of this sometimes necessary proceeding. The almost routine institution of continuous post-operative gastric suction undoubtedly time and again saved lives by averting the ileus which so commonly occurs whether bowel be injured or not. It matters little how many layers of stitches are inserted to close a bowel aperture if distension is allowed to occur; one layer of Lembert stitching suffices if the bowel wall be kept lax. The restoration of lost fluid by intravenous administration in sufficient quantity kept pace with the withdrawal.

There was early realization that abdominal patients have to be worked for and fought for, and that even in some of the most apparently unfavourable cases a good result can be got with such care. By the excellence of the transfusion services and by the greater exploitation of forward teams probably many more desperate cases reached an operating table than did in the last war. These two factors will invalidate any real statistical comparison. These desperate cases included not only patients with abdominal wounds but also those with both abdominal and other severe injuries such as compound fractures of the long bones. The combination is not uncommon, and is fraught with more than fourfold risks.

With the above practices thoroughly carried out, with routine four-hourly post-operative morphine, and with the retention of the patient for ten days where he was operated upon, it is likely that the end-results did not at least fall lower, despite the more desperate cases, than in past wars.

In order to make this paper comprehensive and yet bring it within the limits of an article I have had to omit much. Particularly do I regret omitting the names of individuals. To have mentioned some and not all would have been contrary to the spirit of the Eighth Army, in which brotherhood, kindness, and helpfulness abounded.

Acknowledgments to my seniors I make with gratitude. To Major-General W. H. Ogilvie and Brigadier J. Weddell, the chief consulting surgeons of M.E.F. and A.F.H.Q. respectively, I owe much for opportunity, advice, and support.

Consulting surgeons cannot, however, exercise their full abilities without the sympathetic co-operation of their administrative heads. The successive D.Ds.M.S. of the Eighth Army during this period—Brigadiers J. Walker, C.B.E., M.C., and E. Phillips, C.B.E., D.S.O., M.C.—were both out to be helpful in any and every way, and, in the much longer association with the latter, many of the principles of organization described above were worked out. In advanced base areas and on the west side of Italy there was the same fruitful liaison with another D.D.M.S., Brigadier R. W. Galloway, C.B.E., D.S.O.

A good general values his medical services. In his appreciation of their administrative needs and difficulties and in his ready sympathy for the wounded, as displayed by numerous visits to medical units in the field, General Montgomery showed himself no less lacking in humanity than in strategic genius.

SOME DANGERS OF SULPHONAMIDES IN EAR INFECTIONS

BY

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The use of the sulphonamide drugs in otitic infections is not without its dangers, and it appears to be insufficiently realized that their administration at the wrong time or in inadequate dosage may so mask symptoms, distort the clinical picture, or interfere with the acquisition of immunity that the patient's life may be jeopardized as a result. A distinguished otologist of conservative surgical outlook recently said that he was now opening more mastoids than in pre-sulphonamide days, and this he attributed solely to the increased incidence of these atypical and sulphonamide-distorted types. It is not going too far to state that some otologists are swinging round to the view that these drugs may be so dangerous as to be contraindicated in the treatment of otitic infections unless certain criteria are observed and followed. Too often has sulphonamide been used as a substitute for surgical drainage; too often has it been given in ignorance of the nature of the micro-organism present; too often has its use been applied at a stage of the infection when its administration could only mislead and confuse.

Acute suppurative otitis media usually begins with intense earache, fever, and deafness, and on examination the drum-head is bulging, pulsating, and usually of a purple colour. Such a picture calls for immediate myringotomy, and no amount of

sulphonamide can ever take the place of this necessary step. After drainage is established and the micro-organism isolated, treatment with the most appropriate sulphonamide may be instituted, particularly if the fever persists, and its use may hurry on the resolution of the infection.

Again, after two or three weeks of otorrhoea have passed and subsidence of discharge or fever has not been achieved, the danger of continuing sulphonamides as a substitute for mastoid drainage is a very real one. At this stage of the infection the problem is likely to become one of early osteitis with decalcification of bony trabeculae, destruction of mucoperiosteal cell lining, and thrombosis of vessels in the mastoid cavity. Quite apart from the fact that sulphonamides will not reach the local area owing to inadequate blood supply in the breaking-down tissues, it is unwise, by introducing the masking effect of sulphonamide, to deprive oneself of the presence of signs and symptoms which would indicate the need for surgical drainage.

