NEPHRECTOMY¹ BY ABDOMINAL SECTION.

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As this is an unusual operation I may perhaps claim some indulgence if I explain generally the grounds upon which it was undertaken. This appears necessary from the fact (of which I am assured on high authority) that the whole subject of extirpation of the kidney is not yet familiar to English surgeons. It will, I hope, appear at the same time that my facts and data were in a great measure already gathered and fully weighed before I had any definite prospect of performing the operation; moreover, that the convictions as to its propriety were of no hasty origin, but the plain outgrowth from the consideration of a larger number of clinical facts than it had hitherto been possible for an operator to collect, owing to the recent and rapid growth of the subject. Abroad, only a few imperfect collections of cases have been made; at home, apparently nothing in this direction has been done adequately.

¹ The term "nephrectomy" is employed throughout this paper as shorter than that of "extirpation of the kidney," and as distinct from "nephrotomy," or simple incision into the kidney from the loin. Observation seems to show that such a term will be found convenient in the future,

Since the perusal of Prof. Simon's (of Heidelberg) memoir a couple of years ago, based upon his first successful extirpation of the kidney, the whole question appeared so attractive for many reasons that I had read all other cases which came under notice with special care, and also a good deal of collateral matter.

It appeared that if anything was needed to prove the correctness of Simon's deductions that one kidney can be safely removed from the human body it was furnished by the two cases in which, in 1878, Martin, of Berlin, extirpated healthy movable kidneys successfully, and with manifest benefit to the patients. The next case met with was that of Smith, of New Orleans, also quite successful. Simon's deductions and the consideration of these four cases seemed to lead to but one conclusion, namely, that the operation in its proper place is not only justifiable, but called for.

On seeing the present case, therefore, I felt clear as to the line of treatment to be advised. This opinion was only further strengthened by the evidence of all the cases published at home and abroad which I then collected and tabulated as soon as possible as below. These furnished additional proof of the correctness of Simon's deductions and supplied many data of great value unavailable to him when he wrote, or, indeed, up to the time of his death.

But as this author's original address must always be regarded as the starting-point in any consideration of the whole subject of "nephrectomy," his being the first case in which the operation was performed designedly and on definite principles, it may be well to review briefly the facts and considerations which led him to calmly weigh its propriety and eventually to carry it out with success.

Simon had been asked to treat a case of fistula of the ureter resulting from ovariectomy one and a half years before. Numerous expedients having failed, and the woman's state being truly wretched, the question of removing the offending kidney occurred to him. But

although the annals of pathology afforded him many instances in which one or other kidney had been *gradually* rendered useless by slow disease without any notable effect on the economy, he was not quite satisfied that the *sudden* withdrawal of the functions of one organ would be physiologically tolerated. His first care, then, was to study this point by experiment on healthy animals. But in doing so it would be necessary to distinguish between the mere primary surgical risks of the operation and the physiological, or those relating to the urinary functions.

The careful observation of some fifteen hysterectomies on bitches contrasted with the same number of nephrectomies on dogs supplied data on this point, and satisfied him that there was no more danger in one operation than the other. Both kidney and uterus, it should be remembered, are in the dog almost completely enveloped in peritoneum. Moreover, he found that after some practice he only lost about one out of five cases of nephrectomy. Also that primary and secondary hæmorrhage were far less prominent dangers than had been anticipated. The greatest risk run was from peritonitis, but many dogs recovered without it. Emboli from the renal vein and pyæmia were never met with in his cases, the clot in the vessel being short and limited to the immediate neighbourhood of the ligature. Nor were the physiological effects of the operation to be dreaded. If morphia had been given and the animals survived, they remained stupefied for about twenty-four hours and vomited freely; they ate nothing, lay upon the belly, and did not rise to call. After twenty-four hours these symptoms gradually disappeared, and on the third day they ran about and took their food. If operated on without morphia they presented no appearance of stupefaction, vomited but little, or not at all and very soon regained spirits and appetite.

Simon points out that in estimating the value of these experiments we must not forget that the kidney in the dog is much larger in proportion to the weight of the body than that of man, being as 1 to 170 against 1 to 230

in the latter. Also that the dog has to secrete proportionately more than four times the amount of urea than the human being. If, then, removal of the kidney produce no uræmic symptoms in the dog, the latter ought far less to be looked for in man.

Some other points also come out in Simon's experiments in relation to questions which have since been settled in other ways, but were then matters of debate. First, the general condition of the animals after nephrectomy was excellent in most cases. Again, no albuminuria was produced by the increased intra-vascular pressure presumably caused by the sudden closure of so large a vessel as the renal. Nor did hypertrophy of the heart ensue. The remaining kidney, on the other hand, was found to increase rapidly in size, and to be quite adequate from the first to the double duty imposed upon it.

That the deductions drawn from these observations hold equally well for the human being was soon after shown by Simon's first nephrectomy on the latter as far as one single case could prove anything. Several others from the collection of cases which I subjoin will, I hope, demonstrate the same. Two of these, unknown to Simon, were prior to his operation, and between twenty and thirty have occurred since, and were unavailable to him.

But there is one other question not specially considered in Simon's address which I venture to think deserves particular attention. It is this: *Are we to look for any very striking effect on the vaso-motor system from ligation so close to the solar plexus of the large sympathetic branches and ganglia which surround the vessels of the kidney? Will this, in short, produce much shock?* This could only be determined by direct observation on the human subject, and under very exceptional circumstances. We should be able, namely, to eliminate the effects of that part of the operation which consists in cutting down on the kidney from those due purely to the ligation of the pedicle and its division. There should, in

fact, be an interval between the two operations sufficiently long to admit of observation of the separate and peculiar effects of each.

Now, at least one, if not two, of the cases in my list appears directly to settle this question in the negative. In both, a gash in the loin exposed the kidney, and led to its prolapse through the resulting wound. After an interval (as long as four days in one case) the second operation of ligature of the pedicle and removal of the organ was performed. It is a most striking fact that neither one nor other of these operations gave rise to any real constitutional disturbance.

CASE 1 (No. 11).—An Austrian peasant received a slash with a knife in the left flank on January 3rd, 1873. He lost two or three ounces of blood at the time. A couple of hours later a fit of coughing forced out of the wound a soft, pulpy, vascular tumour. This was replaced by a friend, but prolapsed again on coughing. On examination, twenty-four hours later, by Prof. Brandt, of Klausenburg, this was found to be the kidney, slit in its long axis nearly in halves, and pouring out clear urine. It was not at all painful itself on handling, but when drawn upon much pain was felt in the pedicle, but nowhere else; it could be rotated on the latter without distress. Two days later the patient walked to a studio, remained there for two hours while being photographed in various positions and walked back again. In fact, his condition was almost that of perfect health. On the fourth day after injury, the kidney was removed by Professor Brandt, apparently *without an anæsthetic*. The pedicle was transfixed and tied in two portions, and the organ cut away with a knife. Considerable pain was felt during transfixion, much less during removal. He had no bad symptoms after this and but slight pain, and left hospital sixteen days later quite well. This appears to me one of the most important cases of the whole series.

