DIONINE IN OPHTHALMIC PRACTICE.

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IN the BRITISH MEDICAL JOURNAL of April 30th, 1904, I wrote a short note on dionine as an ocular analgesic, and called attention to the remarkable powers of this new agent introduced by Darier,¹ at that date practically unknown in ocular therapeutics in this country. Since then I have made extensive use of it both in hospital and private practice, and my increased experience has not only impressed me still further with its great value, but also has extended its applications in ophthalmic practice. I have therefore thought that a further communication would prove interesting to many, as only the most meagre information about the important uses of this new drug in eye work is to be found in English medical literature.

Dionine, or ethyl-morphine hydrochloride, although used for some time in general medicine as a sedative to replace codeine and morphine, was first used in ophthalmic practice by Darier as an ocular analgesic. It is a white, odourless, crystalline powder, freely soluble in water. As an analgesic I have used it chiefly in 5 per cent. aqueous solution or made up with vaseline as an ointment in similar strength. When there is great lachrymation I prefer to use it as an ointment, because the aqueous solution gets rapidly diluted with the tears and washed away, whilst the ointment introduced into the conjunctival sac adheres until it is gradually melted and absorbed. When this 5 per cent. solution or ointment is introduced into the conjunctival sac it does not change in any way the sensitiveness to touch of the cornea or conjunctiva, and hence is of no use for the removal of foreign bodies or for operations of any kind on the eye. But if the patient is suffering from pain the result of disease or inflammatory processes in the eye, such as is met with in iritis, irido-cyclitis, glaucoma, ulcer, or corneitis, the introduction of the dionine has a markedly soothing effect, and in many cases gives for several hours complete relief from the severe pain which often accompanies these affections. Dionine is therefore not an ocular anaesthetic, but is a powerful ocular analgesic.

The ocular analgesics which are most widely used at present are cocaine and holocaine, which are both anaesthetics and analgesics. At the meeting of the British Medical Association in 1898 at Edinburgh,² I made a communication on holocaine, in which I pointed out its great superiority to cocaine as an analgesic in relieving the deep-seated pain of ocular disease. Cocaine is least satisfactory for this purpose, and in such affections as iritis and glaucoma often actually increases the pain, probably by increasing the tension of the eye. I have recorded a case³ where an attack of acute glaucoma was brought on by the use of cocaine, and hence this drug can be used only with the greatest caution in diseases of the eye. The introduction of holocaine, free from all the dangers of cocaine and with a more powerful analgesic effect, was therefore a distinct advance in ocular therapeutics. Dionine neither dilates the pupil nor elevates the tension of the eye, and hence is free from the dangers of cocaine. It is superior as an analgesic even to holocaine, and therefore holds the first place as the agent for relieving the deep-seated pain in the eye which is met with in such diseases as irido-cyclitis, glaucoma, and corneitis. In the hospital I carried out a careful series of comparative experiments with three solutions—5 per cent. cocaine, 1 per cent. holocaine, and 5 per cent. dionine—in order to determine the degree and duration of the relief afforded to the patient from the pain attendant upon ocular diseases.

Both as regards the degree and the duration of the relief afforded, I found dionine the most powerful agent, next to it holocaine, and a long way inferior to both cocaine. The dionine drops or ointment may be used freely every two, four, six, or eight hours, according to the severity of the pain and the effect produced. It is an agent which can do no harm and hence its great value. There is, however, an occasional effect produced by dionine at its first use regarding which the patient must be carefully warned, otherwise it may alarm him very much and lead him prematurely to abandon the use of the drug. After the first instillation it may cause a feeling of burning and irritation followed by an intense chemosis of

the conjunctiva, which may swell up and even overlap the cornea. This, however, need not cause the slightest alarm, as the chemosis very rapidly subsides. It is a symptom which may even be welcomed, as in these cases the analgesic effects of the drug seem to be the greatest. It appears only after the first or second instillations, never after subsequent ones.

As on the first instillation of dionine into the eye there is often a feeling of burning and irritation, it is advisable always to begin with a weak solution, not stronger than 2 per cent., and gradually increase the strength, so that in the course of a few days 5 per cent. may be used. When the drug has been used for some time it may even be used in stronger solution than 5 per cent., and I have on several occasions used the pure dionine powder with great relief to suffering. This can only be done, however, when the eye has become thoroughly accustomed to dionine.

