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An extremely basic monoclonal IgG in an aged apoplectic patient with prolonged bacterial infection

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Abstract

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AN EXTREMELY BASIC MONOCLONAL IgG IN AN AGED APOPLECTIC PATIENT WITH PROLONGED BACTERIAL INFECTION

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Abstract. A case with prolonged bacterial infection accompanied by an abnormal serum protein which migrated in the post-gamma region on electrophoresis is presented. The abnormal protein was identified as IgG with λ-type light chain moiety. The patient suffered from prolonged pneumonia and cholecystitis. Bone marrow aspiration and skeletal x-rays did not indicate multiple myeloma.

Detection of dysproteinemia has been facilitated by widespread use of serum paper electrophoresis as routine laboratory procedure. Many instances are found with the homogeneous peak characteristics of multiple myeloma. Only a few of these cases would be expected to have multiple myeloma (1). Other cases of such abnormal proteins without skeletal lesion or bone marrow abnormality were classified as asymptomatic idiopathic paraimmunoglobulinemia (1), dysgammaglobulinemic syndrome (2), non-myelomatous paraproteinemia (3), or benign monoclonal gammopathy (4).

Gammaglobulins which appear as a monoclonal globulin peak on electrophoresis have been used to elucidate the structural specificity against the antigen.

This paper describes a patient with an extremely basic monoclonal IgG without clinical manifestations associated with multiple myeloma or macroglobulinemia.

CASE REPORT

A 63-year-old farmer was admitted to the Mitoyo General Hospital on March 4, 1975, because of coma. Monoparesis of the left leg developed 2 days prior to the admission, but the patient had clear consciousness at that time. On the day of admission, his family found him in deep sleep. He was brought to the hospital.

On admission he was almost comatose with a temperature of 37.8°C, blood pressure 142/80 mm Hg, pulse rate 78 beats/min and respiratory rate 16/min.

His left arm and left leg were flaccid. The spinal fluid was bloody, and cerebral angiograms revealed narrowing of the right anterior artery. The right lenticulo-striate artery, right middle cerebral artery and pericallosal artery were slightly depressed to the base of the brain. Chest roentgenograms taken

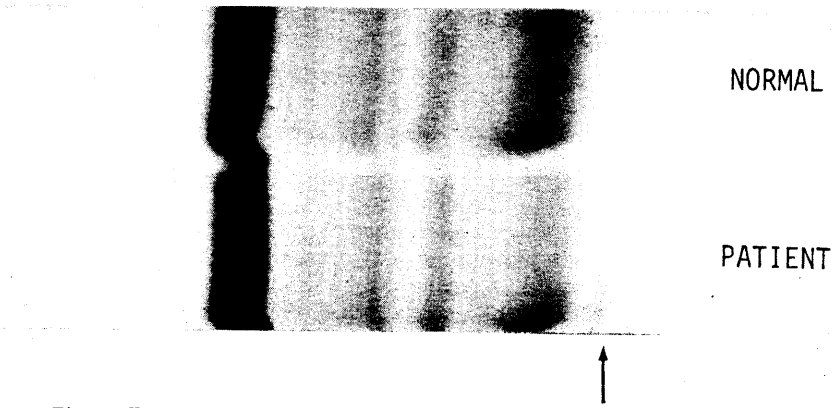


Fig. 1. Elecrophoretic patterns of serum on cellulose acetate membrane. Note an abnormal band (arrow) in the post-gamma-region. Anode is on the left.

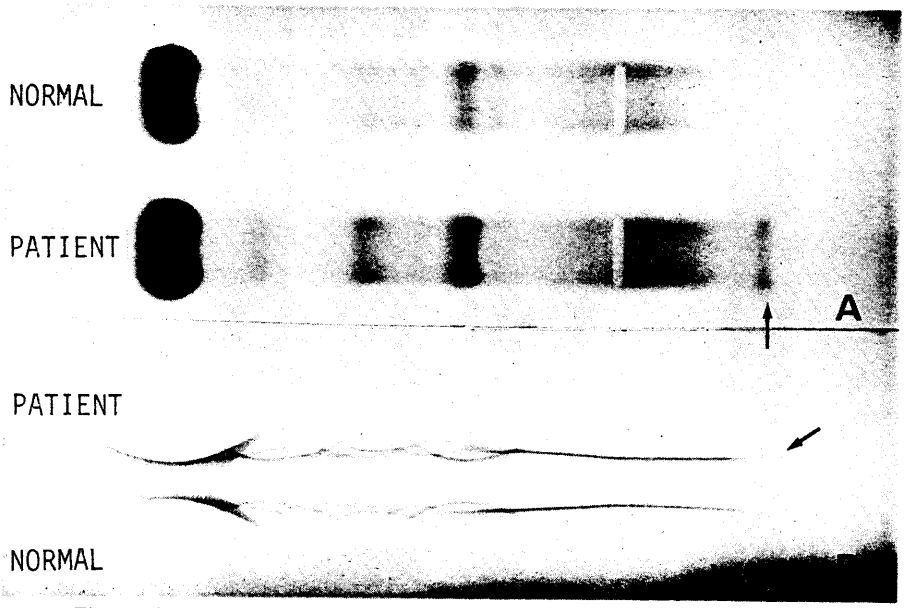


Fig. 2. Agar gel electrophoresis and immunoelectrophoresis developed with antigen serum to whole human serum. *A*, Agar gel electrophoresis. The arrow shows an abnormal band in the post-gamma-region. *B*, Immunoelectrophoresis. The arrow shows an abnormal precipitation are in the post-gamma-region. Anode is on the left.

on the same day disclosed bilateral pneumonia. The electroencephalogram was normal, and an electrocardiogram showed auricular fibrillation.

