DISCUSSION

This patient presented histologic changes of the skin, angioid streaks and cardiovascular involvement which are three major characteristics of pseudoxanthoma elasticum. The changes which took place here appear to be due to rupture of the elastic fibers, to their degeneration and to subsequent calcifications. In a detailed clinical and histopathologic study, Goodman et al. arrived at a conclusion that "an abnormality of the elastic fiber is not necessary for reproduction of certain features of PXE." Recent findings, however, by electron microscopy and by biochemical studies indicate that the basic lesion lies within the elastic tissue. The case reported here illustrates the disease in the aortic arch which is rich in elastic tissue. The cause is not known. It has been suggested that an enzymatic defect exists which may slowly affect the integrity of the elastic tissue. The fact that the disease demonstrates a recessive inheritance is in keeping with this thought. One of the most striking aspects of the case reported here is the fact that in spite of the almost complete occlusion of the aortic arch and the occlusion of the right innominate artery, normal blood pressure existed in the left brachial artery and even a higher pressure in the right brachial artery. The explanation of these findings, in the absence of visible collateral circulation, remains an enigma.

The pathology of the aortic arch could raise the question of a variant of Takayasu's disease. All the clinical, anatomic and histologic findings would not support such a diagnosis. In Takayasu's disease, no pulse can be obtained, the eye involvement is due to changes in the central vessels of the retina and not due to changes in Bruch's membrane; there are histologic evidences of granulomatous or other inflammatory reactions, while vascular stenosis is due to intimal thickening. None of these elements could be demonstrated in this case, while those of pseudoxanthoma elasticum were all present.

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REFERENCES


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Pulmonary Function in Convalescents of High Altitude Pulmonary Edema*


Pulmonary function in 14 high altitude pulmonary edema convalescents were statistically compared to those of 27 control subjects. The convalescents showed significant hypoxemia and widening of alveolar-arterial oxygen tension gradient. The resting DLCO was moderately increased. The results suggest persistence of pulmonary dysfunction for more than 9 to 12 weeks after apparent clinical recovery from high altitude pulmonary edema.

The occurrence of high altitude pulmonary edema constitutes a serious hazard to the people going to altitudes above 11,000 feet. A large number of cases with this distressing syndrome have been reported from this country. The hemodynamic and ventilatory changes occurring during acute high altitude pulmonary edema have been recently studied in the Cardiorespiratory Laboratory of this institute and are being reported else-

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where. After administration of the emergency treatment, all patients with high altitude pulmonary edema are evacuated to a base hospital at Delhi which is situated 650 feet above sea level. Most of the patients become asymptomatic within a few days after arrival to low altitude but it is not known whether any residual pulmonary functional changes persist in these cases. The present study was undertaken to investigate whether any abnormalities in pulmonary function persisted after complete clinical recovery from high altitude pulmonary edema.

SUBJECTS AND METHODS

Fourteen young soldiers who had classic symptoms and signs of pulmonary edema at an altitude of 12,000 feet and above were evacuated to the base hospital at Delhi and subjected to the present study 4 to 12 weeks (mean nine weeks) after complete clinical recovery. The symptoms and signs of pulmonary edema had lasted for three to four days and complete disappearance of radiologic pulmonary densities had taken place within four to five days. Their ages ranged from 21 to 34 years (mean 26.2, SD ± 3.6) and their mean body surface area was 1.62 sq m (SD ± 0.09). Twenty-seven healthy soldiers belonging to the same decade of life (age 18 to 33 years, mean 22.5, SD ± 3.4) and well matched for height, weight and body surface area (mean 1.63 sq m, SD ± 0.07) were also studied and used as the control group to compare the results.

