Progressive hypogammaglobulinaemia in a child born to a mother with Hodgkin’s disease

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SUMMARY A young woman developed Hodgkin’s disease (nodular sclerosis) in pregnancy and gave birth to a boy who developed common variable immunodeficiency. Initially there was normal IgG with low IgA and IgM, and antibody deficiency. IgG levels fell progressively over 4 years. Cellular immunity was normal. We suggest that this is a further family with immune deficiency presenting with common variable immunodeficiency and lymphoid malignancy.

The association of immunodeficiency with lymphoid malignancy has been reported. We report an unusual combination in a family: a young woman developed Hodgkin’s disease in the 3rd trimester of pregnancy and gave birth to a boy who was found later to have common variable immunodeficiency. The father and elder child are normal.

Case histories

The mother. The mother’s past medical history was uneventful until her appendix was removed for acute appendicitis at 28 years; during convalescence she developed infective hepatitis.

She noted enlarged cervical lymph nodes during her normal 2nd pregnancy at age 29. A month after confinement she developed a large liver and spleen. A lymph node biopsy showed Hodgkin’s disease (nodular sclerosis). She also had lymphopenia (0·38 × 10⁹/l). She was treated with radiotherapy and chemotherapy but died 4 years later after a generalised herpes zoster infection.


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in the resting state, and 72% after latex phagocytosis.

The saliva contained IgG 0.16 g/l and IgA 0.5 g/l.

IgM was not present, but free secretory component was detected. The serum IgG showed a reversal of the normal 2:1 kappa to lambda ratio, and was short on immunoelectrophoresis. No antibodies to milk products were present. No antibody was detected to rubella, measles, cytomegalovirus, varicella, mumps, polio type 2, or pertussis. Anti-nuclear factor was negative.

The blood group was O Rh(D) positive. No anti-A or anti-B was present. The HLA type was A1, A3, B5, B7. The direct antiglobulin test was negative. The bone marrow contained 30% lymphocytes, mainly small forms. No plasma cells were seen in over 1000 cells.

An inguinal node biopsy was taken after a booster dose of diphtheria/pertussis/tetanus into the anterior surface of the right thigh. The node was small and dissected with difficulty. There was little surrounding fibrosis. Cortical lymphoid tissue was sparse with very poor follicle formation and no reacting centres. The paracortical area was normally cellular. Macrophages were present in the peripheral sinuses.

Total haemolytic complement was normal, with normal C1 inhibitor and C1q. C3 was 0.85 g/l and C4 0.3 g/l. No virus was isolated from faeces, but adenovirus type 7 was isolated from a sputum sample on one occasion. Bacterial cultures of sputum grew Haemophilus influenzae. On a fat intake of 50 g/day for 3 days the faeces contained 4.5 g fat, i.e. 97% absorption.

Regular postural drainage and injections of immunoglobulin were started.

After a loading dose of 5 days' gammaglobulin, the serum IgG levels rose by the expected amount to 8.5 g/l, but on weekly maintenance, levels have progressively declined by approximately 1.0 g/l per year and have remained at 3.0-4.0 g/l during the last year with continued maintenance. IgA and IgM have not shown any significant changes. IgG was present in the saliva at first, but later became undetectable. There has been no change in the salivary IgA deficiency.

During 4 years of observation, sputum production, chest rales, and finger clubbing have regressed considerably. The chest X-ray is now normal. There has been intermittent alopecia areata, and a traumatic synovitis of the hip.

He is growing normally and doing well at school.

Discussion

The patient's immunodeficiency, with normal IgG, deficient IgA and IgM, and antibody deficiency, was at first similar to the case of Giedion and Scheidegger (1957), but without the profound defect of cellular immunity. However, IgG levels fell progressively during treatment with gammaglobulin, and salivary IgG also became undetectable. Skin tests showed positive but weak delayed hypersensitivity, and no conclusive defect of cellular immunity could be shown. B-cells were normal or raised, whereas in sex-linked gammaglobulinemia they are usually reduced (Cooper and Lawton, 1972). Such patients are now grouped under common variable immunodeficiency. Although the progressive fall of IgG is unusual, it might be found in a larger number of cases if investigations were made early enough. An alternative explanation is that this IgG without detectable antibody activity has been suppressed by replacement with normal antibody.

The alopecia was attributed to trichitillomania, as he has been observed to pull his hair; but it may be a further example of the alopecia associated with hypogammaglobulinaemia described by Ipp and Gelfand (1976).

The mother's disease was histologically nodular sclerosis, the common type of Hodgkin's disease in young women. Lymphopenia is a common feature of Hodgkin's disease. However, Hodgkin's disease in pregnancy is not normally associated with illness in the baby. Poliwoda et al. (1967), in an extensive review, reported that 151 of 162 children born to mothers with Hodgkin's disease were normal. Six were stillborn and 10 died within a few hours or before they were three. Follow-up of such children has concentrated on the development of Hodgkin's disease, and not on immunodeficiency. However, these authors noted that one mother had two boys who both died, one with pneumonia and the other with obscure pyrexia and collapse, which could indicate a familial defect of immunity.
We do not attribute our patient’s illness to his mother’s illness, but there is a well-known association between immunological abnormality and malignancy. Several families have been described with a high incidence of Hodgkin’s disease or lymphoma and immunological defect (Potolsky et al., 1971; Buehler et al., 1975). There must be a genetic basis for this combination of disorders in some families, although the occurrence of Hodgkin’s disease in husband and wife (Mazar and Straus, 1951) suggests an environmental cause in others. In our case we believe that one genetic defect of immunity has predisposed to malignancy and immunological deficiency.

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Intrapartum sensitisation of human infants to the Rhesus-D antigen

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SUMMARY A study is reported of the numbers of nonimmunoglobulin-bearing lymphocytes specifically binding to Rhesus-D positive erythrocytes in the blood of Rhesus-dd infants born to either Rhesus-dd or Rhesus-Dd mothers, at birth and at 6 months of age. There was a significant increase in the number of such antigen-binding cells by 6 months in babies born to Rhesus-Dd mothers. It is concluded that the Rhesus-negative offspring of Rhesus-positive mothers may be sensitised against the Rhesus-D antigen at birth and that protection of such female infants by the injection of antiRhesus-D antibody should be considered.

The human infant at birth is capable of humoral antibody production against specific antigens. Although these responses are almost confined to immunoglobulin M (IgM) production, small amounts of immunoglobulin G (IgG) can be detected. Immune responses to most antigens require T-lymphocyte help and therefore the presence of specifically reacting T-lymphocytes. The response to the Rhesus-D (Rh-D) antigen is thought to be of this kind.

Since the introduction of treatment with pooled antiRh-D antiserum for Rh-dd mothers postnatally, the incidence of haemolytic disease of the newborn has fallen dramatically. A few newborn patients are still found, usually ascribed either to the injection or infusion of Rh-incompatible blood or to a failure in treatment with antiRh-D antiserum (Woodrow, 1974). Some studies have suggested, intriguingly, that the birth of a Rh-dd infant to a Rh-Dd mother could lead to intrapartum sensitisation of the offspring, whose latent sensitivity might be reactivated many years later, during the gestation of a Rh-D-positive fetus. Ramos de Almeida and Rosado (1972) found that the incidence of rhesus isoimmunisation by birth rank was dependent upon the grandmaternal Rh blood group, while Taylor (1967) and Hindemann (1973) suggest that sensitisation against Rh-D in infancy may be a significant event.

Some Rh-dd male infants, the offspring of either Rh-dd or Rh-Dd mothers, were selected by the Rh blood group and the ability of their peripheral blood