Psoriasis and Risk of Myocardial Infarction

To the Editor: The prospective cohort study by Dr Gelfand and colleagues1 found that patients with psoriasis had an increased adjusted relative risk for myocardial infarction (MI). In their conclusion, the authors state that psoriasis may convey an independent risk of MI, which is greater in young patients with severe psoriasis. Analyses were performed using conditional logistic regression, adjusted for age, sex, and other major cardiovascular risk factors (hypertension, diabetes, history of MI, hyperlipidemia, smoking, and body mass index).

Other studies have demonstrated the association of psoriasis with severe psychological morbidity, in particular with depression. Devrimci-Ozguven et al2 demonstrated that patients with psoriasis had significantly higher degrees of depression and more body cathexis problems than did controls. Esposito et al3 reported that psoriasis is associated with profound psychological morbidity (particularly with depression) in a large number of patients. In addition, depression is an independent risk factor for coronary heart disease and an aggravating factor for preexisting cardiovascular disease.4 Moreover, disease-related psychological stress has been associated with an increased risk for coronary artery disease.5

It therefore seems that several influencing and confounding factors, such as depression, psychological disorders, and disease-related stress, could have biased the findings of Gelfand et al. We believe that adjustment for these factors would result in a more accurate estimation of the actual additional risk of MI in patients with psoriasis.

Alevizos Alevizos, MD alevisos@gmail.com
Department of General Practice and Family Medicine
Health Centre of Vyronas
Athens, Greece

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for MI in patients with severe psoriasis that was found by Gelfand et al.

Mario Malerba, MD
malerba@master.cci.unibs.it
Department of Internal Medicine
University of Brescia
Brescia, Italy

Paolo Gisondi, MD
Biomedical and Surgical Sciences
University of Verona
Verona, Italy

Alessandro Radaeli, MD
Department of Internal Medicine
University of Brescia

Giampiero Girolomoni, MD
Biomedical and Surgical Sciences
University of Verona

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To the Editor: Psoriasis is considered an immune-mediated inflammatory disease, such as rheumatoid arthritis or Crohn disease. Dr Gelfand and colleagues found psoriasis to be an independent risk factor for MI. This is consistent with similar findings in other immune-mediated inflammatory diseases, such as rheumatoid arthritis, and supports the systemic nature of the underlying inflammation. Atherosclerosis is regarded as an inflammatory process as well. The cascade of events that ultimately results in formation of atherosclerotic plaques begins with infiltration and retention of low-density lipoprotein and activation of endothelial cells. Platelets are the first blood cells to arrive at the scene, likely contributing to further endothelial activation and subsequent formation of an inflammatory cell infiltrate in the forming plaque.

The notions of a crucial role of platelets in the formation of atherosclerotic plaques and psoriasis as a systemic inflammatory disease resulting in higher cardiovascular morbidity are supported by the finding that platelet activation, monitored by expression of adhesion molecule P-selectin, correlated with Psoriasis Area and Severity Index (a measure of disease severity); these activated platelets help to facilitate leukocyte extravasation. Contribution of P-selectin–expressing platelets to atherosclerosis has been shown in animal models in which interactions of activated platelets with monocytes and endothelium led to delivery of platelet-derived CCL5 and CXCL4, increased leukocyte binding to vascular cell adhesion molecule 1, and exacerbation of atherosclerosis. This may also occur in patients to a clinically relevant degree: analysis of coronary artery calcification as early evidence for cardiovascular disease showed that patients with psoriasis exhibited calcifications with significantly more frequency and severity compared with controls matched for all major known risk factors.

Experimental evidence therefore supports the notion of psoriasis being a disease of systemic inflammation that in turn contributes to the comorbidity of MI. Further research may yield information on which to base recommendations for cardiac screening at an early stage. In addition, it will be interesting to investigate the effects of continuous anti-inflammatory therapies for psoriasis on the development of comorbidities.

Ralf J. Ludwig, MD
r.ludwig@em.uni-frankfurt.de
Wolf-Henning Boehncke, MD
Department of Dermatology
Clinic of the Johann Wolfgang Goethe University
Frankfurt am Main, Germany

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In Reply: Dr Alevizos and colleagues suggest that the association of psoriasis and MI that we observed may be due to psoriasis-associated depression. Although this possibility requires further research to fully address, confounding by depression is unlikely to explain our results.

First, the prevalence of severe depression in patients with psoriasis and the magnitude of this potential association have not been well established in large, broadly representative population-based studies. The authors refer to a small, specialty clinic–based study that demonstrated that patients hospitalized for psoriasis were more likely to be depressed, based on Beck Depression Inventory scores (mean score in mild-moderate depression range), compared with healthy controls. The correlation between depression scores and psoriasis severity was weak ($r=0.29$) and it is unclear if these results would generalize to the broader population of patients with psoriasis we studied. Alevizos et al also refer to 1 large study of patients with psoriasis from Italy that found that patients with psoriasis had an average Center for Epidemiologic Studies-Depression scale score of 26.1, which is a borderline score between mild and major depression. This study was limited by a low response rate (48%), lack
of a control group, and lack of clarity as to the source popu-
lation used to identify patients with psoriasis.

Second, studies of depression as an independent risk fac-
tor for MI have been inconsistent. Studies that have been
positive have found only a modest association with depres-
sion (an approximately 1.5-2.0 adjusted relative risk for
the subsequent development of coronary artery disease), mak-
ing it unlikely that depression is a strong enough con-
founder to explain our results. Finally, there is no indica-
tion that the relative risk of MI due to depression varies by
age, as was observed in our study.3

Dr Malerba and colleagues suggest that the increased risk
of MI we found may be due to elevated plasma homocys-
teine levels in patients with psoriasis observed by Malerba
et al7 was modest (5.6 μmol/L) and the correlation of ho-
mcysteine level with psoriasis severity was weak (r = 0.30);
therefore, homocysteine is unlikely to substantially ex-
plain our observations.6

Drs Ludwig and Boehncke have shown that psoriasis may
be an independent risk factor for coronary artery calcification,7
which provides important confirmatory data for our
results. Furthermore, they provide data that psoriasis se-
verity is strongly correlated with P-selectin (r = 0.83,
P < .001),8 which is expressed on activated platelets and has
been implicated in the pathogenesis of atherosclerosis in
animal models. Further studies will be necessary to determine
the mechanism by which psoriasis confers an independent
risk of coronary artery disease and MI, and how best to mini-
mize this risk.

Joel M. Gelfand, MD, MSCE
joel.gelfand@uphs.upenn.edu
Department of Dermatology
University of Pennsylvania
Philadelphia
Shanu Kohli Kurd, MHS
Jefferson Medical College
Philadelphia, Pa
Andrea L. Neumann, MD
Department of Dermatology
Albert Einstein School of Medicine
New York, NY
Daniel B. Shin, BA
David J. Margolis, MD, PhD
Department of Dermatology
University of Pennsylvania
Andrea B. Troxel, ScD
Center for Clinical Epidemiology and Biostatistics
University of Pennsylvania

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RESEARCH LETTER

Prevalence of Overweight Among High School Football Linemen

To the Editor: Obesity among professional football players has been documented, with recommendations that it be fur-
ther investigated among amateur athletes.1 Adolescent over-
weight is related to unfavorable cardiovascular disease risk
factors and predicts overweight in young adulthood.2 We
therefore examined the prevalence of overweight and obe-
sity in high school football linemen, the players who tend
to be heaviest.

Methods. Data were obtained on 3683 linemen from pub-
licly available varsity rosters,2 including 100% of the play-
ers from 251 (69%) of the 364 Iowa high school teams dur-
ing fall 2005. At least 2 teams from each of Iowa’s 47 districts
were included, making the sample likely to be representa-
tive of all players. Data for height, weight, and year in school
were taken as reported on the roster. Body mass index (BMI)
was calculated as weight in kilograms divided by height in
meters squared. Linemen were classified as at risk of over-
weight (BMI ≥ 85th and <95th percentile) or overweight
(BMI ≥ 95th percentile) based on age-specific percentiles us-
ing the 2000 US Centers for Disease Control and Preven-
tion growth charts.4 Prevalence was compared to 2003-
2004 National Health and Nutrition Examination Survey
(NHANES) data for boys aged 12 to 19 years (the group most
closely matching the players’ ages).3

 Frequencies were also calculated for the percentage of players who would be classified as adult class II (BMI
≥ 35) and class III (BMI ≥ 40) obesity. Age (14.5 to 18.5 years) was assumed from the mid-age at each grade level
(9 through 12); analyses using quarter-year ages did not
change the results. Iowa high school football is catego-
rized into classes based on school enrollment. These
classes in decreasing enrollment size are 4A, 3A, 2A, 1A,