Acrocyanosis in anorexia nervosa

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Summary: Acrocyanosis, an uncommon disorder of the peripheral circulation, may occur in patients with anorexia nervosa. It is not known why this should be, nor whether acrocyanosis correlates with any other features of the disorder. The findings in an unselected series of 155 anorectics are reported. Acrocyanosis occurred in 32 and was more prevalent among the more severely ill. It was associated also with pallor of the face and trunk, slower pulse rates and higher fasting plasma glucose levels. Acrocyanosis could represent a more extreme form of a heat conserving mechanism not uncommon in anorectics. The possible relationship between peripheral vascular changes and plasma glucose levels requires further study.

Introduction

Acrocyanosis is a rare disorder of the peripheral circulation. It is characterized by cyanosis and coldness of the hands and feet. The cause is unknown, but the pathophysiological changes consist of constriction of the skin arterioles and venous dilatation. The onset is most commonly during adolescence and early adult life, and the ratio of female to male cases is in the order of 6:1. This sex difference may be partly explained by the prevalence of acrocyanosis in patients suffering from anorexia nervosa, a disorder which is seen predominantly in teenage girls and young women.

Why acrocyanosis should occur in anorexia nervosa is still uncertain, nor is it known whether the presence of this phenomenon correlates with any other features of this disorder. This study reports the findings in a large series of anorectics, a substantial proportion of whom had acrocyanosis.

Materials and methods

The subjects consisted of a consecutive series of 155 patients suffering from anorexia nervosa referred to a district general hospital between May 1966 and April 1986. All but four patients were female. They have been described in detail elsewhere. The diagnosis had been made on the basis of a weight loss of more than 10% of the calculated optimum for age, sex and height; avoidance of carbohydrate foods; amenorrhoea of at least 3 months duration in females not taking oral contraceptives; and the absence of any other psychiatric illness or organic cause of weight loss. Their ages when first seen ranged from 13 to 67 years, the great majority being less than 25 years old. The duration of weight loss ranged from only 3 months to more than 20 years, but most had been losing weight for less than 2 years.

All patients were referred to and seen by one of us (DM). The physical findings were recorded at the time in the case notes, and these included the presence or absence of acrocyanosis, emaciation and pallor. Thirty-two anorectics (21%) were found to have acrocyanosis and most of these complained of cold extremities. The correlations between the presence of acrocyanosis and other physical signs, laboratory data and radiological findings were assessed retrospectively by reference to the case notes. The statistical significance of any difference was determined using the t-test and, for non-parametric data, the Chi² test.

Results

The mean age of those with acrocyanosis (20.8 years) was comparable to that of the rest (21.1 years). Although they had been losing weight over a longer period this difference fell short of statistical significance. The mean weight of those with acrocyanosis, expressed as a percentage of the calculated optimum for age, sex and height as determined from standard tables or growth charts, was 66.7% compared to the mean weight of the other patients of 74.5% (P < 0.001). These differences and other clinical comparisons are set out in Tables I and II.

Emaciation was more common among the patients with acrocyanosis (P < 0.01), as was pallor of the face and trunk (P < 0.01). The mean
Table I  Clinical findings in both groups of patients on presentation

<table>
<thead>
<tr>
<th></th>
<th>With acrocyanosis</th>
<th>Without acrocyanosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. Mean s.d.</td>
<td>No. Mean s.d.</td>
<td>P</td>
</tr>
<tr>
<td>Age (years)</td>
<td>32 20.8 6.6</td>
<td>123 21.1 8.0</td>
</tr>
<tr>
<td>Duration of weight loss (months)</td>
<td>32 38.8 49.7</td>
<td>123 24.5 37.4</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>32 37.7 6.2</td>
<td>123 41.4 6.7</td>
</tr>
<tr>
<td>Weight (% optimum)</td>
<td>32 66.7 10.6</td>
<td>117 74.5 10.0</td>
</tr>
<tr>
<td>Systolic BP (mmHg)</td>
<td>32 105.2 13.3</td>
<td>120 104.2 12.8</td>
</tr>
<tr>
<td>Resting pulse rate (beats/min)</td>
<td>32 62.9 11.2</td>
<td>117 68.8 14.2</td>
</tr>
</tbody>
</table>

