Some Morphological Aspects of Ovarian Disorders at Gray Steppe

Dana-Simona DRUGOCIU *, BIRŢOIU A. *, Cristina Loredana PANAITE**, FOICA, M. ***

* FMV Bucureşti, ** FMV Iaşi, *** Colegiul Țara Bărsei, Brașov.
danadrugociu@yahoo.com

Abstract The investigations have been performed on the ovaries, oviducts and uterine horns collected from a group of Romanian Grez Steppe cows gynecologically controlled, with the age between 4/8 years. The females were clinically diagnosed having persistent corpora lutea, luteal cysts, follicular cysts and ovarian hypotrophy.

Keywords: Romanian Grez Steppe, cows, ovarian disorders.

INTRODUCTION

In order to confirm the clinical gynecologic diagnosis, we intended to correlate it with the histopathological examination.

This examination must complete the gynecological investigation (metabolic profile, individual clinical gynecologic examination and the hormone profile), in order for the results of the treatments to be positive and to end in the females’ reintegration in the production process, at the same time meeting the desideratum “a calf per year”.

In the specialized literature, several authors (ARCHBALD, 1990; THIBAULT, 1991; LARSON, 1992; KING, 1993; FAYE, 1994; MIHM, 1995, GALVIN, 1995) have emphasized and still emphasize the importance of ovary diseases in the normal evolution of cow breeding processes. The data we conveyed are disparate, and in some cases they are not correlated with the histopathology of the genital tract segments.

MATERIALS AND METHODS

The investigations were performed on the ovaries, oviducts and uterine horns collected from a group of 11 Romanian Grey Steppe cows from a gynecologically controlled lot, aged between 4 and 8 years. The females were clinically diagnosed having persistent corpora lutea, luteal cysts, follicular cysts and ovarian hypotrophy.

The fragments gathered from females presenting these diseases were fixed in BOUIN, CARONOY and ORTH, included in paraffin and sectioned at 5 um.

The 44 histologic pieces belonging to the same organs were sectioned at the SLEE crystal for cytochemical colorations. We used the following colorations: HEA, GIEMSA on the tissue, PAS, Alcian blue PAS, NOVELLI, PAPANICOLAOU, STAEDMAN-MOWRY, SCHULTZ, COTER and LORRAIN-SMITH.

The reading and interpretation was made on a number of 1144 samples, at the microscope using the qualitative method for the assessment of the tinctorial intensity of the specific structures belonging to these organs.
RESULTS AND DISCUSSION

At females with persistent corpus luteum, the size of the luteal cells is 18 – 25 um. They show the vesicle nucleus and the nucleolus which is obvious. The cytoplasm of these cells has a vacuolar aspect in the normal colorations, and in cytochemical colorations it contains high quantities of lipids, cholesterol, cholesterol esters and L-ascorbic acid (fig. 1). The presence of these inclusions in high quantities proves the secretion in excess of the progesterone, which allows us to state that there is an activation of the hormonal secretions at the three levels of the hypothalamus-hypophysis-ovarian axis, a fact which maintains the prolonged anaphrodisia of these females, thus making irreplaceable their treatment with PGF2, which will produce the luteolysis of the persistent corpus luteum.

The oviduct shows the pleats of the branched mucous membrane, with a prismatic epithelium that shows an increased secretion at the apical pole. This specific morphology is due to the stimulation of the oviduct epithelium by the release in excess of the progesterone.

The mucous membrane of the uterus is made from a prismatic epithelium with a cytogenic chorion, where frequent mastocites can be noticed. The richness in granules of the mastocite cytoplasm involves the increased release of the histamine (a vasculotrop and vasodilator substance) that allows the provisioning with nutrient substances of the uterine glands, manifesting an intense secretory activity (fig. 2).

In the case of corpus luteum cysts, on the left ovary, the luteal cells are 19-28 um, with a globulous aspect, with the nuclei showing vesicles and nucleoli. The cytoplasm shows various vacuoles offering a spongious aspect. The characteristic biochemical colorations show high quantities of cholesterol, cholesterol esters, lipids and L-ascorbic acid, showing an excess release of the progesterone. This massive release of progesterone inhibits the hypothalamus-hypophysis-ovarian axis, for the maturation of new follicles, relieving various secondary follicles, with ovocytes in necrobiosis (fig. 3). These ovocytes show a cytoplasm with a retiform aspect and pyknotic or karyorrhexis nucleus.

The pleats of the oviduct mucous membrane are frequent, with an epithelium that has high quantities of proteoglycans at the apical pole of the cells.

The uterine glands are numerous, with a secretory epithelium activated by the secretion in excess of the progesterone (fig.4).

Within the right ovary of the same female, in the histological sections, we noticed two cavitary follicles with the ovocytes in partial (fig.5,6) or total lysis. In the cavitary follicle with partial oocyte lysis we can notice the clear cytoplasm of the ovocytes and the karyolysis. The clear aspect of the cytoplasm proves the lack of the specific inclusions, proteoglycans and lipids specific to the ooplasm. The Sławjanski membrane is much thickened, not allowing the propagation of nutrient substances from the inside towards the structural components. At the other follicle we can notice the internal vacuolization of the cells belonging to the proligorous disk, and also a massive oocyte lysis. The follicle liquid is dense, intensely colored, and the follicle cells of the proligorous disk and of the radiated crown show pyknotic or karyorrhexis nuclei. The Sławjanski membrane is much thickened and separates the internal follicular structures from the sheath-like ones.

