findings were absolutely atypical; (2) the 3-para described at the beginning of this paper.

Enough has been said to draw attention to the fact that the time has come to review our ideas on eclampsia. For statistical purposes "fits" were, in the past, considered a necessary accompaniment of eclampsia. It should now be decided whether fits are a necessary factor, and whether the treatment suitable for the typical eclamptic is suitable also for the atypical—that is, for the chronic nephritic. There is no doubt that the ordinary eclamptic who has not had a severe cerebral haemorrhage will recover with careful palliative treatment, but the woman with nephritis will often fail to do so.

TOOTH EXTRACTION AND CHRONIC INFECTIVE ENDOCARDITIS

BY

HERBERT H. BROWN, M.D., F.R.C.S.

CONSULTING SURGEON TO THE EAST SUFFOLK HOSPITAL

It is recognized that many chronic diseases, especially of the rheumatic type, such as arthritis, fibrositis, neuritis, iritis, etc., are due to the repeated absorption of toxin from a chronic focus of infection with streptococci—generally the *Streptococcus viridans*, but sometimes haemolytic streptococci. One of the commonest situations for this focal infection is at the apex of a tooth, where the toxin is produced under tension and readily absorbed. It has become almost the general practice to recommend patients suffering from one of these rheumatic manifestations to have an x-ray examination, and, if marked apical rarefaction is revealed, to have the offending tooth or teeth extracted.

DANGER OF LOWERED RESISTANCE

Fortunately, even if a large number of teeth are removed at one sitting, the operation is not generally a very serious matter, and recovery is speedy and normal. But if for any reason the patient's resistance against streptococcal infection is low, there may be very serious danger. As Sir William Willcox¹ has pointed out:

"The resistance of a person to a dental infection may be broken down by the constant dosage of the blood stream with toxic products from the focus of infection. A condition of sensitization then results. . . . I have, on several occasions, seen fatal septicaemia and malignant endocarditis follow extraction of infected teeth in a patient in poor health with a low immunity."

It is to this grave danger that I especially wish to draw attention. It may, and certainly does, happen that chronic infective endocarditis comes on without any obvious cause, although in these cases the same germ, generally the *Streptococcus viridans*, which is present in the blood, may be cultured from the apex of an infected tooth. This suggests that the tooth was the primary focus of infection in a patient whose blood shows an abnormal deficiency in bactericidal powers against this organism. But blood infection is more likely to occur in a patient with a very low degree of immunity if blood and lymph channels are opened up by the trauma of tooth extraction, especially if the extraction is a difficult one, requiring more force than usual.

In recent years local anaesthesia by infiltration of the gum and tooth socket with an anaesthetic such as novocain has been very widely practised. Where there is obvious septic infection of the gums a local anaesthetic is not often given, but in apical infection, only revealed by x-ray examination, it is quite usual for extraction to be performed under local anaesthesia. I think there can be no doubt that forcing a fluid under considerable tension

into the comparatively rigid and resisting tissues of the gum and periodontal membranes must tend to carry any germs which may be present in these tissues into the lymphatics, and so to the blood stream, with a danger, if the blood should happen to have no bactericidal power against the infecting organism, of starting a serious and fatal blood infection, such as subacute infective endocarditis. Two cases of this disease following tooth extraction under local anaesthesia are recorded in the *British Medical Journal* (July, 1931) by Dr. L. Abrahamson. In each case there was pre-existing valvular disease, and in both local anaesthesia was used.

I had the opportunity of seeing, not long ago, another case in which chronic infective endocarditis followed immediately upon extraction of a tooth.

ILLUSTRATIVE CASE

The patient, a lady of about 50, was in a poor state of health, and had been advised to have her teeth examined. The radiologist found evidence of alveolar absorption in most of the teeth, but especially in three of them. He advised that, owing to the state of her health, little should be done at the moment, but recommended that one of them, which showed the greatest evidence of damage, should be extracted. This was done on October 26th, 1929, but I have not been able to ascertain whether local anaesthesia was employed. On the following day her temperature rose slightly, and continued a subfebrile course, from 99° to 100° or 101° F., during the remainder of her illness.

