be removed before packing. As the portion of the pack which is actually in the rent controls the haemorrhage by pressure, caution must be exercised in its removal.

Conclusion

According to the investigations into the causes of maternal mortality, post-partum haemorrhage is responsible for 7.5 per cent. of the deaths in New York, 6.3 per cent. in England and Wales, and 3.9 per cent. in Scotland. In addition, it is a factor in deaths classified under shock, sepsis, placenta praevia, etc. Every effort should be made to reduce this mortality by:

1. Treatment of anaemia during the ante-natal period.
2. Refraining from interference with the normal uterine action during the third stage.
3. Realizing the danger of attempting delivery through the partially dilated cervix.
4. Early recognition of the failure of the normal mechanism of placental separation.
5. Having adequate equipment prepared to deal with the haemorrhage rapidly; particularly where the history or the patient's general condition suggests the likelihood of bleeding.

An ounce of forethought may save pints of blood.

Summary

The paper deals with the mechanism of separation of the placenta, suggesting that the Schultz method, rather than the Matthews Duncan, is the normal one.

Post-partum haemorrhage is divided into three classes: (1) placental site haemorrhage; (2) true atonic haemorrhage, where there is no bleeding till after delivery of the placenta; (3) traumatic haemorrhage, where the bleeding comes from lacerations in some part of the birth canal.

Premature separation of the placenta may be held to be the cause of the first type of haemorrhage. Causes of the separation are discussed, and signs and symptoms described.

Treatment of this type of haemorrhage is considered in some detail, particularly with regard to manual removal of the placenta and packing of the uterus.

The other two types of haemorrhage are dealt with briefly, but attention is called to the difficulty which sometimes arises in the diagnosis of traumatic haemorrhage.

In conclusion, some suggestions are made for lowering the mortality from this condition.

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In conjunction with the fifteenth annual Congress of Anaesthetists in Philadelphia from October 16 to 20 there will be sessions of the International Anaesthesia Research Society, the International College of Anaesthetists, the Eastern Society of Anaesthetists, and the Philadelphia County Dental Society. During that week also there will be in progress the Clinical Congress of Surgeons. A preliminary programme has been issued. It may be obtained from the secretaries of the constituent societies, or from Dr. H. W. Featherstone, 54, Newhall Street, Birmingham, or Dr. J. H. T. Challis, Pond House, Firs Walk, Woodford Green, Essex. Anaesthesia clinics will be held in various hospitals, also special research demonstrations. One afternoon and the following morning have been set aside for papers on current researches in anaesthesia and analgesia, and there will be various papers and discussions on the problems relating thereto. The memorial address on October 17 will be devoted to the life and work of the late Dr. Louis H. Maxson.

PRE- AND POST-OPERATIVE TREATMENT OF HEPATO-BILIARY DISEASES

BY

Professor B. O. C. PRIBRAM, L.R.C.P.Ed.

"A surgeon, unless he degenerates into a mere technician, must be a physician who operates."

—CONNELL.

Research in the last decade, especially concerning recurrent troubles after operation, has proved that there is practically no gall-stone disease where the liver is not affected to some degree. It must be stated that the stone formation in the external bile ducts is not always the primary pathological process, and that the liver is affected only in a secondary way. Hepatitis is often the primary change, and only followed by an affection of the external bile-duct apparatus and the gall-bladder. But obviously the changes in the external bile ducts, with all their complications and the immediate danger to life, become so outstanding and predominant that they must necessarily be the main object of treatment. On the other hand, medical treatment is from the very beginning, even when interrupted by surgical intervention, so important that the close co-operation of physician and surgeon should be considered from the outset of the disease. The expression "pre- and post-operative treatment" does not fully express the importance of the task of the physician and general practitioner. This close co-operation should be advocated from the very first also as regards the indications. We frequently observe a truly vicious circle concerning this important question. The physician advises an operation only if there is danger to life or where all conservative attempts have failed. Obviously the general state of the patient is then bad and the liver in a condition of latent or manifest insufficiency. The operative risk is great, the mortality high. This high mortality, on the other hand, makes the physician even more cautious, so that he advocates the operation only in an emergency. This vicious circle—high mortality, late indication; late indication, high mortality—should be broken either by the physician sending the patient to be operated on at an early stage of the disease or by the surgeon succeeding in improving the technique and lowering the operative mortality and thus convincing the physician of the efficiency of operative treatment.

