

FIBRO-LIPOMA OF THE KIDNEY.

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THE tumour was sent to me from the clinic of Dr. James N. Martin, Professor of Obstetrics and Gynecology in the University of Michigan. The following history accompanied the specimen:—

Mrs. Mary L., native American, æt. 31, has two living children. The patient has always had good health previous to the beginning of the present trouble. Her periods have been regular and normal up to the onset of the present condition, since which time they have been small and light coloured, lasting 6 days and attended with great pain.

The patient was very ill after her first delivery. In 1888 she had an abortion, and 6 weeks later she began to flow. This continued with more or less severity for several months, when a second abortion occurred. She recovered after this, and in 1889 and 1892 bore children at full term. In 1894 her fourth child was born after a most difficult labour. This child died 2 weeks after birth, its death being said to have been caused by injuries received during delivery. An instrumental delivery had been necessary, because of obstruction to labour caused by a large abdominal tumour which was first discovered at this time. This tumour was most prominent at the level of the umbilicus, to the left of the median line. To it was ascribed all the difficulty attending labour. The tumour seemed to increase slowly in size, and as the patient became pregnant again in 1895, her physician, fearing complications, induced abortion. From the effects of this the patient recovered slowly, and has been miserable ever since. Three months later another abortion was brought about, and her condition became worse. Nevertheless, she became pregnant again, and in August 1895 a 2-months-old fœtus was removed. This last abortion was accomplished with great difficulty, and was followed by severe endometritis. At this time the tumour seemed to break away from the left side and to become fixed in the median line. According to the patient's statement it has grown slowly but steadily. On 3rd April 1896 a physical examination was made.

The patient is well built and in fair condition. In the median line there is an irregular mass about the size of a child's head, passing to the left to the pelvic wall and extending below beyond the reach of palpation. The mass is fixed and very sensitive, so that examination was difficult. Cervix patulous, the lips everted. Uterus anteverted, measuring $2\frac{1}{2}$ in. It is very sensitive. The vaginal wall on the left is very tense. Examination of the urine is negative.

A definite diagnosis was not made, and the patient was prepared for an exploratory operation. On 19th May a laparotomy was performed; the tumour was found to be retroperitoneal, occupying the position of the left kidney,

of which no other trace could be found. There was but little fat about the tumour; on the right the atrophied renal vessels passed into the mass, and from its lower portion the dilated ureter emerged, apparently containing some solid mass extending half-way to the bladder. It was at once evident that the mass represented the kidney, and it, together with the dilated portion of the ureter, was removed. On examination of the right kidney it showed slight enlargement; otherwise it seemed normal.

The patient entirely recovered.

GROSS APPEARANCE.—The tumour was 14 in. long, 8 in. wide, and 6 in. thick; it weighed 2 lbs. Externally it gave the appearance of a dilated cystic kidney and ureter filled with some solid elastic mass. Its form still suggested that of the kidney; on its anterior surface were several nodular elevations of different sizes, the largest covered with the thinned, almost transparent capsule, through which the colour of the tissue underneath showed yellowish. One of these largest elevations gave distinct fluctuation. The external surface of the capsule resembled that of the kidney capsule, presenting no fat tissue, but covered with stringy portions of the perinephritic connective tissue, from which it had been separated. The posterior surface was more nearly flat than the anterior, but also presented several round nodules.

The tumour was opened by slitting up the ureter and along the capsule in a line corresponding to the hilus. In the dilated and thickened ureter was met, first, the remarkable prolongation, as seen in Fig. 1. This consisted of a round cord-like structure, 6 in. long and 1 in. in diameter, terminating in a smooth, blunt end resembling the glans penis. It had no attachment whatever to the ureter walls, though apparently completely filling its lumen. It was firm but elastic, yellowish white in colour, and having a smooth shining surface, covered, especially near its end, with areas of pearly-white flakes which could be scratched off by the finger without difficulty. The cord was marked off slightly into lobular divisions, and along its inner surface there was a raphé-like collection of connective tissue. Cut surfaces of the growth gave the characteristic shining appearance of adipose tissue. The mucous membrane



FIG. 1.—From a photograph of specimen which is suspended by a string fastened in the cystic kidney, which formed a capsule to the tumour growing in its pelvis. At the lower right hand is the dilated and thickened ureter, slit open along its entire length. To its left is the prolongation of the tumour which extended into it, completely filling its lumen. The kidney pelvis is opened along the hilus, exposing the tumour which falls forward by its own weight, showing that it is not attached above. The point of attachment is shown at the extreme lower left hand by the cut into the capsule. The lobular appearance of the tumour, the curious raphé on the ureter prolongation with the pearly areas on the surface, are well shown in the photograph. The drawing (Fig. 2) is made from a section taken from the surface of the main mass.

of the ureter was thickened and uneven, presenting to the eye small cyst-like papillæ yellowish to brownish in colour.