Haemolytic streptococci were cultured from the tooth socket, but were not found in the blood. The leucocyte count was 8,000, polymorphs 73 per cent., and the polynuclear count showed a marked shift to the left. Streptococci were also cultured in the patient's blood, which had no bactericidal effect upon them. The pathologist concluded that it was probable that there was a low-grade blood infection, although no growth had been obtained from the blood.

Ten days later she was visited by a London consultant, who reported that heart and lungs were sound, and gave a good prognosis as to recovery. A month later another blood examination and culture was made; leucocytosis had now increased to 13,000, polymorphs 77 per cent., but still no culture was obtained from the blood. The consultant, who had been kept informed of the progress of the case, expressed his belief that she was suffering from a low-grade type of septicaemia from a focal infection in connexion with the teeth, and strongly urged the advisability of the extraction of more teeth, as he believed that she would not improve until the focus had been removed. Three teeth were accordingly extracted between December 18th and December 28th under local anaesthesia.

The temperature rose somewhat after the first extraction, and her general condition became rapidly worse. I saw her for the first time on January 4th. She was then in a very serious condition, obviously suffering from endocarditis and myocardial infection. She died on January 10th, 1930.

The mode of onset of the symptoms and the course of the disease clearly indicate a blood infection with subacute endocarditis originating from the first tooth extraction, and very much aggravated by the three subsequent extractions under local infiltration, which introduced a larger number of streptococci into the blood stream. The febrile condition was not due to repeated doses of toxin from an infected focus, but to the elaboration of toxin in the blood from the blood infection with streptococci. Removal of more teeth materially aggravated the infection, adding fuel to the fire.

COMMENTARY

The danger of extracting teeth with apical streptococcal infection is a real one, as these cases show, and I feel convinced that the danger is increased if local anaesthesia by infiltration of the gum is made use of.

Unfortunately, it is not at present feasible to estimate the patient's blood resistance to the infecting organism unless a culture can be made and tested against the

blood. To do this a tooth must be extracted. But it would be a wise precaution, especially in the case of an individual already suffering from valvular disease, or one who may seem for other reasons to be liable to have a weak resistance, to extract *one tooth* only in the first instance, under a general anaesthetic such as nitrous oxide; to make a culture from the tooth; and to test the patient's blood for bactericidal power against it. If the blood has no bactericidal power, an attempt may be made to improve it by graduated doses of vaccine, beginning with very small doses, before any more teeth are removed. In any case of this kind a general anaesthetic, and not local infiltration, is indicated.

REFERENCE

¹ *Clinical Journal*, September 3rd, 1930.

Memoranda

MEDICAL, SURGICAL, OBSTETRICAL

HAEMATOMA OF THE GASTRO-COLIC OMENTUM

This is a case of such rarity that I am prompted to submit it for publication.

A married woman, aged 31, attended the out-patient department, Soho Hospital for Women, on June 16th, 1931, complaining of an abdominal swelling, which she had noticed for fourteen days, and which at times disappeared. During the previous two days it had increased in size, and had become tender. In the preceding week vomiting had occurred twice, and was accompanied by severe pain in the region of the swelling. She noticed that on walking there was a dull aching sensation around the umbilicus. Both micturition and menstruation were regular. The patient had four children, and her confinements had been normal.

On examination there was found to the left of the mid-line, and just above the umbilicus, a circumscribed, dull, tender mass about the size of a small orange. It was freely movable. Examination of the pelvis, cardio-vascular, respiratory, and urinary systems revealed nothing abnormal. Radiograms of the kidneys demonstrated no displacement of these organs.

Laparotomy was performed on July 7th. A purple-coloured lobulated mass was found lying in the gastro-colic omentum. Inferiorly it was attached to the upper and anterior aspect of the middle of the transverse colon, while superiorly it was found adherent to the greater curvature of the stomach. The mass was easily liberated from the colon, but was firmly fixed to the wall of the stomach. During the manipulations the capsule ruptured. The fluid discharged was tarry and glutinous, bearing a marked similarity to the contents of a chocolate cyst of the ovary. The greater portion of the mass was removed, but the upper part was so densely fixed to the stomach that it was deemed wiser to leave it. Into this remaining loculation a small rubber drainage tube was passed. The rest of the abdominal viscera were examined, and appeared to be normal. The drainage tube was removed after twenty-four hours. Convalescence was uninterrupted, and the patient left the hospital three weeks after the operation.

