Abnormal Amino Acid Composition of Nails in Bazex's Paraneoplastic Acrokeratosis

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Bazex's paraneoplastic acrokeratosis is a syndrome with psoriasiform acral hyperkeratosis and nail changes associated with carcinoma of the upper respiratory or alimentary tract. We report here a case where amino acid analysis of the hyperkeratotic and friable nails differed from normal and other diseased nails investigated by us, but they were similar to those reported in trichothiodystrophy or the BIDS syndrome. *Key words: Nails: Amino acids; Acrokeratosis; Cancer.* (Received March 27, 1983.)

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Paraneoplastic acrokeratosis was first described by Bazex et al. (4). Since then several patients with this syndrome have been reported in the French literature and recently reviewed by Cahuzac et al. (6) Four cases have appeared in the American literature (2, 16, 17). The disorder is mainly seen in middle-aged men (4). The characteristic features are acral psoriasiform hyperkeratotic plaques and diffuse hyperkeratosis of palms and soles, with thick and friable or atrophic nails. Sometimes the lesions appear on nose, scalp, elbows and knees. They are associated with carcinoma situated in the upper respiratory or alimentary tract. After removal of the tumour the skin manifestations can disappear, but reappear if the tumour recurs (3, 11). Severely atrophic nails do not grow again (5, 6).

We report here a case of Bazex syndrome with a pulmonary carcinoma where amino acid analysis of the thick and friable nails revealed marked abnormalities. Glycine, lysine and methionine were increased and cysteine, proline and threonine decreased when compared with other normal and abnormal nails.

CASE REPORT

The patient is a 51-year-old man who had been in good health, except for a duodenal ulcer which healed after treatment with cimetidine in October 1980. In January 1981 he felt pain in his left shoulder irradiating out into the left upper arm. He was a heavy smoker and was therefore advised by his doctor to reduce smoking. In March 1981 a slight ptosis and miosis was noticed suggesting a discrete Bernhard-Horner's syndrome. His weight was unchanged. Chest X-ray revealed an opaque tumour in the left apex with an erosion of the second rib and enlarged paratracheal lymph glands. Phlebography of the upper arms showed a compression of the left subclavian vein. Bronchoscopy showed no abnormalities. Transparietal biopsy of the apex allowed us to isolate immature carcinoma cells.

The patient was referred to the dermatology service because of changes in the nails. They were rather hard, yet friable. There was a subungual hyperkeratosis. Nails clippings were taken for analysis of amino acids. In April 1981 he developed hyperkeratotic psoriasiform lesions on the hands and feet (Fig. 1*a–d*). Histological examination showed a non-specific dermatitis. His hair appeared clinically normal.

The pain in his arm abated temporarily after X-ray irradiation but the tumour persisted. Etretinate (Tigason) 75 mg daily was given for 6 weeks. During that time his skin lesions got progressively