On following up the ureter into the cavity of the pelvis, the cord-like mass was found to pass into a large irregular and nodular tumour, completely filling the cavity of the dilated pelvis. This tumour resembled the prolongation in the ureter in every respect. Its surface was smooth and shining, with the same pearl-like flakes; its colour was yellowish white, in some areas quite yellow; its consistency firm and elastic, except over several of the nodules where fluctuation could be obtained. There were no adhesions between its surface and that of the mucous membrane of the pelvic cavity, except in a few places where they were easily separated, the surface of the tumour at these places being covered with the pearly film. The mass was lobulated and nodular, the nodules corresponding to the external elevations in the capsule, and from these the tumour was shelled out with ease. By extending the cut through the hilus, along the entire length of the mass, the whole mass of the tumour was shelled out of the capsule, with the exception of an area about $1\frac{1}{2}$ in. in diameter in the outer posterior-inferior portion of the pelvic cyst, where the tumour passed by a firm white pedicle into the structure of the capsule.

The growth thus exposed resembled a large lobulated lipoma, while the turned-back capsule gave the appearance of a cyst of a hydronephrosis, with dilated calyces into which the nodules of the tumour had fitted. Two of these nodules were degenerating; the largest one giving fluctuation had fitted into the cavity covered by the thin and transparent capsule. It was opened, and about 1 oz. of clear fluid was obtained. This gave the reactions for mucin. At its inferior portion the tumour was divided by a deep fissure

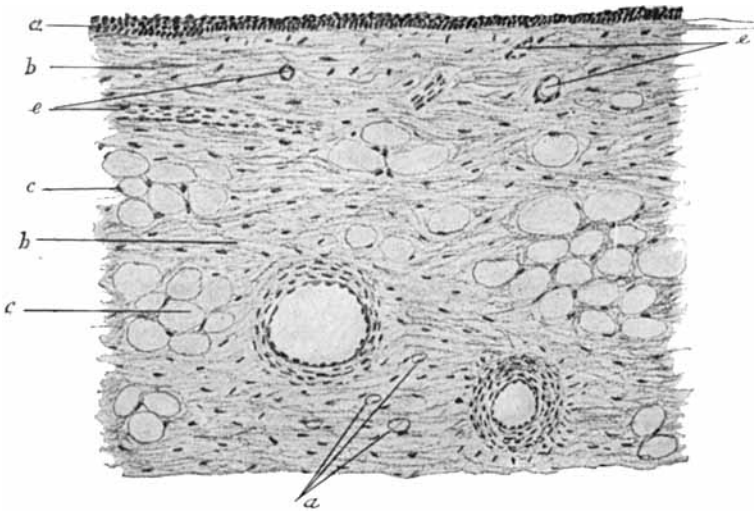


FIG. 2.—Section from outer surface of tumour. Obj. Seibert No. 3, Oc. O. $\times 75$.
a, surface layer of transitional epithelium; *b*, fibrous connective tissue;
c, fat cells; *d*, connective tissue cells containing small fat droplets;
e, small blood vessels.

running upwards, almost separating it into two halves, giving it the appearance as if the growth had first increased upwards, and had then curved on itself along the hilus down to the ureter into which it had sent the prolongation. It would seem, then, that the growth of the tumour had been peripheral and not central. The inner surface of the cyst resembled that of the kidney pelvis, but it was more uneven and thickened.