In the case of females diagnosed with follicular cysts, the follicular liquid is dense, homogenous and viscous. Sometimes, in the follicular liquid we can notice exfoliated cells from the granulosis (fig.7). The Sławjansky membrane is very thick and supports the granulosis that has an irregular aspect, most of its cells showing a pyknotic nucleus (fig.7). The sheath-like cells structure a massive gland, very well vascularised. These cells contain in
their cytoplasm high quantities of lipids, cholesterol esters, cholesterol and L-ascorbic acid. The presence of these inclusions in high quantities shows the increased steroid genesis, with the release of the estorigenic hormones, especially from the forte estorigenic section, estradiol-17-beta, which maintains the state of nymphomania.

On the right ovary of the same 8-year-old female, we noticed a phase of the follicular cystitis where the total oocytosis was produced and the detachment of the proligorous disk from the granulosis structure. The Slawjansky membrane appears thick, and the sheath-like cells contain high quantities of inclusions.

In the oviduct, the pleats of the mucous membrane show a prismatic epithelium whose cells contain high quantifies of proteoglycans at the apical pole. This increased secretion is determined by the state of high estorigenicity of these females.

The uterine glands are big, sometimes pleated with a high, hyper secretery epithelium, in a very vascularised chorion (fig.8).

At the 4-year-old Romanian Grey Steppe female suffering from 2\textsuperscript{nd} stage ovarian hypotrophy, the morphological research in the ovary confirmed the clinical diagnosis. In the cortical area of the ovary we can notice the fibrosis of the chorion where the primary and secondary follicles appear in various involution phases. The oocytes are in advanced necrobiosis, and the follicular cells show an advanced stage of vacuolization in the cortical area of the ovary; the primary and secondary ovarian follicles are submitted to an intense involution phenomenon, due to the fact that they are caught in a strong texture of collagen fibers that minimize their trophicity.

In the oviduct the pleats of the mucous membrane show an epithelium with a decreased secretory activity, manifested in the fact that at the apical pole of the cells low quantities of proteoglycans. The same decreased secretory activity can be noticed in the uterine glands that appear with a cubic epithelium. The same decreased secretory activity, shown by the morphological and cytochemical aspects presented above, in the oviducts and at the level of the uterus, is attributed to a low titrum of estrogens at this level, due to the fact that in the ovary, in such cases of ovarian hypotrophies, the ovarian follicles, where the sheath-like cells responsible with the secretion of the estrogen hormones can occur, do not maturate.

![Fig. 1. Persistent corpus luteum, Romanian Grey Steppe cows – 7 years old. Foamy aspect of the luteal cells cytoplasm. Col. Novelli; x 400.](image1)

![Fig. 2. The chorion of the uterine mucous membrane, Romanian Grey Steppe cows – 7 years old, that showed a persistent corpus luteum. Mastocites in the chorion and glands with a secretory activity. Col. Giemsa; x 400.](image2)
Fig. 3. Secondary follicle with ovocyte in necrolysis, Romanian Grey Steppe cow – 5 years old, with corpus luteum cyst. Col. Novelli; x 400.

Fig. 4. Uterine glands with high secretory activity in a very vascularised and oedematous chorion. Romanian Grey Steppe cow – 6 years old, with corpus luteum cyst. Col. Giemsa; x 400.

Fig. 5. Oocyte lysis in a cavitary follicle. Hypertrophy of the sheath-like cells. Romanian Grey Steppe cow – 6 years old, with corpus luteum cyst. Col. Giemsa; x 200.

Fig. 6. Oocyte lysis in a cavitary follicle, with the thickening of the pellucid membrane and the presence of the hyaluronic acid that cements the follicular cells. Romanian Grey Steppe cow – 6 years old, with corpus luteum cyst. Col. Giemsa; x 400.
CONCLUSIONS

1. At the females with a persistent corpus luteum the histopathological examination showed high quantities of lipids, cholesterol, cholesterol esters and L-ascorbic acid at the level of the luteal cell (in the cytoplasm), proving the secretion in excess of the progesterone. This allows us to assess an activation of the hormonal secretion at the three levels of the hypothalamus-hypophysis-ovarian axis, maintaining a long state of anaphrodisia.

2. In the case of corpus luteum cysts, at the level of the cytoplasm of the luteal cell high quantities of cholesterol, cholesterol esters and L-ascorbic acid were shown, proving a release in excess of the progesterone with the stopping of the follicular maturation process and the occurrence of the partial oocyte lysis at the level of the cavitary follicle.

3. At the cows with 1st and 2nd degree ovarian hypotrophy, the morphological research in the ovary emphasized the fibrosisation of the chorion, with the primary and secondary follicles in various stages of involution and the ovocytes, in advanced necrobiosis. The follicular cells are shown in an advanced degree of vacuolization, a fact which determines a low titrum of estrogens associated with the clinical manifestation of the state of anoestrus.

REFERENCES

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