The determination of ABO genotypes using denaturing gradient gel electrophoresis of polymerase chain reaction amplified DNA fragments. The patient's (KL) results are shown in parallel with control samples with known ABO genotypes.

Discussion

This patient had a carcinomatous sigmoid colon and her serological results were indicative of an acquired B phenotype in a group A₁ individual. Thus, both the clinical history and serological results of the patient were compatible with the presence of an acquired B phenotype. Our DNA genotyping method based on PCR followed by DGGE further demonstrated unequivocally that the patient did not possess a B allele at the ABO locus and was heterozygous AO.

The patient's red cells failed to react with anti-A₁ seven days after admission (table). One possible explanation for this is as follows: the anti-A₁ reaction is a function of the number of A sites per cell. A₁ cells have four to five times as many A sites as A₂ cells.^{7,8} The *Dolichos biflorus* lectin does react with A₂ cells, but is

diluted to produce a negative result with A₂ cells in the reaction protocol. It reacts in saline tests because of the high A site density in A₁ cells.⁸ In the case of acquired B phenotype, the number of A sites is reduced by deacetylation. The patient's cells were negative because the number of A sites was reduced below the critical level for the anti-A₁ to cause agglutination in saline tests.

This is the second report confirming the absence of a B allele in the acquired B phenotype using a DNA based genotyping method. The first such report used PCR followed by restriction analysis, but the patient's ABO genotype was not determined.⁹ Both reports demonstrated the usefulness of DNA based methods in confirming the absence of a B allele in the acquired B phenotype, though slightly different PCR based methods were used.

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POEMS syndrome and Waldenström's macroglobulinaemia

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Abstract

A 58 year old man presented with a three year history of impotence, night sweats and ankle swelling. On examination, the patient fulfilled the diagnostic criteria for POEMS syndrome, but was unusual in that he also had underlying Waldenström's macroglobulinaemia with IgM κ paraproteinaemia. The patient was treated with intermittent chlorambucil and made a good recovery. POEMS syndrome has been described in association with osteo-

sclerotic myeloma and Castleman's disease. The paraprotein involved is usually IgG or IgA with λ light chains. This case indicates that the presence of λ light chains is not essential for the pathogenesis of POEMS syndrome. It also emphasises the diversity of plasma cell dyscrasias that can manifest as POEMS syndrome.

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POEMS syndrome, originally described in 1980,¹ is a rare condition characterised by polyneuropathy, organomegaly, endocrinopathy, monoclonal proteinemia, and skin lesions. It is typically associated with plasma cell dyscrasias and a monoclonal band on serum electrophoresis. Soubrier *et al*² reviewed 25 cases of POEMS syndrome and found that in all cases the monoclonal component had a λ light chain and that the heavy chain was either IgG or IgA. Here, we describe a patient with POEMS syndrome associated with Waldenström's macroglobulinaemia and IgM κ paraproteinaemia.

Case report

A 58 year old retired lecturer presented in 1990 with a three year history of impotence, night sweats and ankle swelling. On examination, he was pale with eczema on the legs, peripheral oedema and excess sweating. His liver was palpable 8 cm below the costal margin but there was no splenomegaly or lymphadenopathy. Sensation to light touch, pin prick, and vibration was impaired in both feet and there was reduced power in the legs with an absent ankle jerk and diminished knee jerk response.

The patient's haemoglobin concentration was 9.8 g/dl with normal red cell indices. White cell count, platelet counts and peripheral blood film were unremarkable. Plasma viscosity was 2.66 centipoise (cp) (normal range, 1.5–1.72 cp) and serum protein electrophoresis revealed the presence of an IgM κ monoclonal band measuring 33.2 g/l (0.5–2 g/l). IgA was normal and there was a polyclonal increase in IgG to 26.9 g/l (5.3–16.5 g/l).

A bone marrow aspirate and a trephine biopsy specimen showed infiltration by lymphoplasmacytoid cells and immunophenotyping of a bone marrow sample confirmed positive cytoplasmic IgM κ expression. A skeletal survey was normal.

Blood glucose was 22 mmol/l (4.0–6.6 mmol/l) indicating diabetes mellitus. Serum testosterone was reduced to 5 nmol/l (110–30 nmol/l) with normal concentrations of luteinising hormone and follicle stimulating hormone. Thyroid stimulating hormone concentration was 7.1 nmol/l (<4 nmol/l) with normal thyroxine and borderline low triiodothyronine, suggesting compensated hypothyroidism. Basal cortisol was normal and there was an adequate response to synacthen.

Neurophysiological tests confirmed the clinical findings of peripheral neuropathy, particularly affecting the legs. No motor unit action potentials were recorded on stimulation of the right medial popliteal, femoral or common peroneal nerves. The median and ulnar nerves showed reduced motor conduction velocities: 32 m/s and 31 m/s, respectively, and no satisfactory F waves were recorded. Left sural sensory action potentials were absent and there was reduced conduction velocity and amplitude recorded on stimulation of the right median and ulnar nerves.

Liver function tests revealed that γ -glutamyl transferase activities were elevated at 139 IU/l (<50 IU/l), as were alkaline phos-

phatase activities (245 IU/l (40–130 IU/l)) but normal bilirubin and alanine transaminase activities were recorded. Histology of a liver biopsy specimen showed non-specific changes. There was no evidence of lymphocytic infiltration or amyloid.

The patient was treated with intermittent chlorambucil. Four years after diagnosis, he remains well with a reduction in the paraprotein concentration to 6 g/l and resolution of the diabetes, eczema and neurological symptoms. The diabetes initially required treatment with glibenclamide.

Discussion

POEMS is an acronym for the syndrome of peripheral neuropathy, organomegaly (usually hepatomegaly), endocrinopathy (mainly impotence, gynaecomastia and glucose intolerance), monoclonal gammopathy, and skin changes (particularly hyperpigmentation, hypertrichosis and hyperhidrosis). Anasarca with peripheral oedema, ascites and pleural effusions is also common. Most cases are associated with osteosclerotic myeloma³ and some with Castleman's disease.⁴ Our patient clearly fulfilled the diagnostic criteria for POEMS syndrome and had the characteristic good response to treatment. However, he was unusual in that the underlying disease was Waldenström's macroglobulinaemia. To our knowledge there is only one other report of such an association.⁵ Our case is also atypical as the monoclonal component was IgM κ whereas in the vast majority of reported cases it is IgA or IgG with λ light chains. In a French study of 25 cases none had IgM heavy chains or κ light chains.² In a Japanese series of 102 patients, of the 71 cases in whom there was a monoclonal component, it was of the λ light chain type in 67 with either IgG (in 38) or IgA (in 29) heavy chain; κ light chains were found in four cases, associated with IgA in three and IgG in one. IgM was found in only one patient.⁶

The pathogenesis of this unusual syndrome remains obscure but attention has focused on the paraprotein itself. Soubrier *et al*² propose a close link between λ light chain production and the biological activities that cause POEMS syndrome as this was present in all of their cases.² This case indicates that the presence of λ light chains is not essential for the pathogenesis of the condition. It also emphasises the diversity of plasma cell dyscrasias that can manifest as POEMS syndrome.

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