CASE 2 (No. 13), recorded by M. Marvaud, surgeon-

major to an Algerine regiment, is almost identical, though not quite so valuable for want of equally full details.

A young Arab woman was stabbed in the right flank with a yataghan, the latter dragging the kidney out of the wound. Here it bled for a short time and then became strangulated. The pedicle was ligatured and the organ allowed to slough off, which it did at the end of some weeks. The patient continued in good health the whole time, the secretion of urine being normal. She was discharged perfectly well two months after admission.

Two other cases, though somewhat less simple, may with advantage be mentioned here.

No. 23. Mrs. H—, æt. 55, came under the care of Dr. Smith, of New Orleans, in April, 1879. Eight years before she began to notice pain in the right side, and a little later a tumour. Not long after "another surgeon performed upon her the usual operation for ovarian tumour, without removing the cause of her trouble." The year following another medical man passed a tape seton through the abdominal wall and the lump, for the purpose of causing adhesions around the latter the movements of which were so painful. This operation was followed by hæmaturia. The setons remained *in situ* for three months and gave some relief, but then broke and came away. Two other attempts six months later to pass in a seton for a similar object failed, the broken ends of two needles besides remaining in the abdomen. Two months later a tape was introduced as before, but with less relief. Her sufferings now rendered her insane, and she spent two years in a lunatic asylum. During this period the second seton came away.

In November, 1878, she had sufficiently recovered to return home, when the tumour was diagnosed to be a movable kidney. As she pressed for its removal, Dr. Smith operated on June 23rd, 1879. He made the usual lumbar incision, forced the kidney into it by pressure on the abdomen, ligatured the pedicle, and cut the organ

away. Nothing of special note, much less anything untoward, occurred during or after the operation. The wound was dressed with weak carbolic acid solution, it suppurred freely until the ligature came away on the tenth day. Little or no pain was complained of and the patient walked about on the eleventh day without trouble.

No. 5 is equally remarkable. A negro woman, five months pregnant, entreated operation for a most painful condition of the kidney. The latter was removed by Dr. Gilmore through the loin, and the patient recovered well and without any ill effect on her pregnancy, which terminated at the usual time.

All these cases appear to show how little impression on the system a simple uncomplicated nephrectomy may produce.

Turning now to the question of uræmia, the evidence of all the cases in the appended table is convincing that it is not to be feared where the remaining kidney is healthy. This has been the great anxiety hitherto, and has been carefully looked for in most cases. But glancing down the column of "symptoms" we are struck by the fact that only in one instance (No. 18) was anything present fairly and exclusively attributable to disturbance of the urinary functions.

The remote effects of the operation have now to be considered.

In the case of dogs, we have seen that months after they were in a thriving condition, and when killed the remaining kidney was found largely hypertrophied. Of the cases recorded in the subjoined table I am able to furnish evidence on this point in six.

Simon, writing of his first patient seven years after operation, says that "she enjoys the best of health." In a courteous letter received from Dr. Martin, of Berlin, a few weeks ago, he says that he still sees the three patients operated on by him in 1878, and that they are in perfect

health. In a later letter he tells me that there is probable recurrence in one of these whom he has since seen, though there was none a year after the operation. Mr. Jessop, too, of Leeds, kindly informs me that the child operated on by him for renal encephaloid (No. 16) was running about for a time after, but that he had reason to believe that the cause of death eight months later was recurrence. In the reports of the other successful cases there is no note as yet on this point. It is sufficiently shown by these, however, that the general health does not suffer by removal of one kidney.

The next point for inquiry is—For what objects has the operation been performed up to the present? The subjoined table shows 28 cases (excluding my own), which may be utilised as bearing generally on this question. Of these the operation was abandoned uncompleted in 2 (for new growths), on account of difficulties, real or apprehended. There remain, therefore, 26 of actual extirpations of the kidney for one cause or other. Of these the diagnosis was ovarian disease in 4, cyst of the liver in 1, and in 1 the organ was removed unwittingly during the excision of a fibro-cystic tumour of the uterus. Thus, there are 6 in which the original design was not removal of the kidney. Of these, 5 died, 1 recovered. There remain, then, 20 *completed* operations, commenced apparently with the distinct aim of excising the organ. The earliest of these was Simon's first, for fistula of the ureter. He has recently been followed by Zweifel, of Erlangen, with the same object, in a similar case, both successful. We then have 2 for the removal of kidneys acutely painful from some unknown cause, 1 death, 1 recovery. Next, 2 for calculous pyelitis, both fatal, but 1 of these only thirty-one days after from pyæmia. Then 3 for injury of the organ, 2 (mentioned above) complete recoveries, 1 fatal; the latter was operated on during great exhaustion, consequent on profuse suppuration following gunshot injury many months before. Then there have recently been 6 for intolerable pain and constitutional disturbance

due to movable kidney; 2 deaths from peritonitis, 4 complete recoveries. Next come 4 for neoplasms of the kidney (one by Langenbuck, a little obscure, however); recovery in 3, death from septic peritonitis in 1 on the third day. To this set for neoplasms, might now be added those 2 fatal cases in which the operation was abandoned. Finally, we have one operation for pyonephrosis, quite successful.

Although any minute comparison of the number of deaths to successes would, taken alone, be quite worthless at present as bearing on the propriety or the reverse of the operation, a glance at this point is not without interest.

Out of this whole 28 cases, 14 recovered and 14 died. Excluding those 6, where the original aim was not nephrectomy, of the 22 remaining 13 recovered and 9 died. Two of the latter were uncompleted operations, and desperate from the first.

But the consideration of the causes of death in these 9 cases will be more instructive. Of 1 (No. 9) it is reported that the patient died within a week, but that no cause was found post mortem. Four died of peritonitis after abdominal section, 2 of shock ten hours after operation (the aorta had been ligatured in one to arrest furious hæmorrhage), 1 of pyæmia. Of the ninth case the cause of death sixty-five hours after operation is not noted.

The successful cases now offer several points for consideration. First of all, look at the matter as we will, 14 patients, one of whose kidneys has been extirpated, have recovered completely. Let us take, however, only those 13 in which the nephrectomy was designed *ab initio*. Firstly, the immediate object of the operation was attained, and the patients were restored to health in all (possible recurrence in 2 excepted). It is a striking fact, again, that only in 1 (No. 18) were any symptoms exclusively referable to the intrinsic nature of the operation observed, such as drowsiness, rigors, &c., setting in at once. In most of the others it is distinctly noticed that there were no prominently bad symptoms as regards the urinary func-

tions. "Again, we have seen that there was no shock after simple cases, nor is any particularly noticed in the others.