The fate of our patients, not only regarding immediate recovery after operation but the chance to be free of all symptoms, depends to a large extent on the restoring of damaged functions of the liver. When reading the opening paper on the insufficiency of the liver from the surgical point of view, at the International Congress at Vichy in 1937, I was able to state that the majority of the disturbances of liver function in hepato-biliary diseases were due to hepatitis in the widest sense of the word. Therefore, the treatment of hepatitis from the very outset until a long time after the operation is one of the main tasks which we have to undertake. Another point is the choice of the most favourable time for operation. This concerns the important question of whether we must operate after the onset of the symptoms or whether there is a chance of improving the general state of the patient by medical treatment and postponing the operation until general conditions are more favourable. This point is especially important in the case of a mechanical occlusion of the common duct. It will be dealt with fully.

Acute Cholecystitis (Acute Occlusion of Cystic Duct)

The most alarming symptoms of acute cholecystitis appear when in an inflamed bladder a stone slips into the neck of the bladder or into the opening of the cystic duct, causing acute obstruction which can be immediately followed by a serious flaring up of a violent infection. The main dangers are perforation of the bladder in the abdominal cavity, causing general biliary peritonitis, or a partial or even total gangrene of the organ. Streptococci and coli bacilli are the most dangerous infecting germs.

In a number of cases an acute infarction and necrosis due to the stone without evidence of serious infection can be found as cause of the perforation of the bladder. Most surgeons prefer to operate in a state when the acute alarming symptoms are settling down, and by careful observation we are sometimes undoubtedly able to postpone the operation until the process is more localized; but a permanent careful observation is indispensable in order to be prepared to operate immediately when the danger of perforation or gangrene increases. I have found that there is a difference in opinion whether hot fomentations or ice should be applied in such cases, as it has been decided to wait before performing the operation. There can be no doubt that in acute cases hot fomentations increase the danger of perforation and spreading of the infection, because the course of all vital processes, especially inflammatory ones, is intensified by high temperature, whereas we can achieve a slowing down of the process by lowering the temperature by means of ice. So there should be a rule that in acute stages of localized peritonitis and danger of perforation ice should be applied in order to retard the local process and gain time for the body to increase its resistance to the infection and, on the spot, to localize the infection by adhesions. Indeed, in most cases we obtain a quick localization by applying ice bottles for a few days. Hot fomentations should be kept for the later course, when absorption of the exudate is the purpose of our treatment.

The reluctance of most surgeons to operate in the very acute stages has been due to the fact that statistical figures have proved that the operative risk is higher in the acute than in the more chronic stage. But I must say that when applying the modern electrosurgical operation (mucoclasia)* this difference between operating in an acute or chronic state no longer exists. By means of electro-coagulation we can practically sterilize all abscesses, and the reaction of the surrounding tissue is so favourably increased that the tendency to heal is improved, and this to such an extent that we are able to close primarily the abdominal wall even in acute and badly infected cases; so I should think that there is no need to worry as to whether we can overcome the acute stage when other indications point for an early operation.

