Short reports

Immunodeficiency associated with laevocardia, bronchiectasis, and paranasal sinus anomalies

Several individuals with the triad of laevocardia (situs inversus with left-sided heart), bilateral bronchiectasis, and abnormalities of paranasal sinuses have been described (Chandra and Khetarpal, 1963; Sharpe, 1963; Lee, 1965; Datta, 1968; Magalini, 1971). In such patients, the frequency of infections, particularly of the respiratory tract, is increased. We report the presence of immunodeficiency in the first patient to be described with this syndrome (Chandra and Khetarpal, 1963).

Case report

Patient. A 7-year-old girl was brought to hospital with a history of repeated respiratory infections since early infancy. She had developed normally, and her weight and height were on the 25th and 10th centiles respectively. The presence of the liver on the left side was noted with a gastric tympanitic note in the right hypochondrium. The apex beat was in the 5th intercostal space in the left mid-clavicular line. Heart sounds were normal and no murmur was heard. There was no cyanosis or club-

bing. X-ray and ECG confirmed the diagnosis of laevocardia (situs inversus with left-sided heart), bilateral bronchiectasis, maxillary sinusitis, and absence of frontal sinuses. The child was re-examined and a comprehensive immunological assessment was conducted at age 14 and again at 17 years.

Methods. Serum concentrations of immunoglobulins, complement components C3 and C4, and α -1-antitrypsin were estimated by single radial diffusion in agar using commercial monospecific antisera (Boehringer). Delayed hypersensitivity was assessed by intracutaneous injection of 5 ubiquitous antigens: *Candida*, purified protein derivative (PPD), mumps, streptokinase-streptodornase, and trichophyton. An induration of 5 mm observed after 48 hours was considered to be a positive response. Lymphocyte proliferation and DNA synthesis was induced *in vitro* by the use of phytohaemagglutinin and assessed by the incorporation of ^3H -thymidine. A stimulation index (ratio of counts/min in mitogen-containing culture to counts/min in unstimulated culture) was calculated. T-lymphocytes were identified by rosetting with sheep red cells, and B-lymphocytes by the presence of surface immunoglobulin detected by immunofluorescence. Opsonisation and phagocytosis were assessed by the number of *Staph. aureus* ingested by 100 polymorphonuclear leucocytes (PMNs). Bactericidal capacity of PMNs was

Table Immunological data

Test	Patient		Controls (range)
	At 14 years	At 17 years	
Serum immunoglobulins (mg/100 ml)			
IgG	410	575	880-1635
IgA	Undetectable	Undetectable	124-210
IgM	48	35	76-156
Salivary IgA	Undetectable	Undetectable	Present
Reciprocal iso-haemagglutinin titre	ND	8	8-128
Complement components (mg/100 ml)			
C3	136	185	88-256
C4	39	28	25-44
α -1-Antitrypsin (mg/100 ml)	320	264	200-400
(g/l)	3.2	2.64	2.0-4.0
Cutaneous delayed hypersensitivity to			
<i>Candida</i> , PPD, trichophyton, mumps, streptokinase-streptodornase	No reaction	No reaction	Present to 1 or more antigens
Lymphocyte stimulation index	6.8	17.5	36-287
Total leucocyte count (per mm ³)	6860	7850	4000-11 000
($\times 10^9/\text{l}$)	6.8	7.8	4.0-11.0
T-lymphocytes (%)	ND	37	68-77
B-lymphocytes (%)	ND	18	12-23
Plasma opsonic function (bacteria/100 PMNs)	436	595	410-796
PMN phagocytic ability (bacteria/100 PMNs)	531	404	410-796
PMN bactericidal capacity (% viable intracellular bacteria)	6	3	14

ND = not done; PPD = purified protein derivative; PMN = polymorphonuclear leucocyte.

expressed as the proportion of viable intracellular bacteria after 2 hours of incubation.

Results. The patient showed low levels of serum IgG and IgM, undetectable serum and salivary IgA, reduced proportion and number of circulating T-lymphocytes, and impaired *in vitro* lymphocyte stimulation response (Table). Delayed hypersensitivity was not elicited to any of the 5 common recall antigens injected intradermally. Response to PPD was absent although the patient had received BCG vaccine in early childhood. The complement system, number of B-lymphocytes, opsonic activity of plasma, and PMN functions were normal.

Discussion

The patient showed impaired immunocompetence on 2 separate occasions. Hypoimmunoglobulinaemia in the presence of normal number of circulating B-cells points to the possible existence of other pathogenetic mechanisms known to underlie common varied immunodeficiency—for example, reduced number and activity of helper T-lymphocytes, increased number and activity of suppressor T-lymphocytes, and serum inhibitors (Chandra *et al.*, 1978). In our patient, the common systemic causes of immunodeficiency (energy-protein undernutrition, anaemia, sepsis, chronic infection, Hodgkin's disease, malignancy, protein-losing enteropathy, nephrotic syndrome, immunosuppressive drugs, anticonvulsant therapy, irradiation, etc.) were excluded by history, physical examination, anthropometry, and appropriate laboratory tests. This, together with the demonstration twice of impaired immunocompetence, suggested that partial immunodeficiency affecting the humoral and cell-mediated systems was a primary event and was a part of the syndrome of laevocardia, bronchiectasis, and paranasal sinus abnormalities. The association of immunodeficiency and congenital malformations is recognised in several dysmorphic syndromes: short-limbed dwarfism, cartilage-hair hypoplasia, Kartagener's syndrome, Down's syndrome, and ataxia telangiectasia (Chandra, 1976).

Summary

In a case of laevocardia, bronchiectasis, and paranasal sinus abnormalities, assessment on 2 occasions showed the presence of moderate immunodeficiency. Serum concentrations of IgG and IgM were low, and serum and salivary IgA was not detected. T-lymphocytes were reduced in number and cell-mediated immunity *in vivo* and *in vitro* was impaired. Opsonisation, complement system, and neutrophil functions were normal.

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Spontaneous maturation of stage IV–S neuroblastoma

It is recognised that a special category of disseminated neuroblastoma exists in which the prognosis is surprisingly favourable (D'Angio *et al.*, 1971). Patients fitting this stage IV–S group are those who would otherwise be stage I or II but in whom the disease is confined to liver, skin, or bone-marrow and in whom there is no x-ray evidence of bone metastases on complete skeletal survey (Evans *et al.*, 1971). Evidence from several series has shown, particularly in patients presenting under age one year, that death is more likely to result from vigorous treatment than from the disease itself (Hassenbusch *et al.*, 1976). The natural history would appear to be for the tumour and metastases either to regress completely or to 'mature' into ganglioneuroma. A case is therefore presented in which treatment, both surgical and therapeutic, has been deliberately kept to a minimum and in which gradual maturation has occurred.

Case history

A baby girl first presented to another hospital at age 4 months with 1 cm subcutaneous nodule in the right scapular region. This was not excised until 8 months by which time eight similar lesions were present on the trunk and limbs. She was otherwise