As to the mode of procedure, we must be on our guard against generalising too freely upon so few data, but the following points may be noted.

Of our 13 successful cases 9 were lumbar sections, 4 ventral. To the latter might be added that other successful case (No 12), where nephrectomy was not designed from the first.

Of the 9 fatal cases the operation was lumbar in 5, and ventral in 4. To these latter might be added, as in the last instance, 5 others not originally intended to be nephrectomies.

On the surface these facts would appear significantly in favour of the lumbar operation, but they lose much of their force when we study the nature of each case for itself.

If I may be allowed to express a general impression, the result of a careful study of these cases, together with experiments on the dead body, it would be this. The lumbar operation appears best suited for removal of healthy or comparatively healthy kidneys, if this be ever justifiable; also in those cases where there has been much perinephritic inflammation; also for pyo- and hydro-nephrosis, and, perhaps, also for the smaller new growths of the organ, especially if fixed. The ventral incision, on the other hand, seems best suited for taking away movable kidneys, whether healthy or containing neoplasms, especially if the latter be large; also for the ordinary cysts of the organ not fixed by inflammation. The difficulty in the case of neoplasmata of removing the lymphatic glands in and about the pedicle of the kidney (which are known to be one of the earliest seats of recurrence) by the lumbar incision, would influence me much in favour of abdominal section, by which the root can be better reached.

Two more points may here be noticed as bearing more particularly on the case now to be described.

First, I found recorded 6 cases of nephrectomy for

movable kidneys, which were causing intolerable pain and constitutional disturbance; 2 were fatal, 4 quite successful.

Secondly, I had before me 6 cases where the operation was for new growth of the organ. Two of these were desperate, and abandoned before completed. Of the remaining 4, 3 recovered, and 1 died of septic peritonitis.

It was with almost all these facts before me that the following case had to be considered :

S. W—, æt. 21, servant; admitted into University College Hospital, November 3rd, 1879. Eight months previously noticed an aching pain in right loin. This was not severe enough to oblige her to give up her employment. She had had very hard lifting and carrying work for some months before admission. Menstruation irregular for last few years. Three months before admission had a severe attack of pain in region indicated, succeeded by vomiting and the passage of very dark bloody urine. A medical man then detected a small tumour between the crest of the ilium and last rib at the painful spot. When this was handled she felt pain, nausea, and occasionally vomited. Since then she has only been able to get about her work at intervals, having soon to return to bed on account of recurrence of the above symptoms, accompanied by hæmaturia. No cause was assigned for the tumour. The family history is good.

Present state.—A remarkably movable oblong tumour is felt on the right side, its long axis running upwards, backwards, and outwards. The abdominal wall is distinctly bulged out over it, most so at a spot about three inches directly above the anterior superior spine of the ilium. Palpation shows its inner border to reach the umbilicus, the outer a line drawn upwards from the junction of the middle and anterior third of the iliac crest. Above it reaches the last rib, below to within a finger's breadth of the iliac crest. The abdominal wall moves

freely over the mass. The surface of the latter is smooth but nodulated, one lump forming the prominence of the skin already noticed. Its edges are rounded and well defined, its shape irregularly oval; it is tender to the touch and pressure, the latter producing nausea, and sometimes vomiting, especially when exerted in an upward direction. The mass is freely movable from side to side, less so from above downwards. It rises and falls with the respiration; it is unconnected with the liver. A tympanic note is obtained all round and over it except at the prominence alluded to. There is no hydatid fremitus or pulsation direct or communicated. The right flank does not appear particularly void. The tumour varies with position.

The general health is fairly good, but there is slight anæmia and occasional hæmaturia: constipation marked before admission.

From the study of these facts and the patient's condition, I felt justified from the first in urging the removal of the mass by operation. The argument was this. There appeared to be little doubt that the tumour was renal. I held it to be a movable kidney, with, in addition possibly, a new growth seated in it. But supposing it to be simply a floating kidney, it still ought to be excised. For the patient's life was rendered comparatively useless as well as wretched by the recurrent attacks of pain and other symptoms. That the suffering was very severe we had opportunities of observing, besides her own statements. I had read Keppler's very interesting analysis, in 'Langenbeck's Archiv' of 11 cases of movable kidney producing intolerable suffering and much constitutional disturbance, and rendering the patients' lives a burthen to themselves, and in some cases to others. So much so was this the case in one instance that the sufferer became melancholic and committed suicide, the diagnosis of floating kidney being confirmed by the autopsy. Out of these 11 Keppler had prevailed on Martin to perform

nephrectomy in 2 (both successful). The same operator soon after removed a kidney similarly affected, also with success. In Smith's case (No. 23) the patient was eventually driven out of her mind by the same condition, but on leaving the asylum was relieved of all her troubles by the removal of the floating organ. Gilmore's case of the pregnant negress seemed significant too. I felt satisfied that the present patient's case was as bad as these, and called for operation as urgently. But if the copious hæmaturia and other symptoms, together with the rapid increase in the size of the tumour observed by the patient, were to be interpreted as pointing to a malignant growth of the kidney, there was all the more pressing need for its removal. The operation was of course a grave one. But it appeared clear from careful study of this series of cases that there was nothing intrinsically dangerous in the removal of the kidney apart from the ordinary risks of ventral and lumbar section. I was satisfied, and still am, that there is no more risk than in ovariectomies. But this was more urgent than many ovarian cases, if malignant much more so. It was not more contra-indicated than many well-recognised operations of expediency.

These, then, were the chief grounds for removal of the tumour. And when some weeks later the case was placed in my hands by the kindness of Mr. Heath, I was quite ready to operate as soon as possible. This feeling was further confirmed—1st, by the changes found in the tumour when I could now examine it; 2nd, by the several recent attacks of intense pain and profuse hæmaturia; 3rd, by the conviction that we had before us a malignant growth of the kidney; and, finally, by the now unanimous opinion of my colleagues, Dr. Graily Hewitt, Dr. Wilson Fox, Dr. Williams, and Mr. Heath, that an operation was justifiable.

