Serum Lipoproteins in Middle-aged Men with Psoriasis

CARIN VAHLQUIST,[1] GERD MICHAËLSSON[1] and BENGT VESSBY[2]

Department of [1]Dermatology and Department of [2]Geriatrics, University Hospital, Uppsala, Sweden

Vahlquist C, Michaëlsson G, Vessby B. Serum lipoproteins in middle-aged men with psoriasis. Acta Derm Venereol (Stockh) 1987; 67: 12–15.

Elevated serum triglyceride and low serum HDL cholesterol levels have been reported to be risk factors for occlusive vascular disease. In 20 middle-aged men with psoriasis the serum lipoprotein pattern was compared with that in a group of healthy middle-aged men. In thirteen of the 20 patients the psoriasis was mild to moderate and in seven patients it was severe and widespread. Both groups of patients had elevated levels of both VLDL and LDL triglycerides. They also showed a tendency towards higher VLDL and lower HDL cholesterol levels than the controls. The abnormalities were more pronounced in patients with severe psoriasis. The lipoprotein pattern found in this study may possibly indicate that psoriasis is associated with an increased risk of occlusive vascular disease. *Key words: Psoriasis; Serum lipids; VLDL; LDL; HDL; Cholesterol; Triglycerides.* (Received June 17, 1986.)

C. Vahlquist, Department of Dermatology, University Hospital, S-751 85 Uppsala, Sweden.

Occlusive vascular disease has been reported to be more common in patients with psoriasis than in healthy subjects, especially in male psoriasis patients in whom large body areas are affected (1). There is some evidence that among patients with psoriasis there is an increased frequency of hyperlipidemia (2), but there have been no controlled studies on this question. Elevated serum lipoprotein lipid levels (3) and changes in the fatty acid composition of the plasma lipid esters (4) are risk factors that are associated with an increased incidence of cardiovascular disease. The present report describes the serum lipoprotein pattern in male psoriasis patients in comparison with that in age-matched healthy men.

PATIENTS AND METHODS

Patients

The study comprised 20 male patients with psoriasis, of ages ranging from 37 to 58 years (mean 50 years). Their disease varied from mild–moderate to severe. Further clinical details have been given in a recent report on a study of the fatty acid spectrum in adipose tissue and the plasma lipid esters in these patients (5).

The patients were divided into two groups: The first group consisted of 13 patients with moderate and stable psoriasis of the nummular and/or plaque type with a mean duration of 26 years (group 1). In none of these patients was more than 25% of the skin surface involved at the time of examination. They were not taking any drugs. The mean Broca's index (weight (kg)/height (cm)—100) in this group was 1.04. Eight were smokers but most of them did not smoke more than 10 cigarettes per day.

The second group consisted of seven patients with a history of widespread and severe psoriasis (group 2). Four of them were receiving methotrexate (5 mg/week to 17.5 mg every 5th day), and one of them was also taking prednisolone, 15 mg/day. Three of the patients were being treated with low dosages of antihypertensive drugs (thiazides, beta blockers and mefruside) for mild hypertension. Six patients had more than 30% of the skin surface involved at the time of the study. The mean duration of the psoriasis in this group was 22 years and the mean Broca's index 1.12. Four were smokers.

For their psoriasis, two used topical steroids on small areas, two used 0.1% dithranol paste, two had no topical treatment at all and 14 used only emollients, as a rule petrolatum.

None of the patients had any history of cardiovascular disease or had a known diabetes mellitus,

and all were euthyroid and had normal results of laboratory tests for liver and renal function. A special, detailed questionnaire was used regarding dietary habits. No clear differences were found between the patients' diet or alcohol consumption and that of the Swedish population at large. The patients were instructed to keep to their diet and not to change their drinking and smoking habits before the samples were taken.

Controls

The control group consisted of 36 healthy, non-obese men, 40–60 years old, mean age 48 years, who were not taking any drugs and were known to have had normal whole serum cholesterol and triglyceride values on at least one previous occasion. They were randomly chosen from persons attending an ongoing health survey in the city of Uppsala, Sweden. Their mean Broca's index was 0.99. Thirty per cent of the controls were smokers. All controls were on their habitual diet and no one had received any dietary advice. Nobody had any known alcohol abuse.

Lipid analysis

Cholesterol and triglyceride concentrations were assayed in whole serum and in the different lipoprotein fractions—very low-density (VLDL), low-density (LDL) and high-density lipoprotein (HDL).

All blood samples were drawn after a 12 to 14 hours overnight fast. A detailed description of the lipoprotein analysis has been given previously (6). Briefly, VLDL was isolated as the top fraction after preparative ultracentrifugation at d= 1.006 and LDL was precipitated from the bottom fraction at d= 1.006 by a heparin-manganese chloride solution. After low-speed centrifugation, the HDL lipid concentration was determined in the supernatant. Cholesterol and triglyceride concentrations in serum and in the isolated lipoproteins were determined in isopropanol extracts by semiautomated methods in a Technicon AutoAnalyzer type II.