MICROSCOPICAL APPEARANCE.—*Tumour.*—Small pieces taken from all parts of the growth were hardened in formalin and alcohol, and cut in celloidin. These sections were stained according to the Van Giesen method and with hæmalum and eosin. Under the microscope these showed that the tumour in all of its parts was essentially of the same structure. The main groundwork consisted of connective tissue fibres; in many places these were very large and coarse, with few nuclei, thus giving the picture of a hard fibroma. In other places the fibres were finer with more abundant nuclei, but in no portion of the tumour were these numerous. There was, therefore, nowhere any resemblance to sarcoma, the tumour on the whole being poor in cells. Among the connective tissue fibres, in the greater portion of the mass, there were numerous large fat cells, usually in groups of six or eight, but also scattered singly throughout the tissue. In many areas, especially in the sections taken from the yellowish portions of the tumour, the fat cells predominated over the fibrous tissue, so that sections from these parts gave the typical appearance of adipose tissue, resembling, perfectly, sections taken from an ordinary simple lipoma. At its pedicle, and in the portion of the tumour passing into the kidney structure, there were but few fat cells, the character of the sections being that of a hard fibroma. Sections of the prolongation in the ureter showed fewer fat cells and more abundant nuclei. Here the transition of the connective tissue cell into a fat cell could be clearly seen; all stages, from the cell containing a minute fat droplet up to the large fat cell, could be found.

Though in many areas the fibrous tissue of the tumour was solid and compact, especially near its origin, the greater part was œdematous, or showed mucous degeneration. This was most marked on the surface of the tumour, where there were numerous small cystoid cavities filled with mucin-containing fluid. Examination of the larger cysts, presenting on the surface in several places, showed them to be not true cysts but only degenerated areas of the tumour tissue filled with the same fluid. The œdematous areas were like those of any œdematous fibroid, the connective tissue fibres being pushed apart by a finely granular substance, the fibres being either swollen and stringy, or becoming indistinct, as if being gradually dissolved in the fluid bathing them. The mucous degeneration in places involved also the fat tissue. No true mucous tissue was found in any part of the mass, neither was any adrenal or tissue of any other kind found in any section. The blood vessels were rather numerous and large with thick walls. Neither hyaline nor amyloid degeneration was observed in these. No areas of hæmorrhage and no pigment deposits were found. In the firmer portions of the tumour there were numerous large lymph spaces resembling those in uterine fibroids.

The surface of the tumour both of the external portion and of the inner cavity, as well as that of the prolongation in the ureter, was covered with a layer of stratified transitional epithelium (Fig. 2), corresponding to that lining the pelvis of the kidney. In the places covered with the pearl-like coating the sections showed a hyperplasia of the epithelium; over the thin cyst-like areas which were in intimate contact with the thinned capsule it was reduced to a mere line; in a few places, where the tumour had been adherent to the wall of the kidney pelvis, it was torn away, but usually at these points of adhesion the epithelium was hyperplastic. There could be no doubt, therefore, that the tumour had grown from the kidney substance out into the pelvis, pushing the pelvic epithelium before it, so acquiring a surface layer of transitional epithelium of the same kind as that of the pelvis.

In its outer posterior-inferior portion the tumour passed by a thick cord-like pedicle about $1\frac{1}{2}$ in. in diameter into the structure of the atrophied kidney. Sections made here showed that the tissue of the tumour passed directly into the connective tissue underlying the pelvic epithelium, and through the medullary portion into the connective tissue surrounding the large blood vessels in the boundary between cortex and medulla.

As far as could be determined it seemed that the tumour had arisen here or in the interstitial tissue of the medullary pyramid, and had grown toward the pelvis away from the cortex. That it did not arise from the kidney capsule is certain, as between the tumour tissue and the capsule a thin layer of atrophied cortex could still be made out, and there was no connection at all between the tissue of the tumour and that of the capsule. Evidently the growth of the tumour into the surrounding kidney tissue had been slight, but in the medullary portion for some distance around the point of insertion of the pedicle there was a thick mass of tissue of the same character as the tumour, and insensibly passing into it, fairly well defined from the neighbouring tissue of the kidney but not possessing any well-marked capsule. In the kidney tissue around this there was a narrow fibroblastic zone with small-celled infiltration and hæmorrhage.

Kidney.—Sections of the capsule of the cyst-like cavity in which the tumour lay showed it to be the atrophied renal substance exhibiting the changes of chronic nephritis, with amyloid degeneration, accompanied by fresh hæmorrhages into the capsule and some of the convoluted tubules.

The mucosa of the pelvis showed in many places marked inflammatory changes, with œdema and hæmorrhage beneath the epithelium. The thickness of the latter varied very much, in places being reduced to a single line of nuclei; but in the areas corresponding to the pearl-like coating on the surface of the tumour it was hyperplastic.

