

OCULAR TETANUS FOLLOWING UPON AN INJURY TO THE CONJUNCTIVA

F. J. DAMATO

M.D., D.O. (OXON.), D.O.M.S. (LOND.),
F.R.C.S. (ENG.)

*Senior Ophthalmologist,
St. Luke's Hospital
Lecturer in Ophthalmology,
Royal University of Malta*

Tetanic infection as a result of an injury to the conjunctiva is rather uncommon. So far two cases have been reported. (Samelsohn, 1879; Czwk. Rasz, 1963). In reporting this case my object is to comment on some particular features.

Case Report

E.G., aged 16 years, the son of a farmer was admitted on the 7th November, 1964, to the Eye Department of St. Luke's Hospital for an injury to the right eye. He reported that he had been hit in the right eye by the frayed end of a common reed. Thorough examination revealed a haemorrhage under the bulbar conjunctiva, covering the lower temporal quadrant of the globe. Three days after admission some discharge came out of the right eye and examination showed that the conjunctiva of the lower fornix was inflamed. Penicillin drops were ordered to be instilled one hourly. On the 5th day the patient complained of double vision. Examination of the motility of the right eye showed marked impairment of the movements of the superior, inferior and medial Recti, along with a drooping of the upper lid. There was also evidence of paresis of the facial nerve on the right side. On November 14 the patient complained of difficulty in opening his mouth and of stiffness in the neck. He was drowsy and complained of nausea. Examination of the mouth showed the presence of trismus and cephalic tetanus was diagnosed. Further examination revealed the absence of the nasolabial fold and frontal wrinkles on the right side, along with a divergence of the right eye. The pupil was semidilated and

reacted sluggishly to light. The fundi were normal. The temperature was 99°F. Respiration 20 per m. and the blood pressure 160/70. The movements of the tongue were good, but there was a paresis of some pharyngeal muscles. The deep tendon reflexes were accentuated and the plantar reflexes were slightly extensor. The cardiovascular, respiratory and urinary systems showed no abnormalities. By the following morning the patient was completely unconscious. However, opisthotonus, abdominal and lumbar rigidity were conspicuous by their absence.

As the patient was unable to take solid food, a Ryle's tube was passed and feeding carried out frequently. An intravenous drip with glucose and saline 30 drops a minute was set up. 200,000 I.U. of Antitetanic serum were given intravenously and 1500 units drops instilled into the conjunctival sac. 1 million units Penicillin were injected intramuscularly twice a day along with Streptomycin 1 G a day. Paraldehyde 10 ml. and Largactil 50 mg were given fourhourly. On the following day 225,000 units A.T.S. were given intravenously and 100,000 units the day after.

For a fortnight the general condition of the patient was rather poor. He was unconscious, restless and delirious. The bacteriologist's report on the smear taken from the conjunctival fornix confirmed the presence of *Clostridium tetani*. On November 21st after desensitizing by small doses of A.T.S. 4500 units were injected intrathecally and 100,000 intravenously. In the following days there was a gradual improvement of the general condition. The patient regained consciousness, the trismus gradually disappeared and he became

capable of feeding himself. The oculomotor and facial paralysis took a longer time to disappear. These signs seem to disappear in the inverse fashion to their initial appearance.

An examination carried out on the 12th December, that is more than a month after the injury, showed that the facial paralysis was still present. The palpebral fissure of the right eye was narrower than that of the left one. There was a right divergent strabismus and a small degree of enophthalmos. There was also a marked narrowing of the palpebral fissure of the left eye on looking to the left side and widening out of the same fissure on looking to the right. The picture was very much reminiscent of Duane's syndrome. An orthoptic examination showed the following:

Cover test: Manifest right divergent strabismus.

Synoptophore angle — 20° R/L 2D.
Fusion angle — 15°. Adduction to 0°.
Stereoscopic vision present.

There was a complete loss of the right convergent movements. The incoordination of the ocular movements seemed the result of a midbrain nuclear lesion. During all this time the lower conjunctival fornix remained red and discharging a small amount of exudate.

