), heart disease (35.1%), and chronic systemic diseases (29.8%). There was a statistically significant association between acute systemic disease and age less than 5 years ($P < 0.001$), and between chronic systemic disease and age 5 years or more ($P < 0.02$). The RF of heart disease was associated with arterial infarction ($P < 0.05$), and the acute head and neck disease RF was associated with venous infarction ($P < 0.05$).
Conclusions: The RFs for ischaemic stroke are multiple in the paediatric population, and some of them are associated with a specific age and type of stroke. The detection of these factors may help in the primary prevention of people at risk, an early diagnosis, and treatment and prevention of recurrences.

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PALABRAS CLAVE
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Pediatría

Factores de riesgo para accidente vascular encefálico en un hospital universitario

Resumen
Introducción: Los factores de riesgo (FR) para accidente vascular encefálico (AVE) pediátrico difieren del adulto e incluyen un amplio rango de enfermedades, como pueden ser cardiopatías, infecciones, leucemias y errores congénitos del metabolismo.
Objetivos: Describir FR en AVE isquémico en población pediátrica y explorar asociación de los FR con edad, sexo y tipo de AVE.
Pacientes y método: Se analizaron 114 casos pediátricos con AVE isquémico ocurridos entre enero del 2003 y julio del 2012. Los FR se estratificaron en 6 categorías, los AVE isquémicos se clasificaron como arterial y venoso. Se compararon los FR con edad, sexo y tipo de infarto (chi al cuadrado y *odds ratio)*.
Resultados: La mediana de edad fue 2,5 años, 74 (62,2%) hombres. El 7,9% de los pacientes no tenía FR identificable y el 67% tenía más de uno. La mayor frecuencia de FR fue: enfermedades sistémicas agudas (56,1%), cardiopatías (35,1%) y enfermedades crónicas sistémicas (29,8%). Hubo asociación estadísticamente significativa entre FR enfermedad sistémica aguda y edad menor de 5 años ($p < 0,001$) y entre enfermedad crónica sistémica y edad mayor o igual a 5 años ($p < 0,02$). El FR cardiopatía se asoció a infarto arterial ($p < 0,05$) y el FR enfermedad aguda de cabeza y cuello con infarto venoso ($p < 0,05$).
Conclusiones: Los FR de AVE isquémico en la población pediátrica son múltiples y algunos de ellos se asocian a edades específicas y tipo de AVE. La detección de estos factores permitirá la prevención primaria en la población de riesgo así como un diagnóstico y tratamiento precoz, haciendo igualmente posible la prevención de recurrencias.

Introduction

The World Health Organisation (WHO) defines stroke as rapidly developing clinical signs of focal or global disturbance of cerebral function, lasting more than 24 h or leading to death, with no apparent cause other than that of vascular origin.[1]

In the paediatric population, stroke is emerging as a severe and frequent disease. It has become one of the 10 leading causes of death worldwide, with a mortality nearing 10%, a rate of neurological sequelae of 70%, and a recurrence rate of up to 35%.[2–4]

Paediatric stroke is not something new. Since Willis and Osler published series of clinical cases in the XVII and XIX century, respectively, the number of reports on paediatric stroke has been rising exponentially.[5–7] Previous studies have identified a wide range of associated factors, commonly termed risk factors (RFs), that are different from the RFs for stroke in adults.[8–11] The RFs associated with adult stroke, such as hypertension, atheromatosis, tobacco use, and diabetes, are rarely found in children. The most common RFs associated to paediatric stroke are acute infections, congenital diseases such as cardiac disorders, some chronic systemic conditions and head and neck disorders.

Since children differ from adults in their RFs, the characteristics of their vascular and haematologic systems, and in their various stages of brain development, it is not possible to extrapolate the results of studies with adults or the treatment guidelines for adults to the paediatric population.[12–14]

Since 2003, the paediatric neurology department of the Pontificia Universidad Católica de Chile (PUC) started keeping a stroke registry for patients aged 0–18 years, and found an unusually high prevalence that had not been described in Chilean studies. This led to the creation of a paediatric stroke research programme, which associated with the International Paediatric Stroke Study (IPSS) Group[15] in 2005. Access to the IPSS allows consulting and obtaining feedback in complex cases and participation in this multicentre study.

The aim of our study was to describe the RFs associated to ischaemic stroke in a paediatric population ranging from 1 month to 18 years of age, and to find the association of RFs to the different ages, types of stroke, and sexes.

Patients and methods

We conducted a descriptive observational study of a cohort of 114 children with ischaemic stroke. Participants enrolled in the study during their hospitalisation or while being monitored in the outpatient services of the Hospital Clínico of the PUC from January 2003 to July 2012. The study was approved by our Ethics Committee.

Inclusion criteria were ischaemic stroke experienced between ages 1 month and 18 years diagnosed by brain neuroimaging (magnetic resonance imaging [MRI] or computer tomography [CT]). Exclusion criteria were haemorrhagic stroke, transient ischaemic attack, and incomplete records.

The data were collected in a clinical form designed for the purpose. The form gathered information on the clinical picture at onset, RFs, investigations performed, outcome at discharge, and subsequent follow-ups. The variables under