I have of late used dionine with great success in a class of cases in which it is often very difficult to give the patient any considerable measure of relief, those met with chiefly in neurotic and neurasthenic patients, in which a constant feeling of soreness and discomfort in the eye is complained of even apart from use. No disease or abnormality may be discoverable on careful examination, and yet the patient constantly complains of the feeling of soreness. In these cases I have found the use of weak dionine drops (1 or 2 per cent. at most) exceedingly grateful to the patient, and giving considerable relief to the symptoms. The drops should be used three or four times daily. The burning sensation at first experienced after instillation will rapidly disappear, and after a few days no discomfort will be experienced. I have found dionine also of great service in the ocular pain complained of as the result of eye strain. We are all familiar with cases where the subjective examination of the patient with the test types is almost impracticable, owing to the irritable and painful condition of the eye consequent upon severe strain. In such cases a few days' rest and the regular use of weak dionine drops (1 or 2 per cent.) have a most favourable effect, relieving the patient from his discomforts, and enabling a satisfactory examination of the eye to be made. There are many cases where we cannot use with safety atropine or homatropine, and in these dionine is most valuable to us as an ocular sedative, but for this purpose it need only be used in very weak solutions (1 per cent. as a rule).

The most recent discovery regarding the use of dionine is that it possesses a remarkable power in clearing up opacities of the cornea, and for this purpose alone would be a most valuable agent. When first I used it in cases of corneitis in order to relieve the pain, I observed that the corneal infiltration disappeared with great rapidity and completeness. This led me to use it in cases of corneal opacities which presented themselves after all the inflammatory symptoms had disappeared. When the opacities were of recent origin it was invariably found that dionine had quite a remarkable action in clearing them up. During the last two years I have been habitually using dionine for this purpose, and have made comparative experiments with dionine and the other methods usually employed for this purpose. As the result of a large experience I can say that no other method employed for the clearing up of corneal opacities can be compared with the results obtained by the use of dionine. The more recent the opacities the better were the results, but even with old-standing opacities improvement may be derived from the treatment.

In the treatment of corneitis, when there is much infiltration, I always combine the atropine with 1 or 2 per cent. of dionine. This answers the double purpose of relieving pain and hastening the abortion of the corneal infiltrate. It was found particularly useful in cases of interstitial or parenchymatous corneitis, but I employ it in all forms of corneitis. When the inflammatory symptoms have subsided the atropine is stopped, but the dionine is continued alone for a considerable time.

For the clearing up of corneal opacities I always employ dionine in the form of an ointment. I begin with a weak ointment, 4 gr. to the ounce, and gradually increase the strength up to 12 gr. to the ounce. A little of the ointment is inserted under the lids and the cornea is gently massaged through the closed lids for a short time, at first

once and subsequently twice daily. If this were to be done at first with a strong ointment considerable irritation might ensue, but by beginning with a weak ointment and gradually increasing the strength, little or no irritation is experienced. The treatment conducted in this way may be continued for a considerable time with little or no discomfort to the patient, and with a very decided effect in clearing up the corneal opacities, more especially if these are of recent origin.

As an agent for the relief of pain in diseases of the eye, as a soothing application in hypersensitive and irritable eyes, and, above all, as the most powerful means at our disposal for the clearing up of corneal opacities, dionine is destined to occupy an important place in ocular therapeutics.

REFERENCES.

¹ Darier, *Leçons de Thérapeutique Oculaire*. ² BRITISH MEDICAL JOURNAL, 1898. ³ *Ophthalmic Review*, 1900.

THE LOCAL ANAESTHETIC ACTION OF STOVAINE.

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DURING the last three months I have submitted stovaine to a continuous series of trials, both in private and on patients attending the clinics of Dr. Orwin and Mr. Chichele Nourse at the Central London Throat Hospital. I have to acknowledge my indebtedness to these gentlemen for permission to make the trials and to publish the results obtained.

The cases in which I have used stovaine have all been cases of minor operations on the nose, throat, and ear. Trials were made with solutions of the strength of 5 per cent., 10 per cent., 15 per cent., and 20 per cent., but it was soon found that a 10 per cent. solution was sufficiently strong for most cases, and that a 5 per cent. solution was too weak. Tampons of cotton-wool were soaked in the solution, squeezed fairly dry, and, in nose cases, inserted into the nostril so as to lie in contact with the mucous membrane of the part to be operated upon; in throat cases the throat was swabbed with cotton-wool on a probe wetted with the solution; and in the few ear cases, a small plug of wool properly moistened was inserted into the external auditory meatus.

ANALYSIS OF 57 CASES.

Nose.

Galvano-cautery to the inferior turbinal body...	22 cases.
Removal of polypi by snare...	11 "
Iditto, by curette...	1 case.
Removal of anterior half of middle turbinal, in the usual way, by forceps and snare...	6 cases.
Removal of anterior end of inferior turbinal...	3 "
Removal of posterior end of same...	4 "
Removal of septal spur by sawing...	1 case.
Stovaine applications for examination and testing...	6 cases.