All the subjects were studied under the resting basal state in the sitting posture. Vital capacity and its subdivisions, maximum voluntary ventilation and maximum mid-expiratory flow rate were recorded on a Collins spirometer of 13.5 liters capacity. Forced expired volume in first second (FEV₁) was recorded on a specially designed low resistance spirometer running at a speed of 30 mm/sec. The steady state pulmonary diffusing capacity for carbon monoxide (DLco) was determined by the method of Bates et al using a Rahn and Otis tidal sampling device for obtaining alveolar air. Finally, expired air while breathing room air was collected in a Douglas bag for a period of three minutes during which a sample of arterial blood was also obtained. The expired air was analyzed for its gaseous composition with Scholander’s gas analysis apparatus. The total volume of the expired air was measured in a Tissot spirometer. The arterial blood was analyzed for total plasma carbon dioxide content, oxygen content and oxygen capacity with Van Slyke's manometric apparatus. Its pH was measured with Beckman model 160 physiological gas analyzer at a temperature of 37 ± 0.1°C. The oxyhemoglobin saturation was calculated without applying any correction for the physically dissolved oxygen in the plasma and the oxygen tension at a particular pH was read off a standard oxyhemoglobin dissociation curve. The carbon dioxide tension of the arterial blood was indirectly estimated from total plasma carbon dioxide and pH using Siggard-Andersen’s blood acid-base alignment nomogram.

The results of various pulmonary function tests in pulmonary edema convalescents and normal control subjects were submitted to statistical analysis. The mean values, standard deviation, standard error and ‘p’ values were obtained with the help of a digital computer using standard formulae.

RESULTS

Ventilatory Function

The results of various ventilatory function in pulmonary edema convalescents and normal control subjects are given in Table 1. There was no significant difference in vital capacity and its subdivisions in the two groups of subjects. The FEV₁ was slightly reduced (P < 0.05) in pulmonary edema convalescents. Maximum voluntary ventilation and maximum midexpiratory flow rates were not statistically different in the two groups. The minute ventilation was significantly higher in patients who had had pulmonary edema (P < 0.001), though there was no significant difference in the respiratory rate. The alveolar ventilation was increased to a lesser extent (P < 0.05) so that the dead space ventilation also was increased. The oxygen consumption was almost the same in both groups of subjects but carbon dioxide production was increased in the pulmonary edema convalescents (P < 0.01) with a corresponding increase in the respiratory exchange ratio.

Blood Gases and Diffusion

There was no significant difference in total plasma carbon dioxide, pH and arterial carbon dioxide tension in the two groups of subjects. The oxyhemoglobin saturation and tension, however, were markedly reduced in pulmonary edema convalescents (P < 0.001). Since the mean alveolar oxygen tension was moderately increased in these patients due to hyperventilation (P < 0.01), the alveolar-arterial oxygen tension gradient was considerably widened.

The steady state diffusing capacity of the lung for carbon monoxide was significantly increased in

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Table 1—Comparison of Ventilatory Function in Pulmonary Edema Convalescents and Normal Controls.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Convalescents</th>
<th>Normals</th>
<th>Value of ‘p’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vital capacity (liters)</td>
<td>3.85±0.20</td>
<td>3.94±0.08</td>
<td>&gt;0.5</td>
</tr>
<tr>
<td>Inspiratory capacity</td>
<td>2.56±0.14</td>
<td>2.56±0.07</td>
<td>&gt;0.5</td>
</tr>
<tr>
<td>Expiratory reserve volume (liters)</td>
<td>1.30±0.10</td>
<td>1.36±0.06</td>
<td>&gt;0.5</td>
</tr>
<tr>
<td>FEV₁ (% of vital capacity)</td>
<td>81.8±1.73</td>
<td>86.0±1.14</td>
<td>&lt;0.05***</td>
</tr>
<tr>
<td>Max midexpiratory flow rate</td>
<td>3.89±0.94</td>
<td>3.83±0.16</td>
<td>&gt;0.5</td>
</tr>
<tr>
<td>Max voluntary ventilation</td>
<td>114.7±5.68</td>
<td>124.2±3.94</td>
<td>&gt;0.1</td>
</tr>
<tr>
<td>Respiratory rate (min⁻¹)</td>
<td>209±1.06</td>
<td>211±1.03</td>
<td>&gt;0.5</td>
</tr>
<tr>
<td>Minute ventilation (liters/min)</td>
<td>7.10±0.51</td>
<td>8.43±0.18</td>
<td>&lt;0.001***</td>
</tr>
<tr>
<td>Alveolar ventilation (liters/min)</td>
<td>5.00±0.36</td>
<td>4.06±0.19</td>
<td>&lt;0.05**</td>
</tr>
<tr>
<td>Dead space ventilation (liters/min)</td>
<td>3.71±0.41</td>
<td>3.82±0.14</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>Oxygen consumption (ml/min·mm·Hg)</td>
<td>151±6.27</td>
<td>140±6.43</td>
<td>&gt;0.1</td>
</tr>
<tr>
<td>Carbon dioxide production (ml/min·mm·Hg)</td>
<td>143±2.11</td>
<td>112±4.19</td>
<td>&lt;0.01***</td>
</tr>
<tr>
<td>Respiratory exchange ratio</td>
<td>0.91±0.04</td>
<td>0.78±0.02</td>
<td>&lt;0.01**</td>
</tr>
</tbody>
</table>