Laboratory examinations revealed the following: red blood cell count $490 \times 10^4/mm^3$, hematocrit 45%, white blood cell count $18,600/mm^3$ (79.5% neutrophils with 50% rod form, 20% lymphocytes and 0.5% basophils), total bilirubin 1.6 mg/100 ml, S-GOT 55 Karmen units, LDH 535 Wroblewski units, alkaline phosphatase 3.0 Bodansky units, total cholesterol 152 mg/100 ml, urea nitrogen 28 mg/100 ml, blood sugar 135 mg/100 ml, chloride 92 meq/l, potassium 3.2 meq/l, sodium 138 meq/l, calcium 4.5 meq/l, c-reactive protein 6-plus,

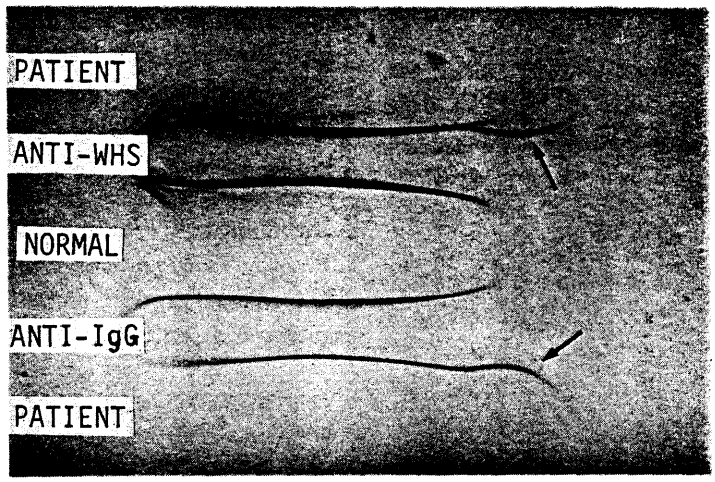


Fig. 3. Immunoelectrophoretic analysis of serum. Arrows show abnormal precipitation arcs formed with anti-sera. Anode is on the left. ANTI-WHS, anti-whole human serum; ANTI-IgG, anti-human IgG.

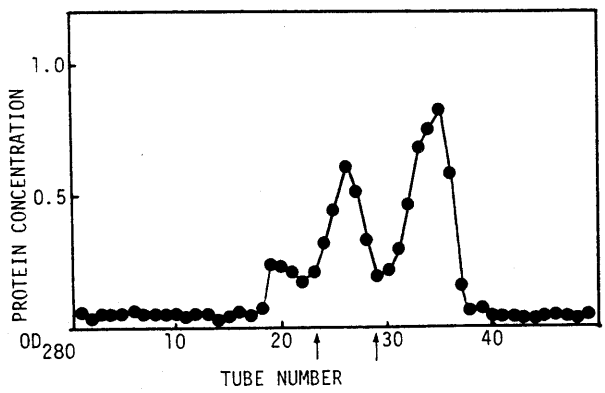
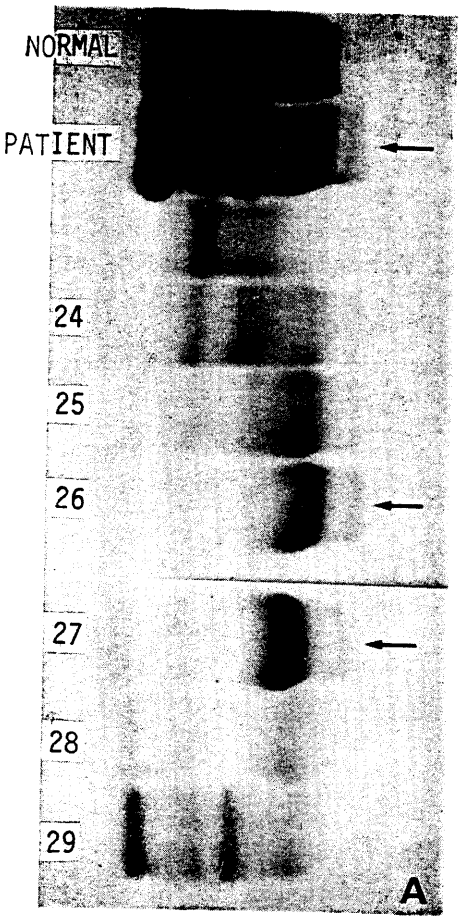


Fig. 4. Elution pattern of Sephadex G-200 gel filtrations of serum. Fractions between arrows were subjected to further analysis.



erythrocyte sedimentation rate 88 mm in the first one hour, anti-streptolysin-O-titer 160 Todd units, rheumatic factor negative and serological tests for syphilis negative. Urinalysis revealed proteinuria 1-plus, minimal hematuria and Bence-Jones protein negative. On cellulose acetate membrane electrophoresis, an abnormal band that migrated in the post-gamma-region was found (Fig. 1). Total serum protein was 8.4 gm/100 ml with 49.5% albumin, 4.2% α_1-globulin, 14.5% α_2-globulin, 9.7% β-globulin, 19.3% γ-globulin and 2.3% abnormal globulin.

