Observations

ON

THE SURGICAL TREATMENT OF OBSTRUCTIVE JAUNDICE FROM AN EXPERIENCE OF OVER 200 CASES.

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My recent operative experience in cases of chronic obstructive jaundice, especially in those associated with gall stones and with chronic pancreatitis, has led me to take a more hopeful attitude in considering the treatment of deeply jaundiced patients from a surgical standpoint; and it is with a view to the expression of my views that I have ventured to respond to the kind invitation of the Council of the Medical Society by giving this paper to-night.

In expressing an opinion that the surgeon has as a rule no business with these cases until the symptoms are well marked, I think it should also be distinctly recognised, not only that no patient should be allowed to die of obstructive jaundice without the question of surgical interference being considered, but also that the question of surgical treatment should be raised at a time when operation may be undertaken, if called for, with a reasonable probability of success.

It has been my unfortunate experience to have to give an opinion on a very large number of such cases at a time when any active interference was out of the question, and when the only interest in the case was the question of diagnosis; and this must have been the experience of many of my surgical brethren.

DIAGNOSIS.

In all chronic jaundice cases the first and often the most difficult question is that of diagnosis, for if we can come to a definite conclusion regarding the cause of the obstruction, the proper treatment to adopt can usually be readily decided on.

The following causes must be taken into consideration :

1. Common duct cholelithiasis.
2. Chronic pancreatitis.
3. Simple stricture of the common bile duct.
4. Inflammatory adhesions causing pressure on or stenosis of the hepatic or of the common bile ducts.
5. Hydatid disease of the liver pressing on or discharging into the bile ducts.
6. Gummata implicating the ducts.
7. Chronic catarrh of the bile ducts.
8. Cancer of the common bile duct.
9. Cancer of the head of the pancreas.
10. Cancer of the liver associated with jaundice either due to catarrh or pressure.
11. Cirrhosis of liver.
12. Other rare causes such as aneurysm of the hepatic artery or of the aorta, and other tumours of the liver, gall bladder, pylorus, kidney, or intestine pressing on or occluding the common bile duct.

It will be at once seen that surgery holds out a good prospect of cure in the first 5 causes enumerated; that medical treatment alone is advisable for causes 6 and 7, and that in the remainder, with certain exceptions, relief only can be hoped for either from medical or surgical treatment.

Although one could easily spend an hour or more in discussing the diagnosis of the various causes, I think it will be more advantageous if I simply mention one or two points that I have found useful in guiding me to a conclusion as to whether the case is suitable for an exploratory operation or not.

A painless onset of chronic jaundice must always give rise to the suspicion either of chronic catarrh dependent on cancer of the liver or of occlusion of the hepatic or common bile duct by growth, and, if this be associated with distension of the gall bladder and rapid loss of weight and strength, cancer of the head of the pancreas will probably be found.

On the other hand, the history of an attack of pain in the upper abdomen, followed within twenty-four or thirty-six hours by jaundice, and preceded by so-called "spasms," either recently or at some remote period, is strongly sug-

gestive of cholelithiasis. In the latter case, the jaundice will probably be less intense than in the former, and an intermittent fever with chills and sweats will probably either be present or have been noticed at some stage of the illness.

Enlargement of the liver is much more common in obstruction due to cancer than in that from gall stones, though it may be present in either; in cancer, however, nodules or irregular bosses may be discovered, and in gall stones an elongation of the right lobe of the liver, which is apt to be mistaken for a distended gall bladder, can often be felt.

The presence of ascites is suggestive of malignant disease, but in one case on which I operated, although there was a fair amount of fluid in the abdomen, I could find no sign of cancer, though there was cirrhosis of the liver due to biliary stagnation from the presence of a gall stone in the common duct for three years. I therefore persevered with the operation, and, after removing the obstruction, stitched up the omentum to the parietes in order to establish a collateral circulation. The patient, a man of 56, is now well. This is, however, an exceptional case, and as a rule the presence of ascites negatives any radical operation on the bile ducts.

In the early stages, difficulties will arise that time will clear up; for instance, the jaundice of gall stones is rarely continuously the same, but increases or diminishes from time to time, whereas the jaundice of obstruction due to growth steadily increases or tends to become absolute, especially in cancer of the bile duct or the head of the pancreas.

