Psoriasis and 2,3-Biphosphoglycerate Blood Level

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Recently, we found an increased blood level of 2,3-biphosphoglycerate (2,3-BPG) which plays an important role in the tissue oxygenation in leg ulcer patients [1]. Erythrocytes contain high amounts of this substance which controls tissue oxygenation. The sufficient oxygen affinity to tissues is dependent on a balanced 2,3-BPG blood level. On the other hand, an increase in 2,3-BPG blood level is observed after the oxygen pressure decreases. At present, little is known about 2,3-BPG in psoriatics. Blood level changes of this substance could explain the abnormal tissue oxygenation found by other investigators [2].

To analyze the 2,3-BPG blood level, a Calbiochem set was used under standard conditions [3] on heparinized blood samples collected from 29 patients (14 men, mean age 35.1 years, range 19-32; 15 women, mean age 42.3 years, range 18-51) suffering from generalized chronic plaque psoriasis and compared with blood samples from 30 healthy subjects (14 men and 16 women, mean age 40.7 years). Psoriasis patients were treated with topical application of corticosteroid creams, salicylic acid, tar and dithranol preparations, 1 male and 2 female patients additionally with methotrexate. Statistical analysis was carried out by usual methods; significance of differences was estimated by Student's t test.

The mean hematocrit value was 0.37 ± 0.02 both in healthy subjects and psoriasis patients. The 2,3-BPG blood level was normal in healthy controls ($5.16 \pm 0.0301 \mu\text{mol/ml}$) and depressed in psoriatics ($2.327 \pm 0.117 \mu\text{mol/ml}$ in male and $2.506 \pm 0.190 \mu\text{mol/ml}$ in female patients). The difference between normal healthy controls and psoriatic patients is statistically significant ($p < 0.01$).

2,3-BPG is an important substance for the control of tissue oxygenation. The normal tissue affinity to oxygen depends on the balanced 2,3-BPG blood level [4]. We suggested in our previous study [1] that higher 2,3-BPG blood levels in patients with leg ulcers could correspond to lower oxygenation. However, the explanation of the 2,3-BPG blood level reduction in psoriasis may be linked to previous therapy such as topically applied salicylic acid or systemic cytostatic therapy, which may possibly influence the viability of erythrocytes. The explanation could be supported by findings [4] that a 2,3-BPG blood level reduction may indicate reduced erythrocyte viability.

References

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