Diffuse and focal hyperaemia of the outer eye in patients with chronic renal failure

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Abstract

In 8 of 57 patients with chronic renal failure that all had deposition of calcium salts in the limboconjunctival area, a focal hyperaemia of the conjunctiva was observed. This focal hyperaemia developed gradually around one or more greyish, slightly elevated, areas situated in the bulbar conjunctiva in the interpalpebral fissure. Clinically these lesions are very much alike inflamed pingueculae.

Three patients showed a diffuse inflammatory reaction of the eye that was characterized by a waxy red episcleral and conjunctival hyperaemia extending beyond the palpebral fissure. The average value of the serum calcium concentration in these patients was particularly high and statistically significantly higher than in patients with calcification but without inflammatory signs and also higher than in patients that showed focal hyperaemia.

In addition to the focal hyperaemia and the diffuse hyperaemia, we observed another diffuse hyperaemia located principally in the conjunctival tissue. This conjunctival redness often followed the focal hyperaemia associated with pingueculae or preceded the more acute fiery red episcleral hyperaemia, but it could also be present in isolation.

Introduction

Inflammatory reactions of the conjunctiva are usually diffuse but a focal hyperaemia can also be present. The differentiation between diffuse and focal hyperaemia is important for the assessment of the underlying pathophysiological mechanism.

In 1966 Abrams [1] described focal hyperaemia in a patient on chronic intermittent haemodialysis with limboconjunctival calcifications. This reflex-irritation was the result of small erosions of the limbal epithelium after desquamation of some of the calcific deposits.

A year later Berlyne and Shaw [2] reported on 15 patients with hyperaemia and severe renal failure. The illustration of a typical case showed a bilateral temporal conjunctival hyperaemia surrounding a small elevated lesion in the interpalpebral area.

Ehlers et al. [3] and de Graaf et al. [4] observed conjunctival hyperaemia in patients with severe renal failure that, according to their description, seemed to be associated with pingueculae. It was thus demonstrated that a metabolic disorder, such as chronic renal failure with its systemic metabolic consequences, can cause focal conjunctival hyperaemia.
Table 1. Median and range of the age (in years) and weight (in kilogrammes) distribution and the distribution of the duration of dialysis (in hours) in male (n = 36) and female (n = 21) patients with chronic renal failure.

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
<th>Significance</th>
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<tbody>
<tr>
<td></td>
<td>Median (range)</td>
<td>Median (range)</td>
<td></td>
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<tr>
<td>Age</td>
<td>49.5 (26-55)</td>
<td>53 (33-71)</td>
<td>NS</td>
</tr>
<tr>
<td>Weight</td>
<td>69.9 (46.8-105.4)</td>
<td>67.6 (32.5-125)</td>
<td>NS</td>
</tr>
<tr>
<td>Hrs of dialysis</td>
<td>4368 (216-14196)</td>
<td>2730 (273-8736)</td>
<td>p &lt; 0.05</td>
</tr>
</tbody>
</table>

Mann-Whitney U test.

In addition to the focal hyperaemia, we observed two types of diffuse hyperaemia in our patients with chronic renal failure on dialysis, that could be located either in the episcleral tissue or in the conjunctival tissue.

Metabolic disturbances in patients with renal failure can thus give rise to a variety of inflammatory reactions characterized by diffuse or focal hyperaemia. We studied these inflammatory reactions of the outer eye in a group of patients on chronic intermittent dialysis.

Patients and methods

During a six year period a total of 57 patients, 36 males and 21 females with terminal kidney insufficiency and on chronic intermittent dialysis, were followed for the occurrence of inflammatory complications of the anterior surface of the eye. The age and weight distribution of the male and female patients are shown in Table 1 as well as the distribution of the duration of dialysis in hours.

In all patients a complete routine ophthalmological examination was carried out and repeated at intervals. The limboconjunctival depositions of lime-salts, identified as hydroxyapatite [5], were graded according to the criteria of Porter and Crombie [6]: i.e. the establishment of the degree of calcification in patients by comparing it to drawings depicting 6 stages, of which 5 stages of calcification intensity.

The evaluation for the presence and location of pingueculae was performed in all 57 patients. The diagnosis was made only in the period in which the patients were in a quiescent stage with regard to any inflammatory condition of the outer eye. One hundred and fifty healthy persons with the same male to female ratio as the patients, 25 of each of the same age categories as the patients, were also checked for the presence of pingueculae.

Levels of serum calcium and phosphorus were measured at regular intervals in each patient and at the beginning of the development of inflammatory reactions of the outer surface of the eye. Fifty healthy persons, matched in sex and comparable in age and weight, were used as controls. The statistical test used was analysis of variance and the Mann-Whitney U test.

Results

Focal hyperaemia

In 14% of the patients a focal hyperaemia of the conjunctival vessels, and occasionally with mild congestion of the episcleral vessels, was observed (Fig. 1). The focal hyperaemia was characterized by exacerbations and remissions. Bacterial cultures were negative. Following this focal hyperaemia, that clinically was indistinguishable from inflamed pingueculae, sometimes a more diffuse pinkish hyperaemia developed, extending beyond the area of the pingueculae, that assumed a diffuse superficial character.

The focal hyperaemia developed gradually around one or more yellowish grey areas, that were sometimes elevated and occasionally triangular in form, situated in the bulbar conjunctiva in the interpalpebral fissure, usually on either side of the cornea. These greyish lesions were often studded with yellowish white areas that were occasionally confluent and more conspicuous at the periphery. In all patients both eyes were affected on the nasal