Quantitation of serum immunoglobulin indicated 1,700 mg/100 ml IgG, 222 mg/100 ml IgA and 108 mg/100 ml IgM. The abnormal globulin showed negative Sia water dilution test. On

Fig. 5A. Cellulose acetate membrane electrophoresis of fractions eluted from Sephadex G-200 column. Numerials represent fractions on the column. Note that the abnormal protein appears in the same fractions as 7S gamma-globulin. Anode is on the left.

agar gel electrophoresis the abnormal globulin appeared in the post-gamma-region (Fig. 2). On immunoelectrophoresis precipitation arcs were present with anti-whole human serum and anti-IgG (Fig. 3). The protein was further identified as an IgG with λ-type light chain by immunoelectrophoresis. The bone marrow aspirate was normal, containing 1% plasmacyte and 18% lymphocytes. The patient became alert on the second hospital day but the hemiparesis remained. Treatment with urokinase, sulfopenicillin and glucocorticoids was instituted. On the 19th hospital day, cholecystitis was revealed.

The patient became well after 10 weeks hospitalization except for the left hemiparesis and the presence of abnormal gammaglobulin in the serum.

Sephadex G-200 gel filtration of the serum was performed to determine the molecular size of the abnormal protein (Fig. 4). Several fractions (#23-29) of the gel filtration were subjected to acetate membrane electrophoresis after

lyophilization. As shown Fig. 5 and 6, the abnormal protein appeared in the same fraction of 7S-gammaglobulin. All these analyses were performed according to the methods described previously (5).

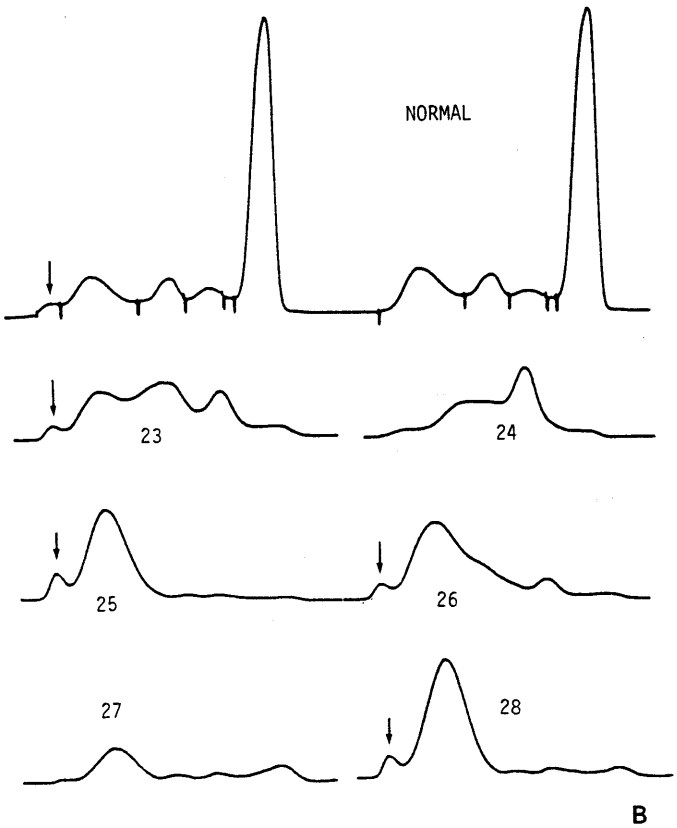


Fig. 5B. Densitometric patterns of cellulose acetate membrane electrophoresis.

DISCUSSION

Axelsson, Bachmann and Hallen (6) analysed sera by electrophoresis from 6,995 persons above 25 years of age that revealed a M-component in 64 cases. M-component was more common at higher age levels. The concentration of M-component was usually low and in only 10 sera did it exceed 1 gm/100 ml. From an immunological point of view, the distribution of M-component was 61% IgG. Plasma cell count in the bone marrow was less than 3% in 77% of cases studied. A diagnosis of myelomatosis was strongly suggested in only 3 cases.

Many instances of benign monoclonal gammopathy were accompanied

with infection, hematological abnormality, polyneuropathy or myopathy (7).

The case described in the present report was an old male patient with prolonged pneumonia and cholecystitis, and without clinical features of myelomatosis. The patient could be diagnosed as benign monoclonal gammopathy or asymptomatic monoclonal gammopathy. The serum of this case contained an extremely basic IgG which could be used for studying the structural heterogeneity of IgG.

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