INJURIES OF THE BLADDER OCCURRING IN THE COURSE OF GYNÆCOLOGICAL OPERATIONS.

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A FEW years ago the injury of an organ happening during the performance of an operation within the pelvis was regarded as a far more serious complication than it is to-day. Wounds of the bladder and rectum are especially liable to occur in the removal of impacted and adherent tumours of the uterus and ovary, and they have frequently fallen to the lot of the most careful and skilful operators. Sometimes organs and structures are so matted together by chronic disease that it is difficult to avoid an accident even with the most gentle manipulation. Now, whenever an injury of the bladder does occur, it is very important that it should be recognised at once, for then the indications for treatment are both simple and clear. (1) The urine must be prevented from getting into the pelvic tissues and the peritoneal cavity; (2) the rent in the wall of the viscus should be at once sutured, and means adopted to keep the organ empty and at rest.

I have known an accidental puncture of the bladder indicated immediately by a distinct flow of urine to heal without causing any trouble or the necessity for any surgical treatment. The spontaneous closure of small wounds may generally be fairly anticipated, still it is the duty of the surgeon to secure all wounds, however small they may be, as soon as they are discovered, and then to proceed with the operation as if no accident had occurred. Fortunately, in the majority of cases, with our present precautions there will be little risk of hæmorrhage, extravasation of urine, or septic infection.

The possibility of wounding the bladder in the removal of intraligamentous and adherent pelvic tumours should always suggest to the surgeon the necessity for cautious manipulation. Sometimes the vesical wall is so much drawn up and dislocated from its normal position that it might easily be mistaken for a cyst. In cases of difficulty it is always desirable for the surgeon himself to empty the bladder before an operation and to determine the exact position of the organ with a sound.

Occasionally it has proved a difficult matter to discover the exact seat of the injury, and even to decide whether the bladder has been really wounded. In this dilemma it is an excellent plan to test the condition of the organ by injecting a weak antiseptic solution. In some rare cases the injury has been readily detected, but its position has been so low in the pelvis and so difficult of access that secure suturing of the seat has proved to be impossible. Under these circumstances careful drainage has been wholly relied on, and with this simple treatment patients have recovered by rapid contraction and healing.

There is another kind of accident which may happen to the bladder during a pelvic operation. Unfortunately it cannot be recognised at the time, but its existence is made evident after the lapse of many days by the development of serious and alarming symptoms. The lesion is not caused by a secret wound or laceration, but by an invisible and latent injury occurring during the manipulation, either from the free separation of adhesions or from damage done to the vascular supply of the vesical walls.

Ovariectomy followed by Sloughing of the Bladder Wall, and Free Discharge of Urine through the Lower Angle of the Abdominal Wound: Recovery.—A. K., aged 58, the mother of seven children, was sent to me by Dr. Hann of Portsmouth, suffering from a large abdominal tumour.

History.—The patient stated that her health had generally been very good, and that the catamenia had ceased normally about eight years. The abdomen had been increasing in size three years, and that for a month she had been wholly confined to her bed. Six days before her admission to the hospital four gallons of thick fluid had been removed by tapping to relieve her breathing. The circumference of the abdomen measured 62 inches, the outline was irregular, and the superficial veins much distended. On examination the pelvic cavity was found to be occupied by a solid mass, the uterus was much depressed and displaced against the sacrum. The patient was extremely weak, and her face exhibited a marked expression of prolonged suffering. Ovariectomy was performed on February 2nd, 1899. The tumour was completely covered in front with a firmly adherent and fleshy omentum, and in some places this structure was an inch and a half in thickness. Four gallons of thick and deeply

stained fluid were evacuated, and many smaller cysts were broken up with the hand. The tumour was everywhere adherent, and a great many ligatures were applied to the abdominal organs to control the hæmorrhage. There was no distinct pedicle. The vessels at the base were temporarily clamped, and the pelvic mass carefully enucleated. A glass drainage tube was inserted behind the uterus.

After-History.—The patient rallied well on the second day. Thirty ounces of bloody fluid were withdrawn by the syringe, and the tube was removed on the third day. Her progress was favourable until the eighth day, when the urine became very offensive and thick. The bladder was washed out with sterilised boracic solution. On the eleventh day I was hastily summoned to the hospital in consequence of a sudden and copious discharge of offensive urine from the lower angle of the abdominal wound which completely soaked the dressings and the bed. Many unsuccessful attempts were made to keep the bladder empty, but, in spite of all our efforts, the urine continued to escape through the abdominal wound. On the nineteenth day a large slough was found, protruding from the urethra, and with the help of forceps it was readily withdrawn. It measured 12 inches in length, and at the centre about 1½ in. in breadth. The urine at once escaped again through the normal passage, and in a few days the patient regained complete control over the bladder. The abdominal sinus rapidly contracted, and the wound soundly healed without any further treatment. The patient left the hospital two months after the operation. On February 15th, 1900, she was in good health, and had gained 20 lbs. in weight.