On the 14th December a moderate amount of granulation tissue was noticed to emerge from the middle third of the lower fornix. Further examination showed the presence of a hard mass below the skin near the inferior orbital border, and a piece of reed 1.4 cm. long and .4 cm. broad was recovered through the granulation tissue. This was followed by a complete disappearance of all inflammatory signs.

Comment

The wound in the lower conjunctival fornix through which the infected foreign body entered the orbital cavity remained undetected until the last moment. It had been difficult all along to explain how such a trifling injury as a subconjunctival haemorrhage without any wound of the tissues could ever be followed by a Clostridium

infection. Once embedded within the orbital cavity tissues, the *Cl. tetani* was provided with excellent anaerobic conditions to develop its toxic powers. It follows that every injury to the eye, even such an apparently harmless one as a subconjunctival haemorrhage should be thoroughly examined for a closed laceration and A.T.S. administered, especially if the patient happens to come from agricultural surroundings.

Diagnosis may be difficult and rather late for several reasons. This is the sort of case which it is rare for the ophthalmologist to encounter more than once in a lifetime. The paradoxical combination of contraction with paralysis does not simplify the problem. Moreover in the case under discussion, ophthalmoplegia and facial paralysis, contrary to what happens in similar cases, preceded the appearance of trismus, a fact that may lead one to think of traumatic paralysis.

The pathogenesis of cephalic tetanus requires further research, and is still far from being completely explained. We know almost nothing of how the tetanus toxin interferes with the nervous system. The tetanic involvement of the cranial nerves is thought to have two origins: one through the facial and the oculomotor nerves and the other through the trigeminus. The toxin first causes a rapid and brief contraction of the muscles, followed by a secondary paralysis of the same muscles. The action depends on the virulence of the *Clostridium* and on the conditions of absorption peculiar to the region. Paralytic phenomena happen when there is absorption of large doses and convulsive phenomena when absorption is weak (Brunner 1894; Jayme Goyaz J. 1941).

In the face the action of the toxin lasts longer, because the anatomic planes are opposed to its rapid diffusion (Albert 1890). Moreover the facial nerve forms, in the face, a vast and superficial nerve plexus. The tetanic toxin has a tendency to localize itself in the vicinity of the inoculation. All these facts contribute to the massive absorption of the toxin and the appearance of the paralysis.

There is thus a local action of the

toxin on the 7th and 3rd nerves, contrary to what is found in the motor branch of the Trigemini, which is thought to be reached through the circulatory system, as in ordinary tetanus. All this will result in the simultaneous appearance of paralytic phenomena and muscular spasm.

Mental symptoms appeared soon after the establishment of trismus. The patient was completely unconscious and delirious for almost a fortnight. This is a rather rare occurrence. It used to be considered a bad prognostic sign. However the infection never extended to the trunk and limbs and there was a gradual and complete recovery. This may well be attributed to the massive use of Penicillin and Streptomycin, in addition to the antitetanic serum.

Summary

A case of ocular tetanus following upon a wound of the lower conjunctival fornix and the entrance of a foreign body in the orbital cavity is reported. Mental

symptoms were a prominent feature besides the usual paralytic and spasmodic signs. Complete recovery followed massive treatment by penicillin, streptomycin and antitetanic serum.

Throughout the acute phase of the illness this case was treated in the surgical wards by professor A. J. Craig; the isolation of the micro-organism was carried out by Drs. E. Agius and J. Mifsud of this hospital.

References

- SAMELSOHN (1879). Cb. pr. Aug., ii, 325. Quoted by DUKE ELDER S. Text-book of Ophthalmology (1954), 6, 6002.
- CZWK. RASZ (1963). Klin Mbl. Augenheilk, 143, 375.
- JAYME-GOYAZ, J. (1941). Amer. J. Ophthal., 24, 1281.
- DUKE ELDER, S. (1954). Text-book of Ophthalmology, 6002, 6008, 6087, 6104, 6105.
- WETZEL, J.O. (1942). Amer. J. Ophthal., 25, 933.
- BRUNNER (1894). Quoted by JAYME-GOYAZ. Amer. J. Ophthal., 24, 1287.
- ALBERT (1980). Thèse de Lyon.