

CHANGES IN THE ACCESSORY SEX GLANDS OF MALE RABBITS FOLLOWING CASTRATION

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Recently, an increased interest is appearing in the study of hormonal influences on the accessory sex glands. In connection with this it is necessary to compare hormonal alterations with those which arise as a result of castration. However, investigators mainly describe changes in the prostate gland [1-6, 10, 11] and the seminal vesicle [7, 8, 10]. Only a small number of them also devote attention to other glands of the male sexual apparatus [9]. In addition, it is difficult, on the basis of sources in the literature, to arrive at a definite opinion as to whether or not castration causes a proliferation of connective tissue and annexation of inflammation in the accessory sex glands, as the descriptions in this connection have been inconsistent.

These considerations were the impetus for carrying out this work.

METHOD

The experiments were carried out on 11 rabbits, of which 2 were 3 kg in weight or more while the remaining were approximately 2 kg; the age of the animals was 5-6 months at the beginning of the experiment. Bilateral orchiectomies were carried out aseptically via the peritoneal cavity under ether narcosis. After definite intervals the rabbits were sacrificed by means of air emboli. The length of the trials ranged from 2 to 337 days. The accessory sex glands, in complex with the urethra, were fixed in 10% formalin and sectioned transversely into 5-6 segments. After being imbedded in celloidin-paraffin, histological sections were prepared from each segment. Staining was performed with hematoxylin-eosin and according to the method of van Gieson. Several sections were stained according to Mallory and impregnated with silver by the method of Foote. In a number of cases a graduated series of sections were stained.

RESULTS

No deviations from the normal structure of the urethra were noted. Rarely, small groups of leucocytes were encountered in the coils of the lumen, but there were no leucocytes in the epithelium or the connective tissue.

In the ductus deferens the width of the lumen and the height of the epithelium had decreased. Disintegrating

cells, in the form of pale shadows, were encountered in the lumen of the ampulla in 3 cases (at durations 27, 34, and 337 days); among them were small numbers of spermatozoa and isolated macrophages. In addition, phagocytosis of bits of cellular breakdown and sperms were noted in the protoplasm of the macrophages.

The seminal vesicle and its glandular crypts diminished, and the epithelial papillae in the crypts became smoothed. Epithelial secretion ceased, and the height of its cells was reduced. Transitional epithelium was also found in the seminal vesicle in 7 cases, but in the distal portions of the vesicle it was observed under normal conditions as well. No marked alterations appeared in the connective tissue of the vesicle; only in one case (experimental duration 115 days) was there observed a focal inflammation in the loose connective tissue between the seminal vesicles and the ducti deferentia. The lymphatic vessels in the area were dilated, and the connective tissue edematous; focal accumulations of macrophages, plasma cells, and lymphocytes, with admixed leucocytes containing segmented nuclei, were noted in the vessels and, here and there, in the connective tissue as well.

The utricular gland, even in the first days of the experiment, decreased in dimensions. As a result of the contraction of the glandular cavities, the double-row arrangement of the epithelium was more clearly defined, and, in places, the epithelial cells were arranged in 3 to 4 rows. No secretory granules were observed. In several of the cavities and in the ducts, homogeneous, pale staining fluid was noted in small quantities, and, occasionally, groups of macrophages containing foamy protoplasm. Over the course of the first 15 days of the experiment, intraepithelial cysts were encountered in all cases, arising as a result of the degeneration of several cells in a stratum of the epithelial layer. At later intervals no cysts were detected. At 2 months the majority of cavities collapsed into contact with the opposing wall; along with this the glandular parenchyma acquired the appearance of solid epithelial complexes, in which were preserved small remnants of the lumen. The epithelial cells, at this time, had decreased in dimensions, mainly at the expense of the protoplasm. As a result of the



Fig. 1. Collapse of the prostate gland. Atrophy of the epithelium. Stained by the method of van Gieson. Experimental interval, 55 days. Microphotograph. Magnification 70x.

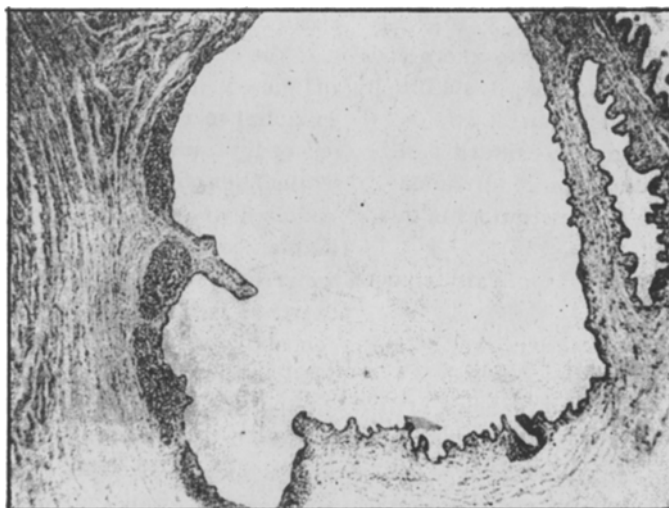


Fig. 2. Collapse of the terminal divisions and marked dilatation of the major ducts in the Superior Cooper's gland. Stained by the method of van Gieson. Experimental interval, 80 days. Microphotograph. Magnification, 40x.

collapse of the glandular cavities, the amount of connective and muscle tissue was found to have increased correspondingly. Argyrophilic and collagen fibers condensed in the internal capsule, producing the impression of a degree of sclerosis. However, no actual proliferation of the connective tissue was noted.

Changes in the prostate gland were rather similar to the changes in the utricular gland (Fig. 1). In comparison with the latter, the collapse of the glandular cavities in the prostate occurred faster. Along with atrophy of the majority of the epithelial cells in the collapsed glandular alveoli, isolated hypertrophic cells were encountered.

The paraprostatic or Superior Cooper's glands were lacking in secretory material. Only in the distal divisions

of the major ducts was a small amount of the palely staining homogeneous content encountered at both early and late intervals. The terminal divisions and the fine excretory ducts were collapsed at the end of the first month, and their lumina became indistinguishable. The epithelial cells decreased in volume, and their protoplasm became homogeneous. The major ducts remained wide or even dilated, often asymmetrically—only the left or the right (Fig. 2). No proliferation of the connective tissue was noted.

In the bulbourethral or Inferior Cooper's gland, at the end of the first month, there occurred a collapse of the terminal divisions; many of them lost their lumen and appeared like continuous cellular masses. No signs of secretion were discovered in the epithelium, and the dimensions of its cells

were somewhat decreased. A scanty amount of the palely staining content was noted in the lumen of the major ducts in isolated cases.

SUMMARY

Castration in rabbits provokes atrophy of accessory sexual glands with complete closure of the glandular cavities and epithelial atrophy. There was no proliferation of connective tissue or inflammatory phenomena. Sperms may be retained in the ampulla of ductus deferens of castrated animals for prolonged periods of time (up to 337 days).

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