

Intracranial hemorrhage after high-dose methylprednisolone in a child with acute immune thrombocytopenic purpura

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Dear Editor,

Severe hemorrhage in children with immune thrombocytopenic purpura (ITP) is rare and occurs in 3% of patients [1]. Intracranial hemorrhage (ICH), the most feared bleeding complication, has an estimated incidence of 0.1–0.5% [1–3]. Mortality rate of ICH is high and varies from 24–57% [2–4]. We report a patient with acute ITP who developed fatal ICH shortly after starting high-dose methylprednisolone.

A 5-year-old girl with an unremarkable medical and family history presented to her pediatrician with acute onset of bruising and petechiae. Physical examination revealed no other abnormalities. Blood pressure was 112/60 mmHg. Laboratory studies showed an isolated thrombocytopenia of $1 \times 10^9/L$ (Table 1). She was diagnosed with acute ITP and managed conservatively. Four days after presentation, she developed large ecchymoses and epistaxis causing anemia. Intravenous immunoglobulins (IVIg; 0.8 g/kg once) and packed red cells were administered (Fig. 1). Platelet count remained low ($1 \times 10^9/L$)

and mucosal bleeding continued. The girl was referred to our department for further management. We saw a pale, tachycardic girl with multiple ecchymoses and active mucosal bleeding from nose and mouth. Hemoglobin was 7.4 g/dL and platelet count $2 \times 10^9/L$. After a second gift of IVIg, prednisone 2 mg/kg/day, an erythrocyte transfusion and a large dose of platelets (ten donor units), platelet count rose to $21 \times 10^9/L$, hemoglobin stabilized and the clinical condition of our patient improved dramatically. However, 36 h later, profuse mucosal bleeding from nose and mouth recurred at a platelet count of $1 \times 10^9/L$. We started high-dose methylprednisolone (15 mg/kg) together with another platelet transfusion. Shortly after starting the methylprednisolone infusion, she complained of severe headache and instantly developed generalized seizures. Blood pressure at that moment was elevated: 170/90 mmHg. Computed tomography (CT) showed extensive bifrontal ICH. Unfortunately, our patient died of progressive herniation caused by massive cerebral edema, despite continuous platelet transfusions and intensive care management. Autopsy was not performed.

The main reason for clinicians to treat children with acute ITP and minor bleeding symptoms is to raise platelet counts in order to prevent severe bleeding complications and in particular ICH. The question is whether treatment really prevents these bleeding complications. The majority of children with severe bleeding or ICH described in literature developed these complications despite prior therapy [1–5]. Why do some patients develop ICH despite therapy? Apart from known risk factors like head trauma, use of non-steroidal anti-

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Table 1 Results of laboratory studies in our patient

	Diagnosis	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9 (1 h after ICH)	Day 9 (5 h after ICH)	Day 10 (at moment of herniation)	Units
Hemoglobin	11.6	5.8	11.3	7.4	8.6	10.6	9.0	6.4		g/dL
Hematocrit	0.32	0.17	0.32		0.23	0.28	0.24	0.17		L/L
Platelets	1	1	1	2	21	1	3	129	16	$\times 10^9/L$
Leukocytes	12.7	7.5	10.6	14.0	12.6	15.6	25.1			$\times 10^9/L$
Neutrophils	8.9	5.4	5.3							$\times 10^9/L$
Lymphocytes	2.8	1.9	3.9							$\times 10^9/L$
Activated partial thromboplastin time (APTT)	29			29				24		s
Prothrombin time (PT)	12.7			14.4				<10		s
Coombs test		Negative		Negative						

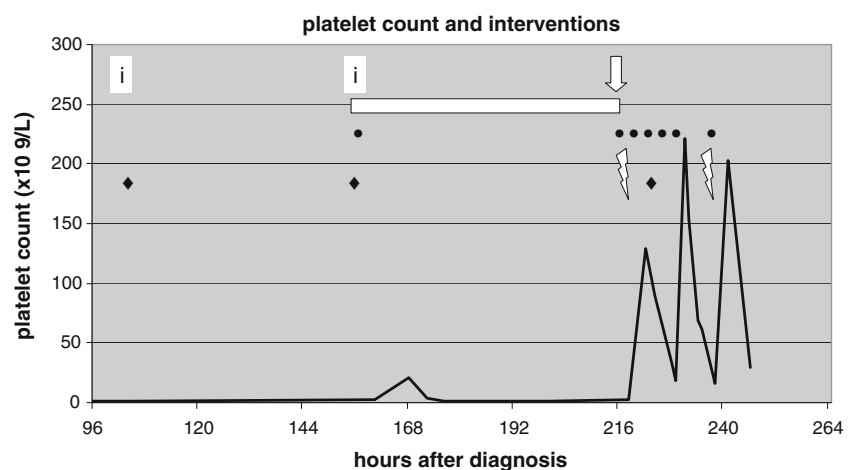
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inflammatory drugs, intracranial arteriovenous malformation, and bleeding beyond petechiae and ecchymoses [2, 3], there are some other possible explanations. Patients may suffer from refractory ITP and remain severely thrombocytopenic despite therapy, leaving them at risk for bleeding complications [6]. However, there is also a possibility of either causing or worsening ICH due to adverse effects of drug therapy. In our patient, the

temporal relationship between starting methylprednisolone and development of headache and ICH remains remarkable. A sudden rise in blood pressure, a known adverse effect of high-dose methylprednisolone, could have initiated or worsened ICH.

In conclusion, this report shows that treatment of ITP cannot always prevent ICH and may even be involved in initiating or worsening ICH.

Fig. 1 Overview of platelet counts and interventions in our patient. *i*=IVIg; *white bar* = prednisone 2 mg/kg/day; *white arrow* = high-dose methylprednisolone infusion; *black circle* = platelet transfusion; *black diamond* = erythrocyte transfusion. *Lightning flash* = event: the first one represents onset of ICH, the second one brain herniation



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