Visual Disturbance Following Fifth Nerve Ganglion Injection

Report of Two Cases

Binoy Chakravorty, M.S. (Cal.), F.R.C.S. (Edin.), F.R.C.S. (Eng.), Ph.D. (Belfast)*

Department of Neurological Surgery, Royal Victoria Hospital, Queen’s University of Belfast, Belfast, Northern Ireland

Injection of the 5th nerve ganglion by Hartel’s approach has been accepted by many neurosurgeons for the relief of tic doloreux.

Although this method is an effective treatment it is not free from complications. Excluding the usual numm face and an anaesthetic cornea, most complications arise from the difficulty of placing the needle point precisely in the ganglion, or from its entering into the adjacent structures.

Harris, in a monograph written from his experience with over 3000 cases, noticed damage to neighbouring structures due to leakage of alcohol into the adjacent cranial nerves. This damage included:

(1) Facial palsy and auditory nerve deafness due to backward leakage of alcohol towards the internal auditory meatus. In some cases the vestibular portion may be involved as well, which may cause vertigo. Nystagmus may be observed during the procedure.

(2) Permanent deafness due to the point of the needle entering into the eustachian tube.

(3) Diplopia from the involvement of the 3rd or 4th or 6th nerves in the lateral wall of the cavernous sinus caused probably by oedema spreading into the wall of the sinus.

(4) Involvement of the motor root of the 5th nerve with weakness of the muscles of mastication.

In 2 of our 60 ganglion injections during the last 14 years (Table 1), the patients developed temporary blindness and ocular palsy. The purpose of this report is to describe and discuss the probable mechanism of this visual disturbance.

Case Reports

Case 1. The first patient was seen in 1959. She was an elderly woman suffering from multiple sclerosis associated with trigeminal neuralgia. During alcohol injection of the ganglion by Hartel’s approach she complained that she could not see anything. By that time not more than 0.2-0.3 cc. of alcohol had been injected. The needle was at once withdrawn. Blindness was complete: the ocular muscles were unaffected, and no other abnormality was found. She was carefully observed and within 20 minutes regained full vision.

Case 2. The second example was seen in 1964. The patient, a 34-year-old woman had had most of her teeth extracted. Three weeks later she developed a throbbing pain in the right upper jaw. The pain spread to the lower jaw and was a typical “tic” pain, brought on by chewing or talking, with the trigger point in the right upper gum.

An alcohol block of the right maxillary nerve was carried out. She was free from symptoms for about 10 days then the pain returned. A trigeminal ganglion injection was given on the right side. In this case we used a mixture phenol and myodil as the ganglion blocking agent.

Hartel’s approach was used and 1 cc. of 1 in 9 phenol in myodil was injected after a preliminary test with 2 per cent novocaine. Immediately following the injection she developed a fixed dilated right pupil and diplopia. There was no light reflex in the right pupil and complete 3rd, 4th, and 6th nerve palsy. Within 2 to 3 minutes she complained that she could not see anything and both pupils were now dilated although ocular movements were present in the right eye.

Total blindness lasted for about 10 minutes after which she regained her vision. On testing it was found that there was no vision in the right eye and ocular movements on the right side were still present.

Since the patient had been injected with myodil, we were able to study the course of the injection by x-ray. Thus it was seen that the needle had passed through the foramen ovale. The medium had been deposited intracranially and had passed forwards and backwards along the base of the skull (Figs. 1 and 2). Anteriorly it

| TABLE 1 |
| Results of 60 cases having ganglion injections |

<table>
<thead>
<tr>
<th>Result</th>
<th>Alcohol Injection (28 patients)</th>
<th>Phenol Injection (32 patients)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete relief</td>
<td>23</td>
<td>31</td>
</tr>
<tr>
<td>No relief</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Severe paraesthesia</td>
<td>2</td>
<td>–</td>
</tr>
<tr>
<td>Corneal ulcer</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Facial herpes</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Diplopia (long lasting)</td>
<td>1</td>
<td>–</td>
</tr>
<tr>
<td>Recurrence</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Meningitic symptoms</td>
<td>1</td>
<td>–</td>
</tr>
</tbody>
</table>

Received for publication July 23, 1964.

*Address: 50/3 Beniandian Street, Calcutta 25, India.
Visual Disturbance Following Trigeminal Injections

was seen to have flowed to the optic chiasma and posteriorly along the anterior surface of the pons.

Bilateral recovery of vision and eye movements were all complete within 2 hours. The pain was relieved and the patient was discharged.

Discussion

In cadaver injections with methylene blue Harris has shown that dye sometimes stains the cavernous sinus and the anterior surface of the pons. Jefferson (1963) in an elaborate injection study with dye and myodil in cadavers and clinical cases reported 3 common patterns of distribution of the agent. He observed that in some cases the injection may follow the posterior root fibres or adhere to them. In others it may enter ganglion substance or Meckel’s cave and from this site escape into the posterior cranial fossa. In some it may escape from Meckel’s cave in the subarachnoid space and pass out of the skull into the spinal canal. Jefferson did not observe anterior migration of the material towards the chiasma.

In the second case, the submento-vertical radiograph (Fig. 1) shows the deposition of the agent but it does not indicate the actual extent of its dispersion. The lateral picture (Fig. 2) convincingly shows the extent of the flow of the medium along the base of the skull, anteriorly to the chiasma and posteriorly along the clivus to the posterior cranial fossa.

Reports seem to agree regarding the possible escape of the dye into the posterior cranial fossa but observation of forward migration of the dye and involvement of the optic nerve or tract is rare. It is difficult to define the exact course of the dye, whether it passes in the extra-arachnoid plane (Jefferson, Group II) or subarachnoid plane (Jefferson, Group III). In this particular case, it is assumed that the dye had probably escaped into the subarachnoid space of the inter-peduncular cistern. Being hyperbaric compared to the cerebrospinal fluid, it had travelled backwards along the base of the skull into the pontine cistern and forwards into the cistern of the chiasma bathing the nerves on the anterior surface of the pons and the optic chiasma respectively. The 3rd, 4th, and 6th cranial nerves on the right side were involved probably because of the right-sided injection.

It is known that phenol particularly affects the nonmyelinated “c” group of fibres and the chance of a permanent effect on the medullated optic nerve fibres is remote. This may not be guaranteed with absolute alcohol. This formidable complication, although very rare, suggests that phenol may be preferable to absolute alcohol.

Summary

Two cases in which temporary blindness and