specified. The best incision is that which many of the old surgeons employed in all abdominal sections, and which Langenhuch, of Berlin, has recommended and practised in at least two successful cases of nephrectomy⁴—namely, along the outer border of the rectus abdominis on the side of the kidney to be removed. The midpoint of the incision will probably be the umbilicus, but this must entirely depend upon the size and outline of the tumour.

All bleeding, which is sometimes considerable in this incision, being stopped, and the peritoneal cavity opened, the state of the opposite kidney can be ascertained, if need be, by digital examination. The intestines should be kept aside from off the surface of the kidney to be removed by means of a large flat sponge introduced into the abdomen. The outer layer of the mesocolon should then be opened sufficiently to allow of the introduction of two or three fingers behind the peritoneum and into the fat in front of the kidney; the fingers should then gently tease their way towards the renal vessels, around which ligatures should be secured. If the vessels are tied separately, care should be taken to secure the artery before the vein. The ureter should then be seized by two pairs of ovariotomy forceps and divided between them. Langenhuch's object in selecting this incision was to divide the outer layer of the mesocolon, and so avoid risk of hæmorrhage; this is more particularly necessary on the right side, since the inner layer of the mesocolon covers the vessel passing to the ascending colon. The enucleation of the tumour should next be proceeded with; lastly, the vessels should be divided outside the ligatures, and the mass removed from the body.

The ureter should now be tied with ligature silk, like the vessels; or the upper end can be turned out (as I suggested at a meeting of the Medical Society in November, 1882) through an opening specially made in the loin, and there stitched to the external wound. Mr. Barwell⁵ has also advocated a lumbar opening with the object of draining the retro-peritoneal space, but I am not aware that it has been carried into practice. The supposed advantage of bringing out the end of the ureter is that it allows of the escape of any pus or scrofulous material which it contains, and also of the antiseptic irrigation of its canal. The advantage of this is doubtful, except perhaps in scrofulous pyonephrosis. The plan of fixing the cut end of the ureter out of the anterior abdominal wound seems to me to invite the subsequent occurrence of intestinal obstruction.

Median laparotomy has been several times employed, but is not so good as the above.

Abdominal nephrectomy is completed like ovariotomy, and the subsequent treatment is the same.

The dangers of the operation will appear from the following comparison of the causes of death after the lumbar and abdominal methods. From an examination of forty-two fatal cases out of 100 nephrectomies collected by Dr. Robert P. Harris,⁶ I find the following facts come out. The cases are arranged according to the nature of the operation:—

Causes of Death.	Abdominal Nephrectomy.	Lumbar Nephrectomy.
Suppuration ...	1 ...	0
Peritonitis ...	10 (4 being septic) ...	2
Hæmorrhage ...	4 ...	1
Uræmia ...	1 ...	5
Shock ...	4 ...	7
Infarction ...	2 ...	0
Pyæmia ...	1 ...	2
Vomiting ...	0 ...	2
Total ...	23	19

Thus it appears that peritonitis, hæmorrhage, pulmonary embolism, pyæmia, and exhaustion from suppuration are more frequent causes of death after abdominal nephrectomy than after lumbar, in the proportion of 18 to 5; whilst the number of deaths from uræmia, vomiting, and shock, after lumbar nephrectomy, as compared with abdominal, is 14 to 5. The greater mortality of lumbar operation from uræmia and shock is due to the fact that in several of the lumbar cases it was subsequently proved that both kidneys were diseased at the time of operation; that in one case the last rib had been removed and the pleural cavity laid open; in another the patient was reduced by cancer of the uterus;

and others were in an unfit state for any surgical operation of importance. The abdominal operation, therefore, seems to be a much more formidable procedure; and the fatality from causes directly traceable to the operation, and apart from the state of health of the patient, is much higher in it.

Looked at from the point of view of the totals, the same conclusion is arrived at, but the difference is not so striking. Thus out of the hundred cases, the nature and result of the operation were recorded in ninety-six. Of these forty-six were abdominal nephrectomies, of which twenty-three recovered and twenty-three died. Fifty were lumbar nephrectomies, of which nineteen died and twenty-seven recovered. A good deal as to result depends upon the nature of the disease for which the operation is performed, but less than might be *a priori* expected. Of eighteen operations for malignant disease nine died; and of sixteen for floating kidneys six died. Of the sixteen cases of floating kidneys fourteen were submitted to abdominal operation, and six died; two were treated by the lumbar method and both recovered. Of seven lumbar operations for uretral fistulæ six recovered and one died.