The element of time alone is of importance in diagnosis, for jaundice with malignant disease runs a very short course, whereas jaundice from gall stones or some simple cause may go on for several years.

It must not be forgotten that gall stones and cancer frequently coexist, and in the case of cancer of the gall bladder gall stones are nearly always present, and the combined disease may form a tumour before the onset of jaundice, though some degree of jaundice usually supervenes early in the disease.

Fat in the motions and glycosuria, with very rapid wasting, are suggestive of pancreatic trouble.

Ague-like symptoms more frequently accompany gall stones in the common duct than malignant disease of the ducts or of the head of the pancreas, but several cases that have come under my notice show that this rule is subject to exceptions.

After the abdomen is opened the discovery of adhesions in the neighbourhood of the gall bladder, and a contracted gall bladder, are strongly suggestive of gall stones, though I have found ulcer of the pylorus producing adhesions to the gall bladder, and at the same time setting up pancreatitis, and then, by pressure of the swollen pancreas on the common duct, setting up jaundice.

If no gall stones be found, but the head of the pancreas be swollen and harder than normal, the surgeon should not too hastily condemn the patient as the subject of cancer of the head of the pancreas, for the swelling may be a chronic pancreatitis, and may be curable by cholecystotomy, as I have proved in a considerable number of cases. Nor does the presence of enlarged glands warrant a gloomy prognosis, for it is quite common to find discrete glands in common-duct cholelithiasis and in chronic pancreatitis, though if the glands be fused together and infiltrating the neighbouring tissues, the outlook is far from good.

A rigid right rectus abdominis and tenderness 1 inch above and to the right of the umbilicus is as suggestive of gall stone trouble as is McBurney's tender point of appendicitis.

The appearance and feel of a tumour composed of matted omentum and the viscera adjacent to an inflamed gall bladder are often very deceptive, and in two at least of my earlier cases, after exploring such a mass with a hollow needle I closed the abdomen and gave a gloomy prognosis, which was proved to be wrong by the patients steadily improving and completely recovering. Before seriously interfering with the adhesions, and thus being committed to the following out of a dangerous and futile operation, it is desirable to raise the abdominal wall and carefully examine the liver and adjoining parts so as to be assured of the absence of secondary nodules of cancer.

If in doubt, it is better carefully to detach the omentum covering the gall bladder itself, when it may fortunately turn out that the viscus is full of gall stones and pus, as in Cases LVI

and LVII to be mentioned later, in both of which inoperable cancer had been diagnosed and a gloomy prognosis given, but in which cure by operation was effected, and the patients are now well; or even if, as often happens in this region, cancer be discovered and proves to be local, a radical operation may be undertaken with good prospect of success, as in a case where, three years ago, I removed from a middle-aged gentleman a wedge of liver and the gall bladder affected with carcinoma, and he remains in excellent health to-day; and in another case, where in a woman aged 56 I excised the gall bladder, the pylorus, and a portion of the liver, the patient being now well on in the second year after operation, in good health.

If, however, secondary nodules be seen or felt in the liver or omentum, the diagnosis of irremovable disease will be at once arrived at and the abdomen closed without delay.

A hæmorrhagic condition is common in cases of chronic jaundice, especially if due to cancer of the head of the pancreas or to interstitial pancreatitis. If not excessive, this can be corrected by chloride of calcium, or possibly suprarenal extract or gelatine; but, if severe, it will undoubtedly seriously add to the risks of operation.

If a patient at or past middle age has heart disease or albuminuria, operation should not be lightly entertained, and such cases have, as a rule, to be content with the relief that can be given by medical treatment.

TREATMENT.

The second question, as to treatment, depends on the diagnosis:

1. If the diagnosis be doubtful an exploratory operation is advisable, providing the general condition of the patient renders it probable that such a procedure *per se* apart from what is to follow will not hasten death.

2. If malignant disease be positively diagnosed operation can, with some few exceptions where it is possible to completely remove it, do little good, or at the best can probably only prolong life for a short time.

3. If gall stones, or, in fact, any of the first five enumerated causes be diagnosed, operation is decidedly advisable if the patient be at all in a condition to bear it.

