THE USE OF STRIPS OF HERNIAL SAC AS FASCIAL (LIVING) SUTURES.

BY

F. R. BROWN, M.B., F.R.C.S. Ed.,

SURGEON, ROYAL VICTORIA HOSPITAL, DUNDEE; ASSISTANT SURGEON,
ROYAL INFIRMARY, DUNDEE.

SOME years ago (1925), while operating for old-standing oblique inguinal hernia in a man of 57 with weak and lax inguinal musculature, it was my intention to reconstruct

FIG. 1.

the canal by using strips of fascia lata after the method introduced by Gallie and Le Mesurier.¹ Having dissected out and removed the sac, which was unusually long and thick, I was struck by the possibility of using strips cut from the sac itself, in the same manner as strips of fascia lata or of aponeurosis of the external oblique muscle.

In this first case the method adopted was to slit the sac up on either side to within about one inch of the fundus, so that the sac when opened out became a rough rectangular sheet measuring about eleven inches by two and a half inches (Fig. 1). From this sheet

strips a quarter of an inch wide were cut, and the operation was completed by two rows of sutures, following Gallie's technique.

This case proved completely successful, and I have now used the procedure in a large number, with some modifications in the method of cutting the strips, as illustrated in Figs. 2 and 3. Where a strip the length of the opened-out sac—that is, almost twice the length of the intact sac—would be considered too short, strips may be cut as in

FIG. 2.

FIG. 3.

Fig. 2, where the whole sac is cut into one or more long ribbons as required. Fig. 3 shows the sac cut in spiral fashion. In this method, the sac is steadied by the assistant's fingers, or may be held on a glove stretcher or two pairs of long artery forceps. Thus really long strips, suitable for continuous suturing, can be got from sacs of moderate size if desired, although it is generally in the large sac type of hernia that fascial sutures are necessary. The width of the strips can be varied according to the thickness of the sac; in a large thin-walled sac the strips may be as much as half an inch wide in order to have a sufficiently strong suture.

This procedure may be employed (1) as an alternative to the use of fascia lata or of the aponeurosis of the external oblique, or (2) in conjunction with the latter; in a recent case the sac was so small that, when cut in spiral fashion, only one rather weak strip about twelve inches long resulted, and two supplementary strips of external oblique aponeurosis were used.

So far, I have carried out this method only in cases of oblique inguinal hernia. There are obvious limitations to its use, and rarely would a sac of ample size be present in direct and femoral hernias.

REFERENCE.

¹ *Brit. Journ. of Surg.*, 1924-25, xii, 289

UNDULANT FEVER DUE TO BRUCELLA ABORTUS:

ISOLATION OF THE ORGANISM FROM THE URINE.

BY

COLONEL W. P. MACARTHUR, M.D., F.R.C.P.I.,
D.P.H., D.T.M. AND H.,

AND

MAJOR J. B. A. WIGMORE, M.B., M.R.C.S., L.R.C.P.,
D.T.M. AND H., R.A.M.C.

UP to the present seventeen cases of human infection with *Brucella abortus* have been reported in England. In only one of these¹ was the causal organism recovered, in this instance from the blood. The remaining sixteen were diagnosed by agglutination reactions only. It seems appropriate, therefore, to record another case of *Br. abortus* infection, the first in this country in which the organism has been isolated from the urine.

The patient is a lady, aged 53, resident in Manchester. Except for a brief visit to Switzerland ten years ago, she has not left the British Isles during the past twenty years. In April, 1929, she spent ten days holidaying in Ludlow, returning to Manchester on April 22nd. During the second week of May she complained of pain in one ankle, and was feverish and shivery at night, but in the mornings felt better. On the morning of May 13th she was definitely unwell, and her temperature was found to be over 102° F. The febrile attack lasted until May 29th, when the temperature, previously gradually declining, remained normal for twenty-four hours, but on the next day it commenced to rise again. Relapses, of the duration shown, followed the original attack: May 31st to July 16th; July 20th to August 2nd; August 4th to August 7th; September 14th to September 18th; November 2nd to November 27th; December 9th to December 31st. The relapses are counted from the first recorded rise of temperature to the last day that the evening temperature was above normal.

At the beginning of the first relapse the physician in charge, Dr. Florence Robinson, sent specimens of blood, urine, and faeces for examination. Agglutination tests for the typhoid group were negative, and on Professor Shaw Dunn's suggestion the serum was put up against *Br. abortus*, with a positive result. Two blood cultures (June 4th and 10th) were negative. Professor Murray saw the patient in consultation on June 10th, and the case was regarded as probably one of infection by *Br. abortus*, although the causal organism was not isolated.

