SUPERNUMERARY KIDNEY: THE OCCURRENCE OF THREE KIDNEYS IN AN ADULT MALE SUBJECT.[1]

By Professor A. FRANCIS DIXON, *Trinity College, Dublin.*

THE occurrence of a supernumerary kidney has been so rarely noted that it seems worth while to place on record an illustration and a short description of a case recently met with in the Class of Practical Anatomy, Trinity College, Dublin. The subject in which the third kidney was present was a man of about forty-five years of age, and did not present any congenital abnormalities other than those connected with the urinary organs. The kidney on the right side was normal in all respects and measured 9·5 cm. in length. Its ureter and vascular supply were normally disposed. On the left side two kidneys, of approximately equal size, were present, lying one above the other, and separated by an interval of 2·8 cm. They were both readily recognised when the abdomen was opened. The upper left kidney possessed a typical outline, and occupied the usual position of a normal left kidney. It measured 7·7 cm. in length. The lower left kidney lay partly in the left iliac fossa and partly on the quadratus lumborum muscle, its middle point being upon a level with the bifurcation of the aorta. It was convex, and covered by peritoneum on its anterior surface; its posterior surface was almost quite flat. The colon descended along its outer edge, and when the overlying small intestine was turned aside a ureter was readily recognised lying on its anterior surface beneath the peritoneum. When the peritoneum and surrounding fatty tissue were removed it was found that the blood-vessels entered and the duct issued from the lower left kidney at the upper and outer part of its posterior surface. The blood-vessels and pelvis of the upper kidney were normally arranged, and its ureter passed at first downwards and slightly outwards to the upper pole of the lower kidney. Here the ureter of the lower kidney joined that of the upper, and then the common duct passed in a slightly tortuous course downwards and inwards over the anterior convex surface of the lower kidney. At a lower level it crossed the termination of the common iliac artery and entered the pelvic cavity. Its junction with the bladder presented no abnormal appearance. The duct of the

[1] The specimen described in this paper was exhibited at the International Congress of Anatomists, Brussels, Aug. 1910.

lower kidney issued from the upper and outer part of its posterior surface, and passing upwards for a short distance, joined the ureter of the upper kidney to form the common duct already described. The remarkable arrangement is illustrated in the figure. In no part of its course was the ureter dilated, and the thickness of its wall and its lumen appeared to be normal throughout.

The artery of supply for the lower kidney was derived from the left common iliac artery, and passed horizontally outwards to reach the posterior

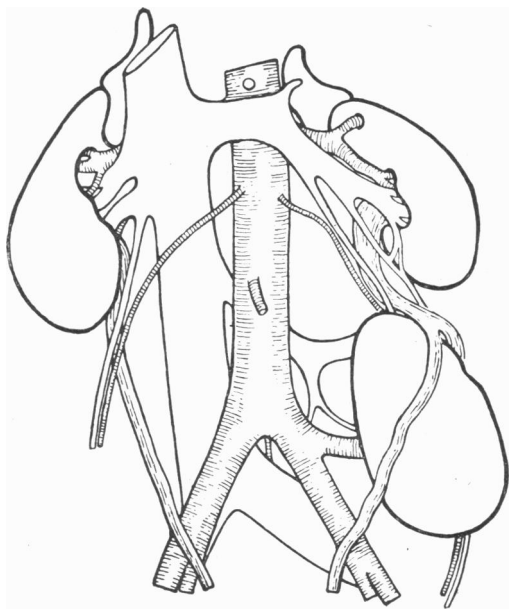

FIG. 1.—Camera lucida drawing made from an adult male subject which possessed three kidneys.

aspect of the organ. The main vein issued from the upper part of the flat posterior surface, and was directed inwards behind the aorta to reach the inferior vena cava. In addition, a slender vein passed upwards, and united in a plexiform manner with the renal vein of the upper kidney. The vessels and duct joined the lower kidney separately, and did not enter a notch, or hilum. An examination of the organ showed that the arrangement of its vessels and ureter could in part be explained by assuming that its outer edge had been rotated forwards and inwards in such a way that the region we would expect to find occupied by the hilum was directed backwards.

The spermatic vessels of the left side passed downwards and outwards behind the lower left kidney, but on an anterior plane to its ureter.

The bladder and the portions of the right and (common) left ureters within the pelvic cavity were normal in every respect.

All authors[1] are agreed that the presence of a supernumerary kidney—with its cortex completely separated—is a very rare phenomenon. Gérard[2] having discussed those cases, the records of which he had an opportunity of studying, concludes: "seules, les observations de Pétrequin et de Hyrtl permettent d'admettre comme possible l'existence de trois reins séparés" (p. 267). Again, in the summary towards the end of the second part of his treatise, he says:—"L'augmentation du nombre des reins est toujours discutable; nous n'ajoutons aucune foi aux observations des anciens auteurs; les cas rapportés par les anatomistes modernes sont susceptibles d'être interprétés de façons très différentes. La seule observation de Hyrtl mérite d'être prise en sérieuse considération" (p. 438).

I have been unable to see the original description,[3] but Gérard mentions the main points of Hyrtl's case. The subject was an aged woman. Right and left kidneys of normal form and structure were present and occupied their usual positions. In addition, a supernumerary kidney about half the size of a goose's egg was present on the left side, at the entrance of the pelvic cavity. It had a convex outer and a concave inner border. Its anterior surface was covered by peritoneum, and its upper end was related to the left iliac artery and vein. The supernumerary kidney received three arteries—one, the largest, from the aorta at its bifurcation; the other two took origin from the left common iliac. Three veins connected the kidney with the iliac vein. The ureter ran parallel to the ureter of the normally situated upper left kidney, and opened into the bladder by an independent aperture.

