

## Posterior reversible encephalopathy syndrome as a debut of postinfectious glomerulonephritis<sup>☆</sup>



### Síndrome de encefalopatía posterior reversible como comienzo de glomerulonefritis postinfecciosa

Dear Editor:

Posterior reversible encephalopathy syndrome (PRES) is a clinical and radiological diagnosis with a variable neurologic presentation that may include vomiting, headache, changes in consciousness and seizures. The most sensitive test for diagnosis is cranial magnetic resonance imaging (MRI). It yields a typical appearance with bilateral focal lesions, in most cases involving the parietal and occipital lobes.<sup>1</sup> Typically, patients exhibit clinical and radiological resolution in response to early treatment.<sup>2</sup> We present the cases of 2 paediatric patients that presented with PRES as onset of acute post-infectious glomerulonephritis.

The first patient was a boy aged 11 years who presented with somnolence and generalised tonic-clonic seizures. In the preceding 48 h, he had experienced headache and blurry vision. The most relevant finding of the history-taking was a wound in the right leg that became infected and required oral antibiotherapy the month before. Once the patient was stabilized and the seizures controlled with administration of midazolam, the patient was admitted to the paediatric intensive care unit (PICU). The blood pressure (BP) was 160/100 mm Hg (95th percentile for age, sex and height, 118/78 mm Hg), leading to diagnosis of hypertensive urgency. The findings of blood tests were compatible with stage 1 acute kidney injury (Table 1) and there was macroscopic haematuria. The evaluation was completed with a cranial MRI, with findings compatible with posterior leukoencephalopathy syndrome (Fig. 1) and the salient findings of the workup for assessment of acute glomerulonephritis were a low level of complement factor 3 (C3) and a high anti-streptolysin O (ASO) antibody titre (Table 1). The initial treatment consisted of nicardipine and furosemide, followed by oral amlodipine for a month. At present, the patient has normal renal function, without proteinuria, haematuria or high blood pressure, and with normalization of C3 levels and the neurological examination.

The second patient was a boy aged 9 years admitted to the PICU due to hypertensive urgency presenting with generalised tonic-clonic seizures associated with headache and macroscopic haematuria with onset 24 h prior. Ten days before, the patient had received treatment with amoxicillin-clavulanic acid for cervical suppurative lymphadenopathy.

At the time of admission, his BP was 170/110 mm Hg (95th percentile for age, sex and height, 120/76 mm Hg). The findings of a head CT scan were normal. Blood test findings were compatible with stage 1 acute kidney injury, with low levels of C3 and elevation of ASO (Table 1). The findings of the cranial MRI were compatible with PRES (Fig. 1B). The patient had a favourable outcome, with neurologic recovery and adequate control of BP after receiving treatment with intravenous labetalol followed by oral amlodipine. At present the patient has normal kidney function with normalization of serum C3 levels and normal BP without pharmacological treatment, although with persistence of microscopic haematuria, a common feature in the follow-up these patients.