During the afebrile interval following the fourth relapse the patient came to London, and on November 2nd another relapse commenced. One of us saw her in consultation on November 8th. The general condition was strongly suggestive of undulant fever. She was restless, sleepless, and despondent almost to tearfulness. The temperature fluctuated usually between 101° and 103°, and once reached 104°. Nevertheless there was little prostration, and the efforts of the nurse in charge were necessary to prevent the patient from rising at night and wandering about the house. The pulse rate was from 80 to 90. Tenderness was marked over the splenic area, but there was a difference of opinion as to whether or not the spleen was palpable. The tongue, which had been covered with a silvery fur at the beginning of the relapse, was then clean except for some persisting patches. One ankle was painful and tender. The bowels were loose, and dark offensive motions, free from any trace of mucus or blood, were passed, sometimes as many as six in the day. Obstinate constipation had been a feature of the five previous attacks. On November 10th a red papular rash appeared rather thickly over the body and limbs; rashes of various types are, of course, not uncommon in "Malta" fever. At this stage the tongue had become quite clean, and the appetite was good.

Catheter specimens of urine were taken for culture on November 11th and 12th. The first was sterile. Of the second sample 10 c.cm. were added to each of twelve tubes containing 10 c.cm. of glucose

broth, and incubated for forty-eight hours at 37° C. Two of the tubes showed cloudiness. Subculture of these on agar plates gave a growth of circular, convex, translucent colonies which microscopically showed small Gram-negative organisms distinctly more bacilliform than *Br. melitensis*. They did not ferment any sugar, and gave an alkaline reaction in litmus milk.

This organism was agglutinated by serums prepared from three undoubted strains of *Br. abortus*, with end-points as follows:

1. Swine strain of *Br. abortus*... up to 1 in 2,500
2. "Abortus No. 5" ... up to 1 in 1,250
3. "Bang" (Oxford strain) ... up to 1 in 500

It is important to note that these serums were prepared by injecting rabbits with living cultures. The standard agglutinating serum of Oxford (prepared from dead cultures) did not cause any agglutination. The organism was not agglutinated by serums prepared from two undoubted strains of *Br. melitensis*, but it is significant that a serum prepared from a strain of *Br. paramelitensis* gave an agglutination up to 1 in 500.

A serum was prepared by injecting a rabbit intravenously with increasing doses of living cultures of the organism under examination. This serum agglutinated thirteen different strains of *Brucella*, the highest end-point (1 in 1,250) being given by the swine strain of *Br. abortus*.

The patient's blood serum agglutinated twenty-two different strains of the *Brucella* group, giving titres up to 1 in 250 with *Br. melitensis* and *Br. paramelitensis* strains, and up to 1 in 2,500 with the swine strain of *Br. abortus*. Using the standard agglutinable cultures of Oxford, and of the Royal Army Medical College, the *Br. abortus* cultures agglutinated up to titre, but the *Br. melitensis* cultures did not agglutinate up to more than half the full titre.

An autogenous vaccine was prepared and its administration commenced after the last relapse. Up to the time of writing (March 28th, 1930) the patient has remained free from any further symptoms of the disease.

The strain of *Br. abortus* isolated from this patient grew readily from the urine in ordinary media, and in the absence of an atmosphere of CO₂. This, together with the results of the agglutination tests given above, suggests that it belongs to the swine variety.

REFERENCE.

- ¹ Nightingale and Wilson (1929): *Lancet*, cexvii, 1143.

A CASE OF BRUCELLA ABORTUS INFECTION.

BY

E. ROLAND WILLIAMS, M.A., M.R.C.S., L.R.C.P.,

MAENCLOCHOG;

AND

A. F. SLADDEN, M.A., D.M.Oxon.,

DIRECTOR, BECK LABORATORY, SWANSEA.

UNDULANT fever due to the organism which sets up epizootic abortion in cattle, goats, sheep, and swine has been described as "a disease of the future," and also as a possible addition to the lengthening list of occupational diseases, for it has its highest incidence among those who have direct contact with cattle, live or dead. In 1924 and 1925 ten cases only were recorded in the United States, but in 1928 and the early months of 1929, when physicians had become more widely aware of the disease, over a thousand cases were reported in forty-two States. In Denmark 222 cases were brought to light during the first year when the disease was systematically sought.