Ureter.—Sections of the enlarged ureter showed a great thickening of all of its coats, especially of the muscularis. The blood vessels were greatly enlarged, with thickened walls, and everywhere throughout the muscle and connective tissue there were areas of leucocyte infiltration. The submucosa was œdematous, infiltrated, and in many places hæmorrhagic. The appearance of the mucosa coincided with that described by Litten as *ureteritis chronica cystica polyposa*. The mucous surface was uneven, small papillæ, corresponding to the naked-eye prominences, projecting into the lumen. The submucosa of these papillæ showed various stages of œdema or mucous degeneration, so that some of them appeared as cysts filled with a hæmorrhagic granular substance in which a few connective tissue nuclei or leucocytes could be seen. The epithelial covering was in every case preserved; and the sections presented these papillæ in every stage of development, from a small elevation, in which the submucosa was only slightly swollen through œdema and hæmorrhage, to the larger cyst-like collections of fluid and blood beneath the epithelium. Litten, who found in the greatly dilated ureter of a case of cystic degeneration of the kidney a condition similar to this, thought that these cyst-like elevations were retention cysts, due to the closure of mucous glands in the mucosa of the ureter. His description corresponds so closely to my finding that I take the two conditions to be the same and reject his explanation, as my specimens show the cysts without doubt to be formed by the collection of exudate and blood beneath the epithelium; some of the papillæ were formed of granulation tissue, the epithelium over them being in some cases atrophied, in others hyperplastic.

On account of the extraordinary character of the tumour the greatest care was taken in making the pathological diagnosis. Search was made in vain for adrenal tissue, so that it seemed certain that the tumour was not related to that rather common class of kidney tumours. The

diagnosis was beyond doubt fibro-lipoma of the kidney, or a fibroma becoming a lipoma through metaplasia of the connective tissue into fat tissue. It had evidently taken its rise in the interstitial connective tissue of a medullary pyramid; and its direction of growth had been out into the pelvis, where, by its expansile increase, it had produced dilatation of the pelvis and ureter, and pressure-atrophy of the kidney. It might be questioned if there had not been, in the first place, a hydronephrosis, the tumour growing secondarily into the cavity. The history and the whole appearance of the case are against this supposition, and I cannot believe that such was the case. Since small fibromata have been found before in the connective tissue of the pyramids, this remarkable case, I think, may be looked upon as a rare instance in which such a fibroid has taken on an unusual degree of growth.

Lipoma of the kidney is very rare, and I have been unable to find in the literature any account of a tumour resembling in all its characters the one here described. A large fibroma is also of very rare occurrence. In the various text-books of pathology the connective tissue tumours of the kidney are dismissed with scant remark. In reference to fibromata most of the authorities say that small fibroid tumours are not infrequently found in the pyramids, and are of no especial importance, as they seldom reach a large size. Very few of the text-books mention lipoma in reference to the kidney. Ziegler may be taken as the representative. He says that the fibromata are found, not rarely, in the kidney in the form of nodules, of the size of a millet-seed to that of a pea, but greater fibromata are rare; angioma, myxoma, lipoma, and the mixed forms of connective tissue tumours he also states to be very rare.

Thoma¹ says that lipomata are found in the kidney along the great

¹ In the older literature I find the following references to lipoma of the kidney:—

Rayer, "Traité des maladies des Reins," 1841.

Cruveilhier, "Atlas d'anat. pathol.," livre xxxvi.

Houel, "Manuel d'anat. path.," 1857.

Bauchet, "Case presented before the Anat. Soc. in Paris," 1859.

Houel et Godard, *Gaz. méd. de Paris*, 1859.

Lacrampe-Lonstan, "Essai sur l'adipose du rein," 1881. In this dissertation numerous cases recorded by Robin, Baade, etc., are cited.

Hullet Browne, *Trans. Path. Soc. London*, 1862.

Barclay, *Lancet*, London, 1864.

Richardts, *Brit. Med. Journ.*, London, 1883.

Ebstein, von Ziemssen's "Handbuch," Bd. ix. s. 2.

All of these references treat not of a true lipoma formation in the kidney but of a collection of fat surrounding an atrophied kidney, in whose dilated pelvis or ureter there was found usually a calculus.

Of cases of connective tissue tumours of the capsule I find the following references:—

Heyder, *Arch. f. Gynaek.*, Berlin, Bd. xxxviii., reviews 22 cases of tumours of the capsule. *Fibroma*—Thomas, Brentzell; *Lipoma*—Spencer Wells, Homans, Kümmell, Olshausen; *Fibro-lipoma*—Spencer Wells, Rosmanit, Alsberg, Thiriari; *Myxo-lipoma*—Madelung, Kundrat, Wiglesworth, Billroth; *Myxo-fibro-lipoma*—Waldeyer and Homans.