Three Illustrative Cases

The following three cases may help to illustrate some of the dangers which may be encountered:

Case 1.—A boy aged 10 had an attack of earache at his preparatory school; this was treated with sulphonamides, apparently got better, and the aural condition was subsequently disregarded. His general health remained unsatisfactory and he lost weight—signs which should have been given greater consideration. On arriving home for the holidays one month later the parents were alarmed at his appearance, and noticed that he complained of vague headaches. He suddenly became ill with signs of meningitis. A pneumococcus (Type 1) was isolated, and after four or five days an otologist was asked to see the boy in order to exclude possible "ear trouble," which, however, was not suspected by the medical attendant. The membrane was congested, but no other sign of abnormality was noted. It was felt certain that the mastoid was involved, and this was proved to be the case, both by x-ray and at the operation, which unfortunately was too late to save the boy's life.

Case 2.—A doctor aged 43 was taken ill with severe earache, fever, and some deafness; these indications should have suggested immediate myringotomy, but he dosed himself erratically with tablets of sulphapyridine instead. There was an improvement in the symptoms, and until the next bout of pain nothing much was thought of the matter; further tablets of sulphapyridine were sufficient to quiet the condition down so as to make it bearable, but on the fourth morning the pain became intense, and was accompanied by severe headache. The membrane was bulging, and the middle ear obviously contained pus. By this time the meninges were involved, and paralysis and loss of sensation in the contralateral face, arm, and leg manifested themselves. After a most stormy three weeks with turbid C.S.F. (Type 3 pneumococcus), periods of coma, and incontinence, recovery eventually took place after large doses of sulphonamide, Type 3 pneumococcus serum, and penicillin; but the recovery was, to say the least of it, unexpected. A subdural abscess over the greater part of the right hemisphere was found; this was rendered sterile and was absorbed as a result of penicillin treatment. In this case an early myringotomy would in all probability have cured the infection without complication.

Case 3.—A call was received to visit a boy aged 10 with a mastoiditis. On inquiry as to the length of history, the curious answer was received that the duration of the ear involvement was four days; this appeared to exclude the possibility of surgical mastoiditis altogether, and the diagnosis was assumed to be incorrect. On examination, however, the mastoid process was swollen and extremely tender to the touch; the ear-drum was oedematous and bulging, and the boy deaf. Realizing that such a condition could not possibly have come about in four days, inquiry was made as to any previous earache, and this resulted in the admission that five weeks earlier there had been an attack of earache on the same side, which was treated with a sulphonamide, had "cleared up," and had since been quite forgotten. It is obvious that a silent necrosis had been taking place in the mastoid process all this time, and that owing to the influence of the sulphonamide the drum had not perforated. The usual signs and symptoms were masked, and it was fortunate that the ultimate state of the ear was easily treated by surgical drainage, and that, unlike Case 1, an invasion of the meninges or the lateral sinus did not present itself as evidence that the ear was still involved. (Infection was with a haemolytic streptococcus.)

Some Points for Guidance

To summarize, it would seem pertinent to draw up a few points for guidance in treatment of otitic infections by sulphonamides.

1. Sulphonamides will never take the place of necessary surgical drainage, and should not be expected to do so.

2. Treatment of acute suppurative otitis media by a sulphonamide should be reserved for the period after incision of the membrane and bacteriological investigation. If the fever is maintained, the appropriate sulphonamide may be used in full dosage (day and night), but not after the end of the second week.

3. After two, three, or four weeks the condition of the ear, if still actively suppurating, is again becoming one that potentially requires surgical drainage, this time of the mastoid; and signs and symptoms justifying intervention must not be masked by the administration of sulphonamides, which at best will rarely reach the local area but will distort the clinical picture as a whole.

4. Wholesale use of sulphonamides in otitic infections is to be deprecated.

5. If a sulphonamide has been given before drainage, the most valuable help in assessing the beneficial effect of the drug is gained by examining the drum-head frequently. If this continues to bulge myringotomy should not be delayed, because the condition, which otherwise appears to be improving, is in reality becoming more perilous. Persistence of deafness is also a strong indication that all is not well.

