

## Calcium Metabolism and Psoriatic Arthropathy

M. LOMUTO<sup>1</sup>, M. CAMMISA<sup>2</sup>, M. IANNANTUONO<sup>1</sup>, G. DITANO<sup>1</sup>, G. CIAVARELLA-PETRACCA<sup>2</sup> and M. PILERI<sup>3</sup>

<sup>1</sup>Department of Dermatology and <sup>2</sup>Service of Diagnoses by Images Nuclear Medicine, and <sup>3</sup>Analysis Laboratory, Casa Sollievo della Sofferenza Hosp. - IRCCS. 71013 San Giovanni Rotondo (Foggia), Italy

Calcium plays a fundamental role (1) in psoriasis through its influence on the rate of mitosis and cell differentiation. These effects are mediated by its role in arachidonic-acid metabolism (which leads to the production of leukotrienes, prostaglandins, etc.), the cAMP/cGMP ratio, the formation of desmosomes and factors effecting cellular cohesion (2). The involvement of calcium in psoriatic disease is also reflected in the differential distribution of this element within the lesional and non-lesional skin of psoriasis patients and healthy skin from non-psoriatic subjects (3).

Psoriatic arthropathy is a condition characterized by phenomena of erosion, reabsorption, destruction and regeneration of the bone tissue. These phenomena would lead us to expect to see changes in blood and urinary levels of Ca<sup>++</sup>, but this aspect of psoriasis has, thus far, received little attention.

### Purpose of the study

Our objective was to evaluate calcium metabolism in psoriasis patients as a possible index to the presence of arthropathic changes. A marker of this sort might eliminate the need for radio-scintigraphic studies, which are not without risk, but are currently the primary means of diagnosing psoriatic arthropathy.

### MATERIALS AND METHODS

Fifty-two subjects with various types of psoriasis (with the exception of pustular pustular forms) participated in this study (tab. I); anamnesis was positive for arthropathy in 4 cases. A panel of bone studies, which has been described in our previous publications (4, 5, 6), was performed in 42/52 subjects; the other 10 were excluded from these studies because they were under the age of 15 or because they might have unknowingly been in the early stages of pregnancy.

This panel included plain X-ray, microradiography, computerized tomography, and radionuclide scan).

Calcium metabolism was evaluated in each subject on the basis of serum and urinary calcium levels, serum levels of ionized calcium, albumin, phosphorus, alkaline phosphatase, creatinine, glucose, uric acid, total cholesterol, triglycerides, RCP and RA tests.

### RESULTS

The findings from the radio-scintigraphic studies (performed in 42/52 subjects) confirmed our previous observations of the almost constant presence of bone involvement in patients with psoriasis (4, 5, 6) (Table II). In most reports, the incidence of arthropathy in psoriasis patients has been estimated at around 20%, but these figures are generally based exclusively on the results of one type of bone study. Early arthropathic involvement can only be detected with a panel of sensitive and sophisticated imaging studies based on various techniques, such as the one used in this study.

In all of the subjects we examined, at least one of the imaging studies revealed signs of arthropathy ranging from minimal

changes, such as increased bone-cell turnover, geodes and/or marginal erosions of the interphalangeal joints, to those classical alterations associated with disabling forms of ankylosing arthropathy.

Laboratory studies (Table III) confirmed the frequency of lipid metabolism disorders in psoriasis patients that has been noted by a number of authors. Serum glucose levels were within normal limits in all 52 patients, and normal blood and urinary Ca<sup>++</sup> levels were found in 51 of the 52, including many with severe arthropathy, extensive cutaneous disease and/or associated metabolic disorders. A mildly elevated ionized calcium level was noted in one elderly patient with frank, long-standing arthropathy, but this elevation could have been due to his general condition rather than his arthropathy.

### DISCUSSION

The reliability of our findings of normal calcium metabolism in these psoriasis patients seems to be confirmed by the concordance among serum and urinary calcium levels, and the levels of ionized calcium (therefore free calcium) and albumin, which normally binds over half of all circulating calcium.

The fact that all of the patients we studied, regardless of the

Table I. Patients.

	n	Age range	Average age	Mean of duration of the disease
Females	15	24-68 y	49 y	11.7
Males	37	11-77 y	50 y	12.5 y
Total	52			

Table II. Instrumental investigation

Skeleton radiography:	specific lesions in 21 cases
Skeleton scintigraphy:	specific lesions in 25 cases

Table III. Laboratory investigations in 52 patients

Hypercholesteraemia	12
Hyperglyceridaemia	11
Hyperuricaemia	17
Hyperglycaemia	0
Albuminaemia	normal
Creatinaemia	normal
Alkaline phosphatase	normal
Phosphataemia	3> 1<
Calcaemia	normal
Calciuria	normal
Ionized calcium	1>

degree of cutaneous and bone involvement or the presence of metabolic disorders, presented serum and urinary  $\text{Ca}^{++}$  levels that were within normal limits, suggesting that there must be regulatory systems at the cutaneous and osseous levels that modulate release and sequestration of calcium ions.

Within the skeletal system, such regulation might be effected by bone-growth factors and bone-derived growth factors which have been found to play important roles in bone metabolism in human and animal studies (7, 8, 9).

Unfortunately, there have been no studies on the activities of these factors in humans that could confirm or disprove this hypothesis.

## CONCLUSIONS

Our findings indicate that blood and urinary levels of  $\text{Ca}^{++}$  offer little useful information on the degree of cutaneous or skeletal involvement in psoriasis patients. Further study will be necessary to identify the metabolic pathways at the bone and skin levels that regulate the intracellular/extracellular gradient of this ion, which is fundamental to the development of psoriasis.

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