forces predisposes the adjacent areas to the breakdown of the cartilage (Bullough and Goodfellow, 1968).

The medial patellar cartilage is particularly susceptible to chondromalacia, being among the thickest in the body and making a poor contact with the opposite articular cartilage. Girls are mostly affected perhaps because of the nature of their sport, perhaps because of relative underdevelopment of the vastus medialis (Williams, 1971), and perhaps because the wider pelvis predisposes to valgus position of the knees.

Transposition of the tibial tubercle compares well to excision of the patella because, although the latter relieves the symptoms of chondromalacia, it does not leave a normal knee—especially in the adolescent, at which age to be supreme in sport the kneecap is a necessity whereas in later life it is not. Quadriceps weakness, knee instability, or disabling restriction of flexion were not encountered after the operation. A total of 17 out of 20 patients found the operation valuable and returned to their normal activities and sport.

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MEDICAL MEMORANDA

Persistent Haemagglutination for Infectious Mononucleosis in Rheumatoid Arthritis

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A case of persistent positive haemagglutination data for infectious mononucleosis in a patient with rheumatoid arthritis is reported. The haemagglutination data including rapid slide tests as well as antibodies to Epstein-Barr (EB) virus-induced antigens showed little change over a 12-month period.

Tube differential absorption tests with either sheep or horse erythrocytes were performed by standard methods (Lee *et al.*, 1968a; 1968b). In determining end-points the microscope was used to confirm marginal macroscopic agglutination. Antibodies to EB virus-induced antigens were measured by indirect immunofluorescence techniques (Henle *et al.*, 1968; 1971a; 1971b).

Case History

A 39-year-old woman with documented rheumatoid arthritis was followed up over a 12-month period. Infectious mononucleosis had been diagnosed at age 18. During the present 12-month period the latex rheumatoid factor titre varied between 1/640-1/1,280, while the Rose-Waaler test remained negative. The symptoms were well controlled with aspirin and limited physical therapy.

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The initial specimen was collected as a control for an infectious mononucleosis study and this and subsequent specimens gave positive test results for the disease by rapid slide tests. Pertinent haemagglutination and EB virus antibody data are summarized in table I. Complete blood counts with each specimen failed to show abnormal-appearing lymphocytes. Lymphocytes harvested from a specimen drawn on 16 April 1972 showed a normal response to phytohaemagglutinin as measured by incorporation of ³H-thymidine. Serological tests for syphilis (V.D.R.L.), HBAg, HBAb, and the ox cell haemolysis test for infectious mononucleosis were negative on specimens taken on 13 July 1971, 4 February 1972, and 16 April 1972. The patient's cold agglutinins (4°C) are compared in table II with those of six selected patients with heterophil-positive infectious mononucleosis.

Comment

Despite negative clinical findings when initially examined in April 1971, a mild or even asymptomatic case of infectious mononucleosis could not be completely excluded. The absence of atypical lymphocytes in a seropositive patient does not exclude recent infectious mononucleosis, since morphological changes as well as clinical symptomatology may disappear many months before the disappearance of specific infectious mononucleosis heterophil antibodies. We believe, however, that the relatively unchanged haemagglutination data over the 12-month period represents persistent false positivity for the disease. In addition, this patient had a persistent cold agglutinin that was unusual in that it was reactive against adult O (ii) cells, but did not significantly react against cord (ii) erythrocytes.

All of the sera from this patient showed relatively high and persistent titres (1/160) of antibodies to EB viral capsid antigens. Such high and persistent anti-viral capsid antigen titres have been recorded frequently in Burkitt's lymphoma and nasopharyngeal carcinoma, less frequently in other malignancies, systemic lupus erythematosus, sarcoidosis, and occasionally in healthy blood donors (5-15%) (Henle *et al.*, 1968; 1971a; 1971b; Evans, 1971). Antibodies to EB virus-induced early antigens are detected in about 75% of cases of infectious mononucleosis depending in part on the severity of illness (Henle *et al.*, 1971a). Since these antibodies usually appear later than anti-viral capsid antigens and disappear again after a few months, they often are of diagnostic significance. Antibodies to EB virus-induced early antigens have also been detected in many patients with Burkitt's lymphoma and nasopharyngeal carcinoma and, less frequently, in other conditions, and often persist (Henle *et al.*, 1971a; 1971b).

