Tetany and myocardial arrhythmia due to hypomagnesaemia

A case report

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Summary

An 11-year-old boy with acute intestinal obstruction presented with tetany, and developed myocardial arrhythmia during anaesthesia. The procedure was abandoned and the patient further investigated. He was found to have hypomagnesaemia and normocalcaemia. Intravenous magnesium sulphate corrected the tetany, and no further arrhythmia occurred during subsequent surgery.

Tetany is normally regarded as a pathognomonic sign of decreased ionized serum calcium. It is less widely appreciated, although well described, that hypomagnesaemia may also produce tetany. Hypomagnesaemia is often described as producing myocardial arrhythmia which may be life-threatening. Occurrence of both tetany and cardiac arrhythmia in a patient with hypomagnesaemia is reported.

Case report

An 11-year-old black boy presented to a peripheral hospital with abdominal pain and distension of several days' duration. A diagnosis of intestinal obstruction was made, and the patient was treated for 24 hours with nasogastric drainage and intravenous fluids. At the end of this time, a diagnosis of intussusception was made and the patient was prepared for surgery.

At pre-operative assessment he was found to be in a reasonable cardiovascular state but with a mild hypokalaemia (3.2 mmol/l). Apart from the abdominal signs, the most significant clinical finding was the presence of tetany. The serum calcium concentration was found to be marginally low and 10 ml of 10% calcium gluconate was administered by slow intravenous infusion, with little improvement of symptoms. It was then decided to proceed with the operation.

Anaesthesia was induced in a standard manner with pre-oxygenation, thiopentone 4 mg/kg, suxamethonium 1.5 mg/kg and endotracheal intubation while cricoid pressure was applied. Following intubation, severe arrhythmias thought clinically to be coupling were noted, with obvious compromise of cardiac output. An ECG monitor was not available at this hospital and when the arrhythmia persisted the anaesthetist decided to abandon the procedure and transfer the patient to a central hospital.

On arrival at Parirenyatwa Hospital, the patient appeared to be septicaemic and was tachypnoeic. Spontaneous tetany was still present. Biochemical investigations showed a normal serum calcium level, a slightly low serum potassium level (3.1 mmol/l) and a serum magnesium level of 0.6 mmol/l. Blood gas analysis showed a normal acid-base status. A bolus of magnesium sulphate 500 mg was administered intravenously, with disappearance of the tetanic symptoms. Anaesthesia was induced in the same manner as before, but with continuous ECG monitoring. No arrhythmias occurred, and surgery proceeded uneventfully. On reversal of relaxation with neostigmine and atropine and re-establishment of ventilation two ventricular ectopic beats occurred, but no further arrhythmia was encountered. The postoperative period was uneventful.

Discussion

A low serum magnesium level is not uncommon in postoperative patients because of increased urinary excretion of the ion. This effect is probably mediated by increased aldosterone levels. Various cardiac arrhythmias have been described in association with hypomagnesaemia which did not respond to potassium infusions but were reduced in frequency by magnesium infusion. The hazards of a reduction in serum magnesium level have been well described in a recent series of articles on patients on diuretic therapy. The stress response induces similar losses of both potassium and magnesium, and might be expected to pose similar problems if the stress stimulus is prolonged. This patient had suffered from intestinal obstruction with gangrenous bowel for several days, and this was obviously sufficient to cause depletion of body reserves of magnesium. Pre-operative correction of potassium levels was not attempted because of doubts about his renal function and the fact that levels greater than 3 mmol/l were considered to be unlikely to be the cause of the arrhythmia. The biochemical data obtained on the second occasion virtually eliminated low calcium levels or acid-base disturbances as the likely cause of tetany, although neither ionized calcium nor serum albumin estimations were available on an emergency basis. However, the prompt improvement in tetany and the absence of arrhythmias during the second anaesthetic period make hypomagnesaemia the most probable cause of both tetany and cardiac irritability in this patient.

Patients with prolonged illness such as the one presented here are by no means a rarity in Africa, and the possibility that hypomagnesaemia may occur in some of these patients should always be borne in mind. Where arrhythmias occur under such circumstances, the serum magnesium level should be checked along with performance of other more routine investigations.

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REFERENCES


Bullous systemic erythematous

A case report

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Summary

Bullous disease in patients with systemic lupus erythematosus (SLE) has been previously described but characterization has been difficult. A case of bullous eruption that is an unusual manifestation of SLE rather than a primary vesiculobullous eruption is described. The patient was successfully treated with dapsone.

Although about 80% of patients with systemic lupus erythematosus (SLE) develop cutaneous manifestations of the disease, a generalized vesiculobullous eruption is rare. These bullae result from dermal-epidermal separation consequent on the basal cell layer degeneration and are recognizable grossly and microscopically as a form of cutaneous lupus erythematosus.

Over the past 10 years there have been several case reports of patients with established SLE who developed generalized vesiculobullous eruptions. These have been reported as either bullous pemphigoid (BP) with SLE, dermatitis herpetiformis (DH) with SLE, or as unspecified bullous eruption in SLE.

A patient with SLE who developed a generalized bullous eruption which responded to dapsone is described. The patient was successfully treated with dapsone.

Laboratory findings

The haemoglobin value was 12.0 g/dl, the white cell count 7.8 x 10^9/l with a normal differential count, and platelet count 150 x 10^9/l. Renal and liver function tests were normal. Serum protein electrophoresis demonstrated a low albumin level of 23 g/l, an elevated γ-globulin level of 13 g/l and a reversal of the albumin:γ-globulin ratio of 0.7:1.0. The serum immunoglobulin estimation showed IgA levels of 22 IU/ml, IgG 318 IU/ml and IgM 215 IU/ml. ANF was present in a dilution of 1:3200 and was of the speckled pattern, anti-DNA testing was negative but anti-ENA was positive. Serum complement components were decreased; C3 was 35 mg/dl and C4 12 mg/dl. Immune complexes were present in high levels in the serum. However no circulating anti-basement zone antibodies were present. The blister fluid revealed a high titre of ANF.

Case report

A 34-year-old Indian woman presented in October 1981 with symptoms and signs of SLE, i.e. arthralgia, photosensitivity, Raynaud's phenomenon and a butterfly rash on the face. The diagnosis was confirmed by a positive antinuclear factor (ANF) test. Treatment consisted of steroids, to which she responded.

Eight months later, in June 1982, she developed a generalized bullous eruption, which was diagnosed histologically as DH. At this stage dapsone was added, with good response. The lesions recurred 2 months later and resembled BP clinically.

A biopsy once again showed features of DH. However, immunofluorescence showed deposits of IgG and C3 in a linear band at the epidermodermal junction and fibrin in the dermis and at the epidermiderminal junction. ANF and anti-extractable nuclear antigen (ENA) were also present. Treatment consisted of prednisone 25 mg/d and dapsone 100 mg/d with good results. However she stopped all treatment in October 1982.

On 21 April 1983 she was seen at King Edward VIII Hospital with a generalized bullous eruption which was secondarily infected and crusted. The few intact bullae were flaccid and arose on normal skin. The tongue, buccal mucosa and lips showed extensive ulceration. The other positive findings were pallor and a low-grade fever and a pregnancy of 7 months' duration. There were no cutaneous lesions typical of SLE.

A clinical diagnosis of pemphigus vulgaris was made and therapy with prednisolone 150 mg/d, was started.