REFRESHER COURSE FOR GENERAL PRACTITIONERS

SPECIFIC TREATMENT OF INFECTIONS OF THE EYE

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Present-day treatment of infections of the eye is highly specific and thus calls for specific diagnosis. Such general terms as conjunctivitis and keratitis are an inadequate basis for effective treatment, for they imply little more than that there is a lesion of the conjunctiva or cornea. The sulphonamides and the antibiotics being specific agents for the treatment of infections due to susceptible organisms, the first step is to establish clinically in all cases, and bacteriologically where possible, that the lesion in question is indeed an *infective* lesion and not merely an inflammatory reaction. Such inflammatory reactions as phlyctenular ophthalmia, and the mass of nondescript lesions labelled chronic conjunctivitis, are not infective in character and their treatment by sulphonamides or antibiotics is a futile abuse of valuable agents. A clear understanding of the infective lesions of the eye as distinct from the inflammatory reactions is therefore essential if any results are to be obtained at all. For the best results it is equally essential to possess a working knowledge of the different types of infection. The infections of the inner eye are grave emergencies that must be left to the expert ophthalmologist.

The sulphonamides, penicillin, and streptomycin used locally are not free from irritative reactions; but, as the sulphonamides, though widely used, are of exceedingly limited value in ocular infections except trachoma, the irritative reactions are of no great importance. Such irritative reactions as occur with penicillin are almost entirely due to the use of impure brands. When white crystalline penicillin is used reactions are exceptional with drops, and almost equally exceptional with ointments if a suitable ointment base is employed; the more complex ointment bases are best avoided, and a simple base such as 90% petroleum jelly and 10% liquid paraffin gives excellent results. Reactions are still less likely if the penicillin is incorporated in powder form into the base and not first dissolved.

Streptomycin, even in purified preparations, is rather more apt to give irritation, but this is not likely to occur except with prolonged use. As both penicillin and streptomycin are quickly effective if they are used adequately and in suitable cases, the question of irritative phenomena is largely an aspect of the abuse of these agents rather than a complication of their rational use.

Infections of the Outer Eye

The infections of the outer eye include such severe affections as purulent conjunctivitis, with its immediate threat to sight from corneal complication, and relatively mild affections such as chronic blepharitis. It is no academic exercise to recognize clearly the clinical features of these different infections, as treatment is determined by this knowledge.

Purulent and Mucopurulent Conjunctivitis.—A red eye is not evidence of infection. The eye may be congested from an attack of acute or subacute glaucoma, or of acute iritis. Definite evidence of infection is presented

by a purulent or mucopurulent discharge from the conjunctiva. In the absence of such discharge the presumption is in favour of an inflammatory reaction rather than infection, except that infection with non-pyogenic viruses produces a conjunctival reaction largely indistinguishable from inflammation. Purulent conjunctivitis, typically seen in ophthalmia neonatorum, may be caused by many different organisms. An accurate bacteriological examination is generally of no great importance, as most pyogenic organisms are sensitive to both penicillin and the sulphonamides. Exceptionally pyogenic reactions are due to Gram-negative bacilli, which do not respond readily to either sulphonamides or penicillin, but respond well to streptomycin. If within 24 hours of instituting adequate penicillin or sulphonamide therapy the infection is not well under control, one may safely assume that it is due either to Gram-negative bacilli or, more rarely, to insensitive strains of organisms which are normally sensitive to the sulphonamides and penicillin.

Infections of the Cornea.—Differential diagnosis in corneal lesions is particularly difficult. Many corneal lesions are inflammatory rather than infective. Some of the inflammatory reactions may be due to infection by non-pyogenic viruses; some, such as phlyctenular ophthalmia and interstitial keratitis, are allergic or anaphylactic in type; some, like the corneal dystrophies with their distinct mode of inheritance, are genetically determined. Of the frank infections of the cornea, by far the commonest is the group of serpiginous ulcer with greyish, obviously infected margins and hypopyon. Here the pneumococcus is a frequent, though by no means the commonest, infecting organism, staphylococci and streptococci being responsible for most cases. These are penicillin-sensitive organisms, and response to modern treatment is excellent—a striking contrast to the poor results obtained in the past. Occasionally an infected corneal ulcer is caused by Gram-negative bacilli. The clinical picture is generally characteristic. Instead of an infected serpiginous margin, there is a sloughy heaped up base, with a good deal of diffuse corneal infiltration—the effect of the proteolytic action of these organisms. Hypopyon is not a striking feature in this type of reaction. These cases do particularly badly if inadequately treated, and do not respond to penicillin.

