

CASE REPORT

CONTROL OF INTRACTABLE GASTRIC HEMORRHAGE BY MONOSODIUM GLUTAMATE

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Monosodium L glutamate (MSG) has been known and used to stop focal bleeding in remoted area and around battle fields along Thai-Laos-Cambodian border. The hemostatic effect of MSG was studied by Jaiarj *et al* (1985a). It was found that MSG decreased the bleeding times of the wounds made by excising the tails or by incising the femoral veins of Wistar rats. In an *in vitro* study with human blood, thrombin time was shown to be shortened and there was a prolonged euglobulin lysis time which suggested that MSG probably accelerated the conversion of fibrinogen to fibrin and also affected fibrinolytic system. Jaiarj *et al* (1985b) also showed that MSG could potentiate the vasoconstriction effect of norepinephrine in a rabbit aortic strip.

From the property of MSG mentioned above, local application of MSG may be useful to stop bleeding. We report successful hemostasis in a case with uncontrollable massive gastric hemorrhage.

A 7.4 years old Thai girl was admitted with history of hematemesis for 2 days prior to admission. She was a known case of β -thalassemia/hemoglobin E disease and had splenectomy at age 3.5 years of age. Blood transfusion was given at 2-3 months intervals to keep her hematocrit above 20 percent. Her clinical course was complicated with autoimmune diseases: ulcerative colitis and sclerosing cholangitis. Immunosuppressive drugs (prednisolone, cyclophosphamide and azathioprine) were given with decent response.

She experienced an episode of post transfusion hypertension from which she developed convulsion. A 3 x 4 cm hematoma on the left occipital area was identified by CT scan. Ever since she had been on anticonvulsive drugs.

At age 6.4 years she presented with severe cholestasis and hepatomegaly due to exacerbation of sclerosing cholangitis while her symptoms of ulcerative colitis was going on. Prednisolone 2 mg/kg/day was given with some improvement. After 4 months of treatment,

prednisolone was reduced to 1 mg/kg/day. Her condition was fairly controlled until 5 days prior to this admission when she developed mucosal ulcer in the mouth, anemia, weakness and was unable to eat. Packed red blood cell transfusion 10 ml/kg was given at the out patient clinic then returned home. At home she was unable to take fluid by mouth so she was admitted to Srakaew Provincial Hospital for intravenous fluid therapy. On the second day of admission she vomited fresh blood and passed melena; she was transferred to Ramathibodi Hospital after 2 days of intractable hematemesis and melena.

Physical examination on admission revealed a weak chronically ill girl with marked palor, moderate jaundice and cushinoid appearance. Body weight was 13 kg, height was 97 cm. Vital signs were body temperature 37.8°C, pulse rate 120/minute, respiratory rate 120/minute, blood pressure 120/80. Positive findings included shallow ulcers on the tongue and lips, enlarged firm liver 6 cm below right costal margin, liver span 9 cm and clubbing of fingers and toes. Laboratory findings revealed completed blood count: Hb 6.3 g/dl, Hct 18%, WBC 24,000/mm³, neutrophils 83%, lymphocytes 8%, monocytes 2%, band forms 4%, metamyelocytes 2%, platelet 360,000/mm³. Urinalysis: yellow color, clear, sp gr 1.015, pH 6, WBC 0-1, RBC 0-1/HP. Blood chemistry: blood sugar 76 mg/dl, urea 65 mg/dl, creatinine 3.1 mg/dl, Na⁺ 130, K⁺ 3.01, Cl⁻ 101 and total CO₂ content 10.7 mmol/l, total bilirubin 10.2 mg/dl, direct bilirubin 7.3 mg/dl, alkaline phosphatase 549 IU/l, aspartate amino transferase 38 U/l, alanine aminotransferase 12 U/l, G-glutamyl transaminase 386 U/l, total protein 56.1, albumin 20.1 g/l. Coagulation studied revealed partial thromboplastin time 51.3 seconds, prothrombin time 21 seconds, thrombin time 9.9 seconds.