I think the conclusion pointed by these figures is that though in some cases from size of tumour the abdominal operation is easier, and therefore safer, the lumbar method is, as a rule, much safer, and to be preferred in all cases where the kidney is not much enlarged, where the tumour can be reduced by puncture, and when the loin space is not too much contracted.

Kroner⁷ collected and analysed forty-one cases of nephrectomy. In twenty-one the abdominal operation was performed, with fourteen deaths; and in twenty the lumbar operation, with five deaths; but in three others the result is unstated. From these cases Kroner concludes that the higher mortality of the abdominal operation is not owing to the greater danger of it, but is due to the fact that these cases include those in which the diagnosis was uncertain, and the operation was therefore commenced tentatively. This is an argument of little weight unless it could be shown that the tentative operations were undertaken by operators not qualified for the task, which is neither asserted nor implied. Kroner's cases are included in Harris's list.

Lateral Retro-peritoneal Nephrectomy.—Mr. Thornton has suggested a method which may be described as the lateral retro-peritoneal operation. It consists in making an incision parallel with the linea semilunaris, but further out than it, and then reaching the kidney by raising the colon and peritoneum. The plan would probably answer very well for certain tumour cases, and Mr. Thornton has employed it successfully in a case in which the ureter of a healthy kidney had been divided in ovariotomy.

The advantage claimed for abdominal nephrectomy and for the lateral retro-peritoneal method is that they enable the vessels to be enucleated and tied before the main enucleation is performed, and that thereby hæmorrhage is saved.

The curved incision used for ligaturing the common iliacs or aorta might be substituted for the lateral incision of Thornton.

THE TREATMENT OF
RECENT TRANSVERSE FRACTURE OF THE
PATELLA BY MEANS OF THE WIRE
SUTURE WITHOUT OPENING
THE KNEE-JOINT.

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As the treatment of transverse fracture of the patella has again been under discussion since Sir Joseph Lister's address before the Medical Society of London, Oct. 29th, 1883, I deem it desirable to recall the attention of the profession to an article on page 30 of THE LANCET, Jan. 3rd, 1880. In that communication I related a successful case of suture of the transversely fractured patella, and at the same time proposed to future operators the method brought into practice in that case—viz., to suture the fractured patella without opening the knee-joint. This proposition does not appear to have attracted much attention, since no mention has been made

⁴ Transactions of the International Congress, 1881, p. 278.
⁵ British Medical Journal, May 26th, 1883, p. 1005.
⁶ An Analytic Examination of 100 Cases of Extirpation of the Kidney, by Robert P. Harris, Amer. Jour. of Med. Sciences, July, 1882., p. 109.

⁷ Archiv für Gynäkologie.

of any surgeon following the practice I advocated. Not that the article entirely escaped attention, for it was referred to by Sir Joseph Lister in the discussion following his address, and by Mr. Turner before the Clinical Society of London. In a communication to the *British Medical Journal*, Dec. 1st, 1883, Mr. W. T. Clegg, referring to a proposition by Brigade Surgeon E. D. Tomlinson, on page 998 of the journal for Nov. 17th, drew attention to the extra-articular nature of the operation urged some years ago by me, and demonstrated by the case reported. In two later operations I have found the observation confirmed which I made in the first case—viz., that after the removal of blood-clots from between the two fragments of the patella a thin but distinct membrane existed between the posterior edges of the fragments, separating the space between the fragments from the cavity of the joint. This permitted me to perform the entire operation in each case without opening the cavity of the joint. In the first of these later cases twenty-five days had elapsed since the accident; in the second case nine days were allowed to elapse before the operation. It seems to me, therefore, a fact of great importance that the suture of the transversely fractured patella is practicable in most recent cases without opening the joint. Like Sir Joseph Lister, I am of opinion that the operation of suturing the patella is quite permissible when performed under strict antiseptic precautions. As all surgeons have not the same faith in the antiseptic treatment, and often neglect some of the minor details, the operation will be seen in a very different light when it is proved that to employ the wire suture it is not necessary to open the joint. I do not mean to assert that in all cases this occluding membrane will be found, even after sufficient time has elapsed since the accident; for it would be illogical to say because it existed in three cases it must exist in all. Notwithstanding this, I feel confident that the occluding membrane will be found in at least the majority of cases. I have felt confident of this since I found the explanation of the origin of this membrane in my second operation.

In this second operation, after laying bare the interstice between the bony fragments, I found between the anterior edges of the fragments, and uniting them, a bluish-white membrane slightly concave to the front (A). Dissecting away this membrane, I came upon blood-clot (C), of a coffee-brown colour, and tolerably dry, filling the space between the two bony fragments. Having removed these blood-clots with Volkmann's spoon, a thin but distinct membrane (P), very similar to the anterior membrane, became visible, uniting the posterior edges of the fragments, thus separating the space between the fragments from the cavity of the knee-joint. This case threw light upon the probable way in which the membrane is formed. It seems to me that the blood lying between the two fragments of the patella, when these fragments are kept at rest and at a moderate distance from each other by the ordinary back splint and bandage, after coagulation undergoes organisation—i. e., the formation of young connective tissue in the place of the blood-clot; and that the so-called organisation of the blood-clot begins and advances most rapidly at the anterior

and posterior surfaces, where the blood-clot is separated by a capillary cleft from the adjoining parts. This fact is quite in accordance with what has been observed in the organisation of the thrombus after ligation of a bloodvessel. There also one observes that the granulation tissue developing from the seat of ligation advances much more rapidly in the capillary cleft between the thrombus and the wall of the bloodvessel than in the thrombus itself. Between the two membranes the blood-clot remains provisionally, becoming organised very slowly. When at last the intermediate portion of the blood-clot is replaced by connective tissue, the ligamentous union between the fragments, the ordinary result of this treatment, is complete, and like connective tissue generally is very apt to be easily stretched. When union has proceeded so far, it is too late to perform my operation, the knee-joint would have to be opened to suture the fragments and the uniting tissue totally removed. At an earlier period, however, say ten to twenty days after the accident, the anterior membrane and the more or less changed blood-clots can be removed whilst the posterior membrane is preserved. The anterior membrane is not always easily seen as a

distinct membrane, since it is adherent to the overlying soft parts and may be dissected away with them. Acting in this manner, and taking precautions not to tear the posterior membrane whilst boring the canals by handling the fragments gently one can perform the suture as an extra-articular operation.

To illustrate the practicability of the method described I will briefly narrate the cases I have operated upon.

CASE 1. *Recent transverse fracture of the right patella, operated upon eight days after the accident.*—Operation on July 13th, 1878. On Dec. 12th, five months after the operation, perhaps much earlier, for I did not see the patient between Sept. 8th and Dec. 12th, the patient could flex and extend the right knee-joint as well as the left. She walks as well as before the accident, quite normally in fact.¹