Acute Virus Infections of the Conjunctiva and Cornea.—The virus infections of the conjunctiva and cornea are exemplified by epidemic kerato-conjunctivitis and superficial punctate keratitis. Here there is neither purulent nor mucopurulent reaction, but a watery discharge with considerable discomfort; frequently there is a history of an acute respiratory affection. These cases are not readily distinguished from inflammatory reactions, except in the acute stage.

“Chronic Conjunctivitis.”—Chronic inflammatory reactions of the conjunctiva—the conditions passing under the name of “chronic conjunctivitis”—are a difficult aetiological group. Persistent treatment with

the sulphonamides and penicillin only aggravates matters, for drug irritation is added to the inflammatory reaction.

Blepharitis.—Inflamed lid margins, especially when acute, may be due to rubbing of the eyelids or to infection spreading from the conjunctiva. The primary lesion should be established and treated. Most cases are, however, of the primary chronic type.

Ophthalmia Neonatorum

Only some 20% of cases of ophthalmia neonatorum are caused by the gonococcus. A considerably greater proportion are caused by the staphylococcus, and most of the common pyogenic organisms contribute a quota. Some 10 to 20% of cases are caused by a pyogenic virus, morphologically similar to the virus of trachoma. Fortunately all these organisms are sensitive to the sulphonamides and to penicillin, though to a variable degree. Maximum dosage of the agent employed is therefore essential if the relatively insensitive organisms are to be caught as well as the more sensitive ones.

There are two alternative methods of treating ophthalmia neonatorum. The easier, though somewhat slower, method is the oral administration of sulphonamides. Treatment with penicillin locally gives incredibly rapid results, but calls for considerably more nursing care. As a routine method, where no special facilities are available, treatment by oral sulphonamides is the method of choice. Whichever method is used, meticulous attention to detail is essential.

Before beginning treatment a swab should be taken for smear and culture, and the eye irrigated with half-normal saline at room temperature. Where facilities are available a drop of adrenaline 1 in 1,000 should be instilled and a scraping taken from the palpebral conjunctiva for examination for the presence of inclusion bodies. In all cases atropine sulphate drops, 1%, are instilled if the cornea is hazy. Any pus that may have accumulated is wiped away with moist pledgets of cotton-wool.

Oral Sulphonamide.—After the above preliminary measures a tablet of sulphamerazine (0.5 g.) crushed into powder is given by mouth in a teaspoonful of water or milk. Sulphamerazine administration in doses of 0.25 g. is continued every 8 hours, until 48 hours after clinical cure. (If sulphadimidine is used the administration has to be at six-hourly intervals.) Local treatment consists in three-hourly irrigation with isotonic saline solution during the first day in cases with profuse discharge; as a rule there is no need for further irrigation on the subsequent days. After irrigation medicinal paraffin is instilled as a precaution against the sticking together of the lids. With this treatment swelling of the lids generally subsides within 12 hours, and the purulent discharge disappears within 24 hours.

Local Penicillin.—After the same preliminary measures as with oral sulphonamide therapy, a drop of penicillin in a concentration of 10,000 units per ml. is instilled into the conjunctival sac. The baby is now placed on the nurse's lap, while another nurse sitting near instils one drop of penicillin solution, 10,000 units per ml., every minute for 30 minutes. Irrigation is not needed, as pus does not form to any extent; such thin mucoid discharge as is present can be ignored or, if it clings to the lid margin, wiped away with moist pledgets of cotton-wool. At the end of this time there is invariably no pus and generally little or no discharge. The eye, however, is still moist, the lids are still swollen, and the

lid margins tend to be sticky. The baby is returned to its cot, and penicillin drops are instilled six times at five-minute intervals, followed by a similar number of instillations at half-hourly, hourly, and two-hourly intervals. This gives a total of 22 hours' treatment. Many cases require no further attention. In some babies the lid margins still tend to remain sticky, and it is advisable in such cases to continue with penicillin at two-hourly intervals until the eye is dry, when treatment is carried on for a further 12 hours. Crystalline penicillin only should be used for making up the drops, as impure penicillin is likely to cause irritative reactions.