TABLE I—Persistent Positive Haemagglutination Data for Infectious Mononucleosis in Patient with Rheumatoid Arthritis

Date	H.D.A.T.			S.D.A.T.			Rapid Infectious Mononucleosis Slide Tests*	VCA†	EA†	D†	R†	Cold Agglutinin titre‡ (Anti-i)	Serum IgM (mg/100 ml)§
	P.H.H.T.	G.P.	B.	P.S.H.T.	G.P.	B.							
13/4/71	448	56	14				Positive	80-160	<10	<10	10?	1/40	290
19/5/71	224	14	7				Positive	160	10	<10	<10	1/40	
13/7/71	224	28	7	56	7	0	Positive	80-160	<10	<10	<10	1/20	
14/8/71	896	56	28	56	7	0	Positive (5/6)	160	<10	<10	<10	1/40	
15/10/71	448	28	14	28			Positive	160	20	<10	20	1/40	260
16/12/71	448	56	7	28	7	7	Positive	160	10	<10?	10?	1/40-1/80	
4/2/72	448	28	7				Positive	80-160	10	<10	10	1/20	
16/4/72	224	14	14	56	7	7	Positive	80-160	10	<10	10	1/20	

H.D.A.T. = Differential absorption test using a 2% horse red blood cell suspension. S.D.A.T. = Differential absorption test using a 2% sheep red blood cell suspension. P.H.H.T. = Presumptive horse heterophil titre (unabsorbed). P.S.H.T. = Presumptive sheep heterophil titre (unabsorbed). G.P. = Titre after serum absorption with a 20% guinea-pig kidney suspension (Difco Laboratories). B = Titre after serum absorption with a 20% beef red blood cell suspension (Difco Laboratories).

* Monospot (Ortho Diagnostics), Monotest (Wampole Laboratories), Mono Dri-Dot (Organon Incorporated), IM test (Microbiological Research Corp; Bountiful, Utah), Diagluto Im (Beckman Instruments), and the 8% horse cell test (Cabrera and Carlson, 1970).

† Antibody titres to Epstein-Barr virus-induced antigens include viral capsid antigens (VCA) and the "D" and "R" subgroups of early induced EB virus antigens (EA).

‡ Cold agglutinins (anti-i) reactive against 0 (ii) adult cells; no significant agglutination (4°C) against adult (II) and cord red blood cells.

§ Normal adult serum macroglobulin (IgM) levels 100 ± 55 mg/100 ml.

TABLE II—Comparison of Cold Agglutinins (4°C) in Study Patient's Serum and Serum of Six Selected Patients with Infectious Mononucleosis (I.M.)

Source of Serum		Titres* with Three Different Cell Suspensions		
		Cord	ii (Adult)	II(Adult)
Study patient†		<10	80	<10
I.M. patient 1		40	80	<10
" " 2		80	80	<10
" " 3		80	160	<10
" " 4		80	160	<10
" " 5		320	1,280	80
" " 6		1,280	20,480	640

* Titres were expressed as the reciprocal of the final tube dilutions after a one-hour incubation period.

† Additional specimen from 12 May 1972.

Recently it was noted that antibodies to EB virus-induced early antigens yield two distinct patterns of immunofluorescence in abortively EB virus-infected Raji cells (Henle *et al.*, 1971b). One pattern ("D"), generally found in infectious mononucleosis, shows diffuse staining of both nucleus and cytoplasm of target cells. The other pattern ("R") is restricted to a cytoplasmic mass in the target cells and is seen especially in patients with Burkitt's lymphoma. Patients with nasopharyngeal carcinoma show predominantly anti-D patterns with low anti-R reactivity (Henle *et al.*, 1971b). In general, the R pattern is found in chronic disease states rather than in acute primary EB virus infections. In the present case low titre antibodies to EB virus-induced early antigens of the R type alone were barely detectable in 1/10 dilutions in four out of eight samples.

Persistently raised levels of antibodies to EB virus-related antigens may reflect endogenous reactivation of a latent persistent

viral carrier state, which regularly follows primary EB virus infections (Evans, 1971; Smith and Bausher, 1972). The level and frequency of such raised titres varies from condition to condition and may reflect the extent of viral activity. According to Evans (1971) a spectrum of host responses may occur in association with endogenous EB virus reactivation. This may result in raised antibody titres but only mild symptoms referable to EB virus infections. Such a reactivation would be expected in diseases associated with a decline in cell-mediated immunity and defects in immunological surveillance (Evans, 1971).

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