CASE 2. *Recent transverse fracture of the left patella, operated upon twenty-five days after the accident.*—A lad of about thirteen years, whilst playing leap-frog, fractured his left patella. He was seen the same evening, June 1st, 1882, by Dr. Van Nes, who found the knee-joint painful and very much swollen. Ice-bags were applied, the limb fixed on a back splint, and elevated. The swelling of the knee-joint was much reduced in a few days. A bandage was then applied, in addition, in the form of a testudo genu, but the fragments of the transversely fractured patella could not be brought, much less retained, in apposition. Dr. Van Nes, fearing the result would be a useless limb, requested me to come over to Waddinxveen (South Holland) to perform the wire suture operation. On June 26th (twenty-five days after the accident) I saw the patient at Waddinxveen in consultation with my former pupil, Dr. Van Nes. The interval between the fragments was then about two centimetres. The patient having been narcotised with chloroform, the limb was exsanguined by the elastic bandage. All antiseptic precautions were observed. I made a longitudinal incision along the front of the patella and laid bare the posterior membrane as above described. After freshening the surfaces of the fragments and removing the tissue from the anterior edges of the bone, a canal was drilled with a bradawl in corresponding parts of each fragment obliquely, the bradawl appearing on the fractured surfaces just in front of the cartilage covering the posterior surface of the patella. Dr. Van Nes depressed the posterior membrane with a probe, whilst I drew the fragments together with a soft platinum wire, fixed the suture by torsion, cut off the ends, and depressed them into the soft tissues in front of the patella. The one suture sufficed; more would have been superfluous. The soft tissues were drawn together with two catgut sutures; the skin wound was closed with aseptic silk, and a small catgut drain left in position. A typical antiseptic dressing was applied with moderate firmness, the limb again fixed on the back splint and placed in an elevated position. Dr. Van Nes conducted the entire after-treatment of the case. I am indebted to him for the following particulars. The patient made an excellent recovery. On the evening of the operation the temperature was 37.5°C., but never exceeded that. On the third day the dressing was renewed; the gauze was dry, and marked only by a slight, aseptic, dry blood-stain. On the tenth day the dressing was again changed; the silk sutures were removed from the skin. The wound was soundly healed. Another dressing was applied as a precaution. Two or three days later a plaster-of-Paris bandage was applied over the last dressing. Six weeks after the operation the patient was allowed to move about with the plaster bandage on. The plaster bandage was removed seven weeks and a half after the operation. The knee-joint was then very stiff; active and passive flexion of the joint was commenced. On Sept. 13th, 1882, Dr. Van Nes wrote to me as follows:—"The stiffness of the knee-joint has almost gone; the patient can bend it nearly to a right angle. He walks quite normally. The patella is freely movable, and no depression can be felt at the seat of fracture, but rather a little crista."

CASE 3. *Recent transverse fracture of the left patella, operated upon nine days after the accident.*—Mr. V. B., aged about forty years, of the Hague, whilst visiting his relations at Utrecht, fractured his left patella by muscular violence in descending the steps leading to the ferry. His brother-in-law, the hospital apothecary, did not permit him to move, but secured a stretcher from the hospital, and had him removed to his mother's house. I saw the sufferer

¹ Vide Weekblad van het Nederlandsch Tijdschrift voor Geneeskunde, p. 241, No. 17, 1879, and THE LANCET, p. 30, Jan. 3rd, 1880.

three-quarters of an hour after the accident. The knee-joint was then moderately swollen, and but little painful; the patella was broken transversely, the two fragments being pretty equal. The interval between the two pieces was one centimetre. I laid the matter before the patient, and proposed the wire suture, which he gladly accepted. I also told him that I thought it advisable to wait eight or ten days before operating. Ice-bags were applied to the joint, the limb placed on a back splint, and elevated, whilst the fragments were retained closely together, and at rest by a testudo genu. On April 7th, assisted by Dr. Vos, Mr. Jonker, and Dr. Van der Heyden, chief of the Medical School and Hospital at Kobé (Japan), I performed the operation exactly as described above. I pointed out the posterior membrane, which was not so far organised as in the second case, and of a bluish-red colour, to my friend Dr. Van der Heyden. He was also of opinion that it was formed by the blood-clot in process of organisation. The interval between the fragments was at this time one centimetre and a half. Whilst I was gently boring the holes for the wire the membrane could be seen fluctuating. The bony surfaces were then freshened, and the space between was sponged out with a weak solution of corrosive sublimate (1 in 1000). The fragments were drawn together with a thinner wire than I had previously used, and the wound closed. A typical antiseptic dressing was applied, the limb placed on a back splint, and elevated. There was a little pain during the first two days. On the evening of the second day, April 8th, the temperature reached $38^{\circ}2$ C.; with this exception the temperature did not exceed the normal.—April 19th: Dressing removed; the wound healed; pad of salicylic cotton applied to protect the young cicatrix; the back splint reapplied. Four days later a plaster bandage was applied from the toes to the hip, and the patient allowed to get up; but to remain in his room. At the end of May he walked about a little with the plaster bandage still on. On June 2nd the bandage was removed. The patient was warned not yet to bend his unprotected knee-joint. Misunderstanding the warning, however, he frequently bent the joint to restore the movements of the stiff knee, and on June 7th the union between the fragments was thus strained. On inspection I found slight tenderness and a little effusion of blood under the soft parts. Rest and a mercurial application were ordered. On June 12th the swelling had disappeared. I could then feel a slight separation of from one to two millimetres between the fragments, but did not feel absolutely certain of this. For security I instructed the patient to wear the apparatus proposed by Mr. H. Parson,² but it caused pain and a little soreness. Meanwhile I became certain that a little separation existed, for there was slight lateral mobility of the fragments. By the middle of July the strength of the limb had so much improved that the patient returned to the Hague, and in August resumed his duties as under station master on the Rhenan Railway. In September, however, whilst standing before his desk, Mr. V. B. felt his left knee suddenly give way, and he fell. He was removed to the hospital at the Hague, and two days later was operated upon a second time. I have since heard he made a very good recovery. That the unfortunate complication of refracture in this case has nothing to do with the mode of operation I propose will be clear. The only circumstance in the operation I can think of that might have contributed towards the accident was the use of a weaker platinum wire than in my previous cases. In consequence the fragments were not so strongly drawn together for fear of breaking the wire.

