

# TREATMENT OF OTOMYCOSIS DUE TO *ASPERGILLUS NIGER* WITH TOLNAFTATE

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Otomycosis, chronic or recurrent in nature, has been observed most frequently in tropical or subtropical countries (Senturia 1957), but it would seem that its incidence is increasing (Scott Brown); this, perhaps, also as a result of widespread use of topical antibiotic preparations, in the treatment of otitis externa. The fungi most frequently found in otomycosis are *Aspergillus niger* and *Candida albicans*; fungi thrive in moist conditions and in the presence of epithelial debris.

A large majority of fungal infections arose during the topical use of broad spectrum antibiotics, the probability of fungal implication in an infection appearing to be proportional to the duration of the antibiotic treatment (Smyth).

The exudate occurring in bacterial ear infections seems likely to provide a degree of humidity favourable to fungal proliferation and it is clear that bacteria and fungi can coexist in the same clinical condition. Antibiotic therapy then might suppress the bacteria primarily responsible, leaving the fungi free to grow. It is suggested that the normal secretion of the meatus may have an inhibiting effect on fungal proliferation. Senturia (1957) quotes several authorities who state that most of the saturated and unsaturated fatty acids have some inhibitory effect on the majority of fungi.

*Aspergillus niger* is perhaps (M. P. English) the most common cause of otomycosis of the intact ear. Fungi are widespread outside the human body, being primarily saprophytic and of world wide distribution. They occur in the soil and on all sorts of decaying vegetable matter, and in the air of residential districts. It is therefore not difficult to think of possible sources of aural infection.

The development of fungal external otitis (Gavin, Hildrick, Smith and Sokranj) is associated with local itching which coincides with the proliferation of the organism in the external auditory canal and is followed by the progression of the condition to produce varying degrees of pain and a clinical picture of mild to severe local inflammation associated with a serous discharge. Untreated advanced lesions are sometimes accompanied by the overgrowth of the fungi which give the appearance of a cotton-like mass of material, similar to damp or macerated blotting paper, lodged in the external auditory canal. Smyth (1961) claimed that *Aspergillus niger* infections appear to be regularly accompanied by pain and are difficult to eradicate completely.

Patients complain of itching and fullness in the ear (Senturia 1957) and slight difficulty in hearing. In more severe cases the patient complains of intense pain in the ear when chewing, and of deafness and tinnitus. In *Aspergillus niger* infections the skin of the osseous meatus and tympanic membrane is covered with a velvety grey, blotting paper like membrane, marked with black spots and giving the appearance of having been sprinkled with fine coal dust. The membrane which may be washed out of the ear canal has a whitish or dirty grey colour. After the removal of such membranes the skin of the osseous canal and the tympanic membrane appears very red and swollen and in part devoid of its epidermal layer.

From the diagnostic point of view (Gregson and La Touche 1961) there are three features which should arouse the suspicion of mycotic infection:

1. Relapse after, or resistance to, standard treatment.

2. The symptom of irritation.
3. A history of local antibiotic therapy.

### Treatment

The first rule in the case of fungus infection of the ear canal is to remove thoroughly all the accumulated debris in the ear canal or post operative mastoid cavity. This is accomplished by the removal of the larger central masses with a dull curette. In very sensitive patients the ear canal or mastoid cavity is syringed with sterile water at body temperature and the debris removed.

If the treatment is limited to simple cleansing and to the removal of detritus from the canal without the use of fungicides and where necessary bactericides, the canal or cavity may be completely refilled with the same sort of debris within a few days.

Several preparations are used in the treatment of otomycosis because of their fungicidal action.

The ear canal may be wiped with a solution of 2% thymol in 70% alcohol. This may cause exfoliation or maceration of the skin, otorrhea occurs and treatment has to be discontinued. Full strength metacresyl acetate may be used, but the patient may be hypersensitive to this drug. 2% gentian violet in 70% alcohol is also used, but there is the objection to the use of dyes in and around the ear. 2% salicylic acid in absolute alcohol is also effective but in several cases it causes severe pain and irritation of the skin of the meatus. The most widely used preparation is Nystatin, which is employed as a powder or as a cream. This is fungistatic and not fungicidal (M. P. English), and deteriorates in warm moist conditions. Some patients develop furunculosis while under treatment with this preparation (La Touche and Gregson 1961).

Thirty patients suffering from Otomycosis due to *Aspergillus niger* were treated with Tinaderm, with very good results. Tinaderm is in extensive use for the treatment of fungal skin infections in other parts of the body, but as far as is known

this is the first record of its use in otomycosis.

The diagnosis of otomycosis was made clinically but confirmation of infection by *Aspergillus niger*, was obtained by mycological studies in ten cases. Of the thirty cases, two affected post operative mastoid cavities and in six cases, a central perforation was present.

No pain or other symptoms were complained of, when Tinaderm was used, except in the case of the two mastoid cavities and when a central perforation was present. In these cases the patient complained of slight stinging.

Debris was removed by a dull curette and in nervous patients by syringing with sterile water at body temperature. The meatus was then mopped dry, with cotton wool tipped probes and then filled with Tinaderm Solution. The external auditory canal or cavity was then packed slightly with  $\frac{1}{2}$  inch selve edged ribbon gauze.

The patient was instructed to keep the gauze moist by instilling on it, six drops three times daily for three days. At the end of this period, the ribbon gauze was removed and the drops instilled directly into the meatus, six drops three times daily for a further period of three days. The patient continued with the drops, six drops twice daily, for another six days.

The itching and irritation in the ear disappeared within the first 48 hours of the commencement of treatment. All thirty cases cleared up with this treatment, and when seen after a month no recurrence was found in any.

In 1960, Japanese investigators synthesised a new group of antifungal agents with local action. These substances were designated generically as Naphthiomates. "Tinaderm", Tolnaftate 1% solution in Polyethylene Glycol 400 is one of these substances. Chemically it is O—2 Naphtyl m N—Dimethyl-Thiocarbanilate.

In vitro studies of antibacterial and antifungal activities, show Tinaderm to be a potent antifungal agent, against, among other fungi, *Aspergillus niger*. It is entirely inert against gram-positive and gram-negative bacteria. Tinaderm is apparently of no value in the treatment of cutaneous

lesions due to *Candida albicans*. Tinaderm was found to be ineffective by systemic administration. It has no local or systemic side effects. Tolnaftates are soluble in organic solvents but are virtually insoluble in water. These preparations are odourless, colourless and greaseless. It also does not stain or discolour the skin, hair or clothing. The toxicity to man on topical application or on oral administration is virtually negligible. There is no primary irritation or acquired contact sensitivity. It can be used with impunity on severely irritated skin. All patch tests for sensitivity have been negative.

Several preparations used in the treatment of fungus skin infection act by virtue of the keratolytic effect produced by them. Tinaderm has proved itself to be an excellent fungicide acting as a chemical and not by peeling or exfoliation.

Luedemann has tried to demonstrate the antifungal activity of Tolnaftate. He found that the drug distorted the hyphae and stunted the mycelial growth of germinating spores of susceptible fungi.

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