ALPHA-CHYMOTRYPSIN* IN OTOLOGY

By A. COYAS (Athens, Greece)

ALPHA-CHYMOTRYPSIN, an enzyme of the human organism, has lately occupied a prominent position in therapeutics, owing to its excellent effect on inflammatory conditions.

Alpha-Chymotrypsin action consists in hydrolysis of pathogenic polypeptides in acute conditions, and dissolution of fibrous formation in chronic conditions.

Owing to its strong fibrolytic, mucolytic, antiswelling and anti-inflammatory effects, Alpha-Chymotrypsin gains special importance in otolaryngology, particularly in otology.

This enzyme has been widely and successfully used in ophthalmology, plastic surgery, rheumatology, orthopædics, etc., as indicated by relevant literature.

We have applied Alpha-Chymotrypsin in cases of chronic adhesive process in adults and catarrhal otitis media in children between the ages of 8 and 14, in two ways, either trans-tympanically by using a fine needle or uplifting of the tympanic membrane.

Both procedures were performed under local anæsthesia induced by a 5 : 1 novocaine-adrenaline solution, injected at four points in the external meatus, corresponding to the walls of the canal. Light general anæsthesia was applied in four children.

In the transtympanic procedure, Alpha-Chymotrypsin was injected through Schrapnel's membrane, the lower front and the lower back quadrant of the tympanic membrane.

In the procedure involving the uplifting of the tympanic membrane the skin of the external meatus was incised as for stapes mobilization, with the help of magnifying glasses.

In both procedures 5 mg. of Alpha-Chymotrypsin recently dissolved in 5 c.c. of normal saline was used. The use of a fresh solution is necessary because the enzyme is neutralized if left unused beyond 5–6 hours. Particular care is taken to avoid bringing the syringe and needle in contact with alcohol or any acid, to prevent neutralization of the enzyme.

Of the two procedures, the one involving the uplifting of the tympanic membrane is preferable in chronic adhesive processes as on the one hand it permits of taking a better view of the middle-ear cavity and estimating

* As produced by Labor. P.E.V.Y.A. under the name of Quimotrase.

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the size of the adhesions, and on the other hand of bringing the enzyme into contact with the lesion for at least 10 minutes as is required.

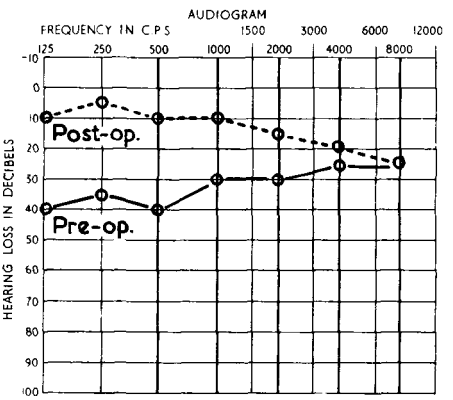
This was accomplished through repeated washings of the middle ear with Alpha-Chymotrypsin solution.

Our Cases

Group A. This group includes a total of six adult patients suffering from chronic adhesive process.

(1) Six-year history. About 1 c.c. of the Alpha-Chymotrypsin solution was injected transtympanically. Fifteen minutes later the patient could hear better and tinnitus was perceptibly reduced, with favourable comment from the patient himself.

The relevant audiogram is as follows (see audiogram No. 1).



AUDIOGRAM NO. 1.
(Air cond.)

This satisfactory result remained for about a month, after the end of which the patient's hearing started progressively and steadily deteriorating.

A further transtympanic injection was made and the result was once more satisfactory, but lasted only 25 days.

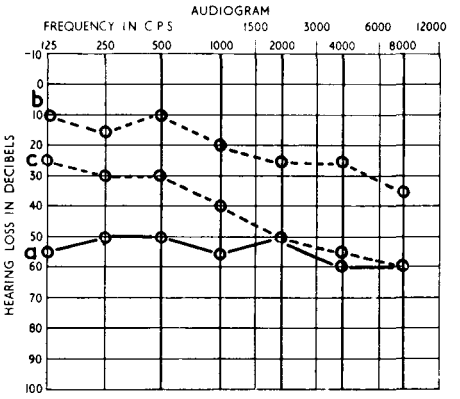
Subsequent injection had no effect whatsoever.

(2) Four-year history. Method of application and dose was as in the previous case. The satisfactory result obtained after the injection remained for three months, following which hearing was reduced, but never to the pre-operative level.

The relevant audiogram is No. 2.

(3) Three-year history. The middle-ear cavity was washed out with Alpha-Chymotrypsin solution following the uplifting of the tympanic membrane. Washings lasted from 10–15 minutes and the amount of the solution was 10 c.c. (10 mg. of Alpha-Chymotrypsin).

