Cholesterol Emboli Syndrome: Significance of the Lesional Skin Biopsies

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Sir.

Cholesterol emboli syndrome (CES) is an undiagnosed multisystemic disease with important sequelae resulting in a poor prognosis with 80% mortality within 12 months after acquiring the disease. The syndrome usually affects elderly patients who have some known risk factors for vascular disease and is often precipitated by some trigger factor (1, 2). Diagnosis is based on suspicious clinical findings and can be confirmed by lesional tissue biopsy (1, 3). This article reports two cases of CES in relation to treatment with anticoagulants. In both cases, diagnosis was established through biopsy of involved skin.

CASE REPORTS

Case 1. A 73-year-old man with a long history of hypertension and chronic renal failure arising from nephrosclerosis (plasma creatinine 150 μmol/l) was admitted to our hospital with deteriorating renal function and bradycardia due to beta-blocker agents. The patient’s medication at the time of the admission was nifedipine and enalapril. Two months prior to the admission, he had been treated with warfarin and atenolol for management of paroxysmal atrial fibrillation.

Examination revealed a blood pressure of 120/70 mmHg and a pulse rate of 34. Bilateral livedo reticularis on his lower limbs was found with painful cyanotic ischaemic lesions of the right toes but intact peripheral pulses and good foot temperature. These lesions had been present for the past 45 days.

Blood chemistry was normal except for the following values: haemoglobin 1.52 mmol/l (normal 2.09–2.71), haematocrit 29% (41–53%), total white cell count 11.5 × 10⁹/l (4.5–11 × 10⁹/l) with eosinophils 1.7 × 10⁹/l (0.05–0.25 × 10⁹/l), plasma urea 42.1 mmol/l, plasma creatinine 423 μmol/l, total protein 56 g/l (normal 60–80), albumin 26 g/l (normal 35–50), triglycerides 2.4 g/l (normal 0.4–1.6) and ESR 113 mm/h. Urine analysis: urinary protein excretion 1.17 g/24 h (normal <150 mg/24 h), and 2+ for red blood cells. A test for antinuclear antibodies was positive at a titre of 1:320 with a speckled pattern and lupus anticoagulant was positive at a titre of 35.8 with ratio 1.29. A thoracic and abdominal CT scan showed a massive thrombosis of abdominal aorta and splenic artery occlusion; the patient died 28 days after admission because of several complications (cardiac failure, cerebral infarction and abdominal pain). Autopsy could not be performed.

DISCUSSION

CES is a complication of atherosclerotic vascular disease that results from cholesterol crystals embolization. These originate in atheromatous plaques in major arteries and go to many organs including skin, kidneys, gastrointestinal and central nervous system. The cholesterol crystals occlude small and peripheral arteries causing local ischaemia and organ damage. This entity

enoxaparin 40 mg/day for 10 days had been given 3 months prior to his admission.

Examination revealed a temperature of 38.7°C, a blood pressure of 150/90 mmHg and an aortic systolic murmur. He had bilateral livedo reticularis on his lower limbs and lower trunk with necrosis of right fifth toe; peripheral pulses and temperature were normal (Fig. 1).

Laboratory examination revealed a total white cell count of 11.8 × 10⁹/l with 83% neutrophils but no eosinophilia, plasma urea 42.1 mmol/l, plasma creatinine 423 μmol/l, total protein 56 g/l (normal 60–80), albumin 26 g/l (normal 35–50), triglycerides 2.4 g/l (normal 0.4–1.6) and ESR 113 mm/h. Urine analysis: urinary protein excretion 1.17 g/24 h (normal <150 mg/24 h), and 2+ for red blood cells. A test for antinuclear antibodies was positive at a titre of 1:320 with a speckled pattern and lupus anticoagulant was positive at a titre of 35.8 with ratio 1.29. A thoracic and abdominal CT scan showed a massive thrombosis of abdominal aorta and splenic artery occlusion; the patient died 28 days after admission because of several complications (cardiac failure, cerebral infarction and abdominal pain). Autopsy could not be performed.

Fig. 1. (a) Livedo reticularis on limbs with central ischaemic lesion. (b) Cyanotic ischaemic lesions with necrosis of fifth toe.
typically affects patients over 60 years of age who have two or more risk factors for atherosclerotic vascular disease (1, 2). Although the syndrome can occur spontaneously (4), it is often possible to identify one or more precipitating factors, e.g. vascular procedures (3), cardiac or aorta surgery (5), treatment with anticoagulants (2, 3, 6) or thrombolytic agents (3, 7). Both patients described above had several risk factors for atherosclerosis and they had received anticoagulants for some months prior to diagnosis. The latent period until appearance of clinical findings can vary from days to months (3), as in our second case.

Diagnosis of CES requires a high level of clinical suspicion. Clinical manifestations can be varied (1). Both patients showed the classical triad of hypertension, acute renal failure and typical skin lesions. Skin lesions are observed in between 35 and 100% of patients and are probably the first signs of the disease. Cutaneous manifestations are varied including a symmetrical livedo reticularis, acrocyanosis, ulcerations, purpura, severe leg and/or foot pain and focal digital ischaemia (the purple-toe syndrome) (1–3, 8). The cutaneous lesions are usually painful and peripheral pulses are normal. These lesions can mimic other systemic diseases like vasculitis, which is an important differential diagnosis (9). An increase in ESR, eosinophilia, transient elevation of muscle enzymes, thrombopenia and hypocomplementaemia are commonly associated but not always present (3). Eosinophilia was present in case 1 and ESR was increased in both cases.

Skin biopsy of affected tissue is diagnostic in 92% of the cases (1, 3). Biopsy must include an area between middle to deep dermis. The characteristic needle-shaped spaces left by the dissolved crystals within the lumen of arterioles from affected skin were observed in our patients.

The syndrome is associated with a high mortality rate, reaching 80% (1, 2). The prognosis depends on the degree of organ affection and the severity of the underlying vascular disease, as seen from the fatal outcome in case 2. There is no current effective therapy (10). Some researchers have suggested treatments like iloprost (a prostacyclin analogue) (11), simvastatin (12) or corticosteroids (13) but none of them have been shown to have a clear beneficial effect. Conventional treatment is through supportive measures that include blood pressure control, renal replacement therapy whenever necessary and withdrawal of anticoagulants except in cases with high risk of embolism.

REFERENCES