Pre-operative Liver Treatment

It might be observed that the most frequent response of the liver in hepato-biliary diseases, especially in the case of acute infection, is a marked oedema of the liver, comparable to oedema of all infected tissues. This oedema of the liver causes the organ to be considerably enlarged. I have found such an oedematous liver of a soft and frail consistency, reaching more than a handbreadth under the costal arch. This oedema is characterized by its fleeting character. It is the very first stage of hepatitis, and can be distinguished from the so-called "serous inflammation"

(Rössle, Eppinger) by the fact that, whereas in the latter case the exudation is rich in proteins, in the case of the oedema mentioned exudation contains scarcely any albumin and can be reabsorbed very quickly by the blood capillaries themselves. We sometimes encounter this liver oedema only as a sign of a functional weakness of the liver during digestion. The fact that in some persons it is observed after the intake of a special kind of food, towards which the patient is particularly intolerant, sometimes gives this oedema an allergic character. However, it is always a sign of functional weakness. The combating of this acute oedema is a very important task in the pre- and post-operative treatment of the liver, and this can be achieved quite easily by osmotic therapy when dehydrating the liver by intravenous injection of hypertonic solutions. Thus we start the pre-operative treatment of our patients a few days before the operation with daily intravenous injections of 50 per cent. glucose combined with calcium.† The effect of this procedure can be observed in a striking way: the enlargement of the liver diminishes and the undue pressure in the epigastrium, which the patient felt previously as a symptom of the tension of Glisson's capsule, very soon relaxes.

Cardiovascular Preparation

Some physicians and surgeons advocate treatment with digitalis or other cardiac stimulants before operation in all cases. We are rather reluctant to do so, and have always found, in intimate collaboration with our consulting physicians, that the pre-operative cardiovascular treatment of all cases as a routine is not necessary or even advisable. We limit cardiac treatment to the demands of a special case, and must say that, according to our experience, the strain of the operation on the patient's heart has been rather overrated. If we analyse all cases with fatal issue we can find scarcely one that is evidently due to overstrain of the heart and circulation immediately after the operation. Cases of acute cardiovascular collapse occur, however, following removal of an obstruction of the common duct and the resulting sudden decompression. This condition is later dealt with more fully.

The most striking case I have observed is that of a woman of 73 with cholaemia, septicaemia, and diabetes due to chronic pancreatitis. Before the anaesthetic could be administered she suffered a serious circulatory collapse on the operating table, and for one hour we had to apply all kinds of stimulants before we could start. The operation, which was quickly performed under spinal anaesthesia (mucoclasia of the empyematous bladder and removal of a common duct stone), was undergone by the patient without the slightest change in the circulatory conditions. Apart from the heart trouble from which she has suffered for years, she now—eight years after the operation and at the age of 81—enjoys a satisfactory general state of health.

The cardiovascular disturbance in the post-operative course, starting mainly from the third or fourth day, is in most cases a purely secondary one, due to absorption of toxic products from the operation field. These toxic products are frequently proteinogenous products of histamine character, but also bacteriogenic toxins, all damaging to peripheral circulation and causing lowering of the blood pressure.

This toxic insufficiency of the peripheral circulation is best combated by an intravenous-drip infusion, which, according to my experience, has proved very satisfactory in the detoxication of the patient and the improvement of the whole circulation. The choice of the solution is

* Pribram, 1929.

† 10 c.cm. of a 10 per cent. solution of calcium gluconate.

important. I often apply glucose and saline, but have found a mixture of citrate-salt solutions in addition very helpful. The patient should not perspire, even when a drip-infusion is continued for four or five days. Perspiration is a sign that the solution has not been retained in the blood vessels and that it permeates the capillaries. If there is any inclination to perspire, a 1 per cent. calcium citrate solution should be added to the intravenous infusion. Parathormone injections (5 units), retaining the calcium level in the blood, have also proved useful. In cases where the peritoneum is endangered by infection, the application of coli serum, or anti-gas-gangrene serum has proved extremely satisfactory. 20 c.cm. of coli serum (200–500 units) intramuscularly, and 5 c.cm. of anti-gas serum (10,000 units) in the first three days. We do not know whether it is indeed specific, or whether the results arise from a general effect of serum; but there can be no doubt as to its efficiency, and in view of my experience during the last ten years I can warmly recommend this treatment. The effect has sometimes been so striking that I do not hesitate to say that a number of patients seriously endangered by the toxic products absorbed from the inflamed peritoneum were saved by use of this serum.