Exceptionally the response to one or other method is not as good as might be expected. In such cases it is essential to change over from one method to the other, and to be guided by bacteriological tests. Rarely streptomycin may have to be used. In no case should local sulphonamides be employed. They are ineffective in checking a purulent infection, and as such their use is dangerous.

Purulent Conjunctivitis in Adults

This, too, may be caused by a variety of different organisms. There is no fundamental difference in treatment from that employed for ophthalmia neonatorum except that if oral sulphonamide is used full adult doses should, of course, be given.

Mucopurulent Conjunctivitis

These cases generally respond rapidly to modern treatment. It is unnecessary to use sulphonamides systemically, for local penicillin therapy is simple and adequate. Any excessive mucopurulent discharge can be washed out from the conjunctival sac with lukewarm water. Penicillin ointment, containing 1,000 units of crystalline penicillin per gramme, can then be instilled two-hourly during the day. Within 24 to 48 hours the eye should be normal. The local use of sulphonamides, though widely practised, is quite valueless.

Acute Virus Conjunctivitis

Epidemic kerato-conjunctivitis is endemic rather than epidemic in this country. There is conjunctival injection, watery discharge, some photophobia, and often an enlarged pre-parotid node, unilateral if only one eye is affected. A history of an acute respiratory infection is common. If corneal involvement supervenes this takes the form of superficial punctate keratitis, demonstrable on staining with fluorescein and by the increase in symptoms. There is no response to the sulphonamides, penicillin, or "aureomycin." Non-specific measures, such as the use of silver nitrate, produce only further irritation. There is at the present no specific treatment, though there is some hope in one of the newer antibiotics.

Trachoma

Trachoma is still the largest single blinding disease in the world. In this country it has been a mass problem only on occasions, and never in recent times; to-day fresh cases are seen only exceptionally. In Ireland it still appears to be a serious issue.

Mechanical expression of follicles is still an important part of present-day treatment of trachoma, but most agents used in the past are now obsolete. After expression the fornix should be painted with 30% sodium sulphacetamide daily for a month or so. Sulphacetamide ointment, 6% in a base consisting of 90% petroleum jelly and 10% liquid paraffin, should be used three

or four times daily. Fresh cases without marked corneal involvement recover rapidly. When the cornea is involved atropine sulphate drops 1% may have to be used three times daily to keep the pupil dilated. If a patient suffers from secondary infection of the conjunctiva when first seen, full doses of oral sulphonamides for three to four days should be given before undertaking expression of follicles and local therapy.

The value of aureomycin and chloramphenicol in trachoma still remains to be assessed.

Infections of the Cornea

Unless a diagnosis of infection by Gram-negative organism is made on clinical grounds when the patient is first seen, every case should be treated at once on the assumption that it is caused by a penicillin-sensitive organism, but a swab from the conjunctival sac should always be taken for bacteriological examination. If, after 24 hours, penicillin treatment has not produced a marked improvement, and particularly so when the culture shows no organisms or reveals Gram-negative organisms, the penicillin should be discontinued.

Serpiginous Hypopyon Ulcer or Other Corneal Infection Due to Penicillin-sensitive Organisms

It is possible that full doses of sulphonamides orally will give good results, but the best results are obtained by subconjunctival injection of penicillin. The procedure is as follows: Any sticky discharge present is washed away by cotton-wool swabs moistened in lukewarm water. Two drops of 4% cocaine are instilled into the conjunctival sac three times, at intervals of two to three minutes, the eye being kept closed during that time. With the eye adequately cocaineized the subconjunctival injection can be easily given. This contains 1,000,000 units of crystalline penicillin dissolved in 10 min. (0.6 ml.) of sterile water and 5 min. (0.3 ml.) of adrenaline 1 in 1,000. A simple way to obtain this solution is to inject these quantities direct into a bottle containing the crystalline penicillin and shake the solution. The clear solution can then be withdrawn into a syringe fitted with a small needle, such as a tuberculin needle, and the injection made subconjunctivally at about 4 or 5 mm. from the limbus. It helps matters if someone else can keep the lids separated while the injection is made.