The pathological report recorded the presence of a mass of blood clot, with a capsule of fibrous tissue; no omental tissue was to be seen.

The literature on the subject is scanty. Louis Timbal¹ published a monograph in which he described two cases of haematoma of the great omentum; both patients died. There are three varieties of blood cysts: (1) a true serous cyst into which bleeding occurs; (2) a primary encysted haemorrhage of the mesentery or omentum due to a rupture of an arteriole; (3) a haemorrhage into the general peritoneal cavity, which becomes secondarily encysted

in the mesentery or omentum. Trauma is a most constant factor in the aetiology. It is interesting to note that there was no history of injury in this case. Only by pathological examination can the types be differentiated. In the case described there was merely a mass of blood clot surrounded by fibrous tissue. The haemorrhage had not taken place into a true and pre-formed sac, since no serous covering could be identified in the microscopical section.

I should like to express my gratitude to Mr. H. Sidney Forsdike for allowing me to publish this case.

W. C. W. NIXON, F.R.C.S.

British Medical Association

CLINICAL AND SCIENTIFIC PROCEEDINGS

SOUTH-EASTERN COUNTIES DIVISION

Specific Therapy of Puerperal Fever, Erysipelas, and Scarlet Fever

At a meeting of the South-Eastern Counties Division of the Edinburgh Branch, held on March 16th, with Dr. MARSHALL in the chair, an address was delivered by Dr. T. W. BENSON, medical superintendent of the City Hospital, Edinburgh, on the specific therapy of puerperal fever, erysipelas, and scarlet fever.

Dr. Benson considered that these diseases were all manifestations of infection by haemolytic streptococci, but there were essential differences in the disease processes. In scarlet fever the streptococcus remained, in the majority of cases, localized in the throat, the systemic disturbance—as evidenced by rash, pyrexia, headache, and vomiting—being due to the absorption of soluble exotoxins. In erysipelas the infecting organisms were situated in the deeper layers of the skin, where was set up the inflammatory process which showed the characteristic tendency to spread. Constitutional disturbance pointed to the absorption of toxin; the fact that erysipelas, characterized by severe systemic disturbance, not infrequently occurred in Dick-negative individuals suggested that the toxæmia was due to an endotoxin. In puerperal infection a new problem appeared—namely, the invasive power of the haemolytic streptococcus. A serum to be effective required not only to be able to neutralize toxins produced by infecting organisms, but to destroy germs it must be bactericidal as well as antitoxic. The facts that the exotoxins produced by different strains of *Streptococcus haemolyticus* seemed to have no qualitative difference, and the majority of them were neutralized by a single antitoxin, had an important bearing on the serotherapy of streptococcal infections in general. Therapeutic serums could be divided broadly into two groups: antitoxic and anti-bacterial. Antitoxic serum aimed at the direct neutralization of bacterial exotoxins, and proved reliable in practice. The acute toxæmia shown in diphtheria, tetanus, and scarlet fever was of only a few days' duration, and the injection of an adequate amount of neutralizing serum would enable the patient to tide over the acute stage. On the other hand, anti-bacterial serums had proved disappointing. It was necessary to aim at the actual destruction of invading germs and the neutralization of endotoxins. Here adequate dosage was essential, and since the bacteriaemic phase might be protracted, the injection might have to be continued over a comparatively long period. The following commercial therapeutic serums against haemolytic streptococcal infections were now available: scarlet fever antitoxic serum, erysipelas antitoxic serum, and puerperal fever antitoxic serum. The essential difference between these modern serums and the polyvalent anti-streptococcal preparations

¹ Les Kystes Sanguins du Mésentère, *Rev. de Chir.*, 1910, xli, 45, 227.