The points noticed after admission were briefly as follows:—First, that for the fifty days the patient was in the house hæmaturia was almost constant. The urine is only once noticed as free of blood. Hæmaturia was

profuse about every six or eight days, gradually decreasing to rise suddenly again. This bleeding almost inevitably made its appearance after manipulation of the tumour, and was preceded and accompanied by intense pain in the latter. The pain also was most constant in the same way, and was accompanied with nausea or vomiting during the paroxysms. For two and a half days before operation these prevented anything lying on the stomach. The growth of the tumour was very remarkable. Just before operation it appeared quite double the size observed on admission. It now measured in the transverse axis of the body $7\frac{1}{2}$, in the vertical $4\frac{1}{2}$ inches. It was distinctly more fixed, and the right flank had now lost its tympanitic note. I therefore regretted much the delay in operating in view of the possible generalisation of the neoplasm. But this regret was redoubled by observing the attack on the Saturday preceding operation. The patient had been particularly well all day and for some days previously, but on that night the worst access of pain she had yet experienced in the tumour set in. This was accompanied by hurried breathing and rise of temperature to 100° , and later by constant nausea and vomiting. Her sufferings were intense all through Sunday, and on that night her pulse, taken three different times, was respectively 170, 180, and 150. She was somewhat relieved by morphia, and next morning her pulse was only 130, but the temperature had risen to 101.5° during the night: her breathing was not so hurried. She was besides pale and anxious-looking, and quite unable to sit up in bed as before. The operation was performed on the next morning (Tuesday, December 23rd, 1879). At this time the pulse was from 125 to 130, the respirations quieter than before, but the vomiting had not yet ceased. She was altogether much exhausted, though, as she told me, she thought she would have been able to walk over from the hospital to the private room prepared for her across the street, she had felt so well on Saturday. As it was she was so prostrate that her removal had had to be deferred. On the same

morning she had passed a large quantity of almost pure blood, and it was noticed that the tumour had shifted *against gravity* two and a half or three inches towards the left side.

As to the operation itself, it was not really difficult, and I was not obliged to depart from the plan I had sketched beforehand in detail. The first incision from the umbilicus downwards was limited to three inches at first, in order that, while the left kidney was being first explored, and then the tumour on the right, the intestines should not protrude. An early escape of the latter and their exposure was much feared, the abdomen not being distended, as in ovarian cases. As a matter of fact, no part of them ever rose above the level of the wound during the whole operation; they were hardly ever seen. For this I have in great measure to thank Mr. Meredith's perfect administration of the anæsthetic.

The end of the tumour lay under the wound, with the ascending colon over its left border. The left kidney was in its normal position as found by the finger. The incision was now enlarged to about three inches above the umbilicus. On passing my hand into the abdomen the tumour in the first place was felt to be distinctly renal; it was freely movable laterally but fixed somewhat towards the aorta. It was unevenly tuberculated, softer, and more elastic in spots, and the end which lay under the liver was pointed. The peritoneum was stretched tightly over it but was smooth and unimplicated. Several large veins were also seen running transversely over the dark purple surface of the growth and under the serous covering.

I now cautiously tore through the external layer of the ascending mesocolon with finger-nail and forceps transversely to the axis of the body, then, inserting the finger under it, slowly and gently swept round the growth. After the anterior portion had been freed this was not difficult, but so far the utmost care had to be observed lest some of the soft parts of the tumour should be broken into, and I should lose myself in its pulpy vascular sub-

stance. Soon the lower end of the mass could be protruded through the peritoneal rent, and the rest, easily but slowly separated from the perinephritic tissue, presently followed. The ureter was now found at its lower and left border, and was divided between two ligatures. The tumour could then be partly extruded through the abdominal incision, but not fully until another rather firm band, lying a little higher up between the mass and the aorta, had been divided. This was found subsequently to contain an aberrant artery and vein. Then the whole mass came out, though still attached by the renal vessels and a fibrous band posteriorly. The vessels were not visible, however. The pedicle was now transfixed with a blunt aneurism needle bearing strong (No. 30) twisted silk, and was tied in two portions; then in the same way, a little nearer to the aorta, the last ligature being finally brought round the whole *en masse*. The pedicle was then divided with a scissors, and the renal artery found dry and gaping; its mouth was ligatured.

The edges of the peritoneal rent falling nicely together I simply sponged the areolar tissue dry, and then the abdomen, replaced the colon, and stitched up the abdominal wall in the usual way. An antiseptic dressing completed the operation. The latter was almost bloodless from beginning to end, no vessels requiring ligature except the renal. The patient bore it very well. Mr. Meredith has kindly supplied me with the following note on this point:—"Pulse about 124 after the operation (it had been 125—130 before), small, quite regular, and of fair strength. During the time she was on the table it had remained steady throughout, and never gave the slightest cause for anxiety."

Looking at the operation now I believe some time might have been saved in its performance. It lasted over an hour, the patient being dressed and in bed in an hour and twenty minutes. But for any slowness of execution I am prepared to accept the responsibility; it was to some extent premeditated. First, this was a

pioneering operation, not having been done before in this way in England. Then I feared from the first that on opening the abdomen the soft vascular mass might be found nearly or actually protruding through its serous covering. This was almost the case. I realised the risk in stripping off the peritoneum of thrusting the finger into this brain-like substance, and so losing my way in it, as had occurred in two foreign cases (Nos. 15 and 22), leading in them to what I think may be called catastrophes. The first of these is thus described by the operator, Professor Czerny:

"The external layer of the mesocolon was divided over the tumour, and the separation of the mass encapsuled under this begun with blunt instruments. Further advance showed that the soft growth had not only broken through the capsule internally, but even the inner layer of the mesocolon. In this soft mass one had nothing to hold on by. A profuse hæmorrhage could only be arrested by temporary compression of the aorta, returning as soon as this was taken off. All the signs of a speedy death from hæmorrhage manifesting themselves, nothing remained to me but to throw a ligature round the aorta. This stopped the bleeding. The abdominal wound having been closed the patient was put to bed. He came to himself thoroughly, but after two hours complete anæsthesia of the lower limbs set in, which persisted until his death, ten hours after the operation."

These are the operator's own frank words, and require no comment. The other case (No. 15) was almost similar.

Again, there was great danger of wounding some of the large veins ramifying over the tumour, and so flooding the field of operation, as had also occurred in one case. Great difficulty, too, had been experienced by another operator abroad in avoiding the distended renal vein. In another case the ligature had slipped off the vessels after division of the pedicle. I thought, therefore, no care too great to avoid these risks. They were all real, and it

appeared better to sacrifice a little time (especially as the intestines were not exposed) to deliberate work, and to avoid all chance of having to adopt any desperate expedient or abandon the operation, which in that case I should have regarded as a complete surgical failure. An examination of the tumour afterwards justified the caution observed. There were spots on its surface almost diffuent, and which an unwary touch would have easily broken into, letting out either its soft material or the blood effused into it.