*Significant difference, **highly significant difference, ***very highly significant difference.
pulmonary edema convalescents as compared to the control subjects \( (P < 0.01) \). The results of blood gases and pulmonary diffusing capacity in the two groups are given in Table 2.

**DISCUSSION**

Clinical recovery after an episode of high altitude pulmonary edema is rapid and complete in most of the cases after prompt institution of supportive measures and removal of the patient to lower altitude. Certain functional disturbances, however, continue to persist for a considerably longer time. Hemodynamic studies in pulmonary edema convalescents have been reported earlier from this institute. The main hemodynamic alteration was found to be an increase in the pulmonary blood volume which was seen in two out of four patients thus studied. In the present study the pulmonary function was tested 4 to 12 weeks (mean nine weeks) after complete disappearance of all the signs and symptoms of pulmonary edema. Out of the various parameters studied, the most highly significant deviations from the normal control subjects \( (P < 0.001) \) were seen in minute ventilation, arterial oxygen tension and alveolar-arterial oxygen tension gradient. In our studies on patients having acute pulmonary edema at high altitude (to be published) profound hyperventilation and respiratory alkalosis were common observations. After complete clinical recovery from pulmonary edema, the minute ventilation continued to be significantly higher than normal. There was a moderate increase in alveolar as well as dead space ventilation. Since there was no difference in respiratory rate in two groups of subjects, the increase in dead space ventilation would indicate an increase in physiologic dead space. This can be assumed to reflect upon the ventilation/perfusion disturbances occurring in pulmonary edema convalescents.

The DL\(_{CO}\) as measured by the steady rate tech-
HIGH ALTITUDE PULMONARY EDEMA


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BEYOND ART AS IMITATION

In 1905 there occurred in Paris at once a scandal and a historic step forward for modernism. At the Salon d'Automne of 1905 a room was assigned to a youthful group of nonconformist painters, a set of unknowns which included Henri Matisse, Georges Rouault, Georges Braque, Andre Derain and Raoul Dufy. The room became known as the cage aux fauves—the cage of the wild ones—and the artists as Fauves. The latter established cubism as an art. The cubist went on from mere cubing of physical forms to the almost total disintegration of the object and the freest manipulation, bending or total displacement of planes. By their arrangement of planes—the planes of natural objects disassembled and rearranged in more effective compositions—they increased knowledge of the ways in which the several painters' means serve to create movement within the canvas. They gave hints of the internal rhythmic orchestration. Many of the compositions of Braque and of Picasso within the strictest cubist technique give back a refreshing if tenuous pleasure.


INDIVIDUAL DIGNITY THROUGH REASON

Baruch Spinoza (1631–1677) has not much use for humility; it is either the hypocrisy of a schemer or the timidity of a slave; it implies the absence of power—whereas to Spinoza all virtues are forms of ability and power. Whereas Spinoza dislikes humility he admires modesty, and objects to a pride that is not "tenoned and mortised" in deeds. Spinoza knows that as passion without reason is blind, reason without passion is dead. Instead of uselessly opposing reason to passion—a contest in which the more deeply rooted and ancestral element usually wins—he opposes reasonless passions to passions coordinated by reason. Thought should not lack the heat of desire, nor desire the light of thought. Spinoza's text: "A passion ceases to be a passion as soon as we form a clear and distinct idea of it, and the mind is subject to passions in proportion of the number of adequate ideas which it has. All appetites are passions only so far as they arise from inadequate ideas; they are virtues when generated by adequate ideas."


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