In reviewing this case I think there can be no doubt that the damage to the bladder was done in the enucleation of the pelvic portion of the tumour. The sudden aggravation of the vesical symptoms and the escape of urine through the abdominal wound are noteworthy facts, quite compatible with the opinion that the injury was inflicted upon the organ at the time of the operation. It is certain that the bladder was not wounded with the knife or torn open in the separation of the base of the tumour, as the urine was discharged for days without difficulty or pain. The catheter was regularly used, and on each occasion the instrument was cleansed and the vulva deodorised.

With reference to the direct cause of the accident, I do not think it can be attributed to the pressure of the drainage tube. In some cases of abdominal surgery drainage has been followed by disastrous results. It does occasionally interfere with the intestinal movements and produces tympanitic distension, and cases have occurred in which strangulation and perforation of the bowel have been ascribed to the insertion of a tube. In my case a large quantity of fluid was removed through the drain during the first two days, and every time the syringe was used the tube was gently moved and rotated for the purpose of preventing pressure on any of the viscera. It appears to me that the perforation was caused by one of the ligatures enclosing a portion of the bladder wall, and so arresting the blood supply and inducing softening and necrotic changes in a limited area. In this way it is easy to explain the latent injury of the bladder, the sudden rupture, and the escape of offensive urine through the track left by the drainage tube.

Mirabeau¹ describes some trophic bladder affections associated with gynæcological operations, and expresses the opinion that vesical trouble after vaginal and abdominal operations on the uterus and ovaries may be due to the rupture of an abscess, the contraction of inflammatory products near the bladder, the passage of a ligature into the bladder, or the ligature of blood vessels supplying its walls. He describes two cases in which definite lesions were detected by means of the cystoscope. The mucous membrane was extremely pale, and marked by great œdema of the mucosa near the trigone. The entire mucous surface was also much thinner than normal, and the trabeculae of the muscular coat could be clearly defined. Mirabeau believes that these vesical changes were purely atrophic, and due to the ligature of blood vessels supplying the bladder.

In cases of rupture or wound of the bladder, the success of immediate treatment depends (1) on the complete disinfection of the seat of injury; and (2) upon the accuracy with which the stitches are inserted. To protect the general peritoneal cavity, sterilised sponges or gauze should be employed and the locality of the wound carefully cleansed. The bladder must then be drawn up and a piece of silk passed through its external coats just at one extremity of the wound. The silk thread can then be used as a retractor, and it will greatly assist the operator in exposing the seat of injury. In some cases the Trendelenburg position will prove a great help. As soon as the wound has been well defined, it should be closed by two layers of catgut or silk sutures. Two layers are always more reliable than one, unless the wound is very small. The first row should take up the mucous and sub-

mucous tissues, and the second should be passed through the serous and muscular walls, and this row should extend a little beyond the extremities of the wound. The surface should now be finally cleansed, then dusted with iodoform, and the ends of the silk retractor cut off.

In some cases a soft self-retaining catheter can be introduced to secure complete rest of the organ. Other patients I have found prefer the introduction of an instrument every two or three hours to any other method of keeping the bladder empty. In extensive injuries the organ can be very efficiently drained by making a temporary vesico-vaginal fistula, and uniting the mucous membrane of the bladder to the mucous membrane of the vagina. As soon as the injured part has healed the mucous surfaces are separated, and the opening closes without any surgical interference.

Dr. Frederick Holmè Wiggin of New York City¹ mentions the case of a woman who underwent hysterectomy for a large myoma. The bladder was injured at the fundus during the separation of some extensive anterior adhesions. The wound was closed at once by suture. For ten days the progress was very satisfactory, but then tumefaction took place at the lower angle of the abdominal wound and this was soon followed by a free escape of urine. A vesico-vaginal fistula was made to ensure complete drainage of the bladder. The abdominal sinus was deodorised and curetted, and then closed by suture. The patient rapidly recovered, and the fistula healed without any surgical treatment.

It is sometimes an important question to decide whether the abdomen can be safely closed without any provision for drainage. This must be determined by the severity of the injury, the state of the urine, and the condition of the peritoneal cavity. Surely, if other organs can be injured and the abdominal wound closed, there can be no reason why bladder injuries should not admit of the same treatment. In my case, however, it appears highly probable that the introduction of a glass drainage tube was a fortunate precaution, and materially aided in saving the life of the patient by establishing a channel for the direct escape of the urine. On the other hand, if the abdomen had been completely closed at the time of the operation, the rupture would have been followed by the accumulation of septic fluid within the pelvis, which would have very probably terminated in fatal septicæmia.

REFERENCES.

¹ *Centralbl. f. Gynäk.*, No. 11, 1899; EPITOME OF THE BRITISH MEDICAL JOURNAL, May 6th, 1899, *par.* 331. ² *Journal of the American Medical Association*, September, 1899.

ABSTRACT OF THE REPORT OF A COMMITTEE ON THE MEDICO-LEGAL RELATIONS OF THE X RAYS.