The patient's condition after operation was briefly as follows:—She recovered from the anæsthetic in the usual way. There was hardly any shock, the temperature only falling to 97.6° . In the evening she was still vomiting; pulse 108. Next morning at 6 a.m. the temperature had risen to 99.2° ; pulse 130; respirations 22. At 10 a.m. the temperature 99.4° . Patient now looked quite as well as on the morning of operation. At 2 p.m. still vomiting; temperature 99° . She seemed to be doing so well that it was decided in consultation not to trouble her with nourishment or stimulants as she was still vomiting. At 6 p.m. as before. At 10 p.m. she was plainly not so well; respirations 36; pulse 140; temperature 99.3° . One could not fail to be struck with the similarity between these symptoms now suddenly setting in and those manifested on the preceding Saturday night. Two hours later Dr. Williams kindly saw the patient with me. Her symptoms were as before. On the one hand, the absence of abdominal rigidity or distension, or the characteristic pulse excluded peritonitis, besides the temperature was only 100.2° . Moreover, she had not the look of that disease. On the other hand, the pulse was too good for rapid *general failure*, and, further, the temperature ought to have fallen for this condition. Besides this, there was something very peculiar in the character of the hurried breathing. On the whole, we inclined to the belief that a clot was forming in the vena cava.

She remained in this state for some hours longer, and

then began really to fail. The pulse became feebler, the respirations shallower, the vomiting continued, the right lower limb became numbed, and she died forty-five hours and a half after operation. She was perfectly clear-minded to the last, and had no head symptoms.

Autopsy twenty-seven hours after death.—Cause of death pulmonary thrombosis. Body fairly well nourished, somewhat anæmic. Slight discoloration over the course of the veins of the right thigh and leg, as noticed some hours before death.

Operation wound accurately and soundly united, without a trace of inflammatory action or puffing. It was seven inches long, three above and four below the umbilicus. Abdominal cavity opened an inch to the left of it to show its serous surface. Union had also taken place here in the most satisfactory manner, the edges being glued firmly together without any *visible* lymph. A small shred of omentum was loosely included in the uppermost stitch. The intestines were normal in appearance and position. There was a trace of stained serum in Douglas' pouch, but no visible plastic exudation anywhere, or any blood-clots. The colon had returned to its normal position, and overlapped the rent in the mesocolon, being firmly adherent to it by invisible cementing material which required considerable force to make it yield. The rent itself had contracted considerably. It led into a space in the perinephritic areolar tissue, which was ecchymosed with the blood of the operation. There was only one small blood-clot here, about the size of a date seed; no trace of pus or visible lymph, though the tissues had already begun to consolidate. In this areolar space lay the vessels of the kidney tied as described, the ligatured end of the ureter a little ecchymosed, and the aberrant renal artery mentioned above. The renal artery was tied at about one inch and three quarters from its origin, and filled with firm clot. The vein had been ligatured exactly at its termination in the cava. Its shortness seems to have been due to the fact that the

cava was drawn away from the aorta, but whether by the weight of the tumour or traction during operation it is hard to say. At all events, the same ligature which closed the artery at about one inch and three quarters from its origin included the vein at its termination. The vena cava and iliac veins were partly filled with fluid blood without clots, either opposite the ligatured renal vein or elsewhere.

The liver was normal, but pale and slightly yellow-tinted. There were one or two minute whitish specks on its surface, suspiciously like secondary deposits. The gall-bladder was engorged.

The left or remaining kidney weighed five ounces. It was slightly hyperæmic, but quite healthy, and without secondary deposits. Its pelvis contained some thickish turbid urine.

The bladder contained a little turbid bloody urine, with a small washed-out clot.

The stomach was pale, but spotted with small ecchymoses, and covered with thick mucus.

The pericardium contained a little straw-coloured serum.

The heart substance was normal. Right auricle full of soft dark coagula. Right ventricle almost filled with a firm, toughish, pale, yellow ante-mortem thrombus, entangled in the columnæ carneæ, but not very firmly adherent to the walls. This was traceable far into the pulmonary arteries, where it ended in ordinary post-mortem coagula. The left ventricle contained only post-mortem coagula.

Both lungs were anæmic anteriorly, with slight turgescence posteriorly; otherwise quite healthy, except for a few small secondary deposits of the neoplasm, varying from the size of a small nut down to that of a millet seed, scattered here and there on the surface. These had the same texture as the tumour.

Some small glands at the root of the kidney were infiltrated with the new growth, but no further traces of the latter were found in the lymphatic system.

The supra-renal capsule was found to have been left behind by the operation, and to be quite normal.

Now, while looking upon the operation as the cause of death, it may not be uninteresting to glance a little more closely at the various factors in the process of dying. First, there can, I think, be but little doubt that thrombosis of the pulmonary artery was the immediate cause of the fatal issue. That it was not peritonitis is quite clear. Nothing could have been more satisfactory than the condition of the whole abdominal cavity and intestines. There was exactly that process of repair going on which we desire in such cases, a glueing together of the wounded surfaces (and of them alone), and yet no trace of lymph visible to the naked eye. Again, it was just as clearly not septicæmia. The temperature never rose above $100\cdot2^{\circ}$, and we had none of those appearances, before or after death, usually associated with that condition. Nor was it the immediate effect of shock. The fact that the temperature only fell six tenths after operation, and had then slowly risen to $100\cdot2^{\circ}$, together with the good character of the pulse for the first twenty-four hours, settle this. It was, also, not hæmorrhage. The patient did not lose a couple of ounces of blood during the operation, and lost none after. Again, there were no uræmic symptoms, the mind being perfectly clear to the last.

I was at first inclined to attribute the fatal issue to those secondary neuro-paralytic effects sometimes met with after severe operations, where (to put it briefly) the system is so depressed by the latter that it is unable to respond to the call made upon it when the time for repair of the wounds comes round, and thus heart and lungs fail, and with them all the other powers. But this cannot be so here. There was no hæmorrhage, no exposure of the intestines, and no shock of any note.

But in saying that the patient died of pulmonary thrombosis, we do not advance much further in explanation. Why did the clot form in the right heart? It is

as difficult to account for this phenomenon here as it is in other cases where it is found. Here there was no evidence of embolus, no trace of clot at the mouth of the ligatured renal vein or elsewhere. The great primary thrombus in the heart also gave no indication in its texture of such an origin. It was limited to the right ventricle, and only extended secondarily into the pulmonary arteries. It was plainly of considerable standing. Whether it had some little shred of the soft encephaloid growth as its starting-point is, I think, a fair subject for speculation, although sections do not show this. If such were so, the thrombus might well have commenced to form a couple of days before the operation, in view of the sudden symptoms of dyspnoea, &c., which had set in and persisted to a greater or less extent until the latter. This thrombus, very small at first, might have been added to when the weakening effects of the operation and the commencement of inflammatory repair had altered the force of the blood-stream and its plasticity. The latter may also have been considerably influenced by the almost constant bleeding for at least seven weeks before from the kidney. That small portions of the growth did pass through the heart at one time or another is plain, for there were secondary deposits in the lungs. Buds of the soft neoplasm, too, were found projecting into the lumen of some of the larger renal veins (fig. 1). Whether the handling of the tumour during operation may have dislodged one of these, which only reached the heart on the second day, is also a fair question. Such a shred at all events had been swept down the ureter a couple of days before, where I found it, and recognised its texture microscopically on the preceding Sunday.

