

Elevated serum sialic acid in idiopathic acute iridocyclitis

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Abstract. We measured the serum levels of sialic acid in 12 patients with idiopathic acute iridocyclitis and 18 normal controls. Sialic acid levels were significantly elevated in the patients with idiopathic acute iridocyclitis. Since animal studies have shown that intraocular inflammation alone cannot elevate serum level of sialic acid, the results of our study suggest that idiopathic acute iridocyclitis may be a multiorgan disease with systemic effects.

Key words: sialic acid - iridocyclitis - ankylosing spondylitis - Reiter's syndrome - bone.

Lascarache et al. (1981) and Susheela et al. (1988) reported elevated levels of serum sialic acid (N-acetylneuraminic acid) in patients with ankylosing spondylitis, which belongs to the spectrum of seronegative spondyloarthropathies. Since patients with seronegative spondyloarthropathies are prone to develop acute iridocyclitis (Smith & Nozik 1989), we suspected that serum sialic acid levels may also be elevated in patients with idiopathic acute iridocyclitis, unassociated with spondyloarthropathies. We therefore measured serum sialic acid levels in patients with idiopathic acute iridocyclitis and those of normal controls.

Patients and Methods

Blood samples were collected from 12 patients with idiopathic acute iridocyclitis and 18 healthy

volunteers. All patients had active iridocyclitis when their blood samples were obtained.

From each subject, 4 to 6 ml of venous blood were drawn into vacuum and unheparinized test tubes and left to coagulate at room temperature for about one hour. The serum was separated from the rest of the blood sample with centrifugation and then stored at -20°C until analyses of sialic acid levels were performed. The estimation of serum sialic acid levels was performed according to the method of Winzler (1961). Statistical analyses were performed using the Student's *t*-test for unpaired data and analysis of covariance. Statistical significance was defined as a P-value of 0.05 or less.

Results

Of the 12 patients with idiopathic acute iridocyclitis, seven (58.3%) tested positive for HLA-B27. The mean age of these patients was 43.4 years, with a range of 15 to 84 years. The mean age of the eight female patients was 50.8 years, with a range of 36 to 84 years. The mean age of the male patients was 28.7 years, with a range of 15 to 46 years.

The mean age of the 18 controls was 36.4 years (range, 25 to 56 years). The mean age of the six female controls was 41.0 years, with a range of 25 to 56 years. The mean age of the male controls was 34.2 years, with a range of 25 to 53 years.

The mean sialic acid level for the patients was

930.6 mg/l with a standard deviation of 107.3 mg/l, and the mean sialic level for the controls was 723.0 mg/l with a standard deviation of 115.2 mg/l. The sialic acid levels were statistically significantly different for these two groups ($P=0.0001$).

The mean sialic acid level for the male patients was 886.8 mg/l with a standard deviation of 126.0 mg/l, whereas the mean sialic acid level for the male controls was 684.8 mg/l with a standard deviation of 88.3 mg/l. The mean sialic level for the female patients was 952.5 mg/l with a standard deviation of 98.3 mg/l, whereas the mean sialic acid level for the female controls was 800.2 mg/l with a standard deviation 131.5 mg/l. The male patients had significantly higher levels of sialic acid than the male controls ($P=0.04$), as did the female patients compared to the female controls ($P=0.04$).

By making 855 mg/l as the upper limit for a normal level of sialic acid, our method of analyzing sialic acid levels had a sensitivity of 83.3% and a specificity of 88.9%.

An analysis of covariance was performed to control for age, race, and sex. The sialic acid levels remained significantly different between the patients and the controls ($P=0.0001$).

There was no statistically significant difference in sialic acid levels between patients with idiopathic acute iridocyclitis who tested HLA-B27 positive and those who did not.

Discussion

Sialic acid is one of the major carbohydrates in the glycoproteins and glycolipids of the cellular membranes (Onat et al. 1990). Sialic acid has been found in the eye in such places as the trabecular meshwork (Tripathi et al. 1987), lens (Tao & Lee 1986), retina (Cohen & Nir 1984), subretinal fluid (Akhmeteli et al. 1975), and retinal pigment epithelium (McLaughlin & Boykins 1987). Rabbit studies demonstrated that the levels of protein, seromucoid, and sialic acid in the aqueous humor correlate with the severity of experimentally induced iridocyclitis (Gieldanowski 1976, 1977; Szary 1977). However, the same parameters in the serum of rabbits did not show any concomitant changes (Gieldanowski 1976; Szary 1977). The results of these studies suggest that iridocyclitis is a localized process and by itself cannot raise the serum level of sialic acid (Gieldanowski 1976; Szary 1977). There-

fore, the elevated serum sialic acid levels in our patients with idiopathic acute iridocyclitis may be caused by other and perhaps more generalized inflammatory processes occurring elsewhere in the body.

Since sialic acid is an important noncollagenous proteins of the bone (Fisher & Termine 1985), it is possible that arthritis and bony destruction in ankylosing spondylitis and Reiter's syndrome could lead to increased serum sialic acid levels by releasing sialic acid from the bony matrix into the circulation. Elevated serum sialic acid levels have been demonstrated in certain inflammatory bone diseases such as ankylosing spondylitis (Susheela et al. 1988), rheumatoid arthritis (Carter & Martin 1962), and osteomyelitis (Gupta et al. 1973). It is possible that patients with acute iridocyclitis may have subclinical arthritis, leading to elevated level of sialic acid from an increase in bone turnover breakdown.

In conclusion, we have shown that serum sialic acid levels are elevated in idiopathic acute iridocyclitis. The cause of this phenomenon is presently unknown. Since animal studies have shown that intraocular inflammation alone cannot elevate serum level of sialic acid, the results of our study suggest that idiopathic acute iridocyclitis may be a multiorgan disease.

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