separated as completely as possible and a drainage tube inserted from which for a few days a small amount of bile escaped.

After the operation the coughing of bile ceased completely for five days and then began again. He continued to cough up a considerable quantity for some time, but it steadily diminished and ceased altogether about a month after the operation. He was discharged on January 9th of this year, feeling well, free from cough, and having gained several pounds in weight. The wound was quite healed, the crepitations at the right base had gone, but some dullness remained. The signs in the abdomen were unchanged.

When examined again, six months later, he felt perfectly well and was doing full work. He had regained his former weight, the enlarged veins in the abdominal wall had disappeared, and there were no abnormal signs in the chest with the exception of slight persistent dullness.

It is an uncommon event for bile, at any rate in quantity, to find its way into the thoracic cavity. When an abscess of the liver ruptures it does so most commonly upwards through the diaphragm, either into the pleura or into the lung, and in the latter case large amounts of pus may be evacuated via the bronchi, and sometimes the pus is mixed with bile. In the present case an abscess of the liver appears to have penetrated the diaphragm and discharged itself into the lung, and at the

same time to have effected a communication with one of the larger bile passages, with the result that pure bile continued to escape long after all pus had disappeared. This seems altogether more probable than the alternative supposition that the primary focus was an empyema which burrowed through the diaphragm and deeply into the lung.

T. R. Elliott and H. Henry¹ described some cases of internal biliary fistulae—one into the lung and one into the pleura—which resulted from gunshot wounds. They noted particularly with regard to the latter, in which pure bile was aspirated from the pleural cavity, the absence of any evidence of an inflammatory reaction on the part of the pleura. The expectorated bile in the present case was similarly lacking in inflammatory products. There was no pus visible either to the naked eye or microscopically during the whole period of observation, though a few organisms were found in it.

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RESTORATION OF THE ROUND LIGAMENTS.*

BY

ARTHUR J. NYULASY, M.R.C.S.ENG.,

GYNAECOLOGIST TO THE PERTH HOSPITAL, AUSTRALIA.

IN one of his many moments of inspiration Lawson Tait fixed the fundus of a retroverted uterus to the anterior abdominal wall by a silk stitch. Out of this inspiration to meet a sudden emergency during a pelvic operation was evolved the independent operation of hysteropexy—an operation which by its very simplicity captured the imagination of gynaecologists and very largely held the field a couple of decades ago in the surgical treatment of retroversion of the uterus. But with the progress of the years evil sequelae were reported, and then came the reaction from the early enthusiasm—a reaction threatening to relegate hysteropexy to the surgical scrap-heap.

Meanwhile the popularity of the Alexander-Adams operation had necessarily waned, in spite of its proven value, and in spite of Goldspohn and Stewart McKay having both shown that during the course of the operation limited access to the pelvic abdomen might be obtained through the same skin incision. It was not, however, until after the year 1900, when the intra-abdominal operation of Gilliam had entered the field, that the prestige of the Alexander-Adams operation was seriously imperilled. But with the advent of the Gilliam operation was ushered in a wave of enthusiasm for the free intra-abdominal method of curtailing the overstretched round ligaments, and to-day the Gilliam procedure or one of its modifications appears to be that most commonly employed in British communities, although it must be admitted that the Baldy-Webster operation has many warm advocates. This latter operation, as with certain others (Mann, Dudley, Murphy) shortens the overstretched round ligaments by eliminating its inner portion, while the Gilliam type and the Alexander-Adams cuts out the outer portion of the ligament.

Long simply puckers up ("shirring") as much of the intra-abdominal portion of the ligament as may be necessary to produce anteversion of the uterus.

Genesis of the Operation.

With the exception of hysteropexy most of the numerous operations for retroversion are based on the view that the excess in length of the overstretched round ligaments should be eliminated by excision or by looping. This view is obviously opposed to the fundamental surgical principle that the ideal treatment of an acquired abnormality is that which restores it to the normal. The ideal treatment then of an overstretched round ligament would be the restoration of the ligament to its original dimensions. How was this end to be achieved?

It first occurred to me that, in retroversion, hysteropexy (Kelly) might be carried out, and the "false ligament" cut away a year or two later. I had seen cases in which this had been done, and in which the uterus had subsequently maintained its anteversion. In such cases the abdomen had been opened on the second occasion to deal with some fresh condition. To re-open the abdomen, however, solely to cut away the "false ligament" seemed to me, on consideration, unlikely to be practicable, and I abandoned the idea,

Restoration of the round ligaments. A., Fold of anterior leaf of broad ligament, between round ligament and bladder; C.C., forceps and cut edges of incision in anterior leaf of broad ligament; P., purse-string; U., uterus; B., bladder; I.R., internal abdominal ring. Drawn from a dissection made in the Perth Hospital, with photographs by Dr. G. W. Barker.

although the fundamental principle as to the ideal treatment of acquired abnormalities still dominated my outlook.