Prophylaxis of Cholaemic Haemorrhage

Post-operative haemorrhage in cases of jaundice is one of the most serious and often fatal complications. It is the main fear in cases where the jaundice has already lasted several weeks before operation. Concerning this point we can say that the danger of this haemorrhage has, according to our statistical figures, diminished considerably through the means we have adopted. The best prophylaxis against cholaemic haemorrhage we have found in the perfecting of the surgical methods—electrosurgical operations (mucoclasia), exact peritonization, and the simplification of the operation for common duct stones by the ether method—but, putting aside these purely technical advances, one of the main points is that operation should not be postponed when a diagnosis of mechanical occlusion has been established. It was the general rule to wait for three to six weeks and to apply conservative treatment until the decision to operate was made. The reason given was that the occluding stone might pass the papilla spontaneously—and we must sometimes wait to see whether this expectation is fulfilled. This period seems to me much too long. The chance that we try to give the patient by postponing the operation involves great danger of a considerable increase of the operative risk, when at last we are forced to operate. Our modern method enables us to make the diagnosis of the mechanical obstruction in a very short time and with a high degree of certainty. The daily determination of bilirubin in the blood serum has proved very helpful. The rapid rise of the bilirubin curve after attack, and its maintenance at a certain level or its further slow increase, is a definite sign of acute obstruction which is unlikely to be removed by conservative methods. Any further delay in operating serves no useful purpose, but increases the operative risk because of progressive damage to the liver. Much more difficult is the diagnosis and indication in cases where the fall of the bilirubin curve and the appearance of bile dyes in the stool suggest that the papilla has become free. The patient should be given every chance by postponing the operation, which can be performed under far more favourable conditions when the tissues are free from bilirubin. We would be wrong, however, in concluding from a falling

bilirubin curve that the stones had in fact passed the papilla and the common duct had been emptied of stones. Indeed, one is sometimes surprised to find the common duct filled with stones high up into the hepatic ducts in spite of the fact that the bilirubin content of the blood has become normal. The explanation is often that a piece of stone has slipped into the papilla or that an acute spasm of the sphincter round the stone made the obstruction complete and was the cause of the clinical attack. The spasm having relaxed, the bile can again drain past the stones into the duodenum. It is not always a so-called "successful attack"—that is, with stones passing through the papilla—but merely a *change in the position of the stones*, which may in a short time again take a turn for the worse. *A falling bilirubin curve, therefore, should not affect our decision to operate at all.* We should only take advantage of the opportunity to operate when the tissues are free from bile dyes and the liver has recovered. We never know whether a fresh attack may again destroy these favourable conditions. We must insist on the necessity of early operation in these cases because our therapeutical results, where there is already a manifest insufficiency of the liver, are somewhat unsatisfactory.

These general rules for an early operation on an obstructed common duct should always be observed. As for the medical prophylaxis, we might state that the popular calcium treatment should be supported by application of parathormone, the hormone of the parathyroid gland (0.5–1 c.cm. intramuscularly or intravenously). Whereas in the case of calcium application the calcium level in the blood serum falls quickly after a certain time, after parathormone application the calcium remains on a higher level. We can warmly recommend this parathormone-calcium treatment in all cases endangered by cholaemic bleeding.

Another way to influence the haemorrhagic state in the case of jaundice is by the application of vitamins. A number of observations indicate various relations between deficiency of vitamins and the tendency to haemorrhagic diathesis, so the analysis of these factors is not quite clear. The fat-soluble vitamins A and D facilitate the resorption of calcium and phosphorus from the intestines; but the resorption of these vitamins from the intestinal tract is interfered with by the absence of bile acids. B-carotene, the precursor of vitamin A, is not absorbed at all in the absence of bile, so we can easily explain a relative deficiency of this vitamin in the case of obstructive jaundice. To the water-soluble vitamin C the control of nutrition of the capillaries is attributed. Just recently the influence of vitamin K on haemorrhagic diathesis has been studied and its value emphasized. From a practical point of view I have the definite impression that vitamin therapy is useful in cases of jaundice. I give the vitamin C in the form of orange juice, with glucose, if the intake of fluid is not impaired, or by injection of redoxon (Roche). Vitamin D can be assimilated by giving 30 drops of viosterol three times a day. Vitamin K is not yet available for general use.

