Mycotic Keratoconjunctivitis due to Aspergillus Niger

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Introduction

Since Leber's report in 1879 describing a case of Mycotic Keratitis due to Aspergillus, several summarizing reviews have appeared, concerning Mycotic Keratitis (Fazakas 1959; Zimmerman, 1962; Sui and Havener, 1963; Naumann et al., 1967).

The intensive use of antibacterial antibiotics and steroid drugs, which are not antifungal and reduce tissue resistance attribute to the importance of Mycotic Keratitis as a secondary infection of the injured eye (Fazakas 1959). Many of the fungi causing Keratitis or other ocular disease are saprophytes (Emmons et al., 1970; Conant, et al., 1971). Among the saprophytic opportunistic fungi, which are known as etiologic agents of ocular diseases, are the Aspergilli (Emmons, 1962; Mangiaracine and Liebman, 1957; Bailey and Fulmer, 1961). These fungi have a broad spectrum of pathogenicity in man when the predisposing factors to infection exist (Seabury, and Samuels, 1963).

Most of described cases of eye infections, in which Aspergilli were involved, were attributed to Aspergillus fumigatus, Aspergillus flavus (Seabury and Samuel, 1963; Mangiaracine and Liebman, 1957; Bailey and Fulmer, 1961), or unidentified Aspergillus sp. (Fazakas, 1959). Only very few reports exist considering Aspergillus niger as an etiologic agent of orbital disturbances (Fazakas, 1959, Donahue, 1949; Rosenvold, 1942).

At least in two of the three cases concerning Aspergillus niger infections, the infection is not described as a Mycotic Keratitis, but as an infection of the lacrimal canaliculi (Donahue, 1949) or Dacryocystitis and Blepharitis (Rosenvold, 1942).

To the best of our knowledge, no case of Aspergillosis of the eye was reported in Israel. We want hereby to report a case of Mycotic Keratoconjunctivitis caused by Aspergillus niger.

Clinical Description

A 64 year old women, housewife, complaining of redness, irritation in both eyes, photophobia, tearing and nuclear vision during two and a half months. She had received non-specific topical treatment, with various antibiotics, such as neomycin, polymyxin, Vasocidin, Bamyxin, and during the last period Dexamycin 0.1 % (containing dexamethasone). Since her condition did not improve, she came to the hospital for consultation. The hospital examination disclosed redness of eyelids, hyperemia of the conjunctiva with subconjunctival microhemorrhages. Superficial parenchymatous, filamentous Keratitis was found. (Fig. 1) Superficial fluorescein staining of the cornea was observed. The other parts of the eye were normal.
Because of the unusual findings of the cornea, virological, bacteriological and mycological tests were performed. The virological tests were negative. From bacteriological cultures, gram-positive cocci were isolated, which were sensitive only to gentamicin. Mycological cultures were negative.

The patient received specific topical treatment with gentamicin drops for approximately one month, without any improvement, nor were there any changes in the clinical picture. For this reason, repeated bacteriological cultures were performed, from which Streptococcus viridans was isolated. In addition, funguslike colonies appeared on blood agar plates. These colonies were further investigated by mycological techniques, as described in the next chapter.

Mycological Laboratory Diagnosis

The suspected colonies from the blood agar plate were transferred to special “fungal media” for morphological differentiation and identification of the fungus. This scheme of diagnosis is in accordance with the methods described in “laboratory diagnosis in fungal Keratitis” by Wilson and Sexton (Wilson and Sexton, 1968).

The following media were used for identification:
1. Sabouraud’s-Dextrose-Agar (Difco)
2. Sabouraud’s Dextrose-Agar supplemented with — 500 mg/L chloramphenicol.
3. Sabouraud’s Dextrose-Agar supplemented with 500 mg/L of chloramphenicol and 50 mg/L of Actidione (cycloheximide).
4. Potato-Dextrose-Agar (Difco).
5. Yeast Extract Agar (0.5 % Yeast-Extract, 3 % Glucose, 2 % Agar).

The above mentioned media enable the growth of most of the fungi that can be involved in ocular diseases, such as yeasts, dimorphic fungi and molds (Wilson, and Sexton mykosen 17, Heft 7 (1974))
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Fig. 2: White filamentous growth after 2 days at 28°C

Fig. 3: Dark colonies after 5 days at 28°C
All media were incubated at 37°C and 28°C to suit the optimal temperature for different fungal species concerned.

After incubation of 3 days at 37°C and 5 days at 28°C, visible macroscopic growth was observed. For microscopic examination — samples of the cultures were stained with Lactophenol Cotton-Blue Stain (20 g phenol crystals; 20 ml lactic acid; 40 ml glycerol, 0.05 g Cotton-Blue, 20 ml H2O).

All media, except the Sabouraud’s dextrose agar with supplement of chloramphenicol and Actidione, supported good growth. This medium inhibits the growth of the so called “saprophytic” molds.

The cultures appeared first in form of a white filamentous growth (fig. 2), which turned to dark black after 3 to 5 days (fig. 3, 4).

Fig. 4: Dark filamentous growth at 37°C on Sabouraud’s dextrose agar, Potato dextrose agar, Yeast extract agar

Examination of the stained microscopic preparations showed branched septated hyphae. A second specific feature observed were black conidiophores (fig. 5) bearing on their top vesicles with rows of conidia (fig. 6). This typical form of the conidiophores, bearing conidia, is a diagnostic feature of the genus Aspergillus.
Fig. 5: Culture mount of Aspergillus niger grown on Sabouraud's dextrose agar showing a group of black conidiophores (× 100)

Fig. 6: Conidiophore with rows of conidia (× 400)
Aspergilli have a broad temperature spectrum in which they can grow, being partially thermophilic (Emmons et al., 1970), the enhanced growth at 37°C of our cultures, is an additional confirmation for genus identification. The black conidia produced by our cultures enabled us the diagnosis of this fungus as Aspergillus niger.

The Treatment

In accordance with the laboratory diagnosis, the patient was given drops of amphotericin B (Fungizone 0.5%) four times a day. The patient was examined twice a week, and a gradual improvement was observed. After three weeks, the patient felt better, clinical examinations showed normal appearance of the conjunctiva. The cornea was clear, the filamentous picture of the parenchyma disappeared, and there was no fluorescein staining of the cornea. It is therefore concluded that the Keratitis disappeared as a result of specific antimycotic treatment. These conclusions are further confirmed by the findings of the repeated mycological cultures, which were sterile.

Summary

A case of Mycotic Keratoconjunctivitis caused by Aspergillus niger is reported. It is possible that the long term antibiotic and steroid therapy was the predisposing factor for the development of the fungal infection.

The presumptive clinical diagnosis was confirmed by laboratory diagnosis based on cultural isolation and species identification. The confirmation is further strengthened by the fact that antimycotic treatment by amphotericin B (Fungizone 0.5%) brought about the disappearance of the Keratoconjunctivitis.

Repeated laboratory analyses for fungal growth after specific treatment were found negative.

References


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