the point of the needle should enter the sheath of the nerve before the solution is injected; the sensations of the patient are the best guide to the position of the needle. Pain may be lessened by a preliminary anaesthetization of the skin with novocain and by injecting 1 or 2 c.cm. of the novocain solution into the nerve as soon as the point of the needle enters the nerve sheath. A considerable bulk of saline solution must be injected; I have been in the habit of using 100 c.cm. The pain produced at the time is not as a rule of great severity or of long duration, and can be controlled by an injection of 1/4 grain of morphine. The patient should remain in bed for at least twenty-four hours after this little operation. In many cases it is advisable to repeat the injection at a different point in the trunk of the nerve after an interval of three or four days. Harris² advises two such injections, one just below the notch and one on the level of the tuberosity of the ischium, as mentioned already.

Another method of value in these cases of sciatic neuritis is the injection of oxygen. A needle and tubing are attached to a cylinder of oxygen, the flow being carefully graduated; the needle is inserted so as to lie in close proximity to the nerve trunk, and enough of the gas is injected to produce a definite ballooning of the tissues.

The stretching of the nerve trunk by forcible manipulations is probably of little service. In a very few cases which have resisted all other methods of treatment it may be justifiable to cut down on the nerve and freely incise the sheath in a longitudinal direction—a procedure which has given relief in cases which had previously proved intractable.

If we believe that we are dealing with a case of "central sciatica," using that term in the sense already explained, it will manifestly be of little service to inject the trunk of the nerve. In such cases very great temporary relief may be obtained by an epidural injection—a method strongly advocated by Sicard. In this method a needle is passed into the sacro-coccygeal foramen and the solution injected into the epidural space in this region, where it can come into immediate contact with the nerve roots. Various solutions have been used for this purpose—normal saline, novocain, and, what I have always used personally with quite good results, a 40 per cent. solution of antipyrine, of which 10 to 20 c.cm. may easily be injected. It is advisable to anaesthetize the track of the needle with novocain, and to have the patient either lying on the affected side or in the genu-pectoral position; a long needle is also essential, especially in fat subjects. As a rule, the relief afforded by this manœuvre is almost immediate, and often quite dramatic; it is easily repeated if needed. This last procedure, coupled with the local and continued application of heat in some form or another, is usually successful in relieving most cases of central sciatica. Any focus of infection must be treated, and some help is afforded, I think, by the use of one of the many varieties of so-called protein shock therapy, such as the intramuscular injection of milk or the intravenous injections of *B. coli* or T.A.B. vaccine.

Putti is convinced of the importance of immobilization as the essential factor in the treatment of these central sciaticas. This he obtains by means of a plaster jacket, to be worn daily for increasing periods until it can be tolerated continuously. It is later replaced by a celluloid corset, which is worn for a prolonged period, six months at least, or even a year. My experience of this form of treatment is at present too limited to allow me to express any personal opinion, but the strong views of Putti must compel a careful attention.

On the other hand, in the more chronic cases of this kind I have become convinced of the great benefits to be derived by carefully designed manipulations under an anaesthetic. Manipulative treatment, again, according to Hoyt Cox and many others, is the only method of useful treatment in cases believed to be due to chronic subluxations of the sacro-iliac joint. In many of the cases of chronic sciatic pains following trauma, even where there is no reason for thinking that this joint has been affected, much benefit often follows manipulations or mobilization. Into the details of these methods space forbids me to enter, but I do wish to make an earnest plea for their consideration.

With this sketch of the treatment of certain forms of sciatica my remarks must be concluded. This disorder, so common and yet so crippling, affords the widest scope for the exercise of our science and our art, and although its care may not excite the admiration of the crowd or intrigue the fancy of the aspiring student, its many difficulties, diagnostic and therapeutic, will be amply rewarded by the gratitude of the patient who has been successfully and permanently relieved.

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SUPPURATIVE PYLEPHLEBITIS AND HEPATIC ABSCESES COMPLICATING APPENDICITIS:

A CASE OF RECOVERY.

BY

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In non-tropical countries appendicitis is the commonest cause of hepatic abscess,¹ but it is a rare complication and one which is as a rule associated with a suppurative pylephlebitis. In the majority of cases small septic emboli become detached from a thrombus in the immediate neighbourhood of an inflamed appendix, and travel through the superior mesenteric and portal veins to the liver, causing a suppurative pylephlebitis. Usually the emboli are numerous and highly septic, producing multiple abscesses throughout the liver and rapidly causing death. The abscesses occupy, as a rule, the right lobe, because of the distribution of the branches of the portal vein. It has been shown that there are two currents of blood in the portal vein—one from the superior mesenteric, which goes to the right lobe, and one from the inferior mesenteric and splenic, which flows to the left lobe. Occasionally a solitary abscess may develop, but this is exceptional. Typically the symptoms of a localized abscess are quite unlike those of multiple abscesses; the onset of the latter is associated with rigors, intermittent temperature, rapid prostration, and grave constitutional disturbances. The former starts less abruptly and does not display anything characteristic in its symptomatology; after a variable interval, usually some weeks, a patient who has had an attack of appendicitis develops a rise in temperature, malaise, and, later, perhaps enlargement of the liver associated with hepatic pain.

Clinically, hepatic abscess complicating appendicitis and suppurative pylephlebitis cannot be separated. When there is suppurative within the portal vein the liver is uniformly enlarged and tender, although pain may not be a marked feature,² and is often absent. There is an irregular septic fever and the complexion is muddy, sometimes distinctly icteroid; jaundice is, as a rule, of mild degree, often being absent. The liver is enlarged and tender, and the spleen in later stages becomes similarly affected. There is a high leucocytosis, and, according to Keene,³ the condition always ends fatally; while Osler⁴ states that pyaemic abscess (of the liver) and suppurative pylephlebitis are invariably fatal, and surgical measures are not justified unless an abscess shows signs of pointing.

It will be seen, then, that the condition is an uncommon one, and that recovery is extremely rare, and we feel that we are justified in publishing the notes of the following case.

A man, aged 30, was admitted to St. Bartholomew's Hospital on June 16th, 1927, having been sent up by his doctor on account of irregular fever. The history was as follows. He was in his usual health until May 7th, 1927, when he had an attack of epigastric pain which lasted four hours and was severe enough to double him up; later that day he vomited three or four times. He felt better the next day and continued at his work; but three days later, not feeling in his usual health, he consulted his doctor.

The patient was ordered to bed and stayed there until his admission to hospital some six weeks later. During the whole of this time until June 9th he had no definite symptoms or signs beyond feeling ill and becoming progressively weaker. From June 9th to June 16th, approximately five weeks after the onset of his illness, he had a rigor every day. There was nothing in his family or past history of importance relating to his present condition, and he had never been abroad.

On admission he looked very toxic and ill; he had a muddy complexion and a drawn anxious expression, and there was great emaciation. Temperature 99.8° F., pulse 120, respirations 30. He was not jaundiced, the tongue was dry and furred, and the breath was offensive. There was a slight fullness in the right lower chest extending downwards to the right hypochondrium; the respiratory movement of the right side was restricted. Vocal fremitus was absent in the right axilla and right base, the percussion note being much impaired and the breath sounds weak over this area. There were no added sounds in the lungs, and the left lung was normal. The heart was normal. The abdomen moved well on respiration; there was a slight fullness in the right hypochondriac region continuous with that in the right lower chest. The liver dullness was increased to the fourth rib above in the mid-clavicular line, but it did not extend downwards beyond the costal margin. There was no tenderness or rigidity even on deep palpation over the liver, spleen, or right iliac fossa. The spleen and kidneys were not felt. The urine was normal. A white blood count showed 27,000 cells per c.mm.

On June 17th the right chest was explored in the seventh intercostal space in the post-axillary line, with negative results. Next day, under α rays, it was seen that the right dome of the diaphragm was abnormally high and that its movements were limited. The diagnosis of right subphrenic abscess was suggested. On June 19th the right subphrenic space was explored, with negative results. During these few days his temperature rose to 103° F. each evening, and fell to 99° each morning. The pulse varied from 130 to 120, the respirations were 25. There were no rigors.

During the next few days his general condition became worse and the physical signs changed. The conjunctivae became slightly jaundiced, his spleen became palpable, and there was epigastric tenderness. In addition there was now a definite outward bulging of the right hypochondrium, and the liver was palpable below the level of the costal margin. A white blood count showed 27,000 cells per c.mm.; a differential count revealed a polymorphonuclear leucocytosis. Blood culture was negative.

On June 25th the patient was extremely ill; he was seen for the first time by Mr. T. P. Dunhill, who made a diagnosis of right subphrenic abscess or hepatic abscess, and advised an exploratory laparotomy. This was performed on the same day by Mr. Dunhill, nitrous oxide gas and oxygen being the anaesthetic, together with local anaesthetic (1 per cent. solution of novocain) for infiltration of the anterior abdominal wall. The abdomen was opened through a right paramedian incision. On opening the peritoneal cavity the liver was found to be much enlarged, a deep purple colour, and intensely congested; it blanched on pressure and was oedematous; there was no perihepatitis. There were some areas paler than normal, and on palpation they felt firmer than the intervening liver tissue, suggesting induration underlying them deep in the liver. The largest of these areas, about three inches in diameter, was situated in the left lobe of the liver, and smaller ones were in the right lobe. It was then decided to explore the indurated area in the left lobe with a syringe. Pus was discovered and about 1 c.cm. withdrawn. The gall-bladder was normal; the portal vein was palpated and appeared to be thickened. The appendix was next examined and found to be surrounded by recent adhesions, the last two inches of it being buried in a loop of mesentery. On peeling it out this two inches was distended with fluid, which afterwards proved to be mucus. It was lying in a mass of material which was obviously the remains of an abscess. Appendicectomy was then performed; the peritoneal cavity was packed off and the left lobe of the liver was next opened up with Spencer Wells forceps at the point at which pus had been found; the haemorrhage was considerable, but no more pus escaped. A rubber drainage tube was inserted deeply into the liver and held in position by a catgut suture, two other sutures controlling the haemorrhage. The abdomen was then closed.

The pus from the liver was examined pathologically and proved to be Gram-negative coliform bacilli.

After History.—Pus was discharged in large amounts through the drainage tube for the first few days, and then the quantity gradually diminished. The temperature varied from 100° to 98.4° F., pulse from 130 to 110, respirations 26. The patient felt better, the appetite rapidly improved, and he slept well. On the fourth day after the operation the white blood count showed 22,800 cells per c.mm. On the eighth day the drainage tube came away with the dressing; the temperature dropped to normal, and remained so; the pulse was 100. On the tenth day the white blood count was 7,200 cells per c.mm. He made an uninterrupted recovery and was discharged on the twentieth day. He was seen again on November 23rd, when he was in the best of health and had regained his normal weight.

The interesting features of the case are: (1) The mildness of the signs and symptoms from the beginning of the illness, including the attack of appendicitis, up till the onset of the rigors some five weeks later. (2) The interval which elapsed between the attack of appendicitis and the onset of suppurative pylephlebitis and hepatic abscess, as indicated by the rigors. (3) The slight jaundice, profound

toxaemia, rapid prostration, enlarging liver and spleen associated with the onset of portal pyaemia, and leucocytosis.

The whole story is typical of this condition, except for the fact that the patient recovered. The significance of the case lies in the importance of draining the liver and in the proof it affords that the condition, although one of extreme gravity, is not necessarily fatal.

While in St. Bartholomew's Hospital the patient was under the care of Dr. C. M. Hinds Howell and the Surgical Professorial Unit, to whom we wish to express our thanks for permission to publish the case notes.

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THE EXAMINATION OF URINE FOR PUS.

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THE presence of pus in the urine can only be established certainly by microscopical examination. Other methods of testing for it, such as the guaiac and caustic potash tests, or simple turbidity estimations, only give positive results when much pus is present; they are open to many fallacies because they are not in any way specific. Microscopical examination requires some preliminary preparation of the urine; this has been hitherto effected by centrifuging or sedimentation. A method which obviated preliminary preparation would be an advantage, because the apparatus necessary for centrifuging is not always available, and it may be inconvenient to wait while the cells of the urine settle in a conical vessel. Moreover, each of these methods has certain inherent disadvantages too often overlooked. In the case of the centrifuge the faster the revolutions and the longer the time revolved the more numerous are the formed elements swung to the bottom of the tube, so that a diagnosis of pus is more likely to be made by the owner of a powerful centrifuge than by one who relies on simpler apparatus. The disadvantages and fallacies of sedimentation are so obvious that it is surprising to see such methods still trusted. The rate of sedimentation depends on so many variable factors, and the cells are often unrecognizably deformed consequent on the increased alkalinity accompanying bacterial fermentation.

The following method of microscopic examination of urine for pus can be performed immediately the urine is voided. The test is completed in two or three minutes, and the only apparatus required is a microscope, a pipette, a ruled slide, and cover-glass. The method has the great advantage also of expressing the amount of pus quantitatively as cells per cubic millimetre, a procedure of special value in those doubtful cases in which one observer reports "excess of leucocytes" and another "small quantities of pus." It allows also a record to be kept of the progress of the disease, the increase or decrease of pus being registered as easily as the temperature and pulse.

Method of Counting Leucocytes in Urine.

The formed elements of the urine (casts, red blood corpuscles, and leucocytes) are enumerated in a counting chamber by a method similar in principle to that employed for blood counts. The chamber differs in that the glass cell is 0.2 mm. in depth and not 0.1 mm. as in the ordinary haemocytometer, and the area of the ruled lines is 16 sq. mm. The Fuchs-Rosenthal slide for enumeration of cells in the cerebro-spinal fluid is very suitable for this urine test and the one now recommended, but other cerebro-spinal fluid chambers providing a depth of 0.2 mm. may be easily adapted. The ordinary haemocytometer cell is unsuitable because the volume enclosed in it is too small. The ruled area of the Fuchs-Rosenthal slide encloses a square, each side of which is 4 mm. in length, the enclosed space therefore being 16 sq. mm. (See Fig. 1.) This large square is divided into sixteen smaller squares, distinguished by being bordered by three lines, each of which encloses one square millimetre. Each of these is again divided into sixteen squares, bounded by sides 1/4 mm. in length. Since the cell is 0.2 mm. in depth (this being the distance between platform and cover-glass) the volume enclosed in the whole cell is $16 \times 0.2 = 3.2$ c.mm.

The urine to be tested is shaken thoroughly to distribute the cells evenly; a sample is then taken with a clean rubber teat pipette, and a drop of the urine is transferred to the platform of