Table II  Physical findings in 32 anorectics with acrocyanosis and 123 without

<table>
<thead>
<tr>
<th></th>
<th>With acrocyanosis</th>
<th>Without acrocyanosis</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss of subcutaneous fat</td>
<td>32</td>
<td>123</td>
<td>NS</td>
</tr>
<tr>
<td>Lanugo hair</td>
<td>25</td>
<td>76</td>
<td>NS</td>
</tr>
<tr>
<td>Emaciation</td>
<td>19</td>
<td>36</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Pallor</td>
<td>15</td>
<td>25</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Orange-yellow palms</td>
<td>3</td>
<td>25</td>
<td>NS</td>
</tr>
<tr>
<td>Atrophic breasts</td>
<td>3</td>
<td>9</td>
<td>NS</td>
</tr>
<tr>
<td>Ankle oedema</td>
<td>3</td>
<td>3</td>
<td>NS</td>
</tr>
</tbody>
</table>

Pulse rate was lower in the acrocyanotic cases (P<0.05). There was no significant difference in the systolic blood pressure, measured in the supine position. Ankle oedema was a rare finding, being found in only 3 cases with acrocyanosis and 3 without.

As regards eating behaviour, the two groups did not differ significantly with respect to the presence of binging, self-induced vomiting, or purgative abuse. Nor was there any difference in the prevalence of observed or reported physical overactivity.

There were no significant differences with respect to the blood picture or tests for renal and hepatic function. Similarly, the mean serum cholesterol and carotene levels did not differ between the two groups of patients. By contrast, the mean fasting serum glucose level was significantly higher in patients with acrocyanosis (4.4 ± 1.1 vs 3.9 ± 0.9 mmol/l) (P < 0.05).

Chest radiographs of 35 female patients with a weight loss of at least 20% of their calculated optimum weight were compared with those of an equal group of age-matched normal females. Eleven of these patients had acrocyanosis. As reported elsewhere, the mean cardiothoracic ratio was significantly lower in the anorectics than in the control group, but the mean value in the 11 cases with acrocyanosis (35.5%) did not differ significantly from that in the other 24 patients (37.4%).

Computed tomography of the brain had been carried out in 23 patients. In 10 cases this had revealed widened sulci, ventricular dilatation or both these abnormalities. There was no correlation between these findings and the presence of acrocyanosis.

Discussion

The above findings confirm the clinical impression that acrocyanosis is not uncommon in patients with anorexia nervosa. It appears to be more prevalent among the more severely ill patients. Acrocyanosis also appears to be associated with facial and truncal pallor, a slower pulse rate and higher fasting plasma glucose levels.

There have been a number of recent investigations of cardiac size and efficiency in anorexia nervosa, but little attention has been paid to the peripheral circulation. Where this has been studied it has been largely in the context of body temperature regulation. Wakeling and Russell measured finger skin temperature as part of their investiga-
tion of thermoregulation in anorexia nervosa. Vasodilatation in response to the immersion of the contralateral arm in warm water was both delayed and abnormally slow. The explanations proposed by the authors included a protective mechanism against excessive heat loss, dehydration, emotional strain, or a primary disturbance in thermoregulation.

Gleeson and Moore\(^7\) carried out a variety of measurements following exposure to heat. These included mean skin temperature and finger blood flow. The vasodilatation response differed between their anorectics and their healthy women, being most impaired in the two most acutely ill patients. Mecklenberg and his colleagues\(^8\) investigated the effects of cold as well as heat and found that the body's core temperature was poorly maintained in their anorectics. Although this was not assessed directly, they concluded that failure of the peripheral vasomotor responses was in part responsible.

Luck and Wakeling\(^9\) reported that hand blood flow was reduced in anorexia nervosa, although the mean skin temperature and finger blood flow. The vasodilatation response differed between their anorectics and their healthy women, being most impaired in the two most acutely ill patients. Mecklenberg and his colleagues\(^8\) investigated the effects of cold as well as heat and found that the body's core temperature was poorly maintained in their anorectics. Although this was not assessed directly, they concluded that failure of the peripheral vasomotor responses was in part responsible.

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Acknowledgements

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References