Throat.

Galvano-cautery to hypertrophied lingual tonsil	1 case.
Uvulotomy...	1 "
Piece of naso-pharyngeal growth removed for examination...	1 "

Ear.

Polyp removed by snare...	1 case.
Curettage of middle ear (granulations)...	2 cases.

In comparing the anaesthetic action of stovaine with that of cocaine, on the whole, the impression formed was that in the newer substance we have a local anaesthetic fully as powerful as the old. In not a single case was there any complaint or indication of toxic phenomena.

In one case in which a septal spur was removed by sawing under nitrous oxide and ether, and in which a tampon charged with stovaine and adrenalin solution had been placed in the nose, the operation lasted longer than had been expected, and the patient came round before the sawing was finished, but the local anaesthesia was so perfect that the patient felt no pain at all. It is obvious that in cases where a general anaesthetic is to be used in addition to the local anaesthetic, stovaine, which produces no depressant symptoms, is preferable to cocaine.

In curetting granulations in the middle ear stovaine was applied to the surface to be scraped, and a better anaesthesia obtained than with cocaine used in the same way. As is well known, to ensure complete anaesthesia

for this little operation a subcutaneous injection into the so-called "zone of Troeltsch" is necessary.

Several of the patients had had a former experience of cocaine, and all, with one exception, preferred the anaesthesia of stovaine. One of these had suffered from toxic symptoms with cocaine.

Thus far it would seem that stovaine is much to be preferred to cocaine for local anaesthesia, but an accident made me acquainted with an unpleasant result. A female patient had come for the application of the galvano-cautery to the inferior turbinals, and was prepared for operation in the usual way by the insertion of tampons soaked in a 10 per cent. solution of stovaine into the inferior meatus of the nose. Pressure of other work prevented me from attending to her for about forty minutes, and at the moment when, the tampons having been removed, I was about to apply the cautery, the electric current gave out, and the affair had to be postponed. She returned to me four days later, complaining of a free watery discharge from the nose, which had come on half an hour after her previous visit. On examination I found, to my surprise, that there was superficial sloughing of the mucous membrane of the inferior turbinals, and of the corresponding parts of the septum on both sides, just where the tampons had been lying. There was, however, but little reactionary swelling, and with suitable treatment the slight ulceration was healed in about ten days. Inquiry among others of the series of patients elicited the fact that many had suffered from "colds in the head" for some days following the application of the new agent.

In order to test this observation several other trials were made. Applications of a 10 per cent. solution of stovaine were made for varying lengths of time to the nasal cavities, and the nose examined at intervals of every two or three days for some time after the application. It was found that the amount and extent of tissue destruction varies with the length of time of application. In a case where the duration was ten to fifteen minutes nothing happened. In another of twenty minutes' duration very slight superficial sloughing occurred. So that it would seem advisable not to allow a contact of longer than fifteen minutes, a length of time quite sufficient to ensure satisfactory anaesthesia.

Although the strength of the solutions used for injection into the tissues and into the spinal canal (0.5 per cent.) is much less than that employed in the foregoing tests, it would be advisable, in view of my findings, that observers should note whether or not any irritant effects arising from the stovaine occur after the operation is over. In the case of the spinal cord in particular care should be exercised, for, if the drug exerts a destructive or irritant effect on mucous membranes, it stands to reason that a delicate nervous tissue may also suffer from an intimate contact with stovaine, even when it is used in very weak solution.

My results, summed up, are as follows:

1. Stovaine equals cocaine in local anaesthetic action.
2. Stovaine does not induce general toxic symptoms in ordinary anaesthetic doses.
3. Stovaine, like cocaine, induces ischaemia of erectile mucous tissues.
4. Stovaine should not be left in contact with mucous surfaces for longer than fifteen minutes, lest its powerful irritant action be followed by sloughing and ulceration.

It is proper to suppose that the last rule is of less importance when some destructive action is the aim of the surgeon, as in cauterizing, etc.

PROFESSOR KOCHER of Berne will deliver the annual address of the Cardiff Medical Society on Friday, May 25th. The subject chosen is Graves's disease.

The new operating theatre at the Royal Devon and Exeter Hospital, which was opened on May 4th, by Mrs. Nosworthy, of Dawlish, its munificent donor, has been carefully designed to meet all modern requirements. The theatre can be heated rapidly, and the ventilation, by electricity, is equally sensitive; the inlets for ventilation are packed with cotton-wool. The floors are fireproof and paved with terrazzo, the walls are lined with opal tiles, and there is a domed ceiling of the same construction. The top and side lights are double glazed and there are anaesthetic and sterilizing rooms adjoining. The fittings of the theatre are all nickel-plated. The cost was about £1,500.