

## RENAL FASCIA

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### SUMMARY

These investigations indicate that the anterior layer of the renal fascia continues across the midline of the body in front of the aorta and inferior vena cava to become continuous with a similar layer on the opposite side of the body. The posterior layer of the renal fascia blends with the fascia covering the psoas major especially at the medial and lateral edges of this muscle. But, in addition to these two layers, there is also a deeper stratum connecting the anterior and posterior layers around the medial border of the kidney, and this deeper stratum is pierced by the renal vessels and ureter. At the upper pole and lateral border of the kidney, the anterior and posterior layers of the fascia fuse; at the lower pole they also fuse, but much more loosely than in the other locations. Incidentally, the perirenal veins may be sufficiently large to merit attention during operations on the kidney.

**KEY WORDS:** *Anterior layer of the renal fascia; Deep stratum; Perirenal veins; Posterior layer of the renal fascia.*

In a comprehensive article, Mitchell (1) made some observations on the renal fascia which differ in certain aspects from the descriptions found in most literature (2,3,4). Mitchell studied the renal fascia by injecting radiologically contrast media into the perirenal space between the kidney and the fascia and determined by x-rays and dissections, the boundaries of the space occupied by this material and the directions in which it spreads. He stated that the posterior layer of the fascia blends medially with the fascia on the psoas major and that the anterior layer is attached to the bodies of the vertebral and intervertebral discs.

Southam (5) made extensive research on the renal fascia both by dissections and by studying transverse and longitudinal sections through the

kidney region. According to his account, at the medial border of the kidney the anterior and posterior layers of the renal fascia fuse together as far down as the hilum, but opposite and below the hilum they remain separate; the posterior layer fusing with the periosteum of the lumbar vertebrae, while the anterior loses itself in the connective tissue in front of the aorta and inferior vena cava.

From the above accounts, it is evident that there is a considerable disagreement with the exact arrangement of the fascia. There is a general agreement that at the lateral border of the kidney the two layers join and fuse with the transversalis fascia (6,7); at the upper pole of the kidney, they, likewise, join and blend with the fascia on the diaphragm; while at the lower pole of the kidney,

they remain distinct and fade out as they traced downwards. There is no agreement, however, on the arrangement or attachment of the layers at the medial border of the kidney (8,9).

If the view of Mitchell is correct, it is evident that the renal vessels must pierce the renal fascia; if, on the other hand, the description given by Southam is correct, it is difficult to understand why an effusion into the perirenal space in one side of the body does not extend across the corresponding space on the other side.

An effort was therefore made to determine which of these descriptions is more accurate. A search for the renal fascia was made on twenty cadavers which were being dissected in the laboratory; and, in addition, a special dissection was carried out on another cadaver, and transverse sections of the body at the kidney level were carefully studied. These investigations led to the conclusion that although all of the above descriptions of the renal fascia are in a sense correct, they are incomplete.

First, from the bodies studied, it is evident that a layer of the fascia can be traced from the anterior aspect of one kidney across the midline to the anterior aspect of the other. This layer is very thin in front of the aorta, and its continuity across the midline can be traced impeccably only as high as the origin of the superior mesenteric artery. Above this level, the anterior layer of the fascia turns forward to cover the mass of connective tissue surrounding the origins of the celiac axis and superior mesenteric artery and in which lie the celiac and superior mesenteric autonomic plexuses.

If this anterior layer of the fascia is incised in the midline and turned laterally, or, better still, if it is incised in front of the kidney and turned medially, it can be seen that at the medial border of the kidney the layer splits. As it has already been mentioned, a superficial lamina passes across the midline of the body in front of the aorta and inferior vena cava, and a deeper stratum passes backward around the medial border of the kidney.

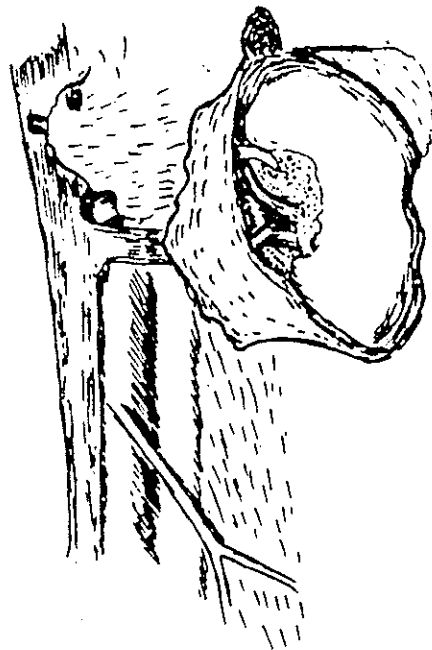


Fig. 1. The anterior layer of the renal fascia has been turned medially and a deeper stratum can be seen passing backward around the medial border of the kidney. This deeper stratum is pierced by the renal vessels.

Figure 1 is a drawing of such a dissection and the renal vessels can be seen when piercing the fascia. By making careful research, this deeper stratum could be demonstrated in almost all the well-preserved bodies which were being examined.

With the object of demonstrating it in a more striking and convincing manner, a special dissection was made. In the body of a young adult male containing very little fat, a block of tissue was removed from the back extending from the 11th rib to the crest of the ilium and from near the midline to a line about 16 cm from the median plane. The block extended deeply as far as the 12th rib and the quadratus lumborum muscle. The latter muscle was then removed carefully, thus exposing the posterior layer of the renal fascia from behind. The fascia was then incised and the kidney removed piecemeal through the incision. By this procedure, the anterior and medial parts of the renal fascia were not disturbed. The renal vessels and ureter were cut at the kidney.

It could be seen quite plainly that the renal vessels and ureter are passed through a layer of fascia and that the anterior and posterior layers of the renal fascia are in fact to some degree, continuous with each other around the medial border of the kidney.

While making this dissection, it was noticed that the posterior layer of the fascia turns into the hilum of the kidney at the medial border of the organ and becomes firmly attached to the posterior aspect of the pelvis of the ureter.

In the specimen, it can be seen that the posterior layer of the fascia splits at the medial border of the kidney and the two resulting laminae diverge. As it has already been mentioned, one of the laminae turns into the hilum to blend with the posterior wall of the pelvis; the other is continued forward and medially to blend with the fascia covering the psoas major muscle at its anterior edge. It has also been noticed that the postrenal fascia is likewise attached to the fascia of the psoas major at the lateral edge of that muscle. The continuity between the anterior and posterior layers of the renal fascia at the medial border of the kidney could not be demonstrated in the transverse

sections.

The prerenal layer can be easily separated from the kidney, but a short distance medial to the hilum becomes firmly adherent to the front of the renal pedicle consisting of the ureter, renal vessels, surrounding fascia, and fat, and just in this region bands of fascia pass from the prerenal back to join the postrenal layer. This connecting layer of the fascia, however, could not be demonstrated in these transverse sections through the hilum possibly because it is broken by the ureter and renal vessels.

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