

LETTER TO THE EDITOR

Anaphylactic shock-like symptoms due to niacin overdose: A case report

Dear Editor,

A 46-year-old woman started taking thiamine and niacin supplements for arthralgia according to the recommendation of her physical therapist. One hour after intake, she noticed a mild rash, itching, and complained of malaise. The next day, upon taking the supplements again, the symptoms worsened. The following morning, she fainted and presented to the emergency room of our hospital. The patient was alert with the following vital signs: temperature, 37.5°C; blood pressure, 70/45 mmHg (normal blood pressure, almost 130/70 mmHg); and pulse rate, 125 b.p.m. Pruritus, erythema, and edema were observed throughout her body (Figure 1a–d). Laboratory tests indicated: white blood cells, 15 810/μL; C-reactive protein, 4.85 mg/L; and creatinine, 2.52 mg/dL, even though her previous medical history did not indicate renal dysfunction. The initial diagnosis was anaphylactic shock due to thiamine and niacin ingestion based on hypotension and systemic flushing. Although the patient was administered three i.m. injections of 0.3 mg adrenaline,

her blood pressure did not recover completely. After the administration of 125 mg methylprednisolone, H₁ and H₂ blockers, and the initiation of continuous noradrenaline infusion, the erythema persisted. We administered steroid pulse therapy based on a diagnosis of prolonged anaphylactic shock. The patient's blood pressure gradually recovered and renal dysfunction improved, but erythema persisted.

The patient's drug history suggested she had ingested 3000 mg niacin, triple the normal amount, within 48 h (Figure 1e). Niacin was the only newly initiated and overdosed drug, and her symptoms have been reported in previous studies of niacin overdose. Therefore, we diagnosed the patient with niacin overdose. Celecoxib was administered to block the arachidonic acid cascade, which reportedly induces niacin flush. Three days later, the erythema improved, and the patient was discharged.

Niacin is a form of vitamin B₃, and overdose induces niacin flush, which is not widely recognized. The G protein-coupled nicotinic acid

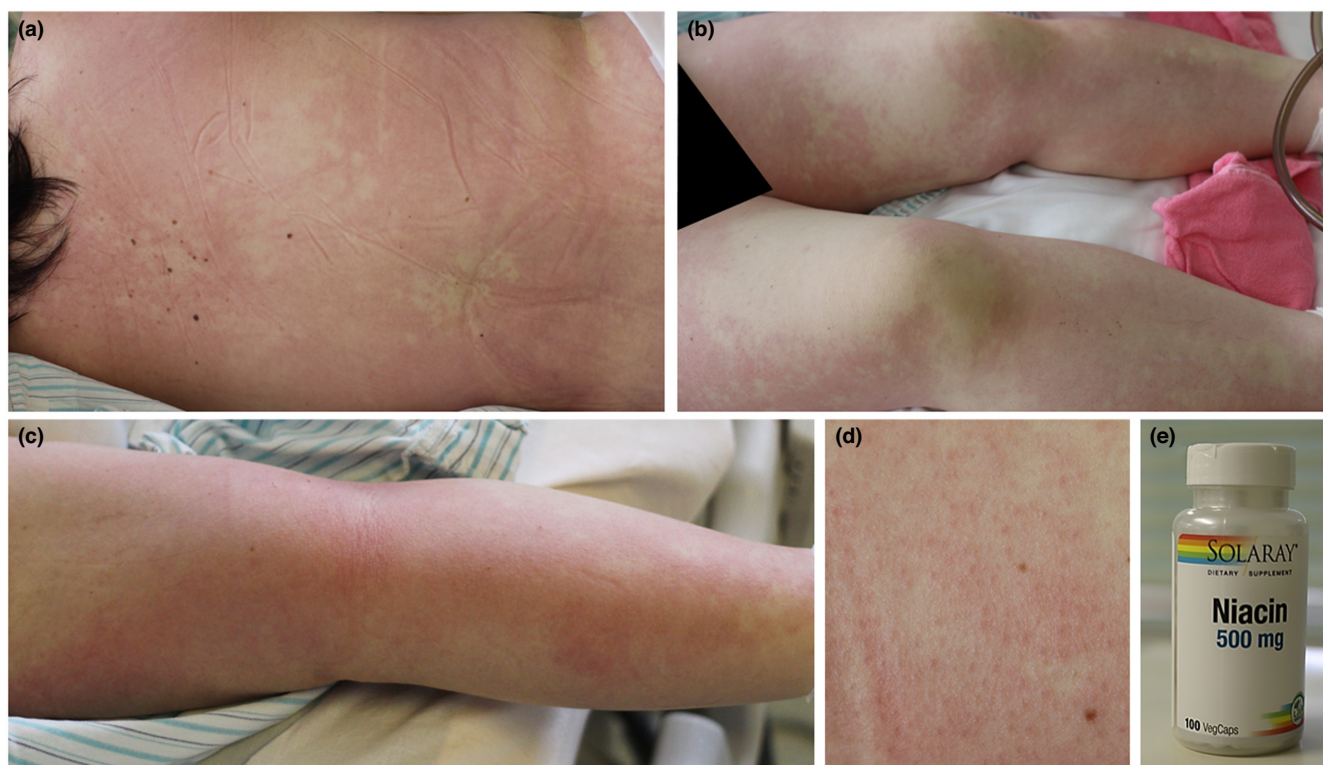


FIGURE 1 (a) Pruritic erythema is present on the patient's back. (b,c) The erythema is also observed on her extremities, some of which were reticulated. (d) Close-up view of the erythema. (e) The niacin supplement which she took

receptor, GPR109A, can induce differential responses depending on its location. Niacin appears to activate GPR109A on dermal dendritic cells or macrophages, releasing arachidonic acid; this produces prostaglandin E₂ and D₂, causing vasodilation, presented by flushing and hypotension.¹ This reaction was suggested to occur without the histamine/bradykinin pathway.² Some individuals intentionally consume excessive amounts of niacin to cause flushing, as they believe vasodilation improves blood circulation, which supposedly aids arthralgia, depression, and hay fever.

In our case, the first presentation of erythema may have been a niacin flush. This, however, has been reported to last generally for 1 h,¹ not several days, and has not been reported to cause hypotension. Anaphylactic shock from thiamine or niacin has been reported to occur within minutes to an hour and has never been reported with oral administration,^{3,4} which differs from our case. Niacin overdose can cause skin flushing, hypotension, fever, nausea, and hepatic or renal damage.⁵ These symptoms have been reported to last for several days,⁵ suggesting that the prolonged erythema and hypotension in our case were also caused by excessive niacin intake. Therefore, reactions due to niacin overdose can be misdiagnosed as anaphylaxis. Although we missed measuring niacin blood levels because of initial misdiagnosis, these levels could help in the diagnosis of overdose. Given the ease of accessing supplements, physicians should recognize niacin overdose symptoms.

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None.

CONFLICT OF INTEREST

None declared.

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