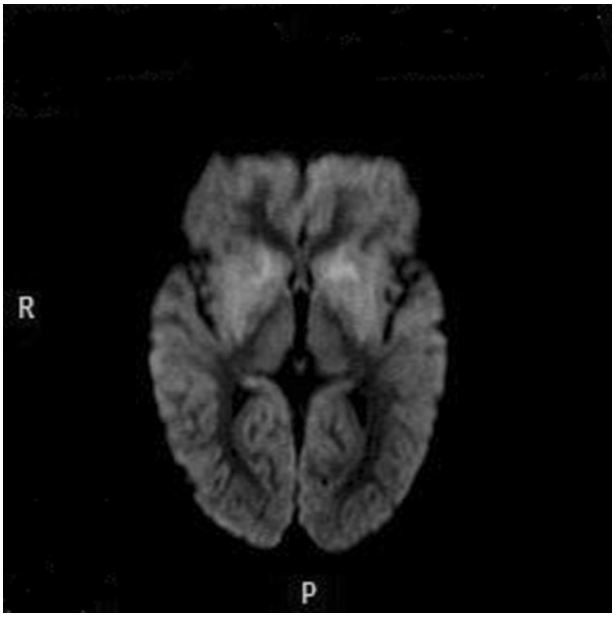

Fig. 1. MR imaging in the first 24 h after acute ipoxic–ischaemic brain damage. Axial apparent diffusion coefficient map shows a reduced ADC value (0.41) in posterior putamen and globus pallidus, and a high ADC value in anterior putamen and head of caudate nuclei (0.73), indicating the prevalence of T2 effect. The relatively high ADC value indicates chronic impairment of anterior portion of basal ganglia.

the patient developed ESRF and began peritoneal dialysis. When he was 4 years, in spite of a satisfactory cognitive and emotional development, the child showed severe neuromuscular deficit with focal hand dystonia and athetosis, inability to keep his head and trunk upright, or walk. He had no hearing defects. No metabolic investigations were performed. At the age of 4.4, after 6 months of treatment with growth hormone, the child weighed 14 kg (10°C) and was 96 cm tall (10°C). During a febrile illness, he manifested apnoea, followed by cardiac arrest, prolonged brain ischaemia and irreversible coma. An MRI performed in the first 24 h showed, besides brain atrophy, T2 hyperintensity on basal ganglia. Diffusion-weighted images showed an extensive signal alteration indicating water diffusion restriction in the lenticulostriate nuclei and the caudate nuclei head with low ADC values (4.1 ± 0.15 SD) in the posterior portion of the lenticulostriate nuclei. The anterior portions of lenticulostriate nuclei showed higher ADC values (7.3 ± 0.43 SD) in the same regions of hyperintensity on T2 weighted images (Figure 1). Therefore the hyperintensity might be related to abnormalities of metabolic mechanisms existing before the hypoxic injury [6]. The child died after 2 months of coma.

Like the cases described by Laakkonen H *et al*., we can exclude prenatal or neonatal complications causing the neurological impairment in our patient. However, our case showed several different features, such as the more severe muscular hypotonia, adequate growth, growth hormone therapy and normal hearing. In spite of these differences, the MRI findings and the unexplained sudden event causing early death strongly suggest that our patient may have been suffering from the new clinical entity that Laakkonen *et al*. call NPHS1 with muscular dystonia and athetosis.

Acknowledgements. The authors wish to thank Dr A. Iolascon of the CEINGE-Advances Biotechnology Laboratories, Naples, Italy for the molecular study of NPHS1 locus in the patient, as well as the patient's parents.

Conflict of interest statement. None declared.