6. Patients taking sulphonamide drugs sometimes do not acquire any resistance of their own to the infection with which they are contending, and it would seem that recurrences are more likely in these cases, which, in addition to developing no immunity to the infection, may find the micro-organism has become sulphonamide-resistant. Recently a schoolboy had five extremely severe and prolonged attacks of tonsillitis (haemolytic streptococci) over a period of three and a half months; each attack lasted at least a fortnight, with high fever. All attacks, except the last, were treated with sulphonamides, and it was assumed that, in addition to developing no individual immunity, the micro-organism had become sulphonamide-resistant. Tonsillectomy was uneventful, and has resulted in freedom from any further trouble.

7. It is needless to emphasize the uselessness and danger of giving inadequate or erratic dosage of sulphonamides. If given at all, full doses at four-hourly intervals, day and night, are required for the full period, and the drug should be continued for a time after complete subsidence of fever.

General Comment

It would seem, then, that the chief dangers to be met with in cases of otitis treated with sulphonamides are found in those in which this has been the sole treatment. Such cases appear to the unwary to have been completely relieved, and no further anxiety is felt about the ear condition—and there may be much to support such an attitude. Sometimes the middle ear may return to normal, with recovery of hearing; more often the tympanic membrane, still intact, will remain oedematous, the middle ear congested, and with much loss of hearing. Mastoid tenderness is frequently absent. In such a case it is difficult to know what has been happening in the three or four weeks following the initial infection and apparent subsidence, but such signs and symptoms as pallor, loss of weight, dirty tongue, vague headaches, and (probably most important of all) congestion of the unperforated drum-head, with deafness, should give rise to the suspicion that a slow, latent, and insidious infective process which will not undergo resolution is going on all the time. Such masking is the origin of greater potential dangers than those seen in pre-sulphonamide days, in which the course of the infective process could be clearly followed.

Some help can be gained by radiography, and this should always be used in doubtful cases. Mastoid tenderness and swelling in these atypical cases usually manifest themselves late, about the fifth or sixth week, but not before a critical latent phase has passed, in which the lateral sinus, the meninges, or the brain might just as easily have provided the first sites for an extension of the original infection.

In cases, or suspected cases, of thrombophlebitis of the lateral sinus and brain abscess, reliance should not be placed on sulphonamide drugs, which (a) will fail to eliminate the infection and so lead to catastrophe, and (b) will mask the indications which would suggest the necessity for surgical intervention.

One must remember that sulphonamides bring about a condition of bacteriostasis; unless the patient's immunity is sufficiently raised, either artificially by appropriate serum or naturally by his own efforts, the micro-organism will be capable of regaining its activity. This was well seen in Case 2, in which large doses of sulphadiazine (60 g. in 8 days) brought about such a great improvement that the hemiparesis and hemianaesthesia were almost eliminated and the signs of meningitis had practically cleared; within a few hours of stopping the

drug, however, the patient relapsed into coma, with turbid C.S.F. and incontinence, and was only restored to consciousness with the greatest difficulty by means of intravenous sulphapyridine. Large doses of intravenous serum and penicillin intrathecally and intramuscularly led to eventual recovery. It would appear possible that, in the future, it will be proved that penicillin is capable of bringing about sterilization and absorption of purulent foci, and so dispense with the need for surgical drainage in these cases; this is a feat which it is beyond the power of sulphonamides to achieve.

BONE-MARROW TRANSFUSION IN INFANTS AND CHILDREN

INTRODUCING A SPECIALLY DESIGNED NEEDLE

BY

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Some skill and experience are required to insert a needle or cannula by the cut-down technique into a vein of the ankle, cubital fossa, wrist, or scalp of premature and small infants. These, however, are a group of patients who not infrequently need parenteral fluid. An attempt has therefore been made to develop a more simple method than the intravenous, and one which would be at least as safe and sure. The bone marrow of the tibia was the site elected. The marrow cavity in the sternum of infants, and in fact of considerably older children, is not large enough for this to be a practicable place for the reception of transfusion agents. Hamilton Bailey (1944) has reviewed the present position with regard to bone marrow for this purpose, and is favourably impressed. He mentions the winged Wits sternal-puncture needle as admirable for cannulization of the sternum in adults. In my opinion, however, a Wits needle or a Tocantins needle leaves much to be desired in use for an infant.

FIG. 1

FIG. 2

The needle illustrated (Figs. 1 and 2) was designed for transfusions into the tibial marrow of infants and children. The following features may be noted: