ranged from half an hour to 3 days. It will be seen that in a large majority of cases operation was performed within 6 hours of perforation. This promptness of treatment is doubtless due partly to the fact that the area served is predominantly urban, but much credit must also be given to the diagnostic acumen of the practitioners in this area. Fig. 14 shows that in this series the fatality rate rose progressively with delay in treatment. This, of course, confirms general experience and the reports of all previous observers.

Summary

Figures are reported relating to the incidence of perforated peptic ulcer in an area in the West of Scotland with a population of over 2 millions. The more notable findings are as follows:

1. From 1924 to 1938 there was a progressive increase in the incidence of perforations. During the war the steady increase has been interrupted by a marked rise in 1940-1, followed by a return to a lower level. These changes almost entirely concern duodenal ulcer.

2. The 1940-1 rise was not correlated with air raids in this part of the country. It is suggested that, in addition to anxiety about the war situation, overwork and perhaps undernutrition may have exerted an influence.

3. The sex ratio has undergone little change during the 20-year period. The rise in 1940-1 and the fall in 1942-3 were confined to men. In women during the war years the general pre-war trend was maintained. This finding is somewhat surprising in view of the great changes which have taken place since 1939 in the habits and working conditions of women.

4. Perforation is rare in childhood; its incidence rises rapidly in adolescence and attains a maximum between the ages of 30 and 40 years. Since 1924 there has been a rise in the mean age which does not appear to be due entirely to ageing of the population. The mean age is higher in females than in males.

5. Perforations are unduly common in December and relatively uncommon in August, September, and October. This low incidence in the summer months may possibly have a nutritional basis or may be related to the holiday season.

6. Perforations are less frequent on Sundays and Mondays than on other days. This may perhaps be related to rest at the week-end.

7. Perforations are unduly common between 3 p.m. and 6 p.m. and comparatively uncommon during the night and morning. The relation of these phases to meal-times is not clear and requires further study. There may be a correlation with periods of stress and rest respectively.

8. The fatality rate from perforations increases with age and with delay in treatment. It is greater in gastric than in duodenal ulcer, in females than in males, in winter than in summer.

This survey has been carried out under the auspices of a committee of the Nuffield Provincial Hospitals Trust appointed in Glasgow for the study of sickness records. Thanks are due to our surgical colleagues and the hospital authorities for furnishing us with the information on which this survey is based, and particularly to the medical superintendents of the three main voluntary hospitals, who have given us every facility for extracting the hospital records. Our task has been greatly lightened by the generous help we have received on all sides. We acknowledge also our debt to Prof. J. W. McNee, of whose staff one of us is a member.

Extracting clinical records often proves disappointing, but in this instance we have been gratified at the amount and the detailed character of the information available, and we have pleasure in recording our appreciation of the care devoted by our colleagues, year in and year out, to this routine task of hospital work.

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That there is a real demand for a contributory hospital scheme for those who desire treatment in hospital private wards and nursing homes is shown by the progress made by the Hospital Service Plan under the chairmanship of Sir Bernard Docker and sponsored by King Edward's Hospital Fund for London. This plan has grown steadily since its inception barely two years ago, and the secretary of the London Association for Hospital Services (10, Old Jewry, E.C.2) now announces that the maintenance refund rate is to be increased from £6 a week to £6 6s., thus indicating a desire among the higher-salaried public to make provision for their dependants and themselves in the event of serious illness. The increased refund is payable to subscribers admitted to hospitals after the end of October.

EXPERIENCES WITH THE GIANT MAGNET AND METALLIC INTRAOCULAR FOREIGN BODIES IN RECENT BATTLE CASUALTIES

BY

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It is perhaps important to publish the following case just now, and we do so at the suggestion of Brig. Sir Stewart Duke-Elder.

Case History

On July 15, 1944, L/Cpl. E., a land-mine battle casualty from Normandy, was admitted to No. 4 Canadian General Hospital. He had been blown up on July 3, and was "pulseless" when picked up and transfused that evening. From toes to vertex he was spattered with wounds of various sizes. All were superficial except one in the abdominal wall, one of the left hand, and a penetrating injury of the left eyeball.

The first two wounds were operated upon in France. When received at No. 4 Canadian General Hospital the patient was in good condition. He had received intramuscular penicillin, 50,000 units five-hourly, starting on July 8, to a total of 500,000 units; it was then stopped. On the 18th it was given again—15,000 units every three hours to a total of 150,000 units.

H. A. G. D. located a small foreign body impacted in the retina about 3 d.d. down and in from the disk. The entrance wound was minute, near the limbus towards 9 o'clock. There was haemorrhage of the retina near the track of the missile, but lens and vitreous were clear. The vision was 20/20. A radiograph showed a single minute opacity corresponding in position to the visible F.B. H. A. G. D. had the case transferred to the S.E.C. Ophthalmic Centre for extraction, since his magnet was not very powerful, and assisted at the subsequent surgical procedures.

On July 15 operation was performed under novocain infiltration. Good rotation was ensured by dividing the mesial rectus. A 3-mm. incision was made in the sclera through a linear diathermy coagulation, between points of fine silk suture. The incision was seen to be about 1 mm. from the F.B., which was partially hidden by coagulum. Six short applications of the giant magnet with the tip of a beak-shaped terminal on the wound produced no movement. It was considered inadvisable at this time to extract the particle with forceps, for several reasons which need not be discussed here. The patient was retained for further consideration.

The next day, when we were dealing with a minute metallic F.B. in the vitreous of a German prisoner of war by the posterior route, Major H. W. Applin, who was collaborating, observed a slight rocking of the F.B. at the end of about the tenth short application, as the current went on and off. Thereafter the particle made larger excursions from the centre of the vitreous towards the wound and was delivered through the choroid (which had not been incised) at the thirty-fifth application. The immediate post-operative progress in this case was uneventful; the eye remained quiet, the vitreous clear, and the vision 6/6.

This experience encouraged us to continue with magnet extraction in the case of L/Cpl. E., since, meantime, some metallic particles collected from scabs on his legs had proved magnetic, and had given a positive Prussian-blue reaction when dissolved in nitric acid. On July 28 the sclera was exposed down to the previous wound and the curved terminal placed against it towards the side away from the F.B. The magnet was then used in short bursts of about 4 seconds (on a few occasions as long as 15 seconds) for 75 applications. The current was probably flowing for not more than a total of 10 minutes. During this time the F.B. was observed to rock in its bed of coagulum, gradually come out of it, and lie across the wound. The magnet was then too hot to manipulate, and it was considered that its insulation was in danger. The patient was returned to bed.

On Aug. 2, under continuous pentothal, the mesial sclera was freely exposed, the internal rectus being divided again to give free access. The scleral suture was removed from the original wound, on which the beak-shaped terminal was placed. The wound elevated slightly at the first magnet application, and the particle, less in size than the head of a half-inch pin, came out at the sixth trial without any haemorrhage or vitreous showing.

The post-operative course has been uneventful. The vitreous remained clear and the vision good—6/9 with lens.

Commentary

It has long been known that intermittent applications repeated at a number of sittings will succeed in moving a feebly magnetic particle (see Crawford, R. A. D., *Brit. J. Ophthalm.*, 1943, 27, 227), and no doubt others have had similar experiences to ours with recent battle casualties; but it seemed to us and to Major Applin that it may not be generally realized that a small magnetic F.B. or a larger feebly magnetic particle may behave as a non-metallic F.B. for a considerable number of magnet applications and be labelled as such. Moreover, with such particles the magnet test of pain production in a cocaineized eye is useless.

There are further lessons to be learned from this case and other recent cases we have dealt with.

1. The posterior route is ordinarily best for posterior-segment F.B.s.

2. The shortest route to the exterior is probably always best, provided it does not drag the particle over or through an intraocular part or structure of relatively greater importance than that in which it is lodged.

3. A beak-shaped magnet terminal is almost essential for work well behind the equator; a blunt cone-shaped terminal is sometimes a danger, especially with highly magnetic large bodies, unless they are situated in the anterior segment, since the field is too diffuse to direct the delivery accurately.

4. The removal of small metallic intraocular F.B.s of feeble magnetism, which it is desirable to remove as in the case of iron compounds, is sometimes determined by the patience and perseverance of operator and patient and the life of the magnet and rectifier—possibly oftener than we have thought heretofore.

5. It is perhaps stating the obvious to say that exploration of intraocular F.B.s lodged superficially in the skin of face or body or in the conjunctiva, as to their composition and magnetism, is desirable.

6. To those accustomed to the localization of civil hospitals in peacetime the slower and less accurate methods necessitated by war conditions constitute a great handicap.

7. The fact that frequent applications of the giant magnet increase the magnetism of feebly magnetic alloys should influence technique.

8. The application of a surface diathermy terminal to the sclera in the neighbourhood of a metallic intraocular F.B. is likely to produce an uncontrollable reaction emanating from the F.B. For this and other reasons (e.g., the greater difficulty of withdrawing a magnetic particle from a bed of coagulum) it is probably better technique to apply diathermy to the neighbourhood of the scleral wound after the F.B. is removed.

9. If prolonged applications of the Army portable giant magnet are required, as in the case described above, it is almost essential to place it on an adjustable stand with a tilting top, beside the operating-table.

In this article only a representative few of these papers will be considered. Prof. Tröltzsch of Würzburg in 1867 recorded the frequency with which he found purulent otitis media in infants aged from 16 hours to 1 year. Parrot (1877), in Paris, was surprised how often he found pus in the middle ear of infants at necropsy. In his lectures on "l'athrepsie" he expressed the opinion that there was close association between athrepsia and otitis media: "Soit comme maladie primitive, soit comme complication." Johnston, Brown, and Tisdall (1930) in a clinical study of 171 cases of intestinal intoxication found otitis media in 109 (63.7%), the predominant organism being the streptococcus, which has also been recorded as the chief causative organism in American reviews of the subject. They point out the differences between the symptoms of gastro-enteritis and those of classical primary mastoiditis, and conclude that "intestinal intoxication is not due to masked infection in the middle ears and mastoid antra." Findlay (1932) and Yampolsky (1933) hold the same opinion. Melle (1934) reported on the examination of mastoids in 300 consecutive necropsies in children. In 140 no abnormality was found in middle ears or mastoids, though of this number 62 had died of some alimentary condition. In the remaining 160 pus was found in the middle ear or mastoid. The cause of death in 73 of these had been alimentary intoxication or chronic malnutrition. The remaining 87 of the "pus in mastoid" group had died of causes other than alimentary. In other words, pus in the middle ear or mastoid was not found more often in patients dying of acute alimentary intoxication or chronic malnutrition than in those dying of any other cause. He stated that "from a clinical point of view, and from one's observations at post-mortem, I can see no justification for blaming the mastoid as the primary cause of an acute alimentary intoxication."

Le Mée (1937), discussing Parrot's findings, suggested that the condition was a "post-mortem empyema" and the mechanism one of elementary physics. Cooling of the air in a cavity results in a reduction of pressure, and suction of adjacent fluid (in this case from the pharynx) takes place. Consequently, if looked for, pus may be found not only in the middle-ear cavities but also in the sinuses of infants. Le Mée thought that "the finding of pus in the middle-ear cavities of infants had not the same significance as in the child." Ebbs (1937) examined at necropsy the ears of 880 children aged up to 14 years who had died from a great variety of medical and surgical conditions. Pus was found in the middle ears of just over half of these patients. His series included 603 infants under 1 year, and 61% of them had purulent otitis media when examined after death. A clinical history of "gastro-enteritis" was obtained in 238 infants under 2 years, and 81.4% of these had pus in the mastoids. Further, he found at necropsy that 71.6% of 134 so-called "primary pneumonias" and 70% of secondary pneumonias had otitis media. Ebbs concluded that "otitis media [as found in his series] had played a very large part as the aetiological, complicating, or final cause of death in a great many of these children."

Cooper (1937), investigating infantile diarrhoea clinically in 300 infants, found parenteral infection in 122. Though otitis media was by far the most common infection, "it did not seem to prejudice the outlook." McConkey and Ross Couper (1938) found that of 1,324 infants admitted to hospital, 195 had otitis media or otitis media and mastoiditis, and they thought that the presence of these was responsible for diarrhoea and vomiting in a certain proportion of cases, especially in the toxic groups, caused by "a pent-up infection in the middle ear" and lack of drainage. Campbell and Cunningham (1941), with 574 cases of gastro-enteritis, concluded that "only those parenteral infections found in the early days of illness could be regarded as playing a part in causing the disease."

The question of the association between infantile diarrhoea and vomiting and middle-ear infection has been raised again by Leathart (1943), who believes that "many infants dying from diarrhoea, vomiting, and dehydration have had in addition an unsuspected bilateral mastoiditis two or three weeks before death." He attributes the condition to milk, vomit, or infected mucus entering the Eustachian tube in children either too young or too ill to sit up and accordingly nursed while lying on their

LATENT MASTOIDITIS IN INFANCY

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The frequency with which pus is found at necropsy in the middle ears and mastoid cavities of infants is now generally recognized, but the exact part it plays in the causation of death is still controversial. The present paper is based on an analysis of 120 consecutive necropsies in which the middle ears were specially examined. It is felt that observations on a comparatively small series might be of value in reaching a solution to what is admittedly a difficult clinico-pathological problem.

The Literature

The literature is extensive, but the conclusions reached by the various authors on the significance of latent mastoiditis in infancy and early childhood are by no means unanimous.