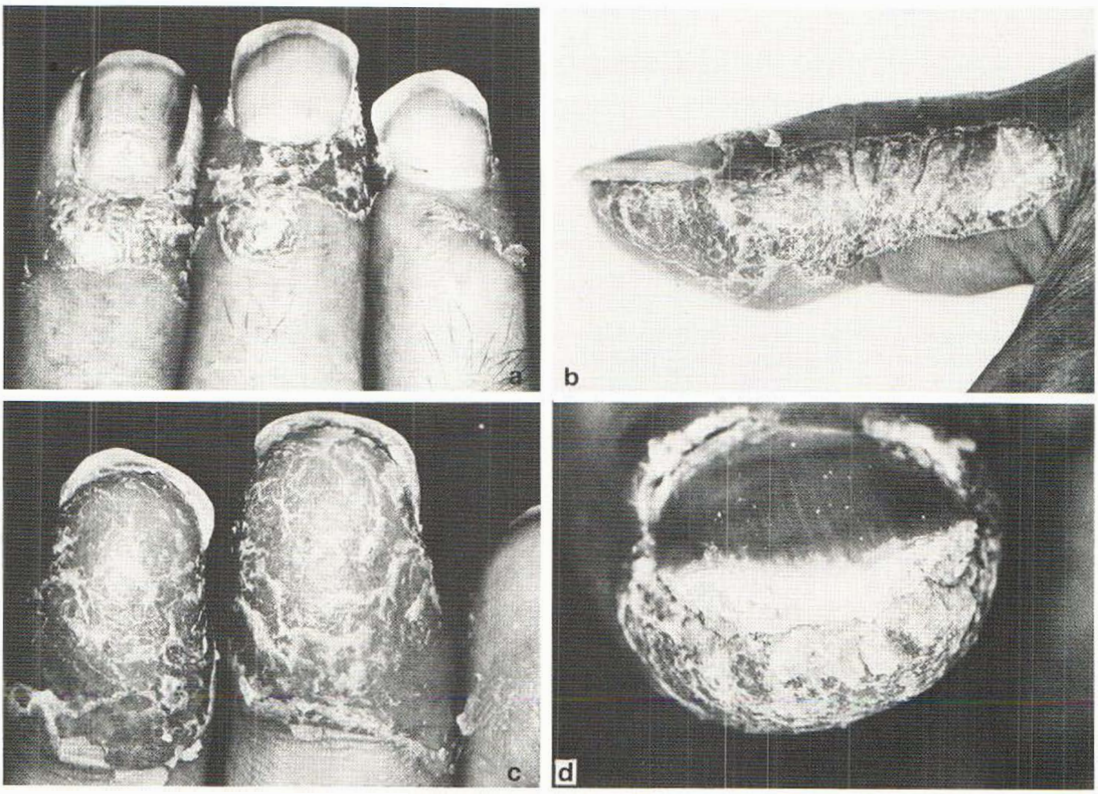

Fig. 1 a–d. Psoriasiform lesions on fingers and nails with subungual hyperkeratosis and paronychia.

worse. Thereafter in September 1981, bleomycin and platinum were given but his condition deteriorated and he died one month later.

Amino acid analysis. The nail clippings (150 mg) were hydrolysed with hydrochloric acid at 104°C for 22 hours and the amino acids were determined using a JEOL 5AH analyser.

Controls. As controls we used normal nails from a healthy subject and abnormal nails from 6 patients with psoriasis with pitting, onycholysis and hyperkeratosis, as well as brittle and dystrophic nails. In addition we examined a hypertrophic onychogryphotic toe nail caused by injury.

Statisical methods. To establish if any one value differed from the others, analysis was carried out according to the first difference method of Bonferroni (8).

RESULTS

The results of the amino acid analysis are shown in Table I. Our patient with Bazex's syndrome had an increased proportion residues of lysine, methionine, and glycine and a decrease in arginine, threonine, proline and cysteine. Both the patients with varying degrees of psoriatic nail changes and the patient with onychogryphosis after trauma had amino acids as in the normal nail.

DISCUSSION

Our values for amino acids of normal, psoriatic and onychogryphotic nails are the same as earlier reported for normal nails (1, 7, 12). Greaves et al. (10) used this type of nail analysis

to distinguish between psoriatic and rheumatoid arthritis. They found no difference in the mean values between the various patients and controls, or between dystrophic, normal-appearing psoriatic nails when comparing individual amino acids. A discriminant analysis, however, taking into account inter-relationship between acids, revealed certain statistical differences, but their clinical significance is doubtful.

The change in amino acid residues in the nails of our patient with Bazex's paraneoplastic acrodermatosis was striking. Unfortunately the patient had died when we received the results, so that determinations of amino acids in other keratinous tissues or blood could not be done. At the time when the nails clippings were taken he had not received any drugs for 6 months. We therefore believe that the amino acid changes were associated with his disease. The total amino acids were not changed in our patient and there were no obvious signs of malnutrition. An early and sensitive sign of malnutrition is an increased glycine-/valine ratio in the blood (9). Such an increased ratio was observed in our patient and it has been speculated that an imbalance of amino acids ought to contribute to anorexia in cancer patients (13). However, we have been unable to find any reliable data hereon, or information on amino acids in nails or hair from cancer patients.

A decrease in high sulphur proteins of the hair has been described in the autosomal recessive (BIDS) syndrome with brittle hair, intellectual impairment, decreased fertility and short stature (1, 13). The nails were hypoplastic and showed a decrease of half cysteine. Price et al. later reported 2 cases of the BIDS syndrome which they named trichothiodystrophy. The patients had hypoplastic spoon-shaped nails with distal splitting, lamellar ichthyosis, hyperkeratotic palms and soles, brittle and broken hairs, ocular dysplasia, physical retardation and decreased fertility (14). Amino acid analysis of blood and urine was normal whereas nails and hair showed the same pattern as our patients. It seems possible therefore that a similar change in metabolism could be present in both disorders.

Table I. *Percentage amino acid residues in nail clippings*

	Bazex syndr.	Psoriasis 6 patients	Normal	Onycho-gryphosis
Lys	4.9	2.8–3.7	3.6	3.2
His	1.4	0.8–1.5	1.0	0.9
NH_3	8.7	6.1–11.4	10.1	8.9
Arg	5.0	6.2–6.5	6.9	6.3
Ac cys	0.0	0.0–0.1	0.0	0.0
Met So	1.3	0.3–0.6	0.6	0.4
Asp	8.6	7.2–8.5	8.1	7.4
Thr	4.3	5.1–6.8	6.2	5.5
Ser	8.4	8.8–10.1	9.9	8.7
Glu	12.5	12.5–14.0	13.9	12.5
Pro	2.7	4.3–6.2	5.0	4.9
Gly	10.8	6.1–8.5	7.6	6.3
Ala	6.2	5.0–5.9	5.7	5.1
Cys	1.1	7.4–12.6	9.4	9.3
Val	4.4	4.9–5.6	5.4	5.0
Met	0.7	0–0.8	0.5	0.5
Ileu	3.8	3.0–3.5	3.3	3.2
Leu	8.0	7.1–8.2	8.1	7.5
Tyr	2.6	2.0–2.6	2.4	2.6
Phe	2.6	2.1–2.6	2.3	2.1

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