1. When the Diagnosis is Doubtful.

It will be convenient to consider these three conditions *seriatim*, and first of all the question of operating for the purpose of clearing up the diagnosis, with a view to at once closing the abdomen if unfavourable conditions be found, or, if advisable, performing whatever operation may be necessary at the time in order to bring about relief or attempt a cure.

The uncertainty as to the cause of the obstruction in many cases of jaundice is what makes this class of cases of such extreme interest both to the physician and surgeon; and although ripe experience will frequently enable a diagnosis to be arrived at by instinct as it were, yet mistakes will be made at times and patients condemned when prolongation of life or subsequent cure by operation proves that the most skilful diagnostician may err.

The following brief abstract of cases condemned as hopeless, but afterwards operated on, demonstrates my meaning better than a multiplicity of words. The numbers, where present, refer to the order of the cases in my notebook:

No. 56.—Woman, aged 50, residing at Burnley. Jaundiced nine months; great loss of weight; pain not a prominent symptom, but present. Pronounced to be cancer by an eminent Manchester physician, and operation not advised. Operation, September 29th, 1892. Gall stones found in gall bladder and common duct. Cholecystotomy and choledolithotomy performed. Good recovery. Quite well when heard of a year later.

No. 57.—Woman, aged 50. Jaundiced ten months. Pain with ague-like attacks. Pronounced malignant by a distinguished physician in Sheffield, and operation deprecated. Operation, October 4th, 1892. Gall stones removed from gall bladder and common duct. Good recovery; well in 1893.

No. 66.—Woman, aged 54. Sent to me for tumour in gall bladder region associated with pain and jaundice. Gall stones diagnosed, but on opening the abdomen a hard nodular tumour discovered yielding only blood to exploring syringe. Thought to be malignant, and abdomen closed. Complete and perfect recovery; and when seen some months later all trace of tumour had disappeared.

No. 212.—Man, aged 45. Painful epigastric attacks for twelve months, with vomiting. Deep jaundice for three months, with ague-like attacks. Loss of 2½ stones in weight. Distended gall bladder. Operation, March 29th, 1898. No gall stones. Tumour of head of pancreas discovered with thickening of common duct, thought to be cancer. Drainage of gall bladder for ten days. Complete recovery. Quite well at present. Case, chronic pancreatitis.

No. 233.—Man, aged 39. Gall stones, seizures for five years, and discovery of concretions in motions. Operation, September 22nd, 1898. Gall bladder and liver infiltrated with what appeared to be cancer, though nodules not large enough to be felt through abdominal walls. Some gall stones felt deeply in bile passages. Thought to be useless to attempt complete operation. Patient recovered, lost his jaundice, gained weight, had no further recurrence of pain, and was reported to be quite well May 24th, 1899. This case I cannot explain, as there was every appearance of cancer of the liver.

No.—Man, aged 51, said by eminent London physicians to be suffering from cancer of liver and to be incurable. Jaundice intense for nine months; great loss of flesh; very little pain and no ague-like attacks. The only suggestive symptoms were the history of intermittent pains in the upper abdomen some years previously, and a tender point at the usual spot 1 inch above and to the right of the umbilicus, which enabled me to diagnose gall stones in the common duct and to advise operation. Operation, September 21st, 1901. Six large gall stones removed from common duct by choledochotomy. Good recovery. A letter in November stated that he had gained 1 stone 11 lbs., that he had completely lost his jaundice, and was quite well.

All these cases go to support the first proposition, that if the diagnosis be doubtful and the patient be at all in a condition to bear operation, exploratory laparotomy should be performed, for not only may a removable cause of the jaundice be discovered, but it may fortunately happen that even if the disease appear to be incurable on exposure, the operation *per se* may have some hitherto unexplained influence leading to recovery, as in 2 of the cases mentioned and in others that I have seen.

Were it necessary I could very considerably amplify this list of operations in doubtful cases leading to a complete and perfect cure of patients pronounced by experienced and careful observers as hopeless, and in many of the cases the patients had been especially warned by their advisers on no account to consult a surgeon lest he should be tempted to interfere.