[1]Department of Paediatrics Ivana Pela[1]
[2]Department of Radiology Claudio Fonda[2]
University of Florence
Azienda Meyer, Florence
Italy
E-mail: ivana.pela@unifi.it

1. Holmberg C, Tryggvason K, Kestila MK *et al*. Congenital nephrotic syndrome. In: Avner ED, Harmon WE, Niaudet P. (eds), *Pediatric Nephrology*. 5th edn. Baltimore: Lippincott Williams & Wilkins, 2004; 503–516
2. Kestila M, Mannikko M, Holmberg C *et al*. Congenital nephrotic syndrome of the Finnish type maps to the long arm of chromosome 19. *Am J Hum Genet* 1994; 54: 757–764
3. Patrakka J, Kestila M, Wartiovaara J *et al*. Congenital nephrotic syndrome (NPHS1): features resulting from different mutations in Finnish patients. *Kidney Int* 2000; 58: 972–980
4. Qvist E, Pihko H, Fagerudd P *et al*. Neurodevelopmental outcome in high-risk patients after renal transplantation in early childhood. *Pediatr Transplant* 2000; 26: 53–62
5. Laakkonen H, Lonnqvist T, Uusimaa J *et al*. Muscular dystonia and athetosis in six patients with congenital nephrotic syndrome of the Finnish type (NPHS1). *Pediatr Nephrol* 2006; 21: 182–189
6. Engelbrecht V, Scherer A, Rassek M *et al*. Diffusion weighted MR imaging in the brain in children: findings in the normal brain and in the brain with white matter disease. *Radiology* 2002; 222: 410–418

doi: 10.1093/ndtplus/sfn048

Advance Access publication 3 June 2008

Viruses may trigger allopurinol hypersensitivity syndrome

Sir,

A relationship between allopurinol hypersensitivity syndrome (AHS) and viral infections, especially with human herpes virus (HHV)-6, has been suspected since the first report of AHS in 1970 [1]. Although participation of other opportunistic viral infections has also been reported, the mechanisms by which any of these contribute to AHS are still unknown. We report a case of a 39-year-old woman receiving peritoneal dialysis due to lupus nephritis who developed severe AHS, which may have resulted from influenza virus infection. She experienced a systemic skin rash with high fever just after administration of allopurinol. Both hypereosinophilia and high titre influenza virus type A-specific antibody were present before admission and at hospital day 6. Because antibody titres for HHV-6

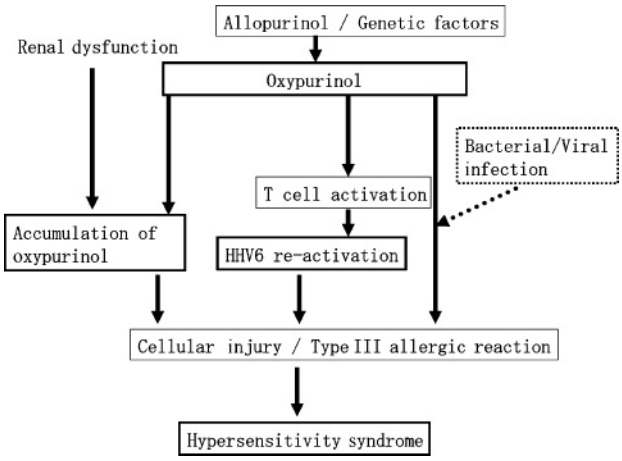

Fig. 1. Possible mechanism for the onset of allopurinol hypersensitivity syndrome. In addition to established pathways (direct cellular injury and inactivation of viruses), community infection may accelerate the cascade.

IgG, Epstein-Barr virus, measles and rubella were positive but within the normal range, we suspected that the AHS may have been induced by influenza virus infection. Her symptoms diminished following withdrawal of allopurinol and administration of predonisolone. Current hypotheses for mechanisms of the AHS onset include two pathways Fig. 1. First, storage of allopurinol and its metabolite, oxypurinol, may directly inflict cell damage, especially in patients with renal dysfunction. A second possible pathway suggests that a type III allergic reaction caused by allopurinol may induce the re-activation of HHV-6, or activation of other opportunistic viruses, such as cytomegalovirus [2] and Epstein-Barr virus [3], through the activation of T-lymphocytes. Recently, CD46 was identified as a receptor for HHV-6, and it was therefore suggested that this reactivated virus damages cells, including epidermal cells and lymphocytes, via CD46 binding [4]. In the present case, the influenza virus titre was elevated in parallel with the clinical symptoms of AHS, and it is possible that this virus exacerbated the cascade reaction in the same way as do other viruses. We suggest that such community-acquired bacterial and viral infections may also accelerate these cascade reactions and that genetic factors may interact with these events.

Conflict of interest statement. None declared.

Department of Nephrology, School of Medicine, Faculty of Medicine
Saitama Medical University, Iruma
Saitama, Japan
E-mail: kannoyh@saitama-med.ac.jp

Masami Koike
Yoshihiko Kanno
Koji Tomori
Hirokazu Okada
Hiromichi Suzuki

1. Suzuki Y, Inagi R, Aono T *et al*. Human herpes virus 6 infection as a risk factor for the development of severe drug-induced hypersensitivity syndrome. *Arch Dermatol* 1998; 134: 1108–1112
2. Arakawa M, Kakuto Y, Ichikawa K *et al*. Allopurinol hypersensitivity syndrome associated with systemic cytomegalovirus infection and systemic bacteremia. *J Intern Med* 2001; 40: 331–335
3. Descamps V, Mahe E, Houhou N *et al*. Drug-induced hypersensitivity syndrome associated with Epstein-Barr virus infection. *Br J Dermatol* 2003; 148: 1032–1034
4. Santoro F, Kennedy PE, Locatelli G *et al*. CD46 is a cellular receptor for human herpesvirus 6. *Cell* 1999; 99: 817–827

doi: 10.1093/ndtplus/sfn042

Advance Access publication 14 April 2008

A case of lethal enteroviral haemolytic uraemic syndrome?

Sir,

In the recent years much has been learnt about haemolytic uraemic syndrome (HUS), which is defined by symptomatic or bloody diarrhoea, acute nephropathy, thrombocytopenia and microangiopathic haemolytic anaemia. Often HUS is complicated by neurological symptoms in children [1]. The main aetiological culprit is Shiga-like toxin-producing *E. coli* (STEC) accounting for ∼85% of HUS cases. Recently the aetiological role of enteroviruses in HUS has been studied and rejected as being an aetiological agent [3] even though earlier case reports suggested a role (see references in [3]). We present a case of HUS, which was probably due to enteroviral infection.

A 17-month-old girl, who was previously healthy, was admitted with bloody diarrhoea preceded by vomiting for a day or two. A few hours into the admission the girl developed a seizure and was transferred to an ICU. Extensive clinical and laboratory testing was carried out (Table 1). Tests showed uraemia, thrombocytopenia, haemolytic anaemia, leucocytosis and anuria. The patient developed cardiac arrest at 8 h into the admission. Resuscitation with concurrent peritoneal dialysis was attempted for an hour without success.

On autopsy we found a normally developed girl without any deformities. The autopsy revealed a thickened haemorrhagic colon, stasis and oedema in the lungs, hydrothorax and hydroperitoneum. The CNS was without lesions (vascular or any other). There were no signs of iatrogenic injury.

On histopathological examination we found signs of endothelial damage in the small vessels of the kidneys (Figure 1) and the intestine (with thrombosis), fragments of thrombi in the small lung vessels and a necrotic colon with submucosal haemorrhage and leukocyte infiltration. No thrombi were found in the brain.

Concurrent to the autopsy we requested several tests expecting to find a STEC infection but instead we found an enteroviral infection (Table 1).

Our case indicates that enteroviral infections may be able to inflict HUS, and contradicts other studies of HUS [3].

It is clear from the above-mentioned findings that the case presented as HUS, with all of its cardinal findings, uraemia, thrombocytopenia, haemolytic anaemia, and endothelial damage in the kidney and intestine. We used stool and tissue cultures for the bacterial tests whereas viral tests included PCR, serology and cultures. Sadly subtyping (using cell cultures) was unsuccessful after several attempts.