The case about to be described is the second reported to have occurred in Wales and the fifteenth or sixteenth recorded in Great Britain. Possibly, however, the number of cases recorded is not a true measure of the incidence of human infection. It has been suggested also that there is a real extension of the disease in most countries, coincident with more frequent and widespread epizootics of abortion among cattle; in this connexion may be cited cases recently reported from New Zealand by Gilmour and Ludbrook and by L. J. F. Bull.

Wilson and Nutt, investigating the mixed milks from herds in Cheshire, Lancashire, Derbyshire, Staffordshire, and Northumberland, established the presence of *Br. abortus* in 8.8 per cent. of the samples. Although the mortality is very low (about 2 per cent.) and permanent impairment of health apparently rare, incapacity is often of long

duration, many cases being ill for one or even two years. The record of the following case may therefore prove of interest, especially as it exemplifies many salient signs and symptoms of the disease.

On January 6th last one of us was called to see a farmer, aged 53, who had lived all his life in the same locality in Pembrokeshire. He definitely became ill on January 2nd with headache, backache, and nausea, but for a week prior to that he had felt vaguely unwell, getting very fatigued and having to lie down in the afternoons. When first seen he had a temperature of 103°, with a pulse of 96. He had a violent cough, and complained of much headache, restlessness, and insomnia. The heart sounds were rather poorly defined, and the breath sounds were defective at the right base. He was bringing up a type of copious white sputum, which led to the suspicion of some degree of pulmonary oedema. At this time the case was thought to be influenza.

During the days immediately following the temperature remained at 102°, with a relatively slow but feeble and intermittent pulse. The blood pressure (85/125) seemed much below what one would expect in a plethoric man of his age. There was a trace of albumin in the urine. The patient complained of very heavy drenching morning sweats and severe pains in the calves of the legs. There were no definite rigors, and no mention was made of any peculiar odour of the perspiration.

On January 12th the spleen, which was rather soft, could just be palpated below the costal arch. This observation, along with the history of insidious onset, the comparative (though not complete) absence of upper respiratory catarrh, and the fact that no one else in the house had developed influenza, led to a suspicion of paratyphoid, and a blood specimen was sent to the Beck Laboratory. Serum from this, of the tenth definite day of illness, was tested for agglutination power by the Dreyer technique against *B. typhosus* and paratyphoid A and B, with negative results even in low dilutions.

In view of the occupation of the patient and the knowledge that *Br. abortus* infection in man may be acquired from cattle, a further agglutination test with *Br. abortus* (Oxford emulsion) was made, and strong agglutination found up to a dilution of 1 in 2,500. This is well beyond the limit of any non-significant response, and indicated past or present infection by this organism. As cases of "undulant fever" are found to give positive agglutination also with *Br. melitensis*, the organism of Mediterranean fever, the serum was also tested with an emulsion of the latter obtained from Messrs. Burroughs Wellcome and Co.; this test proved positive to a dilution of 1 in 2,500 also.

It is still a moot point whether the two organisms, *Br. abortus* and *Br. melitensis*, are to be regarded as identical or whether they represent two closely allied species. Their clinical effects on the human subject appear to be similar, and both organisms have been shown to produce abortion in the cow. It may be significant that *abortus* cases have been studied chiefly from cow-borne infections, whether direct or through cow's milk, whereas our knowledge of *melitensis* cases comes chiefly from infections arising through goat's milk. It may well be that passage of the organism through the cow and the goat respectively may produce slight serological differences in organisms originally identical.

In the case under consideration there have been no opportunities of isolating the organism, and therefore no agglutinin absorption experiments have been possible. The very definite serological reactions, however, coupled with the very complete clinical picture and the history of the environment and circumstances of the patient, would seem to have established beyond reasonable doubt that this illness was due to infection by *Br. abortus*.

Further inquiries made in the patient's locality brought out evidence that: (a) epidemic abortion was especially rife among cattle in the village where the patient lived; this was vouched for by the local veterinary surgeon; (b) four of the patient's cows had "lost their calves" during the preceding six months; (c) he last had a cow abort about three weeks before he definitely became ill; into that cow he had inserted pessaries manually "to help to clear her up."

The further clinical course may be summarized thus:

On January 14th the temperature in the evening was down to 100°, with pulse of 84. The cardiac condition had improved, and the spleen could only just be felt. Sweats were still complained of, there were still loud rales at both bases, and resonance and breath sounds were impaired at the right base. On January 15th the chest signs were more pronounced, the temperature was 101°, and the pulse 84; there was some pain in the left cheek. On the