The class of cases which I described before the London Polyclinic as chronic pancreatitis demonstrates how unwise it is to give a too gloomy prognosis even in cases apparently malignant, for it is to be borne in mind that the hardness of the head of the pancreas in chronic pancreatitis may resemble in touch that of cancer, and it is only by the subsequent course of events after the operation for jaundice that the true nature of the disease is made manifest by the complete recovery of the patient. Moreover, even in some tumours of the gall bladder inflammatory may closely resemble malignant growth in almost every particular save the one, that after operation the inflammatory swelling tends to disappear and the malignant to increase.

2. In Malignant Disease.

The second proposition as to operating in the presence of a positive diagnosis of malignant disease, so far as such a diagnosis can be positive. There are clearly in my mind two classes of cases in which operation can do no good:

- (1) Primary cancer of the liver, characterised by irregular enlargement of the organ, with the usual general signs of malignant disease; and

- (2) Cancer of the head of the pancreas after middle life, characterised by the entire absence of pain at the onset of jaundice, an absence of the history of gall-stone attacks, an extremely rapid loss of weight and strength, and the presence of an enlargement of the gall bladder, and usually some enlargement of the liver.

In the former disease the growth is too diffuse for removal, and in the latter my experience is that the disease is absolutely irremovable, and that drainage of the gall bladder, even if successfully accomplished, does not prolong life materially; and this is borne out by Dr. Hale White's observations published in *Guy's Hospital Reports*, and in the series of operations collected by Dr. Takayasu of Osaka. In younger patients the question of operation should, however, always be seriously considered, as malignant disease of the pancreas is not common until middle age or later, and chronic pancreatitis may be the cause of the jaundice, and is curable by drainage of the gall bladder.

The following cases show that in forms of cancer other than those mentioned, relief or even apparent cure, may result from operation.

No. 201.—Woman, aged 52. Pain over gall-bladder region for a year; tumour noticed a month. Jaundice. Operation, November 27th, 1897. Cancer of gall bladder and adjoining part of right lobe of liver, which was elongated, removed by elastic ligature. Recovery and out of doors in six weeks. Recurrence of disease following year.

No. 271.—Man, aged 46. Seven years gall-stone attacks. Infective

cholangitis. Loss of 4 st. in weight. Jaundice. Operation, June 26th, 1899. Tumour of liver adjoining gall bladder excised by wedge-shaped incision. Fundus of gall bladder removed. Cholelithotripsy and cholecyst-enterostomy. Complete and perfect recovery. Patient in excellent health at present time, two and a-half years after operation. Microscope showed disease removed to be cancer.

No.—Woman, aged 63. History of pain and tumour associated with jaundice. Great loss of flesh and strength. Operation, August 10th, 1900. Mass of growth discovered in liver, gall bladder, and pylorus. Cholecystectomy, pylorotomy, and partial hepatectomy performed. Good recovery. Patient well, and in good health now.

3. In Gall Stones, etc.

As regards the third proposition—that if gall stones or any of the first five causes of jaundice enumerated in the opening of my paper be diagnosed, operation is urgently demanded, if the patient be in a fit condition to withstand any operative interference.

I find that I have operated on 212 patients suffering from obstructive jaundice dependent on one or other of the causes mentioned; of these, 183 recovered, showing a mortality of 13.6 per cent.; 60 were the subjects of malignant disease either of the liver, bile ducts, or pancreas, and of these 46 recovered from operation and lived for various periods, some of them being well at the present time, thus showing a mortality of 23.3 per cent. In support of the third proposition, 152 out of the 212 cases were operated on for obstruction dependent on gall stones in the common duct or on other non-malignant causes, with 135 recoveries. Many of these patients were extremely ill at the time, and operation was only undertaken as a *dernier ressort*; but none of these almost moribund cases have been left out of the list, which shows a mortality of 9.8 per cent., an experience which will, I trust, justify my assertion that these cases may be operated on with a very reasonable prospect of success, and that as a rule they demand surgical treatment, and at an earlier stage than has hitherto been granted; for it must be borne in mind that nearly every recovery is a life saved, since in the greater number of cases of obstructive jaundice, whether arising from gall stones, hydatid disease, chronic pancreatitis, or stricture or adhesions obliterating the lumen of the bile ducts, death after more or less prolonged suffering is the usual termination.