The lipoprotein patterns were classified as proposed by Fredrickson, Levy & Lees (7), using the criteria suggested by Beaumont et al. (8). Cut-off points for hyperlipoproteinemia for men and women were 1.40 and 1.00 mmol/l for VLDL-triglycerides and 5.20 and 5.70 mmol/l for LDL-cholesterol, respectively, corresponding to the 85th percentile in healthy men and women in a local control material (9).

The concentrations of serum apolipoproteins (Apo) A-I, A-II and B were measured by electroimmunoassay (6).

Statistics

Means and standard deviations were calculated by conventional methods. Tests of equal means were based on a two-way analysis of variance (10).

RESULTS

The lipoprotein data are given in Table I. The psoriatics showed a consistent tendency towards raised triglyceride levels of whole serum as well as of the VLDL- and LDL-lipoprotein fractions. The significance of the results was strengthened when patients in groups 1 and 2 were combined and compared with the controls. VLDL-cholesterol was then significantly elevated ($p<0.05$). At the same time there was an obvious tendency towards a lower HDL-cholesterol concentration in psoriatic patients and the difference compared with the controls was almost significant both for groups 1 and 2 combined ($p<0.06$) and for group 2 alone ($p<0.06$).

According to the Fredrickson classification of hyperlipoproteinemia, four patients (out of 13) in group 1 had a type IV hyperlipoproteinemia, three patients (out of 7) in group 2 had a type IV and one a type IIb hyperlipoproteinemia. The serum concentrations of Apo A-I, A-II and B did not differ significantly from those in the controls (Table 1); but one could see a tendency towards elevated Apo-B values in patient group 2.

COMMENTS

To our knowledge no reports have been presented previously in which the serum lipoprotein pattern in psoriasis has been compared with that in healthy age- and sex-matched

Table I. *Concentrations (mmol/l) of triglycerides (TG) and cholesterol (Chol.) in very-low-density (VLDL), low-density (LDL) and high-density lipoprotein (HDL) and in whole serum*

Serum apolipoprotein levels (Apo A–I, A–II and B) in per cent of those in healthy controls (means ± SD) are also given

	Controls (n=36)	Moderate psoriasis Group 1 (n=13)	Severe psoriasis Group 2 (n=7)	Groups 1+2 (n=20)
VLDL				
TG	0.7±0.4	1.2±0.7**	1.3±0.6**	1.2±0.7***
Chol.	0.4±0.3	0.6±0.3	0.6±0.3	0.6±0.3*
LDL				
TG	0.4±0.1	0.6±0.2***	0.6±0.1***	0.6±0.1***
Chol.	4.0±0.8	4.0±0.6	4.1±0.8	4.0±0.7
HDL				
TG	0.2±0.1	0.2±0.1	0.2±0.1	0.2±0.1
Chol.	1.2±0.3	1.1±0.3	1.0±0.2	1.1±0.2
Whole serum				
TG	1.4±0.5	2.0±0.8**	2.1±0.6**	2.1±0.7***
Chol.	5.6±0.9	5.8±0.7	5.9±1.0	5.8±0.8
Apo A-I	107.0±12.8	104.7±12.3	100.0±11.6	103.1±12
Apo A-II	105.0±11.3	109.1±8.2	104.0±16.9	107.3±11.8
Apo B	141.1±25.3	144.5±24.9	150.7±33.0	146.7±27.3

Significance of differences (controls vs. moderate psoriasis; controls vs. severe psoriasis): *$p<0.05$, **$p<0.01$, ***$p<0.001$.

controls. This study on middle-aged men with psoriasis has demonstrated that the serum lipoprotein pattern differs in several respects from that in healthy control subjects. These abnormalities include elevated levels of VLDL and LDL triglycerides and of total serum triglycerides. There is also a tendency towards increased VLDL cholesterol and decreased HDL cholesterol concentrations. Elevated serum triglyceride (11) and low HDL cholesterol levels (3) have been reported to constitute risk factors for the development of coronary heart disease. We have previously found that in patients with psoriasis the fatty acid composition of the plasma lipids and of adipose tissue show a number of aberrations (5). Particularly marked are the decreases in linoleic and α-linolenic acid, as well as in several of their metabolites. Low linoleic and α-linolenic acid contents have previously been found to be associated with hypertriglyceridemia and hyperlipoproteinemia type IV (12).