Packed red blood cells plus fresh frozen plasma were given to raise the hematocrit to 25 percent. Sucralfate 1 g was given every 4 hours enterally. Cimetidine 80 mg was administered every 6 hours

parenterally. Three hours after admission she vomited coffee ground material with clotted blood, passed melena and then became weak and pale. Repeated ice saline irrigation was performed but could not stop bleeding. She vomited fresh blood and passed melena continuously. Omeprazole 20 mg once daily was given intravenously in place of cimetidine. Somatostatin 25 IU was administered subcutaneously every twelve hours. Pitressin 20 IU/1.73 m² was also initiated but bleeding could not be controlled. Endoscopic examination of the stomach at 72 hours after admission showed hemorrhagic lesion at fundus, preploric and antral mucosa, compatible with hemorrhagic gastritis. Neither varices nor ulcer were seen. Somatostatin was then reduced to 20 IU every 12 hours. Massive gastric bleeding continued and she developed impending shock in spite of blood transfusion. Hematocrit dropped from 27 to 16%. She received packed red blood cells 75 ml/kg, and fresh frozen plasma 47 ml/kg during those 3 days. Dopamine 6 mcg/kg/minute was given intravenously to maintain blood pressure along with blood transfusion. At this point MSG was considered due to the desperate situation and the decision was discussed with her mother who agreed to try MSG because she lived in the border area and had herself witnessed the use of MSG to stop external bleeding before. 5 g of MSG dissolved in 50 ml of normal saline was then introduced into the stomach via nasogastric tube, with the aim to retain it for 10 minutes. At 7 minutes of MSG retaining in stomach the patient complained of headache and her blood pressure increased from 92/79 to 130/92. MSG saline solution was then aspirated. The blood pressure gradually declined to 107/79 in 15 minutes. Following MSG irrigation 30 ml of blood stained gastric content from the nasogastric tube was seen during a 12 hours period. Another episode of bleeding occurred after 12 hours, MSG 2.5 g in 50 ml saline irrigation was repeated and again the bleeding stopped successfully. No hypertensive episode was noted at this time. She passed melena but no new blood was observed from the nasogastric tube drainage. Blood pressure was maintained without dopamine. Tranexamic acid 30 mg was additionally administered every 6 hours intravenously. Only 20 ml/kg of packed red blood cells transfusion was required to keep her hematocrit above 25% from day 5 to day 15.

Monosodium glutamate is a physiological nutrient, and food additive used as a taste enhancer. MSG is also widely regarded as the provocative agent in the "Chinese restaurant syndrome". However discomfort and flushing which are regarded as part of the reaction

could not be elicited in positive and negative histories of Chinese restaurant syndrome subjects when they were challenged with MSG (Kenny, 1986; Wilkin, 1986). A small subset of patients with food allergy and asthma might develop bronchospasm and wheezing when high dose (2.5 g) was consumed (Moneret-Vantrien, 1989). Aminocaproic acid an antifibrinolytic agent has been used to stop bleeding in hyperfibrinolytic conditions. MSG has molecular formula of [HOOC(CH₂)₂CH(NH₂)-COONa] which is somewhat similar to aminocaproic acid [HOOC(CH₂)₄CH₂(NH₂)] (Hathaway and Goodnight, 1993). MSG has possible role in hemostatic mechanism as shown by *in vitro* study. It shortens thrombin time and prolongs euglobulin lysis time which signify antifibrinolytic effects. When it was used to inhibit fibrinolysis at sites of vascular injury in case of hemorrhagic gastritis, cessation of bleeding was immediately observed. Other agents such as prostaglandin E₂ which activates platelet aggregation (Vermyleu *et al*, 1983) was reported to stop bleeding by local application. The use of prostaglandin E₂ (PGE₂) analogues in the dose of 18/μg/kg day in 4 divided dose given euterially was observed to control bleeding in an infant with protracted hemorrhagic gastritis recovering from acute pancreatitis (Casaubon *et al*, 1987). Transient vasoconstriction was evidenced by transient hypertension in our patient. Vasoconstriction may be helpful in control of bleeding along with clot formation. The adverse reaction to MSG is minimal and its effectiveness in hemostasis and vasoconstriction has been impressive in the control of massive gastric bleeding in our case.

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