How long the patient would have lived had she survived the operation it is hard to say, probably not very long. The deposits in the lungs, however, were still small, the largest about the size of a nut. But I cannot help thinking that, had we operated before the last attack of dyspnoea, pain, &c., had set in, she would have survived

the immediate effects of the operation; and if when she first came in, that we should probably have forestalled recurrence, which was manifestly recent.

Examination of the tumour; naked-eye appearances.—The kidney on removal weighed $30\frac{1}{2}$ ounces; its length was 7, breadth $4\frac{1}{2}$, and depth $4\frac{3}{4}$ inches. It was larger below than above, where its only healthy portion lay. This had the usual appearance of smooth, pale renal tissue. The rest of the organ was uneven and lumpy, with dark purple patches over the irregularities. The largest prominence was below and anteriorly, and equalled the area of about a crown-piece. Here the surface was soft, and even fluctuating under the finger. In no spot did the growth actually pierce the capsule of the kidney, which was smooth everywhere, but in several places it very nearly did so.

The ureter, cut about three inches long, looked normal; its infundibulum was dilated. The renal vein was severed close to the kidney, as also the arteries, which appeared of normal size. The perinephritic areolar tissue presented nothing abnormal.

On section of the organ in the usual way its upper portion is seen to be quite healthy for about as much as the upper quarter of a normal kidney. Below this the organ is almost completely converted into a mass of encephaloid new growth from the apices of the pyramids to the great convexity. Here, somewhat towards the front of the mass, is a soft collection, about the size of a hen's egg, consisting chiefly of blood held together by very loose trabeculæ of the growth, and encapsuled in a very tough fibrous covering about $\frac{1}{12}$ inch thick. The latter is lined by decolorised fibrin deposited in layers of different density and hue. Outside of this encapsuled mass the growth extends in all directions as a more or less spongy tissue, made up of loose fibrous trabeculæ enclosing much softer material, and here and there extravasated blood. This softer substance is almost diffuent in parts, out of which can be picked up shreds

of very delicate texture. It appears manifest that the youngest parts of the neoplasm are those towards the cortex of the kidney, the oldest at about the position occupied by the apices of the pyramids, although most of the latter are obliterated by the new growth. The expansion of the latter has elongated the pelvis to a large extent, and drawn out the calyces into tubular structures. Seven of these can be made out. One of them laid open shows the growth commencing to fungate through its fibrous wall. Over the area of a sixpenny-piece an irregular flocculent bleeding mass projects into its lumen. A second calyx is nearly filled with another such projection. The large encapsuled mass mentioned above is also nothing but one of the calyces distended by one of these portions of soft growth, and the blood extravasated into it at different times. The greater part of the rest are healthy as to colour and texture of their lining membrane.

The renal arteries can only be traced a short distance into the fungous mass of the tumour and are soon lost.

FIG. 1.

a. Vein laid open ; normal.

b. Two buds of new growth piercing through the intima of the vein.

c. New growth outside the vein.

The vein too is soon lost. But before it has passed far inwards its walls are found to be pierced by small pulpy projections of the new growth. These can be studied

in every stage, from that of mere raising of the inner coat of the vessel to actual projection of spongy tufts into the vessel. (See Woodcut, fig. 1).

On the whole, a careful dissection of the organ appears to show the following to be the plan of growth of the neoplasm.

1. That it commenced in one or other of the pyramids in the lower part of the kidney, and spread from this centrifugally, the cortex having been but recently invaded.

2. That the calyces and pelvis were much stretched before their walls were actually pierced.

3. That one calyx was much distended by such a mass and by the blood poured out by it. And also that this blood was poured out at different periods, and with sufficient intervals to admit of thick separate layers of fibrin being deposited from it on the walls of the calyx.

4. That the other calyces pierced by the growth presented the process in a more recent stage, with no coagulation of blood *in situ*, but simply projecting tufts.

5. That the renal vein had comparatively recently been pierced by the neoplasm, explaining probably the very small extent of its generalisation in the lung.

6. That the neoplasm was probably a small round-celled sarcoma.

Microscopic structure.—The bulk of the growth consists essentially of small round indifferent cells crowded together without any particular arrangement in large masses. (See Woodcut, fig. 2). These are bounded by bands of fibrous tissue of more or less firm texture. In the younger parts of the growth the small aggregations of cells occupy alveoli, of oval form and tolerably even contour, but varying much in size and arrangement. This alveolar structure is very striking in many places. Whether the individual loculi were derived from the distended tubules of the organ or not could not be determined from the sections examined. In none of them, however, were there any traces of epithelial elements, nor were there any other traces of renal structure discovered here. The cells of the neoplasm were in all points identical with those of the small round-

FIG. 2.

Section near the periphery of the growth, showing a somewhat alveolar structure. Some alveoli contain the small round cells, others have been emptied in preparation.

celled sarcomata, to which group the growth is plainly to be referred.

The following table gives the proportion of urea passed before and after the operation :

The amount of urine passed in 24 hours was estimated on five occasions.	The amount of urea passed in 24 hours was estimated on six occasions.
ozs.	grs.
50	342
69	390·5
46	499
38	369
68	185
	400
5) 271·0	6) 2185·5
Average for 24 hours...54·2	Average for 24 hours...364·25

The amount of urine passed in the twenty-four hours following the operation was twenty-six ounces, or a little less than half the average quantity.

The amount of urea passed in the twenty-four hours following the operation was 200 grains, or 164.25 less than the average quantity, or nearly two thirds of the average whole.

Finally, if this case has done nothing more it has demonstrated that the diagnosis of cancer of the kidney is, in certain instances, arrived at with sufficient certainty to justify operation, should this not be contra-indicated by other considerations.

I cannot conclude now without acknowledging Mr. Heath's kindness in placing this case, in which I was so much interested, in my hands for operation. I have also to thank Mr. Erichsen for kindly being present to aid me with counsel, and Dr. John Williams and Mr. Beck for their able assistance.

The appended table is compiled from a careful study of the original reports of the several cases in every instance except three, viz. Nos. 1, 13, and 23, where the originals were not accessible, but only abstracts.

Table of all cases of Nephrectomy (two

No.	Operator and original record.	Sex and Age.	Diagnosis or aim of operation.	Evil dates back.	Date of operation.	Seat of incision.	Form of dressing.	Treatment of pedicle.	Symptoms after operation.
1	Wolcott (America), 'Med. and Surg. Rep.,' Phil., 1861, vol. vii	M. 58	Cyst of liver	6 yrs.	1861	—	—	—	—
2	Peaslee (America), 'Ovarian Tumours,' p. 158	F.	Ovarian cyst	—	1868 Apr.	Ventral	—	—	No coma; free secretion of urine
3	Simon (Heidelberg), 'Chirurg. d. Nieren,' Erlangen, 1871, Th. i, p. 33	F. 46	Fistula of ureter after ovario-hysterotomy	18 mos.	1869 2nd Aug.	Lumbar, extra peritoneal	Not anti-septic	3 silk ligatures, thick No. 2	"Neither headache, coma, delirium, nor convulsions;" patient vomited from the chloroform; urine reduced at first, but "no albumen found"
4	Esmarch (Kiel), 'Archiv f. Gynæk.,' Bd. i, Hft. 3, p. 415	F. 19	Ovarian cyst	12 yrs.	1869 15th Nov.	—	—	Ligatures, 16 in all	Only noticed "thirst;" pain in back continuous
5	Gilmore (America), 'Am. Jour. of Obstet.,' May, 1871	F. 33	Painful kidney: patient 5 months pregnant	4 yrs.	1870 Dec.	Lumbar	—	1 ligature of one vessel after removal	—
6	Bruns (Germany), 'Würtemb. M. Corresp. Bl.,' 1871, No. 14	M.	Gunshot wound on Dec. 2, 1870	4 mos.	1871 23rd Mar.	Lumbar 9 inches long	Not anti-septic	Ligature very difficult	Great pain and desire to urinate. Spoke quite clearly
7	Meadows (England), 'Brit. Med. Jour.,' 1871	F.	Ovarian cyst	—	1871 24th June	Ventral	—	Ligature	"No inflammation anywhere"

abandoned) hitherto recorded or authenticated.

Result, immediate and eventual.	Hæmorrhage at or after operation.	Condition of organ removed.	Remarks.
Death 15 days after from exhaustion of suppura- tion	—	Encephalo- loid of right kidney; weight 2½ lbs.	—
Death 50 hours after of peritonitis	—	—	The original record is exceedingly scanty, giving little more than these notes.
Out of bed in 6 weeks: the three ligatures re- mained fixed until the 6th month, at which time patient was apparently quite well: after they came away the sinus healed in a few days	During, but easily arrested	"Quite healthy in all parts"	The original record is most valuable. N.B.—Analysis of the matters vomited showed no trace of urea.
Death 36 hours after; œdema of lungs and dys- pnœa marked	During, smart from adhesions, none after	Large cyst of left kidney	This operation is incorrectly attributed to Schetelig by one or two writers; Schetelig only recorded it by Esmarch's permission.
Recovered well; did not abort	—	Shrunk, fibrous, marked by ribs	The patient was a negress, and suffered intensely before operation; the nature of the body removed was not quite clear until after removal.
Death 10 hours after from shock	Inconsider- able	Converted into a large abscess	The patient was very weak before the operation, and bore the chloroform badly. The operation lasted nearly 2 hours. The right kidney was also dotted with small abscesses.
Death 6th day after of hæmorrhage from pedic- le	—	Large cyst	The original record is very scanty.

No.	Operator and original record.	Sex and age.	Diagnosis or aim of operation.	Evil dates back.	Date of operation	Seat of incision.	Form of dressing.	Treatment of pedicle.	Symptoms after operation.
8	Simon (Heidelberg), 'Chr. d. Nieren,' Th. ii, p. 148	F. 30	Calculus pyelitis	12 yrs.	1871 8th Aug.	Lumbar, rapid	Charpie packed lightly into wound	Ligatures 2, not catgut	Vomited, but no uræmic symptoms. Pain in abdomen in direction of ureter
9	Durham (London), 'Brit. Med. Jour.,' May, 18, 1872	F. 43	Painful kidney	2 yrs.	1872 14th May	Lumbar	—	—	None bad
10	Peters (N. York), 'N. Y. Med. Jour.,' Nov., 1872	M. 36	Calculus pyelitis	19 mos.	1872 16th May	Lumbar difficult and slow	Lint	Ligature 1, strong silk	Vomiting, but no uræmic symptoms
11	Brandt (Austria), 'Wien Med. Wochensch.,' Nov., 1873, p. 1079	M. 25	Injury by a knife slitting kidney in loin	4 dys	1873 7th June	Lumbar original wound	Not anti-septic	Ligature double silk	Nothing uræmic before or after, but sweated a good deal
12	Cambell (Dundee), 'Edin. Med. Jour.,' 1874, vol. xx, p. 36.	F. 49	Ovarian disease	18 mos.	1873 2nd Dec.	Ventral	Modified anti-septic	Ligature hempen	No uræmic; free flow of urine from first
13	Marvaud (Algiers), 'Revue de Méd. Milit.,' Oct., 1875	F., 'young arab'	Wound by yataghan	Few days	1875	Lumbar, original wound	—	Ligature silk	No uræmic; good flow of urine from beginning
14	Langenbuch (Germany), 'Berl. Klin. Wochensc.,' No. 24, 1877	F. 32	Sarcoma of lumbar muscles or of kidney	18 mos.	1875 7th Dec.	Lumbar	Anti-septic	Ligature difficult, slipped off	None bad; no fever
15	Kocher (Bern), 'Deutsch. Zeitsch. f. Chir.,' Bd. ix, 1876	F. 35	Sarcoma of a freely movable kidney	18 mos.	1876 20th Apr.	Ventral high	Anti-septic failed	Not reached	Only thing remarkable was cystitis second day

Result, immediate and eventual.	Hæmorrhage at or after operation.	Condition of organ removed.	Remarks.
Death 31st day after from pyæmia, setting in on 21st day	None from incision; severe from pedicle at operation	Small, fi- brous, cal- culous with blood clots	"Very favorable conditions until the 21st day," when pyæmia manifested itself. Original report is most carefully made, and very valuable. Operation lasted $\frac{1}{2}$ hour.
Death within a week	—	—	Original report most scanty.
Death 65 hours after	Very little during or after	Enlarged and granular	The operation lasted $2\frac{1}{2}$ hours.
Recovery; left hospital on the 16th day; liga- tures came away on 6th day	None be- fore or after	Healthy; weight 58 grammes	Original report most instructive. After the first knife-wound patient was able to walk about without trouble in spite of the protrusion of the kidney from the opening into which it had been forced by coughing.
Recovery, but tedious; wound quite healed 84th day; left hospital on 113th day	Consider- able oozing nothing more	Cyst of Lower $\frac{1}{4}$ th of left kidney	—
Recovery; left hospital in two months quite well	Smart before	—	The ligature was allowed to cut its way through the pedicle, and the kidney to slough off, which it did in "some weeks."
Recovery; left hospital Jan., 1876	Slight when ligature slipped	Doubtful, a hollow organ	There is some doubt as to the nature of the diseased mass removed, the speci- men having been thrown away by the inadvertence of a servant.
Death 3rd day, from peri- tonitis	None noted	Sarcoma extensive	Operation abandoned; the growth spreading too far into transverse meso- colon to be separable; abdominal in- cision stitched up.