To give even a brief abstract of every case is quite impracticable in the limited time at my disposal; but many of my cases can be found in my work on *Diseases of the Gall Bladder and Bile Ducts* (second edition), and others on chronic pancreatitis have been published in the *BRITISH MEDICAL JOURNAL* and the *Lancet*. I must therefore content myself by giving an abstract of a few of my cases, promising that a record of the whole shall ultimately be furnished:

CASE—Lady, aged 54; resided in India for eighteen years. Characteristic gall-stone seizures with jaundice for two years. Loss of flesh and invalidism. Operation, August 22nd, 1900. Choledochotomy and removal of five stones from common duct. Complete recovery, and patient now well.

CASE—Lady, aged 57. Several attacks of gall-stone colic in course of years; jaundice a month. Painful and tender tumour. Operation, June 8th, 1901. Choledochotomy, with removal of an oval concretion from common duct, and cholecystectomy for removal of calcified gall bladder containing one stone. Complete recovery. Patient now well.

CASE—Lady, aged 45. Jaundice and dilated stomach, associated with vomiting and painful indigestion. Operation, May 5th, 1901. Gall stones found in common duct and removed by choledochotomy. Pylorus stenosed and treated at same time by pyloroplasty. Complete recovery; loss of all abdominal symptoms. Quite well at present time.

CASE—Man, aged 60. Great loss of flesh for four years, and painful indigestion. Painless onset of jaundice six months previously. Great loss of flesh. Some enlargement of liver, but none of gall bladder; no nodules to be felt. Exploratory operation advised, but declined. Two years later he saw me again, and was then reduced to an extreme degree of atrophy and feebleness. Liver enlarged, but not nodular. Deep jaundice, varying in degree. Slight ascites. Operation, October 21st, 1901. Citrhus of liver, with ascites, and one gall stone found in common duct. Choledochotomy, and at the same time fixation of omentum to abdominal wall. Good recovery; loss of jaundice; gain in weight and strength. Now well.

CASE—Woman, aged 36. Painful attacks for fifteen months, associated with jaundice, which had been continuous for some months. Operation, March 20th, 1900. Cholecystectomy and removal of several concretions from gall bladder and cystic duct. Large stone in common duct crushed between finger and thumb and removed by gall-stone scoop. Complete recovery. Patient now well.

Other cases could be given, of cure by cholecystotomy and manipulating the stones backward into the cystic duct and gall bladder, and thence removing them; of duodeno-choledochotomy; or opening the duct through the duodenum; of adhesions binding down the common duct; of stricture of the common duct treated by cholecyst-enterostomy; of

chronic pancreatitis treated by cholecystotomy, and of hydatid disease discharging into the bile ducts and treated by cholecystotomy and hepatotomy, but I will only give examples of three conditions.

No. 161.—Man, aged 44. Six years history of swelling over liver, one year's history of attacks resembling gall stones with infective cholangitis and jaundice. Operation, January 1st, 1897. Hydatid disease of liver discharging into bile ducts. Hepatotomy and cholecystotomy. Good recovery and ultimately complete restoration to health.

No. 261.—Woman, aged 42. Jaundice for 3 months; attacks resembling gall-stone colic for 2 years; no tumour; ague-like attacks. Operation, May 8th, 1899. Dense adhesions between pylorus; gall bladder and liver broken down; gall bladder shrunken and common duct found strictured by adhesions which were all detached. No gall stones found. Good recovery. Jaundice disappeared before patient returned home. Complete recovery.

No. 286.—Woman, aged 51. Attacks resembling gall stones for 3 years. Jaundice continuous for 14 weeks. Great loss of flesh. Slight albuminuria. Operation, October 23rd, 1899. Fifteen gall stones removed from gall bladder; large mass, hard and nodular, in head of pancreas. Cholecyst-enterostomy. Complete recovery, and patient now in good health. The tumour of the pancreas was a chronic pancreatitis.

It would be tedious to give further cases, but these will serve as examples of operation for the various causes of obstructive jaundice not dependent on malignant disease.

A careful study of the causes of mortality in the whole series of cases shows the two greatest dangers to be hæmorrhage and shock, and the two next serious causes exhaustion and sepsis, the accidental causes of death, heart disease, syncope, kidney disease, apoplexy, and other accidents being such as may follow any operation in patients so extremely ill as all cases of obstructive jaundice must be.

