SUMMARY

The doctoral thesis ”*RESEARCH REGARDING THE IMAGING DIAGNOSIS AND THERAPEUTIC VALUE OF SURGICAL TECHNIQUES USED IN UTERINE PATHOLOGIES IN BITCHES AND QUEENS*” has been coordonated by Professor Dr. Vulpe Vasile, within the Doctoral School of the University of Agricultural Sciences and Veterinary Medicine ”Ion Ionescu De La Brad” Iaşi. The practical aspects of this study have been accomplished within the S.C. SANIVET S.R.L. Iasi veterinary practice. The purpose of this study was refining the ultrasound diagnosis of uterine inflamatory diseases and to evaluate the efficiency of new surgical treatments for uterine and ovarian pathologies. Also, there has been made correlations between the ultrasound diagnosis and the macroscopic and microscopic anatomopathological diagnosis for a better understanding of the lessions noticed during the ultrasound exam.

The thesis comprises 11 chapters, divided in 2 parts: the first part represents the current state of knowledge and the second part is represented by one's own research.

The thesis has been elaborated taking into account the norms of elaboration and writing imposed by the Doctoral School since 2016. It includes a total number of 185 pages, of which 39 pages represent the bibliographic study and 103 represent the own researches.

The first part spreads over 39 pages and is divided into 3 chapters, referring in turn to the anatomy and morphophysiology of the uterus and ovary, methods of diagnosis of uterine and ovarian diseases, but also to surgical techniques used to treat diagnosed diseases.

The second part is divided into seven chapters, being presented initially the purpose and objectives of the thesis, materials and working methods followed later by the results obtained from the clinical examination, hematological examination and imaging examination. These chapters are followed by the chapters that describe the results of the surgical interventions and the results of the histopathological examination, the paper concluding with the general discussions in the form of conclusions.

The first chapter is entitled "Aspects regarding the morphophysiology of the uterus and ovary in bitches and queens", and it is structured in five subchapters. The first two subchapters present macroscopic morphological aspects of the uterus and ovary, the third subchapter presents physiological characteristics of the ovarian cycles and the fourth chapter presents histological aspects of the uterus and ovary in dogs and cats. The fifth subchapter briefly presents the main pathologies that were encountered in case studies: postpartum endometritis, placental retention, cystic endometrial hyperplasia and pyometra.

The second chapter presents the main aspects in diagnosing uterine and ovarian diseases in dogs and cats. The clinical examination and the paraclinical examination are considered in turn. The main paraclinical examinations used were ultrasound examination, histopathological examination, blood examination, examination by nuclear magnetic imaging and radiological examination.

The third chapter is divided into three subchapters, they describe different aspects of surgery. The first subchapter describes the ovariohysterectomy on the white line, the second subchapter describes the ovariohysterectomy by the flank, and the last subchapter presents in general how to use the radio electrosurgery unit.

The first chapter of the second part, entitled "Aim and Objectives", describes the main purpose and objectives of the current study. The main objective was to conduct a prospective cohort study of cases with uterine disorders and had as objectives:

- early diagnosis of uterine diseases;
- clinical and ultrasound examination to diagnose uterine diseases;
- Doppler ultrasound examination to assess circulatory changes in the uterus and ovaries;
- diagnosis of uterine diseases to be later confirmed by histopathological examination;
- increasing surgical techniques by:
  - evaluation of the efficiency of classical ligatures compared to ligatures performed with the radio-electrosurgery unit,
  - assessment of the safety of small incisions,
  - appreciation of the use of metal staples for skin suturing in cats.

The fifth chapter is called ”Materials and working methods”. It is structured in two subchapters. The first subchapter describes the technical means and the biological material used. The study was conducted on a group of 102 bitches and 141 cats, all aged between 1 and 15 years. The second subchapter describes the clinical examination, the ultrasound examination, the nuclear magnetic resonance imaging examination, the histopathological examination and the blood examination.

Chapter six presents the results of the clinical examination and the hematological examination. It is structured in six subchapters, being approached in turn: the way of working, the results obtained after the clinical examination, the results obtained after the blood examination and the conclusions resulting from the examination of the obtained data.

Following the clinical examination, only 26% of the total number of cases were found, the main diseases diagnosed being dystocia, postpartum metritis, pyometra with generalized symptoms or open cervix and in a few cases cystic endometrial hyperplasia. Fetal death was not diagnosed by clinical examination. Palpation is a method of investigation that provides a number of important information, but the information obtained depends on the doctor. An experienced doctor gets much more data from palpation than a novice doctor, which makes it subjective.

Blood tests, both hematological and biochemical, rarely showed changes, and when they did change they were not specific to uterine diseases.

Chapter seven is addressed to imaging diagnosis, especially ultrasound examination. This chapter is structured in three subchapters, initially presenting the materials and methods used in the ultrasound examination, followed by results and discussions, the third subchapter presenting the conclusions.