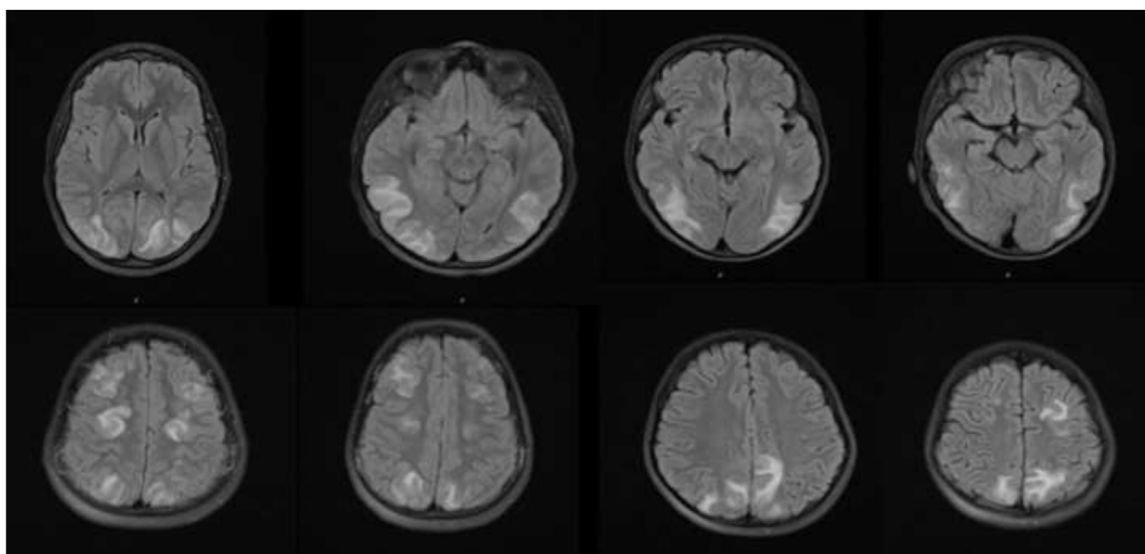
We have presented 2 cases of PRES associated with post-infectious glomerulonephritis that were not related to streptococcal pharyngitis, as is typical. The first case occurred following a cutaneous infection and the second following cervical lymphadenopathy, both with elevation of ASO without isolation of the pathogen. The aetiology of PRES is heterogeneous,<sup>3</sup> although in children it usually develops in the context of hypertensive seizures secondary to renal disease, chemotherapy or pharmacological immunosuppression, blood disorders or systemic lupus erythematosus. Recently it has been described in association with infection by SARS-CoV-2.<sup>4</sup> Early diagnosis is difficult due to the coexistence of nonspecific symptoms, although macroscopic haematuria, which was present in our patients, can suggest a renal aetiology. In our patients, acute encephalitis was initially suspected until the detection of high blood pressure. Since this is an infrequent disease, it is important to maintain a high level of clinical suspicion in the presence of nonspecific neurologic symptoms emerging after an infection of likely streptococcal aetiology. We also ought to highlight the importance of measuring the arterial blood pressure in paediatric patients and be knowledgeable of the reference ranges provided in paediatric guidelines. The treatment is based on controlling the trigger, which in the cases of PRES associated with post-infectious acute glomerulonephritis presented here corresponded to managing the high blood pressure and acute kidney injury. Gewirtz et al<sup>5</sup> recently provided evidence that poor control of high blood pressure increases morbidity in these patients due to exacerbation of cerebral oedema, so treatment must be provided, usually in the intensive care unit, with continuous infusion of antihypertensive drugs to gradually reduce BP with the aim of preventing cerebral ischaemia. In paediatrics, the drugs used most widely for management of hypertensive urgency are labetalol and nicardipine, while sodium nitroprusside is falling into disuse because it is considered to carry high risks.<sup>6</sup> While PRES is characterised by its reversibility and favourable prognosis in up to 75%–90% of cases, it is a severe disease with a mortality ranging from 3% to 6% and that causes neurologic sequelae in 10%–20% of affected patients.<sup>5</sup> For all the above reasons, we underscore the importance of being aware of this disease to maintain a high suspicion in the event of compatible symptoms that would allow early initiation of appropriate treatment, without which it can cause irreversible brain damage.

<sup>☆</sup> Please cite this article as: Castellano-Martinez A, Roldán-Cano V, Morales-Arandojo P, Rodríguez-González M. Síndrome de encefalopatía posterior reversible como comienzo de glomerulonefritis postinfecciosa. *An Pediatr (Barc)*. 2022;96:452–454.

**Table 1** Main laboratory test results of the patients at diagnosis and at 8 weeks of follow-up.

	Patient 1		Patient 2	
	Diagnosis	8 weeks	Diagnosis	8 weeks
Creatinine (mg/dL)	1	0.58	0.93	0.63
GFR (mL/min/1,73 m <sup>2</sup> )	63	>90	62	>90
Urea (mg/dL)	56	25	43	19
Sodium (mEq/L)	135	138	139	137
Potassium (mEq/l)	4.2	4.5	1.4	3.8
Phosphorus (mg/dL)	5.3	5.3	3.9	4.1
C3 (mg/dL) (NR, 80–90)	(NR, 80-90)	120	36	108
C4 (mg/dL) (NR, 10–40)	15	28	19	24.7
ASO (IU/mL) (NR, 0–160)	395	53	598	195
Urine sediment	Uncountable RBCs/field	No pathological features	500 RBC/ $\mu$ L 300 WBC/ $\mu$ L	17 RBC/ $\mu$ L
ACR (mg/g) (NR < 30)	1542	7.5	405.3	8.7

ACR, urine albumin to creatinine ratio; ASO, anti-streptolysin O antibodies; C3, complement factor 3; C4, complement factor 4; GFR, glomerular filtration rate estimated with the Schwartz equation (2009); NR, normal range; RBC, red blood cell; WBC, white blood cell.

**Figure 1** Magnetic resonance images obtained in the 2 presented cases.

Long TR sequence (T2-weighted and FLAIR) images from patient 1 (A) and patient 2 (B) showing symmetrical areas of cortico-subcortical hyperintensity in the temporo-occipital and frontoparietal regions of both cerebral hemispheres, compatible with posterior reversible encephalopathy syndrome.

## References

- Ahn CH, Han SA, Kongmd YH, Kim SJ. Clinical characteristics of hypertensive encephalopathy in pediatric patients. *Korean J Pediatr.* 2017;60:266–71, <http://dx.doi.org/10.3345/kjp.2017.60.8.266>.
- Shankar J, Banfield J. Posterior reversible encephalopathy syndrome: a review. *Can Assoc Radiol J.* 2017;68:147–53, <http://dx.doi.org/10.1016/j.carj.2016.08.005>.
- Thavamani A, Umaphathi KK, Puliyel M, Super D, Allareddy V, Ghori A. Epidemiology, comorbidities, and outcomes of posterior reversible encephalopathy syndrome in children in the United States. *Pediatr Neurol.* 2020;103:21–6, <http://dx.doi.org/10.1016/j.pediatrneurol.2019.07.007>.
- Anand P, Lau KHV, Chung DY, Virmani D, Cervantes-Arslanian AM, Mian AZ, et al. Posterior reversible encephalopathy syndrome in patients with coronavirus disease 2019: two cases and a review of the literature. *J Stroke Cerebrovasc Dis.* 2020;29:105212, <http://dx.doi.org/10.1016/j.jstrokecerebrovasdis.2020.105212>.
- Gewirtz AN, Gao V, Parada SC, Robbins MS. Posterior reversible encephalopathy syndrome. *Curr Pain Headache Rep.* 2021;25:19, <http://dx.doi.org/10.1007/s11916-020-00932-1>.