The study of the non-successful cases is perhaps the most instructive, and from them we can derive lessons that will, I feel sure, tend to diminish the mortality very considerably. This is already occurring materially in my own practice, for the statistics of the cases up to December, 1899, show the mortality as 16.4 per cent., whereas those since January 1st, 1900, though equally serious, have only had a mortality of 14.2 per cent, but in the choledochotomies the difference is as 14.5 to 7.4 per cent. To what is this difference due?

First, I think to increased experience; and, as a consequence, a greater accuracy in diagnosis and a better selection of cases.

Secondly, to knowing when to stop in a case where, after exploration, it is manifest that neither cure nor even material relief can result from operation.

Thirdly, to improved technique in operating, and in the preliminary and subsequent treatment of cases operated on; and

Fourthly, to increased practice enabling the operations to be accomplished in little over half the time they once required.

In the heroic employment of calcium chloride we have a very efficient means of modifying the coagulating power of the blood, but to be efficient it must be administered for at least two days before operation, and along with nutrient enemata for three or four days or longer if necessary afterwards. Adhesions should be ligatured where possible, and all bleeding points both in the parietes and inside the abdomen should be clamped and ligatured; or if that be impracticable owing to general oozing, pressure by means of sterilised gauze affords a useful and safe means of hæmostasis.

In preventing shock, the envelopment of the patient in a suit of cotton wool, operating on a heated table, administering 10 minims of liq. strychninæ B.P. before beginning the operation, and giving a large normal saline enema with or without brandy half an hour before operating and immediately after, and repeating it if necessary, we have very efficient means of treatment. But quite as important as any of these measures, or perhaps even of greater importance, is the cultivation of the habit of operating expeditiously, for it stands to reason that, in any patient so ill as chronic jaundice cases always are, every minute's prolongation of manipulations in the abdomen and of anæsthesia is adding to the risk, and I know that it is often possible to perform even a choledochotomy in half to three-quarters of an hour. Even in the most complicated cases the operation ought not to occupy much longer than an hour, though I have heard of these operations occupying three or four hours. A simple exploratory operation should occupy only ten or fifteen minutes, and should involve little risk of shock.

Exhaustion and heart failure are best combated by rectal

alimentation, by judicious mouth feeding as soon as the anæsthetic sickness has ceased, and by the use of small doses of strychnine administered subcutaneously, when called for by nervous depression or heart failure. A rigid all-round asepsis, the employment of gauze drainage where necessary, and the careful removal of the infected bile as it flows from the ducts, give one security from sepsis.

I have purposely said nothing of the operative technique of choledochotomy, as the subject is already a sufficiently large one for discussion; and I thought more profit would result from a limitation of my paper to the question of surgical treatment of obstructive jaundice as a whole.

CASE OF EXCISION OF CLAVICLE FOR A ROUND-CELLED SARCOMA.

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DURING the past two years I have had under my care a considerable number of primary tumours of bone, the majority of which have been malignant and of the type known as sarcomata. Of the bones involved some were those usually attacked, such as the humerus, femur, and tibia, while there were others, such as the ulna, scapula, and clavicle, that are less commonly the seat of these new growths.

Injury in a certain number of the cases was associated with the appearance of the tumour, but in others no such cause could be traced. As bearing on this point one of my cases was of special interest. It was that of a sarcoma of the femur occurring in a male aged 65, who had suffered from an ununited fracture of that bone twenty-six years previously. The fracture had been successfully wired by Lord Lister in the Edinburgh Royal Infirmary about twenty-five years ago. Looking to the very general view that sarcomata hold a double relation to fracture—namely, that they both cause it and also result from it—I was prepared to find that the new growth had originated in the line of fracture. Examination, however, of the specimen after amputation showed that this was not the case. The tumour was situated in the lower fragment of the old ununited fracture, the line of union of which was distinct and easily made out, and was perfectly firm.

The case to which I wish specially to draw attention in the present paper is one of sarcoma of the clavicle. Apart from the fact that this bone is very rarely attacked by such growths, there are other points about the case that justify its being put on record.

History.—The patient, A. M., was a girl, aged 16, who was sent by the late Dr. Black of Greenock to be under my care at the Glasgow Cancer Hospital. She was admitted there on September 30th, 1899. Of a fair complexion, her general appearance was that of good health, although perhaps somewhat anæmic. She complained of a swelling of about seven months duration in the left side of the neck, which was accompanied by some pain on the surface of it. She could assign no cause for the appearance of the swelling, and it came, she said, at first, as a small movable lump near the collar bone. It had given rise to very few symptoms. At one time she had pain passing down the arm and up the side of the head, but that had now disappeared. It was more the size of the growth and its rate of increase that were causing concern to her relatives.

State on Examination.—Examination of the left side of the neck showed that there was good ground for these anxieties, for in the situation of the left clavicle there was a large globular tumour the size of an infant's head (see Fig. 1), covered by normal skin, in which large vessels were seen ramifying. The swelling commenced at a point $\frac{1}{2}$ inch from the outer end of the left clavicle, crossed the middle line, and reached close up to the sternal end of the right clavicle. Above it rose to the level of the prominence of the thyroid cartilages, and below it descended over the second rib. On palpation the mass had a firm elastic consistence, and almost gave the impression of being a tense cyst. No fluctuation was present, and no pulsation could be made out in it. It was firmly anchored down at its base, apparently to the clavicle, but it was not easy to say whether it passed deeper or not. There was certainly no evidence of pressure upon any important structures. A skiagraph of the parts showed that, with the exception of a small portion at its outer end, the left clavicle had almost disappeared, but beyond this nothing very definite could be made out. The thoracic organs were healthy, and no secondary deposits could be detected elsewhere. The urine, too, contained nothing abnormal.

The two points that had to be decided about the case were, first, the nature of the tumour; and, secondly, the advisability of its removal. As regards the former, the clinical history and the appearances presented by the skiagraph pointed to its being a sarcoma that, whatever its seat of

origin at first, had now involved the clavicle, and was likely to go on increasing. Upon the question of removal, there was something to be said for and against it. Everything, of course, depended on the deeper attachments and relations of the tumour, especially as regards the pleura and the large vessels behind. The absence of all indications of their involvement, the as yet local character of the growth, the good general health and youth of the girl, were points distinctly in favour of removal, and decided me to recommend the patient's friends to submit her to the risk of operation. Accordingly I wrote to Dr. Black to that effect, who concurred.

Operation.—The operation was done on October 16th, the anæsthetic used being chloroform. The incisions used are seen in Fig. 2, and were of the H-shape. The chief one was across the upper surface of the tumour in its long axis and in the line of the clavicle. At the inner end of this was another one nearly at right angles to it, but curving downwards and crossing the left sterno-clavicular articulation. A somewhat similar incision was made at the outer end of the first, exposing the pectoralis major, where it formed the anterior axillary fold. Flaps of skin, very thin, were then dissected up exposing a very vascular tumour. Its

Fig. 1.

upper border was first attacked and freed as far as possible. Then the outer end was cleared, and the clavicle sawn across in its outer quarter clear of the growth. The tumour, along with the inner portion of clavicle, which was incorporated in it, was next turned inwards and dissected off its deeper attachments. This was a matter of some difficulty, especially where the growth came into relation with the subclavian and internal jugular veins, nor was it easy to get away all the remains of the clavicle at its sternal articulation owing to its fragmentary nature. It was, however, accomplished. After gouging out a portion of the sternal end of the second rib, which was somewhat eroded, and after the removal of some enlarged glands in the posterior triangle of the neck, the edges of the incisions were brought together with sutures of horsehair, and three iodoform wool drains were inserted in different places. The patient bore the operation very well, and did not suffer much from shock.

Description of Tumour.—Reserving in the meanwhile the detailed microscopic account of the tumour, it may be mentioned here that on removal it formed a globular mass, flattened somewhat antero-posteriorly. It measured $5\frac{1}{2}$ inches in its long diameter, and about 3 inches in depth, and it was covered by a fairly well-marked capsule, to which portions of muscle and fascia were adherent, while at one part of it was the sawn surface of the outer end of the clavicle. On section the surface presented uniformly a "fleshy" appearance, with here and there trabeculae of