Finally, since I have demonstrated that suture of the transversely fractured patella with wire can be performed in the majority of recent cases—say ten to twenty days after the accident—without opening the joint, and since this is not possible in old cases, it will therefore be far safer to operate in recent cases than in old ones.

Utrecht.

² Vide THE LANCET, May 19th, 1883, p. 862.

It is not an uncommon practice, we believe, in Yorkshire to administer the leaves of the arbor vitæ (*Thuja occidentalis*) to horses for the purpose of imparting a gloss to their coats. It is a practice, however, that cannot always be followed with impunity, and a farm servant at Driffield was last week sentenced to a month's imprisonment for causing the death of a mare by this means.

ON ASEPTIC BLADDER WASHING.

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WASHING out the bladder is a proceeding which when properly performed is calculated to relieve, and in some cases to cure, very serious conditions, but if ill done is pregnant with mischief. It is one of the most efficient methods of treating chronic vesical catarrh, and it is the most useful means at our disposal for checking that septic inflammation of the bladder which constitutes one form of what has lately been spoken of as "catheter fever." Offensive urine is, in my experience, always bacterial, and there is no reason why septic bladder catarrh should not be treated on ordinary surgical principles either by washing out the cavity or by drainage by means of perineal section, or by both measures combined. To wash the bladder without doing harm four points must be attended to.

1. The catheter must not press with its point against the opposite wall of the bladder—in other words, when the eye has entered the cavity it should go no further.

2. During its stay in the bladder the catheter should be perfectly still, therefore one hand will be fully occupied in holding it steadily in position.

3. No pressure should be made upon the abdominal walls.

4. No germs of decomposition must be introduced, therefore the catheter must be clean and no air must be allowed to enter.

The first and the last are the most important rules, and if they are rigidly followed the sort of catheter employed is to

a great extent a matter of taste, and of individual preference. For the effectual removal of septic mucus it is generally necessary to flush the cavity many times at each sitting, and at each alternation between outflow and inflow there is great risk of introducing air if the operation be done either with a syringe or a funnel and elastic tube, the two usual methods. Moreover, the syringe labours under the additional disadvantage of having a limited capacity, while the amount of fluid which the bladder requires to flush it is a very variable quantity, in some cases an ounce and a half being enough to open its sacculi, and in others five times that quantity being not more than sufficient. With the object of avoiding some of the risks of the operation, and reducing it to such simplicity that it can be performed by the patient himself, and can therefore be repeated frequently, a point of importance in many cases, I have contrived an apparatus which I will now describe, and which I may premise can be readily made by any tinman. The principle on which it acts is that the water flows into the bladder from a reservoir held aloft, which may be a common tin can holding a quart or more, and that when it flows out again it passes into the chamber utensil through a separate tube, and that these tubes being made of soft indiarubber, alternate compression of one or other will cause the water to flow alternately in and out of the bladder. It is obvious that for this purpose there must be a sort of three-way or T-shaped junction-pipe close to the end of the catheter, one arm being connected by tubing with the reservoir, another with the catheter, and the third leading to the utensil. Each arm should be about half an inch long, and of such calibre as to fit tightly into such a