Post-operative Acute Insufficiency of the Liver

Acute insufficiency of the liver in the post-operative course is the most serious complication, and is to a high degree fatal. Clinically the patients become more and more sleepy, and this condition ends in cholaemic coma eight to ten days after the operation. Anatomically we find an acute necrosing hepatitis, and, we may say, also an acute atrophy with extensive fatty degeneration. The liver

cells are full of fat, while glycogen is very poor or entirely absent, and this even when we have given a large amount of glucose as a pre- and post-operative measure. In these cases the liver cells have irreparably lost their main vital function of storing glycogen. The largest supply of glucose with insulin in addition is no longer capable of restoring this function. However, when treating these serious cases the best thing is to apply glucose with a few units of insulin in an intravenous-drip infusion (1 unit to 4 grammes of glucose). We may add calcium and parathormone.

The best way is undoubtedly to avoid the development of such a breakdown of the liver function by an early operation. A definite form of this acute insufficiency sometimes follows upon too sudden an outflow of bile from the common duct after removal of an obstruction. To give an example: We operate on a patient with obstruction of the common duct that has lasted for weeks and even months. The jaundice is considerable, but the patient is apparently still in a satisfactory state of health. The liver works just enough to meet the daily demands. The operation is quite easy and can be quickly performed. The ampulla of Vater can be easily freed by a supra-duodenal incision. We introduce a drain into the common duct and the prognosis seems to be quite favourable. The first three or four days following the operation are satisfactory, and the recovery appears normal. Intestinal motion has already set in and the patient seems to be saved. From the fifth to the eighth day a tendency to sleepiness causes some worry, as the first sign of a turn for the worse. The sleepiness increases during the next few days, and the patient sleeps almost the whole time and can be kept awake only with difficulty and for short periods. Between the eighth and tenth days following the operation the patient dies.

One feels that before the operation there was functional equilibrium of the liver, in spite of the fact that the liver cells were extremely damaged. It appears that the fact of having removed an obstacle, so obviously noxious, has caused a total collapse of the liver function. I have called this state "acute insufficiency of the liver following decompression." It seems that a sudden decrease of pressure in the common duct, after opening it and removing the obstruction, must be regarded at least as one cause of the collapse of the organ.

We have quite a number of analogies in pathology. We must distinguish two forms of such an acute functional collapse after decompression. In one form the state of the heart and circulation is sufficient until the last condition; in other cases cardiovascular symptoms following such a sudden change in the bile duct prevail from the outset. Both types, however, end in a coma which must be regarded as the immediate cause of death.

I have tried to find an explanation for this acute cardiovascular collapse. The liver is not only an admirably working chemical factory but also an organ annexed to the blood circulation. The liver is able to store 20 per cent. of the total amount of blood, and, through this property, is a direct circulatory assistant to the right heart. It relieves the right auricle in the case of insufficiency.

An obstacle in the common duct causes increased pressure and dilatation of the intrahepatic bile ducts. A sudden decrease of this pressure to zero, or even below, causes an afflux of blood, an increase of the blood store in the liver, and the diminution of the amount of circulating blood. It may thus give rise to a serious collapse of the peripheral circulation, especially when this has already

been damaged. This collapse, following the removal of an obstacle and a sudden fall of pressure, is well known in the case of tapping of an ascites, a pleural effusion, or even after an abrupt emptying of a full bladder by catheterization. This organ collapse, and the acute insufficiency of the liver following removal of an obstruction and the sudden decompression, was the subject of study for several years. The practical conclusion was that it would be better to avoid too sudden a fall of pressure in the bile duct when draining, so I never again resorted to drainage of the hepatic duct, but introduced a rubber tube downwards into the common duct, where it was stitched watertight and the drainage allowed simply as a kind of overflow. But even this overflow was allowed only slowly, and was interrupted by closing the tube temporarily with a clamp. I can recommend this procedure as useful, according to my experience. Another suggestion is to abstain from any external drainage in the case of a greatly damaged liver, where we fear a sudden collapse, and to perform instead a choledochoduodenostomy. This procedure can be advocated in cases where there is not a serious infection of the bile ducts.