The use of adrenaline ensures that the penicillin does not diffuse too readily into the surrounding tissues, and in consequence the intraocular level reached is high and also more persistent. Patients generally tolerate subconjunctival injections well, and there is usually no difficulty in giving a second or third injection at intervals of 24 hours if necessary. However, any but the most severe hypopyon ulcer will have responded well to one injection, so that if the hypopyon has disappeared, or almost disappeared, within 24 hours a second injection is unnecessary. Continued treatment is, however, a matter of some importance. The intraocular level of penicillin can be maintained at a therapeutic point by instilling penicillin ointment, containing 100,000 units per gramme, at intervals of two hours for a further two to three days.

Proteolytic Corneal Ulcer Due to Gram-negative Bacilli

These cases can be satisfactorily treated by subconjunctival injection of 0.5 g. of streptomycin in a manner similar to penicillin injection. Generally two or three injections at intervals of 24 hours are necessary. As with penicillin therapy, maintenance treatment should be con-

tinued when the subconjunctival injections are no longer necessary: streptomycin ointment containing 0.1 g. per gramme should be instilled at two-hourly intervals during the day for two to three days.

Cases Showing No Organism

As all cases will have received penicillin subconjunctivally (or streptomycin exceptionally) the response will guide further treatment. If the patient is doing well on penicillin the negative bacteriological report should be ignored. If the response is poor after 24 hours streptomycin should be used, for the Gram-negative infections are often not readily demonstrated bacteriologically.

Adjuvant Treatment

All cases require atropine sulphate drops 1% instilled three-hourly in the affected eye. Where facilities exist, the solvent used for dissolving the penicillin or streptomycin may carry 1/60 or 1/40 gr. (1 or 1.5 mg.) of atropine sulphate and 1/10 or 1/8 gr. (6.5 or 8 mg.) of cocaine hydrochloride per 10 min. (0.6 ml.).

Treatment of Blepharitis

Chronic simple blepharitis is generally due to a low-grade infection by penicillin-sensitive organisms. The treatment is simple and consists in removing such scales or scabs as are present with cotton-wool swabs moistened either with hydrogen peroxide (10 vols.) or with alkaline solution containing 4 gr. of sodium bicarbonate to the fluid ounce (1 g. to 113 ml.). When the lid margins are quite clean penicillin ointment containing 1,000 units of crystalline penicillin per gramme should be applied (the ointment base being, as already indicated, 90% petroleum jelly and 10% liquid paraffin, and the penicillin being directly incorporated in the base in crystalline form and not in solution). This procedure should be repeated nightly for a fortnight or so. Most cases will have responded well. An alternative and older method is to paint liquor tinctorium *B.P.C.*, instead of penicillin ointment, on to the lid margin. This method may well be used where penicillin treatment has failed. Chronic blepharitis is, however, often an expression of poor nutrition, so that relapses are not uncommon unless general measures are also undertaken.

Dr. J. Heller and his colleagues of the Hôpital Boucicaud in Paris have just published in *La Semaine des Hôpitaux de Paris* of August 26 an electrocardiographic study of 354 cases of angina of effort, together with radiographic measurements of the heart volume and clinical study of the cases with special attention to the possible aetiology. The cases chosen all had attacks of pain strictly provoked by exercise (walking), the attacks lasting at the most 15 minutes (patients with more prolonged pains were omitted from the analysis), and in every case the E.C.G. was taken with precordial recordings V_1 to V_7 as well as the standard and unipolar limb leads. Among their conclusions the authors note that nearly all (99%) of their patients were aged 40 or more, that nearly half of them had a perfectly normal E.C.G., and that coronary thrombosis occurred in 33 cases (9.3%): two-thirds of these infarcts were not preceded by any typical long attack of pain. One of the aetiological factors they investigated was sex, and in particular whether the onset of the menopause influenced the appearance of angina of effort in women. They studied 70 cases with normal menopause, the average age of onset being 48, and 19 younger women in whom it had been artificially induced for various reasons, and were unable to find any correlation between date of menopause and date of first anginal attack.