Another case which somewhat resembles that described and illustrated in this paper is recorded by Hansemann.[4] In this the kidney on the right side was normal in all respects, including the arrangement of its vessels and ureter. On the left side there were two smaller kidneys, one of which—the upper—lay in the usual situation opposite to the right kidney. Its vessels were normally disposed, and its ureter passed downwards and joined

[1] See, for instance, J. Albarran, *Médecine opératoire des voies urinaires* Paris, 1909. Wimmer, "Doppelbildungen an den Nieren," *Virchow's Archiv f. Path. Anat.*, Bd. cc., H. 3, S. 487. F. Watson and J. Cunningham, *Diseases and Surgery of the Genito-Urinary Tract*, vol. ii., 1909.

[2] "Les anomalies congénitales du rein chez l'homme," *Journal de l'Anatomie et de la Physiologie*, vol. xli., 1905.

[3] *Osterreichisch med. Wochenschrift*, 1841, No. 41.

[4] "Drei Nieren," *Berliner klinische Wochenschrift*, Jan. 25, 1897, p. 81; *Berlin med. Gesel.* of Jan. 13, 1897.

the pelvis of the lower kidney. The lower of the two kidneys present on the left side was larger than the upper one, and its hilum was turned somewhat forwards. Its arterial supply was derived from the aorta and from the *right* iliac artery. The lower kidney possessed two pelves, but its two ureters joined and hence finally a single duct served for the two kidneys of the left side. This duct ended normally in the bladder.

Hansemann considers that the blood supply of the lower left kidney, inasmuch as it was partly supplied from the right side, may indicate that the organ represented the connecting piece of the much more common horseshoe kidney. It may be noted that in the case described in this communication no such indication is afforded by the vascular supply.

Hansemann mentions that he has himself only seen one other example resembling the case described by him, and that it occurred in a pig. In it four kidneys were present, two on the right side, completely separated from one another, and two on the left side, united by a pedicle of connective tissue. The ureters on each side united, and thus only one pair of ducts reached the bladder.

Watson Cheyne[1] was enabled to recognise the existence of a third kidney during the course of an operation in a living subject. The third kidney was well developed, and was found on the right side of the body, just at the brim of the pelvis, against the side of the lower lumbar vertebræ. It lay three to four inches from the normal right kidney, and possessed a ureter and separate blood supply. In shape and size it resembled a normal kidney, but it was distinctly lobulated. The left kidney appeared to be smaller than the upper of the two kidneys on the right side.

Depage[2] has also met with a supernumerary kidney in a living subject. In his case the third kidney was found in front of the vertebral column, between the aorta and vena cava. It possessed a ureter of its own.

Newman[3] records, from memory, a case seen by him at a post-mortem examination, in which a third kidney was represented by a small pear-shaped body situated close to the upper pole of the left kidney. It had a distinct ureter, which joined the ureter of the left kidney half an inch below the pelvis of the latter.

Calabrese,[4] one of the most recent writers on the subject of supernumerary kidney gives an account of a case in which he was able, during the life of the patient, to prove the existence of a third kidney. The patient was a woman aged fifty-five, and the supernumerary kidney was of

[1] "A Case of Movable Third Kidney," *Lancet*, Jan. 28, 1899.

[2] *Jour. de Médecine et Chir., Bruxel.*, 1893, No. 11. (Mentioned by Calabrese, *loc. cit.*)

[3] *Trans. Clin. Soc.*, vol. xxxi., 1898.

[4] "Rein surnuméraire constaté pendent la vie," *Annales des maladie des organes génito-urinaires*, 1908, p. 1841. See also the same Journal, 1910, No. 10, p. 749.

small size, and lay with its upper pole almost in contact with the lower pole of the normally situated left kidney. The ureter and vessels of the lower kidney were recognised during the operation.

Calabrese mentions that in the Museum of Pathological Anatomy, Bologna (?), there is a specimen illustrating supernumerary kidney found at a post-mortem examination, May 27, 1827.

He also alludes to a case which occurred in the practice of Rustkinski during the Russo-Japanese war. In this latter case a small left kidney was removed during life, and after death a second small kidney was found on the left side.

Watson and Cunningham [1] refer to the reports of the Surgeon-General, Marine Hospital Service, U.S.A., 1885, in which three cases of supernumerary kidney are noted. Two of these cases—namely those of Newman and Cheyne—have been already mentioned in this paper; in the third case a very small kidney was found occupying the hilum of the left kidney. The little kidney had a short ureter, which ran into the ureter of the left kidney. I have been unable to consult the original description of this case.

Although it is very unlikely that the list given in this paper is complete, it contains a note of all the cases—ten in number—to which I have been able to find references in recent works. Only those observations are included which deal with cases in which the proper kidney substance of the supernumerary organ was completely separated.

It will be noticed that we may divide the cases into two groups: (1) those in which the supernumerary kidney was comparable in size to a normal kidney, though perhaps smaller, and (2) those in which the supernumerary organ was very small, and probably represented by a single renculus—a renal papilla with its pyramids and surrounding cortex. A majority of the cases belong to the first group; the case described by Newman and one of those mentioned by Watson and Cunningham belong to the second group.

Unfortunately but few details are available regarding many of the cases. It is, however, very interesting to find that the supernumerary kidney occurred seven times on the left side, and only once (Cheyne's case) on the right side, among the eight cases in which information as regards the side of the body is recorded. It is remarkable that so large a proportion of the recorded cases were recognised in the course of surgical operations.

[1] *Diseases and Surgery of the Genito-Urinary Tract*, London, 1909, vol. ii.