Besides these cases I find also:—

Von Eiselsberg, *Fibro-lipoma*, *Wien. klin. Wchnschr.*, 1890; Gould, *Lancet*, London,

blood vessels in the boundary between cortex and medulla, also between the tissue layers of the kidney capsule as small coin-shaped tumours, and finally in the loose connective tissue surrounding the kidney. Both of these latter varieties are, however, not true kidney lipomata but are capsular in origin.

All of these tumours can then be excluded as not originating in the tissue proper of the kidney. But many other authors have described, under the head of kidney lipomata, certain small tumours originating in the cortex and giving an appearance on their cut surface similar to that of fat tissue. The true character of these tumours was doubtful, and they went by the name of "*sogenannten lipome*" until it was shown definitely by the investigations of Grawitz,¹ that they are not true lipomata but are misplaced adrenal tissue.

After excluding all of these cases, the number of tumours reported, that can be looked upon with certainty as true lipomata of the kidney, is very small indeed. Virchow, in his work on tumours, vol. i., says that in the kidney, nodules of the size of a cherry may develop, consisting of perfectly developed, lobulated fat tissue, at times rich in blood vessels. He himself had seen but one such specimen, and explained it as originating from a fibroma, the connective tissue cells having taken up the fat and so become transformed into fat tissue. Klebs, in his text-book, cites the one case of Virchow. In 1884, Grawitz exhibited two specimens at the Surgical Congress. Cases also are described by Beneke,² Metzner,³ Bieck.⁴ In all of these the tumours appear to have been small and of little significance, and in some of the cases it was not absolutely certain that the tumour was not of adrenal origin.

The only report of any lipomatous tumour of the kidney of surgical importance that I have been able to find is that of the case of Alsberg (*Langenbeck's Archiv*, 1892). In his case the tumour, like the one I have described, was obtained by nephrectomy, having given rise to symptoms justifying surgical operation. Alsberg states that it is the only case in the literature in which a surgical operation has been made upon a kidney lipoma. I have been unable to find any other, so my case stands with his, as an instance of fat tumour of the kidney giving rise to such serious symptoms that operation was demanded for relief. In neither case could a positive diagnosis be made; and the history and symptoms must in all such cases be

1888, *Myxoma of kidney capsule*; Van Tillmann, *Hygiea*, Stockholm, 1891, *Fibro-myxoma of capsule*.

In the majority of these cases the kidney was completely surrounded by the tumour, hence the capsule was looked upon as the origin of the growth. In the other cases the tumour arose from only a portion of the capsule, and developed by the side of the kidney which was not involved in the growth.

¹ *Virchow's Archiv*, Bd. xciii.

² *Beitr. z. Path. Anat. u. z. Allg. Path.*, Jena, Bd. ix.

³ *Inaug. Diss.*, Halle, 1888.

⁴ *Inaug. Diss.*, Marburg, 1886.

similar to those of malignant tumour. The absence of blood in the urine might be considered, as hæmaturia is the rule in malignant growths of the kidney. As far as my own case is concerned very little importance can be attached to the results of the urine examination, as the sediment was not centrifugalised and examined microscopically for red blood corpuscles.

Histologically, the tumours of Alsberg's case¹ resemble mine; and I am inclined to believe that the origin in each case was the same. The coincidence of the adrenal adenoma in his case might favour the hypothesis of Grawitz and Horn, that the kidney lipoma arises as do the adrenal adenomata, from misplaced tissue in the kidney, that in the process of development parts of the fat capsule of the kidney as well as of the adrenal tissue can be enclosed. Yet Alsberg is inclined to believe that the tumours arose from a metaplasia of the connective tissue of the kidney into fat tissue. Beneke also found in 3 cases of kidney lipoma, that in the neighbourhood of the lipoma there was a fibroblastic zone in which the formation of fat cells could be seen. So in my case the transformation of the connective tissue cells into fat cells is very evident. I believe, therefore, that a lipoma may arise from the connective tissue of the kidney by the transformation of the fibroblasts of the proliferating centres, or of the older connective tissue cells into fat cells.

In conclusion, I may state that lipomata of the kidney can in rare instances reach a large size, causing, by pressure, atrophy of the organ and symptoms so serious that surgical interference is necessary.

¹ Verhandl. d. deutsch. Gesellsch. f. Chir., Berlin. Twenty-first Congress.