No.	Operator and original record.	Sex and age.	Diagnosis or aim of operation.	Evil dates back.	Date of operation	Seat of incision.	Form of dressing.	Treatment of pedicle.	Symptoms after operation.
16	Jessop (Leeds), 'Lancet,' 1877, vol. i	M. 2½	Renal encephaloid	1 year	1877 7th Jan.	Lumbar	Not anti-septic	Ligature whipcord	None bad; no vomiting; good flow of urine
17	Kocher (Bern), 'Deutsch. f. Chir.,' Bd. ix, 1878	M. 2½	Renal new growth	2½ yrs.	1877 27th Sep.	Ventral	Anti-septic	Ligature double catgut	No uræmic; no vomiting; free flow of urine soon after
18	Martin (Berlin), 'Langenb. Archiv,' Bd. xxiii, 1879, p. 540	F. 49	Painful floating kidney	8 yrs.	1878 15th Mar.	Ventral	Anti-septic strictly	Ligature, 1 <i>en masse</i> , 2 transfixion	Rigors, pain, nausea; drowsiness at first
19	Martin (Berlin), loc. cit.	F. 30	Painful floating kidney	5 mos.	1878 25th Aug.	Ventral	Anti-septic strictly	Ligature, 4 transfixion, 1 <i>en masse</i>	Some vomiting and pains
20	Martin (Berlin), loc. cit., and private letter	F. 25	Painful floating kidney	—	1878	Ventral	Anti-septic strictly	—	—
21	Martin (Berlin), 'Berl. Klin. Wochensc.,' 1879, No. 22.	F. 53	Sarcoma of kidney	2 mos.	1878 9th Dec.	Ventral	Anti-septic strictly	Ligatures 9, silk	—
22	Czerny (Heidelberg), 'Cent. Blt. f. Chirurg.,' No. 45, 1879.	M. 50	Malignant tumour of kidney	2 yrs.	1879 19th Jan.	Ventral	—	Not reached	—
23	Smith (N. Orleans), 'N. Or. Med. & Sur. Jour.,' Aug., 1879.	F. 35	Painful floating kidney	8 yrs.	1879 3rd June	Lumbar not difficult	Not anti-septic	Ligature "strong"	No uræmic; slight fever; free suppuration

Result, immediate and eventual.	Hæmorrhage at or after operation.	Condition of organ removed.	Remarks.
Recovery; child up and running about soon after	—	—	Mr. Jessop kindly informs me that he satisfied himself by examination 8 months later that recurrence was taking place, probably in the lumbar glands; the child died a few weeks later at its home; no autopsy.
Death 3rd day of septic peritonitis	Considerable during; none from pedicle	Adeno-sarcoma 15 × 16 × 10 cm.	—
Recovery; out of bed on 17th day; wound healed 26th; strong, working 3 months	None from pedicle; some from peritoneum	Perfectly healthy	Next to Simon's monograph this is the best article on the subject yet written. The great distress of patient was quite relieved by operation; latter lasted 36 minutes.
Recovery; out of bed on 13th day walking about; wound healed 17th; discharged	—	Perfectly healthy	A more striking case than last; symptoms very slight, recovery very rapid; operation lasted 50 minutes.
Recovery, complete	—	—	—
Recovery, complete; out of bed 8th day, went home 17th day	None	Malignant new growth weighed 28 ozs.	Operation rendered particularly difficult by presence of large engorged veins running over the tumour; operation lasted 45 minutes.
Death 10 hours after of shock	Profuse at operation from renal artery	Soft spongy mass left <i>in situ</i>	Having broken into the soft mass of the tumour during operation profuse bleeding set in from torn renal artery; the aorta was then ligatured.
Recovery uninterrupted; walked about on 11th day	—	Healthy; showed scar of seton	Ovariectomy attempted in 1873, no relief; a seton was passed through abdominal walls and tumour in 1874 to cause adhesion; temporary relief.

No.	Operator and original record.	Sex and age.	Diagnosis or aim of operation.	Evil dates back.	Date of operation.	Seat of incision.	Form of dressing.	Treatment of pedicle.	Symptoms after operation.
24	Zweifel (Erlangen), 'Archiv. f. Gynækol.,' B. xv, Heft. i, p. 1.	F. 29	Fistula of ureter into uterus after labour	2½ yrs.	1879 8th Jan.	Lumbar	Anti-septic strictly	Ligature silk, left long	Vomiting, pain, and restlessness on 1st day, nearly absent 2nd day
25	Czerny (Heidelberg), loc. cit.	F. 32	Pyonephrosis	4 yrs.	1879 22nd May	Lumbar	Chl. Zinc. Thy-mol. gauze	Ligature silk, and elastic	None noted
26	Quoted by Mr. Wells, 'Med. Tim. & Gaz.,' 1870, Jan. 8th.	—	Fibro-cystic tumour of uterus	—	—	Ventral	—	—	None uræmic or referable to loss of kidney
27	Martin (Berlin), Private letter.	F. 48	Painful floating kidney	—	—	Ventral	Anti-septic strictly	—	—
28	Martin (Berlin), Private letter.	F. 24	Painful floating kidney	—	—	Ventral	Anti-septic failed	—	—

Result, immediate and eventual.	Hæmorrhage at or after operation.	Condition of organ removed.	Remarks.
Recovery; stay in hos- pital prolonged for sepa- ration of ligatures	Moderate from torn kidney	Small, atrophied; ureter large	The removal of the organ produced no ill effects.
Recovery; hardly a trace of fever; up on 25th day, discharged on 42nd	Pretty free during operation	Large abscess; burst at operation	A portion of the 11th rib was removed during the operation for free access to pedicle. There was a perinephritic abscess and fistula beforehand.
Death on 3rd day	—	Healthy	The original notice is very brief, but the kidney appears to have been re- moved inadvertently being adherent to the tumour.
Death from peritonitis	—	—	—
Death from septic peri- tonitis	—	—	—