*Made to the American Surgical Association at its Meeting in
Washington, May 1st, 1900.*

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THE report begins by stating that at the meeting in 1897, in a paper on the Roentgen Rays in Surgery, the Chairman of the Committee made the following remarks:

Before leaving the subject of fractures it may be well to present for discussion a few questions having a medico-legal bearing, even although it may not be possible at present to answer them finally.

We begin by asking whether skiagraphy has as yet given us a better understanding of fractures in general or has been the means of suggesting more efficient treatment. It is difficult, in reply, to point to any one definite addition to our knowledge of these injuries, and so far as I know no material modification of the general rules governing the treatment either of fractures generally, or of any specific fracture, has as yet resulted; but in individual cases, such as have been described above, it has certainly been of great utility, and is likely to become more valuable as technique improves and experience increases.

The question whether or not the patient has the right to demand as ordinary care that the medical attendant should have a skiagraph of the fracture taken, I would at this time unhesitatingly answer in the negative. Until a much larger number of cases have been observed and the pictures and the clinical results have been compared the routine use of skiagraphy might be more harmful than useful.

There can be no doubt, however, that skiagraphs will figure largely in suits for damages after accidents and in cases of alleged malpractice. They have already been admitted as evidence in such cases, and it is probable that juries will with increasing frequency have to decide whether to place greater weight on deformity as shown by skiagraphs or

on expert evidence as to the absence of genuine disability. It seems obvious that each case must be studied by itself, but that it would be injudicious, if not altogether unwarranted, for us to assume at present that clinical experience and the judgment based upon it should be subordinated to the pictorial testimony of the skiagraph.

It is not, however, too soon to advise that in all obscure, complicated, and unusually difficult cases the help afforded by the Roentgen rays shall be secured by the surgeon, even if it is done chiefly with a view to his own protection.

As time goes on it is probable that we shall be better able to estimate accurately the precise clinical value of minor deformities. In the meantime it seems to me we should be careful to avoid the setting up of an impossible ideal as a standard in fracture cases.

After discussion it was on motion resolved that a committee be appointed "to formulate an opinion as to the reliability of skiagraphs," and the result was the formation of this Committee on the Medico-legal Relations of the X-rays.

In 1898 material was collected from current literature and from the personal experiences of the Committee. In February, 1899, a circular letter was sent to every member of the Association asking for an answer to the following questions:

QUESTIONS.

1. Have you found skiagraphy reliable in the diagnosis of (a) fractures attended with so much swelling of surrounding tissues that satisfactory palpation of the fragments is impossible? (b) fractures about joints? (c) epiphyseal separations? (d) fracture of the neck of the femur? (e) ununited fractures?
2. Have you any reliable cases of recognition of (a) fracture of the base of the skull? (b) fracture or dislocation of the vertebræ? (c) fracture of the sternum, scapula, clavicle, or pelvis?
3. Do you know of any cases in which the testimony of the skiagraph in cases of supposed foreign bodies in tissues, or of tumours, gall stones, or kidney stones, has led to ineffective or mistaken operations?

ANSWERS.

The replies to question No. 1 were uniformly in the affirmative, except as to item (d), which refers to the neck of the femur. As to that, with but one exception, the replies were negative.

As to question No. 2, they are almost as uniformly in the negative.

Question No. 3 was answered negatively by twelve and affirmatively by six.

In other words, the large majority of the surgeons who replied to the communication had found the skiagraph satisfactory in fractures with great swelling, fractures about joints, epiphyseal separation, and ununited fractures, but not in fractures of the femoral neck. The same number had not had reliable pictures of fractures of the base of the skull, of the spine, of the pelvis, sternum, or scapula. A few had used it in cases of fracture of the clavicle, but there it is obviously rarely necessary.

The answers to the third question vary, as during the time of the correspondence rapid improvement was made in the technique, and renal calculus became fairly easily recognisable. Of course, it was not likely that many cases of mistakes as to supposed foreign bodies in the tissue would occur, but the cases recorded serve as a warning as to the possibility of such mistakes.

At the meeting in 1899 the Committee reported progress, and asked to be continued, feeling that the position taken finally on this question should rest upon the broadest possible foundation, and thinking the evidence then available insufficient for the purpose of drawing general conclusions which might serve as a safe guide to both the medical and legal professions in appropriate cases.

In presenting the final report this year the Chairman of the Committee said that in fairness to skiagraphy itself as a surgical aid, it should be stated in advance that many of the errors of which examples are cited in the report are avoidable; that the habit of taking more than one plate and of comparing with plates from the normal region corresponding will lessen them when it is systematically adopted; and that there is no disposition on the part of the Committee to deny or disparage the great usefulness of skiagraphs in surgery. The report proceeds:

"But usefulness and infallibility are not identical. In a thing which purports to be a representation analogous to a photograph, showing only what exists and nothing else, the claim of infallibility, of exact accuracy, is sure to be made by some lawyers, and listened to approvingly by some judges and juries. Your Committee believes that the time for such an attitude has not arrived, and that the facts now before the profession, some of which are herewith presented, justify this conclusion.

"In trying to systematise the material bearing on this subject it has seemed well to classify the evidence, which goes to show: