

HLA ANTIGENS IN PERTHES' DISEASE

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Fifty children with Perthes' disease were typed for HLA-A and HLA-B antigens and the frequencies compared with those for 551 controls. There was no significant difference in these antigen frequencies.

The possible role of genetic susceptibility in the aetiology of Perthes' disease has been suggested by previous studies (Gray, Lowrey and Renwick 1972; Wynne-Davies and Gormley 1978). There are difficulties in examining the possible role of genetic factors in the disease since a relatively straightforward Mendelian approach is not possible. In this study the possible association between Perthes' disease and the presence of HLA-linked genes was investigated.

METHODS AND MATERIALS

Fifty consecutive children with Perthes' disease presenting at the orthopaedic departments of the Royal Liverpool Children's Hospital and Alder Hey Children's Hospital, were reviewed.

Separated lymphocytes from these patients were tested for HLA-A and HLA-B antigens using a modified lymphocytotoxic technique (Terasaki and McClelland 1964). Antigen frequencies in 551 control individuals (blood donors, laboratory staff and students) from the same geographical area were recorded.

RESULTS

Table I shows the frequencies of the HLA-A and HLA-B antigens in patients and controls. There was no significant difference between the frequencies for patients with Perthes' disease and those for the control patients for any of the antigens tested. Antigen frequencies were considered to be significantly different if the probability value was 0.0019 or less.

Bertrams, Schiersmann and Ritgen (1978) suggested an increased frequency of the A1 antigen in patients with Perthes' disease but this was not confirmed in our study. The results for the two studies were combined (Woolf 1955) and the relative risk for Perthes' disease in A1 positive individuals calculated as 1.45, chi-squared value=3.82, $P=0.051$ (P for heterogeneity=0.3).

Table I. Frequencies of HLA-A and HLA-B antigens in patients with Perthes' disease and in control patients

Antigen	Patients with Perthes' disease		Control patients		P
	Number	Per cent	Number	Per cent	
A1	19	38.0	193	35.1	0.80
A2	19	38.0	245	44.6	0.46
A3	14	28.0	154	28.0	1.00
A9	9	18.0	101	18.4	1.00
A10	4	8.0	51	9.3	0.96
A11	11	22.0	74	13.5	0.15
A28	3	6.0	30 (506)*	5.9	1.00
A29	3	6.0	36 (503)*	7.2	1.00
Aw30/31	1	2.0	25 (497)*	5.0	0.86
Aw32	2	4.0	33 (500)*	6.6	0.68
B5	1	2.0	49	8.9	0.15
B7	13	26.0	161	29.3	0.74
B8	19	38.0	156	28.4	0.20
B12	15	30.0	166	30.2	1.00
B13	2	4.0	26	4.7	1.00
B14	6	12.0	40	7.3	0.35
B15	1	2.0	64	11.6	0.06
Bw16	1 (18)*	5.6	8 (186)*	4.3	1.00
B17	2	4.0	48	8.7	0.37
B18	5	10.0	30	5.5	0.32
Bw21	1	2.0	5 (105)*	4.8	0.70
Bw22	1	2.0	30	5.5	0.47
B27	6	12.0	50	9.1	0.67
Bw35	7	14.0	65	11.8	0.82
B37	1	2.0	7 (241)*	2.9	1.00
B40	3	6.0	64	11.6	0.33

* Total number tested

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DISCUSSION

Perthes' disease has a complex aetiology and it can no longer be regarded as a focal disorder of the hip. Burwell, Coates and Vernon (1976) concluded from an anthropometric study of 232 children with Perthes' disease that there is an abnormality in the mechanisms that determine the differential growth rates in various regions of the body. It was thought that this probably resulted from environmental influences affecting the embryonic stage and possibly from genetically inherited susceptibility. Hall and Harrison (1978) found a higher incidence of minor congenital anomalies in a series of 112 children with Perthes' disease than in a control group. The possibility that a generalised abnormality of skeletal development causes the hip to become susceptible to Perthes' disease at a later date was considered. Experimental work (Zahir and Freeman 1972; Sanchis, Zahir and Freeman 1973) and histological studies (McKibbin and Ráliš 1974) of affected femoral heads have suggested that vascular changes are associated with Perthes' disease. Wynne-Davies and Gormley (1978) produced evidence for a number of associated factors, such as a late order of birth, a higher than average parental age, families with a low income and a history of foetal malposition or breech delivery.

The results of several studies have suggested that Perthes' disease occurs within families (Gray, Lowrey and Renwick 1972; Harper, Brotherton and Cochlin 1976; Wynne-Davies and Gormley 1978). Although this significance has been discounted in these reports, the incidence of Perthes' disease in relatives was considerably higher than the likely incidence in the general population. Harper, Brotherton and Cochlin (1976) recorded that the incidence of Perthes' disease in South Wales was 0.02 per cent in relation to the total number of live births, 0.62 per cent in siblings, 2.8 per cent in children (corrected for age) and 0.18 per cent in second-degree relatives. The incidences in relatives recorded by Wynne-Davies and Gormley (1978) were 1.6 per cent in siblings, 2.0 per cent in children and 0.28 per cent in second and third-degree relatives. Assuming an incidence in the population similar to that quoted above again shows a considerable degree of familial incidences of Perthes' disease. This could be due to common environmental factors within families, but the possibility of a genetic effect cannot be excluded.

If genetic factors are involved in the aetiology of Perthes' disease, there is no evidence from the results of this study that any of the relevant genes are HLA-linked.

We wish to thank Professor G. Bentley, Mr C. J. E. Monk, Mr R. Owen and Mr J. F. Taylor for allowing us to study their cases. We thank the National Tissue Typing Reference Laboratory in Bristol for supplying antisera.

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