I have found this operation quite satisfactory in many cases, but I would not go so far as Finsterer and other surgeons in the indication for it—the mortality, according to Finsterer's statistics, still being 9.6 per cent., which is considerably higher than our own figures. Another way to avoid this acute liver collapse is by primary suture of the common duct after removal of stones. I have had splendid instances of recovery after suture of the common duct, but this procedure is in my opinion justified only in cases where a solitary cholesterol stone has caused the obstruction and there is no doubt that this stone is the only one. In all other cases I think it advisable to satisfy ourselves of the state of the common duct by radiographs in the post-operative course (cholangiography).

Post-operative Bowel Motion

I am not in favour of forcing the bowels to move in the first three days after operation. For twenty-four to thirty-six hours the bowels are practically always paralysed, but this not only causes no harm, but the rest provides the best conditions for the abdominal wounds to heal and for inflammatory processes to localize. When the conditions in the abdominal cavity appear to become grave the intestines start to move almost without help. On the other hand, when there is an uncontrolled inflammation any movement excited by forcible means (purgatives, irritants, etc.) may cause a spread of the inflammation. The only thing I do is to give an injection of 20 c.cm. of glycerin into the rectum when the bowels have already started to move; but the rhythm is still disturbed, and the purpose is not achieved. I do not give any oral purgative as a rule before the fifth day. Should peristalsis be delayed in spite of absence of any peritoneal irritation 1/60 grain of physostigmine or prostigmin intravenously has always a reliable effect.

Post-operative Complications

Finally, one cannot insist too much on the post-operative care of the patient, so as to avoid complications affecting the lungs, thrombosis, and embolism.

Lung Complications.—In all operations of the right hypochondrium the right lower lobe of the lung is in some danger through diminished movement of the diaphragm, and also through the direct spreading of infection by the lymphatics. Some of the lung complications are

due to small embolisms arising from infected thrombotic veins in the field of operation. I have no doubt that tamponage of the wounds is sometimes to blame for this. In operating for hepato-biliary diseases I have abandoned tamponage for nearly fifteen years. If drainage is necessary only a rubber drain should be used.

As a prophylactic measure, from the very first day after operation, *breathing exercises*, with lifting and massaging of the legs, have proved helpful. Injections of quinine and calcium 10 per cent. solution have undoubtedly been of benefit in avoiding bronchopneumonia or in aborting it in the very beginning.

Recovery after an operation for hepato-biliary diseases is, when performed in an early stage, almost complete, and the patient does not need any special help. In advanced cases, on the other hand, the number of complications which may arise in the post-operative course may be considerable. As shown above, many of these complications can be avoided by improvement and simplification of surgical technique; but I am also convinced that careful vigilance and treatment in the post-operative course may still save quite a number of patients who are endangered by the manifold complications that may arise in spite of a successful operation.

Summary

In hepato-biliary diseases close co-operation is indispensable between physician and surgeon from the very beginning. This co-operation should concern indication and treatment. When resorting to the electrosurgical method (mucoclasia) operation at a very acute stage does not result in greater risk than when done in a chronic stage, and we no longer need to undertake the danger which the postponement of an early operation may involve.

Treatment of Hepatitis.—The pre- and post-operative treatment of hepatitis, based on hepatic insufficiency, is one of the main tasks of the physician from the very beginning. One of the earliest and most frequent symptoms of acute hepatitis, the acute fleeting oedema of the liver, must be considered. This can be combated very efficiently by means of intravenous injections of hypertonic solution (50 per cent. glucose).

Complications of the Peritoneum.—In cases of peritonitis, injections of coli serum or anti-gas-gangrene serum have proved very efficacious.

Cholaemic haemorrhage is best avoided by early operation and by the simplification of the operative technique (electrosurgical operation, exact peritonization, ether method). Calcium and parathormone injections have proved helpful. Vitamin therapy also gave promising results.

C. C. Macklin (*Med. Rec.*, 1939, **150**, 5), in an investigation of spontaneous mediastinal emphysema, found experimental corroboration of the physical basis of Hamman's sign (a loud "crunching" sound heard over the praecordium and associated with diminution or obliteration of cardiac dullness) in the foam-like blanket of air bubbles seen upon removal of the sternum in cats whose lungs had been locally over-inflated by an air blast introduced into the lower right bronchial tree by way of a catheter. The air was never within the pericardium, but always between the parietal pericardium and the pleura. The air enters the mediastinum through the lung root, and its presence embarrasses the circulation by pressing upon the heart and great vessels. Anginoid pain may be due to direct pressure upon the coronary vessels. Extension upwards, downwards, and laterally into the opposite lung was found.

NEPHRECTOMY WITH PARTIAL RESECTION OF THE OTHER KIDNEY

BY

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Cases in which more than 50 per cent. of the total renal substance has been removed appear to be rare enough to warrant this report.

Case History

The patient was a married woman of 39 known to be suffering from branched calculi in both kidneys. The urine was infected with *Bacillus coli* and streptococci. For some eight years her life had been rendered miserable and uncertain owing to repeated attacks of pyrexia, renal colic, alternately on each side, and, latterly, menacing attacks of anuria from which she narrowly escaped.

Although there was no great discrepancy in the size of the stones as seen on the x-ray film, intravenous pyelography demonstrated that the right kidney was quite active, while the left exhibited no apparent function. Clinical examination together with the history pointed strongly to a left pyonephrosis with a probable secondary perinephric abscess. No alternative presented itself between leaving her to die or endeavouring to effect a cure by operation. The first urge was to remove the main septic focus, re-establish her health, and then deal with the remaining right kidney. The recent history of anuria, however, doubtless due to intermittent blocking of the right ureter, left the uncomfortable feeling that such an attack following left nephrectomy was not only probable but would certainly be fatal.

In order to establish a safety-valve it was accordingly decided to drain the right kidney pelvis after removing the stone and carry out prolonged drainage to secure disinfection and make the inevitable left nephrectomy safe against post-operative anuria. When, however, on June 2, 1937, the right kidney was exposed for this purpose, it was found that crumbling projections of the calculus so filled the minor calices of the lower pole with gritty debris, and the tissues were so frayed and impregnated with pus, that rapid recurrence of the stone seemed inevitable. The lower pole was accordingly amputated at the level of the lower margin of the pelvis, a little more than one-quarter of the kidney being excised. Haemorrhage was checked with ribbon catgut and muscle graft. It was some three days before the insulted organ began to excrete urine through the Malécot tube in the pelvis. After that the flow was copious, while the absence of anything from the bladder except occasional emissions of thick creamy pus confirmed the suspected condition of the other kidney.

The hope that the planned left nephrectomy could be carried out at leisure was nullified by the fierce septic reaction which the lowered resistance caused by the operation permitted. There was a persistent swinging temperature, with evening rises as high as 102° F. The patient's condition steadily deteriorated. By the end of June the red blood count was less than 3,000,000 and haemoglobin was 48 per cent., and it was clear that further delay would secure nothing except still more unfavourable conditions for the inevitable but serious operation in prospect.

The tube had slipped out of the right renal pelvis on the tenth day and could not be replaced. The urine began to pass via the bladder. Providentially, a couple of days before the projected operation the safety-valve re-established itself and all the urine came from the side. The conditions for a clean field with all this soakage were not ideal, and the operation itself was even more difficult than expected. Not one, but two separate perinephric abscesses were encountered on the way to the kidney, one close under the diaphragm. Sharp dissection and the resection of part of the eleventh rib, the twelfth being very short, were necessary before the solid adherent mass of kidney and perinephric tissues were freed