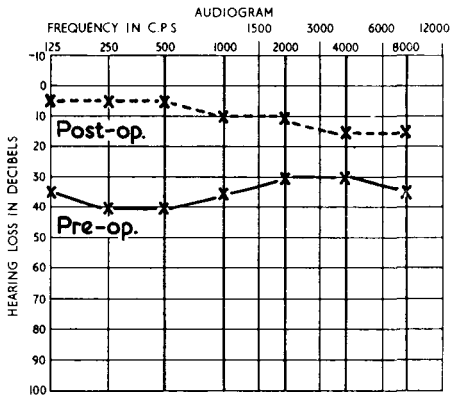
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AUDIOGRAM No. 2.
(Air cond.)
a. Pre-oper. b. Post-oper. c. 4 months after the operation.

An improvement in hearing was obvious after replacement of the tympanic membrane.

The relevant audiogram is No. 3.



AUDIOGRAM No. 3.
(Air cond.)

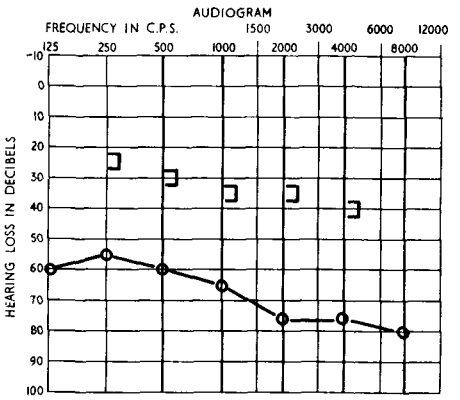
The results of this operation remained unaltered for 3 months. We were unable to follow-up any longer as we lost contact with the patient.

(4) Fifteen-year history. As in the previous case the middle ear was washed out with Alpha-Chymotrypsin solution. No improvement was observed, the relevant audiogram is No. 4.

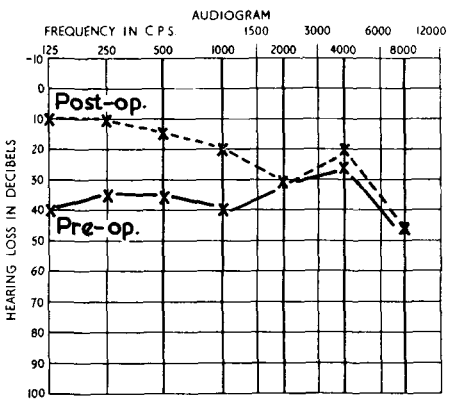
(5) Eight-year history. In this case Alpha-Chymotrypsin solution was applied first by uplifting the tympanic membrane. Fifteen days later, owing to the deterioration of the patient's hearing Alpha-Chymotrypsin solution was injected transtympanically.

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The resulting audiogram is No. 5.



AUDIOGRAM No. 4.



AUDIOGRAM No. 5.
(Air cond.)

Fifteen days after the transtympanic injection there was no improvement and the patient's hearing remained at pre-operative levels.

(6) Ten-year history. Alpha-Chymotrypsin solution was applied by uplifting the tympanic membrane and washing out the middle-ear cavity.

Since no improvement was observed, further applications were considered purposeless.

Group B. This group includes five children between 8 and 14 years old suffering from catarrhal otitis media.

Their main symptom, deafness, was ascertained audiometrically to be at the level of 25–30 db.

Case No. 3 complained of both deafness and a feeling of fullness. Neither earache nor other trouble was complained of (see the Table).

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TABLE

Case	Age	Onset of Deafness	Otoscopic Image	T's—A's	Previous Treatment
1	11	3 weeks (R.E.)	Reddish	4 years ago	Antibiotics for 10 days
2	8	2 weeks (R.E.)	Reddish	1 year ago	Antibiotics + nasal drops for 13 days
3	14	10 days (L.E.)	Bulging	—	—
4	9	4 days (L.E.)	Bluish	2 years ago	Myringotomy 9 days ago + antibiotics
5	8	1 week (R.E.)	Almost normal	—	Antibiotics + nasal drops for 5 days

In all cases Alpha-Chymotrypsin was applied as follows:

(1) Transtympanic injection of 0·7–1 c.c. of Alpha-Chymotrypsin solution with insulin syringe (0·005 gm. + 5 c.c. of solvent).

(2) Intramuscular injections of 0·002 gm. Alpha-Chymotrypsin in 5 c.c. solvent for five days. In every case we had immediate results and about 18 to 24 hours later both the tympanic membrane and hearing were back to normal.

The young patients were systematically followed-up for a period of 3 months and no recurrence was observed.

Conclusions

1. The use of Alpha-Chymotrypsin has no side-effects and is therefore safe.

2. In our cases of chronic adhesive process the satisfactory result was not permanent in spite of local applications.

3. In catarrhal otitis media the use of Alpha-Chymotrypsin locally and by intramuscular injections gave satisfactory results when antibiotics had had no effect.

4. Such treatment may lead to the avoidance of further complications of the middle ear.

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20 Kanari Street,
Athens,
Greece.

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