The cause of the hyperlipoproteinemia in psoriasis is not clear. It may be a phenomenon associated with the fatty acid changes, which in turn may be caused by a variety of factors. Obesity (13), as well as treatment with thiazide diuretics, β-blockers (14) and corticosteroids (15), has been reported to be associated with hypertriglyceridemia and low HDL levels. This could possibly contribute to the lipoprotein changes seen in the group of patients with severe psoriasis. However, this does not seem to be a major explanation, as similar lipoprotein changes were observed in the group of patients with moderate psoriasis with a normal body weight and no drug treatment. In this context the recent report by Leren et al. (16) on a lowered LDL-receptor activity in cultured dermal fibroblasts from psoriatics is interesting. Since no increase of the serum cholesterol was observed, the authors speculated on an LDL-receptor aberration being present only in the dermal fibroblasts. Another explanation why no serum lipid changes were seen in the psoriatics

investigated by Leren et al. (16) could be that their study comprised both men and women. The female participants could, as a group, mitigate serum lipid changes that would have been more pronounced, if the study had included only male patients.

The fact that at least middle-aged men with psoriasis have a tendency to hyperlipoproteinemia per se has to be considered in the treatment with oral retinoids, which also induce lipoprotein changes of a similar type as those described here (17, 18). However, the retinoid induced hyperlipidemia and the described hypertriglyceridemia in psoriatics need not necessarily be additive.

ACKNOWLEDGEMENTS

This study was supported by grants from the Swedish Medical Research Council (03X-05174) and the Swedish Psoriasis Association.

REFERENCES

1. McDonald CJ, Calabresi P. Psoriasis and occlusive vascular disease. Br J Dermatol 1978; 99: 469–475.
2. Pfahl F, Rouffy J, Puissant A, Duperrat B. Hyperlipoprotéinémies et psoriasis. Journées Nationales de Dermatologie 1976; 103: 588–590.
3. Gordon T, Castelli WP, Hjortland MC. Predicting coronary heart disease in middle-aged and older persons: The Framingham study. JAMA 1977; 238: 497–499.
4. Miettinen TA, Maukkarinen V, Huttunen JK, Mattila S, Kumlin T. Fatty acid composition of serum lipids predicts myocardial infarction. Br Med J 1982; 285: 683–684.
5. Vahlquist C, Berne B, Boberg M, Michaëlsson G, Vessby B. The fatty-acid spectrum in plasma and adipose tissue in patients with psoriasis. Arch Dermatol Res 1985; 278: 114–119.
6. Vessby B, Lithell H, Helsing K, Östlund-Lundqvist A-M, Gustavsson I-B, Boberg J, Lederman H. Effects of bezafibrate on the serum lipoprotein triglyceride removal capacity and the fatty acid composition of the plasma lipid esters. Atherosclerosis 1980; 37: 257–269.
7. Fredricksson DS, Levy RI, Lees RS. Fat transport in lipoproteins—an integrated approach to mechanisms and disorders. N Engl J Med 1967; 276: 34–42.
8. Beaumont JL, Carlsson LA, Cooper GR et al. Classifications of hyperlipidaemias. Bulletin of the World Health Organization 1970; 43: 891–915.
9. Carlson LA, Ericsson M. Quantitative and qualitative serum lipoprotein analysis, Part I (Studies in healthy men and women). Atherosclerosis 1975; 21: 417–4339.
10. John PWM. Statistical design and analysis of experiments. Macmillan. New York, 1971.
11. Carlsson LA, Åberg H. Serum triglycerides—an independent risk factor for myocardial infarction but not for angina pectoris. N Engl J Med 1985; 312: 1127.
12. Simpson HCR, Barker K, Carter RD, Cassels E, Mann JI. Low dietary intake of linoleic acid predisposes to myocardial infarction. Br Med J 1982; 295: 683–684.
13. NIH Consensus Development Conference Summary. Treatment of hypertriglyceridemia. Arteriosclerosis 1984; 4: 296–301.
14. Johnson BF. The emerging problem of plasma lipid changes during antihypertensive therapy. J Cardiovasc Pharmacol 1982; 4(Suppl 3): 213–221.
15. El-Shaboury H, Hayes TM. Hyperlipideia in asthmatic patients receiving long-term steroid therapy. Br Med J 1973; 2: 85–86.
16. Leren T, Maartman-Moe K, Thune P, Berg K. Low density lipoprotein receptors in cultured skin fibroblasts from psoriasis patients. Clinical Genetics 1984; 25: 230–241.
17. Michaëlsson G, Bergqvist A, Vahlquist A, Vessby B. The influence of 'Tigason' (Ro 10-9359) on the serum lipoproteins in man. Br J Dermatol 1981; 105: 201–205.
18. Vahlquist C, Michaëlsson G, Vahlquist A, Vessby B. A sequential comparison of etretinate (Tigason®) and isotretinoin (Roaccutane®) with special regard to their effects on serum lipoproteins. Br J Dermatol 1985; 112: 69–76.