6. Seeman T, Hamdani G, Mitsnefes M. Hypertensive crisis in children and adolescents. *Pediatr Nephrol.* 2019;34:2523–37, <http://dx.doi.org/10.1007/s00467-018-4092-2>.

Ana Castellano-Martinez<sup>a,\*</sup>, Virginia Roldán-Cano<sup>a</sup>, Patricia Morales-Arandojo<sup>b</sup>, Moisés Rodríguez-González<sup>c</sup>

<sup>a</sup> *Sección de Nefrología Pediátrica, Hospital Universitario Puerta del Mar, Cádiz, Spain*

<sup>b</sup> *Sección de Pediatría, Hospital Universitario Puerta del Mar, Cádiz, Spain*

<sup>c</sup> *Sección de Cardiología Pediátrica, Hospital Universitario Puerta del Mar, Cádiz, Spain*

\* Corresponding author.

E-mail address: [anacastellanomart@gmail.com](mailto:anacastellanomart@gmail.com) (A. Castellano-Martinez).

<https://doi.org/10.1016/j.anpede.2021.06.012>

2341-2879/ © 2021 Asociación Española de Pediatría. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## Sexually transmitted infections in Portuguese adolescents<sup>☆</sup>



### Infecciones de transmisión sexual en adolescentes portugueses

Dear Editor:

Sexually transmitted infections (STIs) are a global public health problem, with evidence of an alarming increase in their incidence in adolescents. These infections can have long-term repercussions of health, including infertility, pelvic inflammatory disease or cervical, oropharyngeal, or rectal cancer in case of infection by some strains of human papillomavirus, and adverse pregnancy and birth outcomes.<sup>1</sup>

Sexually transmitted infections, overall and in the paediatric population, are a global concern. Asking adolescents about their sexual activity and identifying risk factors for STIs are essential for the diagnosis of these infections, which are often asymptomatic. Also, when adolescents present with genitourinary complaints, it is important to consider the possibility of an STI before prescribing empirical antibiotic therapy.

Analysing the prevalence of STIs prevalence and their association with sexual behaviour in adolescents is essential to guide the development of strategies to reduce the incidence of these infections and promote sexual and reproductive health.<sup>2,3</sup>

We conducted a retrospective study that included all *Neisseria gonorrhoeae* and *Chlamydia trachomatis* infections diagnosed in adolescents aged up to (and including) 18 years between January 1st, 2015, and December 31st, 2019 in a Portuguese tertiary care hospital.

We identified 33 cases, of which 24 (72.7%) were diagnosed in the last 3 years. [Table 1](#) presents the demographic and clinical characteristics of these patients. [Table 2](#) sum-

marises the data for the risk factors for STI analysed in the study.

There were 20 cases (60.6%) of infection by *Neisseria gonorrhoeae*, of which 8 (40%) were cases of coinfection with *Chlamydia trachomatis*. The samples used for diagnosis were of urine (16), urethral discharge (12), cervical swab (8) and conjunctival swab (1). The diagnosis was made by molecular testing (30), culture (7) or both (4). Of the 11 cases of *N. gonorrhoeae* detected by culture, 6 were further investigated with an antibiogram, which identified

**Table 1** Demographic and clinical characteristics of the sample.

	n (%)
Sex	
Male	21 (63.6%)
Female	12 (36.4%)
Age, years (median, 17.5; range, 13.4–18.4)	
10–14	1 (3%)
15–18	32 (97%)
Clinical manifestations	
Urethritis	17 (51.5%)
Vaginal discharge	3 (9%)
Lower urinary tract symptoms	3 (9%)
Eye discharge	1 (3%)
Pelvic inflammatory disease	1 (3%)
Vaginal bleeding	1 (3%)
Asymptomatic	7 (21.2%)

**Table 2** Risk factors for sexually transmitted infections (STIs).

Risk factor	n (%)
Lack of regular condom use for birth control	26 (78.8%)
New or recent sexual partner (last 60 days)	7 (21.2%)
Alcohol and/or drug abuse	4 (12.1%)
Men who have sex with men	4 (12.1%)
Previous STIs	4 (12.1%)
Multiple sex partners (>2)	3 (9%)

<sup>☆</sup> Please cite this article as: Fonseca S, Lacerda L, Teixeira C, Reis-Melo A, Tavares M. Infecciones de transmisión sexual en adolescentes portugueses. *An Pediatr (Barc).* 2022;96:455–456.