Meanwhile I had been employing the Montgomery-Gilliam operation, but towards the end of 1913 I began a new procedure, sewing up a loop in the round ligament reached by a short incision parallel to it in the anterior leaf of the broad ligament. One day I noticed that when I had tied a purse-string to close the opening in the broad ligament the uterine anteversion was increased beyond that produced by the loop in the round ligament. In subsequent cases I applied this observation, when necessary, by deliberately extending the incision (and the outer and inner limits of the purse-string). But during this period I made two other observations: (1) that the material of the anterior leaf of the broad ligament generally appeared to be stronger than simple peritoneum; and (2) that in many cases of retroversion this leaf of the broad

* Read before the West Australian Branch of the British Medical Association on September 20th, 1922.

ligament was unduly lax. Whether this laxity was cause or effect I was unable to decide. It seemed plausible that it might represent a result of frequent overdistension of the bladder; but, on the other hand, it might represent an effect of long retroversion of the uterus, the primary fault being softening of the round ligaments from congestion extending from the uterus. However, whether the laxity was cause or effect, it appeared reasonable to think that by removing it and placing the uterus in anteversion the overstretched round ligaments would be given physiological rest and thus put in the best position for restoration to the normal.

By this time (about June, 1914) the meaning and force of my observations had become fairly well crystallized. I was satisfied that the material of the anterior leaf of the broad ligament was elastic and strong enough to hold the uterus anteverted, without direct interference with the round ligaments, and, furthermore, that by adequate extension of the incision (and purse-string) in the broad ligament the undue laxity of the anterior leaf of the broad ligament must be reduced.

The Operation.

The way was now clear to put these views to the test of practice, and on July 9th, 1914, I deliberately carried out the operation of restoration of the round ligaments in a case of retroversion in the Perth Hospital. This operation consists in splitting the anterior leaf of the broad ligament parallel to the round ligament, between the round ligament and the bladder, undermining the opening, and closing it by a purse-string, the outer limit of the purse-string being in the vicinity of the internal abdominal ring and the inner limit being towards the uterine cornu. The immediate effect is to bring the uterus into anteversion, and to demonstrate the round ligaments contracted down to their normal length—an interesting physiological experiment performed directly under the eye. Furthermore, the undue laxity of the anterior leaf of the broad ligament is seen to be reduced.

Results.

I have carried out the operation of restoration of the round ligaments in over two hundred cases, many of them subsequently going through pregnancy and parturition, so that I am in a position to speak with some little authority as to the value of the operation. In one case the operation was performed in about the sixth week of gestation, and there was no subsequent trouble, parturition being quite normal and the uterus remaining anteverted. In another case, recently reopened for some fresh morbid condition a few years after the operation, there was no obvious evidence of the primary operation, the uterus being in anteversion and having its normal motility, although there had been an intervening parturition. On the other hand, in another recent case, in which the Montgomery-Gilliam operation had been carried out some years earlier, hysterectomy proved exceptionally trying on account of the anatomical disorder in the pelvis caused by the first operation.

Standard of Efficiency.

The conditions to be fulfilled by an ideal operation for retroversion of the uterus may be stated as follows: (1) It will conform with the principles of rational surgery in that it restores the abnormalities to the normal; (2) it will permit of adequate access to the pelvic abdomen; (3) it will leave no condition which may prove a source of future disability or danger; (4) it will stand the strain of pregnancy and parturition; and (5) it will not complicate future operations on the pelvic abdomen.

I know of no operation which appears to fulfil these conditions so completely as restoration of the round ligaments. This restores the round ligaments to their original condition as nearly as is ever likely to be possible, while at the same time it reduces undue laxity of the anterior leaf of the broad ligaments. It practically restores the abnormal to the normal without introducing any factor that might prove a source of trouble either of itself or in case the abdomen should need to be reopened in the future. In none of the cases subsequently coming under my notice have pregnancy and parturition been attended with difficulty from the operation or with recurrence of the retroversion.

Operative Technique.

A good light and the Trendelenburg position are almost essential. The suprapubic abdominal incision may be the ordinary vertical or the transverse. Retraction of the wound edges should be adequate to expose the round ligament in its whole length in the abdomen. For the incision in the anterior leaf of the broad ligament a fold is raised between the round ligament and the bladder, snipped into, and the opening

freely undermined, and extended outwards and inwards. The commencement (outer limit) of the purse-string suture (silk or Pagenstecher) is made near, and a little on the pelvic side of, the internal abdominal ring. The suture terminates just beyond the inner end of the incision. If the free ends of the purse-string are now caught together and pulled on, the tissue in which the thread is placed will be drawn somewhat inwards. This new point marks the outer limit of the purse-string when tied, and thus permits us to fix on the inner limit necessary to produce the desired amount of anteversion of the uterus. (The round ligament and the bladder must be avoided in passing the purse-string; when the purse-string is tied the raw edges of the incision should have been buried.) If, when the purse-string is tied, the uterine anteversion is found insufficient, it may be readily increased by the same suture either by taking in the uterus near the cornu or by taking a fresh bite farther outwards in the broad ligament. It is convenient to work from the side (of the patient) opposite to the round ligament being dealt with. When the operation is completed a narrow raised fold of the broad ligament is noted extending across the utero-vesical interspace; this can prove in no way a detriment to the patient.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

A POSSIBLE CASE OF BRONCHO-PULMONARY SPIROCHAETOSIS.

In the discussion on the differential diagnosis of pulmonary tuberculosis at the Glasgow meeting of the British Medical Association Dr. James Lawson referred to broncho-pulmonary spirochaetosis, and instanced a possible case under observation at Tor-na-Dee Sanatorium. The results of further investigation of this case are, I think, worthy of record, since the evidence is conflicting and leaves the diagnosis doubtful.

The patient was a lady aged 40, who had never been abroad except for a year at school in France and Switzerland. Down to five years before admission she had always had good health except for otitis media as a child. At the age of 33 she had whooping-cough, which left her with a cough and a little sputum for about four months. The sputum was streaked with blood once; it was repeatedly examined for tubercle bacilli, with negative results. She had an attack of influenza four years later, which was followed by a persistent cough with sputum, and on three occasions at intervals of about three weeks she had small but definite haemoptyses. She was seen by a consulting physician, who diagnosed pulmonary tuberculosis and advised sanatorium treatment.

There was no history of tuberculosis in her blood relations, but her husband had died of pulmonary tuberculosis six years before her admission. She complained of a rather troublesome cough with copious sputum, and slight huskiness of the voice on waking. The sputum was copious, thin, and very fetid, and on standing separated into an upper clear watery layer and a lower layer of yellowish-grey pulaceous material. Repeated examination by ordinary and concentration methods of twenty-four hours' samples failed to reveal tubercle bacilli, but numerous septic organisms were present, along with large numbers of spirochaetes which at first we thought were the spirilla of Vincent's angina, since she had severe pyorrhoea alveolaris, and the tonsils were a little enlarged, congested, and cryptic. The mucous membrane of the nose and nasopharynx looked unhealthy, but the larynx was normal. The physical signs in the lungs were those of definite infiltration (with râles) of the upper half of the right lung, and doubtful infiltration (without râles) at the left apex. The x rays confirmed these findings, and in addition showed some calcareous deposit at the roots of both lungs, with two small dilated bronchi near the root of the right lung. Her general condition was quite good, and there was practically no systemic disturbance except slight tachycardia. The blood was normal, and the Wassermann reaction was negative.

A provisional diagnosis of pulmonary tuberculosis, with spirochaetal infection of the mouth and fauces, was made. After local treatment the consulting rhinologist declared the upper air passages healthy, and dental treatment was equally successful in clearing up the septic condition of the teeth and gums, but there was practically no diminution of the fetid sputum, and the spirochaetes were as numerous as ever. We therefore formed the opinion that broncho-pulmonary spirochaetosis was a possible diagnosis. An independent bacteriologist was asked to examine the sputum, and he reported that "the spirochaetes are certainly not *S. pallida*, and if infection from the mouth can be excluded it is very possible that they are of the type described by Castellani; they closely resemble the spirochaetes described by him, but similar organisms may be found in the mouth, so that it is not possible to say definitely that they are pathogenic in this case."

The von Pirquet test was inconclusive, only a slight reaction being obtained. Injection of samples of the sputum into guinea-pigs gave negative results as to tuberculosis, and no lesions of any sort were produced. Two successive samples of blood were sent to Drs. Gosse and Punch for the complement fixation test, and both were "positive."

On the above evidence it is very difficult to make an exact diagnosis, but taking all the facts into consideration I think it