

EXPERIMENTAL REPRODUCTION OF NEPHROSCLEROSIS

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Diffuse nephrosclerosis is difficult to reproduce experimentally in animals. For example, the methods of obtaining nephrosclerosis following diffuse glomerulonephritis [2, 6] or hydronephrosis [1, 3, 7] are very laborious and time consuming; the use of methods based on the injection of toxic substances into the renal artery [6] frequently results in the development of extensive infarcts of the kidney tissue, and the mechanical removal (excision) of pieces of the kidneys [5, 6] leaves large, single scars, which has little in common with diffuse nephrosclerosis in man [1-7].

We have attempted to develop a method of reproducing nephrosclerosis in animals which, although simple and reliable, would nevertheless yield a diffuse, focal sclerosis, of variable severity, in one or both kidneys. A method of multiple point thermocoagulation of the renal cortex was used for this purpose.

EXPERIMENTAL METHOD

A rabbit weighing 2800-3000 g was given a subcutaneous injection of 2-3 ml of a 1% solution of morphine. After 10-15 min the rabbit was tied down to the bench on its right side. The operation was performed on the left kidney because it is more conveniently situated for manipulation. An operation field bounded by the following lines was chosen: the line joining the spinous processes—above, the anterior border of the ilium—posteriorly, the nipple line—below, and the 8th rib—anteriorly. An incision 5-6 cm long was made through all the layers under local infiltration anesthesia with 0.5% novocain solution. The incision began 2-3 cm posteriorly to the anterior end of the 11th rib and ran parallel to the lower border of the longissimus muscle. An injection of 30 ml of 0.5% novocain solution was made into the perinephric areolar tissue. When the wound edges were retracted with hooks the kidney was easily mobilized into the wound. With a bunch of red-hot needles, punctures were made to a depth of 0.5-0.6 cm (90-110 altogether). The needles were left in the kidney tissue until a grey coagulation mark was formed on the surface. Bleeding was negligible after this type of trauma. The wound was sutured in layers: muscles and subcutaneous fascia with catgut, skin with silk. The sutures were taken out on the 7th-10th day.

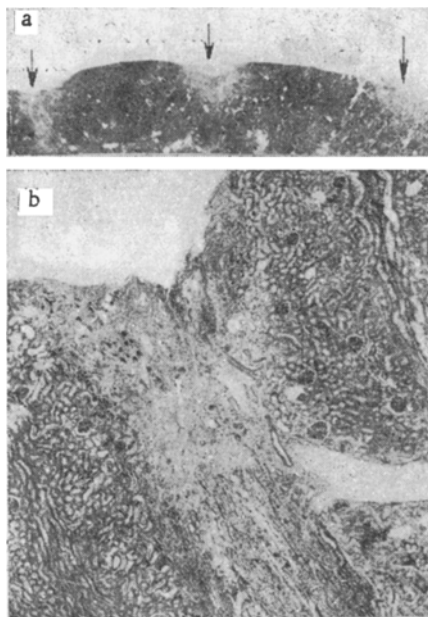
Postoperative observations revealed no changes in diuresis or the presence of albumin in the urine. The rabbits quickly put on weight.

EXPERIMENTAL RESULTS

The results of morphological investigation of the kidneys of 5 rabbits sacrificed at various intervals after operation are given below.

Nineteen hours after operation multiple petechial hemorrhages with yellow edges were visible on the kidney surface. An incision into the cortical layer showed the presence of yellowish-red conical areas. Under the microscope, zones of necrosis were seen in the cortical layer, surrounded by foci of leukocytic infiltration. The neighboring areas of kidney tissue were grossly congested and hemorrhagic foci were present.

Two days after the operation the surface of the injured kidney was covered with a readily detachable fibrin film, removal of which revealed the sites of the punctures, with the appearance of yellow conical bands on section.



Sclerosis of the cortical layer of the kidney 25 days after injury. The arrows point to scars in the cortical layer. Hematoxylin-eosin. a) $\times 3$; b) $\times 12$.

tent, into the medulla. Among the dense fibrous tissue isolated fragments of the tubules and hyalinized glomeruli with thickened capsules could be seen.

A microfocal nephrosclerosis can thus be reproduced in one or both kidneys by this method.

SUMMARY

A microfocal nephrosclerosis was obtained experimentally in rabbits by punctate thermocoagulation of the cortical layer of the kidney. Histological investigation confirmed the high efficacy of the method.

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All abbreviations of periodicals in the above bibliography are letter-by-letter transliterations of the abbreviations as given in the original Russian journal. Some or all of this periodical literature may well be available in English translation. A complete list of the cover-to-cover English translations appears at the back of this issue.