The ultrasound examination was applied to all animals in the examined group, the ultrasound changes in the appearance of the uterus being essential for the qualification in the study. All animals included in the study belong to the common breed. The examination was performed with an Esaote MyLab 6 ultrasound, that was in the private practice, identical to one of the ultrasounds provided by the Faculty of Veterinary Medicine Bucharest. Following the ultrasound examination, they were diagnosed with pyometra 63 (61.76%) of bitches and 73 (51.77%) of cats with cystic endometrial hyperplasia 17 (16.67%) of bitches and 42 (29.78%) of cats with fetal death 6 (5.88%) bitches and 10 (7.09%) cats with dystocia 12 (11.76%) bitches and 10 (7.09%) cats and with postpartum metritis 4 (3.92%) bitches and 6 (4.25%) cats. The ultrasound examination was also performed with Doppler mode. It was observed that uterine and ovarian vascularization are visible especially during the estrous cycles, gestation, but especially in uterine and varian pathologies. The second subchapter discusses the ultrasound aspects specific to each pathology, such as: how to present different pathologies, changes that occur and how they are presented by the device, how the image was obtained (sagittal, transverse), but also observations on risky pregnancies that can become uterine pathologies over time. The third subchapter summarizes the observed ultrasound aspects.

Chapter eight presents the surgical ways in which uterine diseases have been treated. Similar to the previous chapter, the materials and materials used, the results obtained accompanied by discussions and conclusions are presented.

The radiosurgery device was used in 36 (35%) of the 102 bitches and in 43 (30%) cats considered in the study. The remaining 66 (65%) bitches and 98 (70%) cats were neutered using classical ligatures.

In the subchapter in which the materials and methods are presented, the way of using the radio-electrosurgery device is developed in detail, but also the way in which it was set to obtain the results.

The subchapter of results and discussions begins with the age distribution of uterine diseases, followed by the presentation of some essential aspects of the castration process. Within the same subchapter are presented intraoperative aspects in bitches and cats where different pathologies were encountered. Towards the end of the chapter is mentioned a formula (L (incision length)^2 = π^2r (ultrasound measured uterine radius) 2) identified in doctoral studies to reduce the incision on the white line as much as possible. Below are presented aspects observed intraoperatively with the use of the radio electrosurgery unit, but also how it was used, as well as the settings that were made. Each step to be followed and each aspect to be taken into account when using the radiosurgery unit was detailed. Aspects related to the power of the current used, its frequency, the size of the chosen electrode, the importance of the contact area, the importance of the contact time but also about the mounting of the return electrode are presented. In addition to all these aspects related to the installation of the device in a monopolar way, aspects are discussed regarding the installation of the device in a bipolar way and how it was used.

The last part of this subchapter presents aspects observed in practice regarding the suturing of the surgical wound. The 3 types of sutures used are mentioned, suture with metal staples, with nylon thread and with resorbable polyglycolic acid thread. Both the advantages of each type of suture and the disadvantages that were observed in the office are presented. The subchapter ends with the presentation of some cases that showed complications after castration.

In the third subchapter, a series of aspects mentioned above are resumed, but it is also presented the possibility that the technique used will be useful in preparing surgeons for laparoscopic interventions.

Another important and noteworthy aspect is that the use of the radio-electrosurgery unit shortens the duration of surgery, but also leads to a faster healing of the animal.

Based on the results obtained, it can be stated that this method is also suitable for performing ovariohysterectomy when no pathologies are present, and can be used in sterilization campaigns to control the animal population.

Chapter nine presents in detail the results of the histopathological examination. The data obtained and presented in this chapter were through the collaboration with the pathological anatomy laboratories within the Faculty of Veterinary Medicine Iași, the Faculty of Veterinary Medicine Cluj and the Faculty of Veterinary Medicine Bucharest.

The first subchapter describes the laboratory within the Faculty of Veterinary Medicine Iași, as well as the steps followed to obtain histological preparations.

In the second subchapter are presented and discussed various microscopic aspects of uterine pathologies encountered in dogs and cats. The main aspects encountered are presented, but also microscopic characteristics of the use of the radio-electrosurgery unit. Both the aspects related to the ovarian pedicles and the uterine abutment 3 days after castration were shown, which show the local reaction from the body, but also the aspects related to the way the uterus and ovarian vessels behave after the application of the radio electrosurgery unit. The following are microscopic aspects most frequently

found in uterine pathologies. All pathologies were mainly accompanied by endometrial hyperplasia, followed by changes in the walls of the ovarian vessels and changes in leukocytes.

The third subchapter emphasizes the importance of histopathological diagnosis in confirming diagnoses previously established by clinical examination, ultrasound and finally macroscopic examination after ovariohysterectomy.

In most cases, the histopathological exam confirmed the results suspected after a macroscopic analisis of the uterus, but there were some cases where the histopathologic exam showed important tissue alterations without macroscopic modifications

Chapter ten presents general discussions on the peculiarities of imaging diagnosis, but also on the therapeutic value of surgical techniques used to treat uterine diseases in dogs and cats.

Chapter eleven presents the main conclusions resulting from clinical and ultrasound investigations, but also about the effectiveness of surgical treatment.

At the end of the thesis, the Bibliography and the list of figures are presented. The bibliographic sources for the current study were represented both by materials from the Romanian specialized literature and from the literature from abroad. These sources were used both for the bibliographic study and for the comparative discussions of the results.