

Summary

The doctoral thesis entitled “**Contributions to the study of some antibiotics used in veterinary surgery**” had as motivation the high frequency of the surgical disorders in animals and the wide-spread use of antibiotics for therapy. The paper has 264 pages and it is structured according to the present legal provisions, having two main parts: the first part, entitled “**The Present Stage of Knowledge Regarding Antibiotics**”, comprises 51 pages and offers details about the antibiotics and antimicrobial chemotherapeutics; the second part, “**Personal Contributions**” has 182 pages and presents the objective and the orientation of the research, the study material, the methods that were being used, the obtained results and their interpretation. This second part ends with the general conclusions.

The first part of the paper has two chapters, where one can find succinct information on the specialty literature concerned with the subject of the thesis, syntheses that were used later on for the interpretation and comparison of the data obtained in the second part. This part is illustrated by four tables and twelve figures selected as suggestive for detailing the role of antibiotics.

The first chapter, entitled “**General data about antibiotics**”, presents the provenience of antibiotics (natural or synthetic), the terminology and the utilization.

The second chapter offers detailed information about “**The Classification of Antibiotics**”. The chapter has five subchapters that present data from the specialty literature. The classification of antibiotics is based on the way in which they are obtained, the places where they have an action on the bacterian cell, the indications, the limits and the contraindications of their use.

The second part, entitled “**Personal contributions**”, has four chapters that present details about the results concerning the use of two antibiotics, Rifampicillin and Kanamycin 25 % sol., for the treatment of some surgical disorders. The motivation for the use of these antibiotics was the existence of a collaboration contract with the Research Centre for Antibiotics in Iasi.

That is why the main research objectives were:

-the use of Rifampicillin for traumatic lesions, by establishing the method of administration, its action and the possible combinations with other substances;

-the use of the combinations of Rifampicillin for purulent dermatitis, for the treatment of otitis and for the pathology of the anal glands in dogs;

-the use of kanamycin sol. 25% for the treatment of some surgical disorders;

The study was done on 308 horses with accidental wounds, 824 carnivores with accidental and operational wounds, 90 bulls with accidental wounds, 104 carnivores with pyodermitis, 35 carnivores with otitis, 1080 carnivores with infection of the anal glands, all being locally treated with pure Rifampicillin or in combination with other substances; another 299 horses, bulls, sheep, pigs and carnivores, with different surgical disorders, were treated for infections with kanamycin 25% sol. The obtained results were presented in 29 tables, 143 figures and 15 graphics.

The accidental wounds that were treated with Rifampicillin had a different etiology: cuttings, contusions, snatching or penetrating articular wounds. In the case of the penetrating articular wounds, the antibiotic was administered in its pure, capsulated state of 150 mg, on the trajectory formed by the blunt object. In the case of the other types of wounds, the antibiotic was administered as powder, using the original combination (formed of Rifampicillin 1.0, Magnesium Sulfate 10.0 and Lactose 100.0) which was called Rifatrol.

The powdering procedure was preceded by massive surgical correction, in order to assure the direct contact of the product with the living tissues. In addition, the product was packed in plastic container with a perforated stop for uniform dispersion. The therapeutic effect was calculated by making a comparison with other wounds that presented the same etiology and clinical aspects, but were not treated with Rifatrol powder. The comparison took into account the aspect of the secretion, of the new tissue and the lack of complications during the healing process.

In horses, the therapeutic action of the Rifatrol manifested itself in comparison with the clinical aspect of the accidental injury, that is if the wound could be sutured. This way, the healing process of the sutured wounds varied between 97% in the case of superficial injuries done by cutting and 73% in the case of the deep wounds. The complications that delayed the healing process were represented by exaggerated seroma which requested the drainage between

two points of suture. In the case of the sutured wounds that were not treated with Rifatrol, the complications varied between 25% in superficial wounds done by cutting and 100% in deep wounds. The lack of antibiotic (Rifampicillin) produced the infection of the seroma, which required drainage and antiseptic lavage, this delaying the healing process. The high frequency of the complications and the delay of the healing process is more common in the case of the wound that were not sutured.

In carnivores, the accidental wounds treated by powdering of the antibiotic and suture healed in a greater proportion (96.4% - 75%), in comparison with the wounds that were not treated with powdered antibiotic, in which case the incidence of the complications being much higher (10 - 100%). The same differences were noted in bulls, this emphasizing the healing effect of the Rifatrol administered as powder.

In the case of the wounds in carnivores that required surgery, the administration of Rifatrol as powder shortened the average time needed for the suture wires to be kept. The time varied between 9 and 14 days, in comparison with 12 to 24 days for the untreated wounds. The absence of the powdered antibiotic led to new interventions for additional drainage and dehiscence of the wound.

The clinical aspects of the healing of the accidental wounds in animals underlined the healing role of the Rifatrol powder, due to the antimicrobial effect of the Rifampicillin, the analgesic effect of the magnesium sulfate and the adsorbent, draining and nutritional properties of the lactose. That is why the product is recommended during the first phase of the evolution of the healing process for its capacity to shorten the cleaning of the wound, during the second phase for its ability to stimulate the granulation tissues and during the third phase for its capacity to cicatrize and form the protective crust.

The healing effect of the product was also highlighted by the biopsy tests performed on the samples taken from the edges of the wound and from the new tissues, after 3, 7, 14 and 21 days; special importance was given to epithelization, fibroblastic reaction, fibrillogenesis and the newly formed capillaries. The histological images revealed an intense activity of the healing process in the case of the wound treated with Rifatrol, in comparison with the moderate reaction of the untreated wounds. The difference in the stimulation of the regenerative activity was seen from the 7th day of treatment, while during the 14th day a large amount of collagen fibers,

organized in fascicles, and the presence of newly formed capillaries, which assure the nutrition of the new epithelium, could be noted in the case of the treated wounds.

Within 21 days, the healing is finalized for the treated wounds: the epidermis has its characteristic structure and the keratinization is intense, in order to assure the protective role. In the case of the untreated wounds, this process is only starting.

The histological aspects demonstrate that the medicine formula we suggested is efficient, as the epithelization, the fibroblastic reaction, the fibrillogenesis and the angiogenesis occur at a high level, all this leading to a quicker healing process of the accidental and operative wounds; the reduction of the aseptic and septic complication frequency is another important aspect that is worth being mentioned.

The studies about pyodermitis in carnivores allowed the following classification: superficial pyodermitis (58.8%), profound pyodermitis (40.4%) and pododermatitis (4.8%), with different types and subtypes. Therefore, the intertrigo manifested itself through its three localizations (at the level of the mamma, axilla and vulva), while the impetigo was diagnosed in 21.1% of the cases, with the predominance of the pustulous subtype.

The folliculitis was encountered in 23.1% of the cases, affecting especially the German Sheppard dogs (41.67%), followed by the common breed (20.83%) where the evolution of the disorder is a consequence of the poor living conditions. Acne and furunculosis have been observed especially in young animals under 12 months of age, and are characterized by the formation of some little purulent deposits. The pododermatitis was also observed in young animals and was localized between the toes or on the front legs.

The bacteriological research revealed the microbial flora considered responsible for the emergence and evolution of the pyodermitis. The determinant agent is considered to be the staphylococcus, while the *Clostridium perfringens*, *E. coli*, *Proteus spp.*, *Archanobacter pyogenes* and *Pseudomonas aeruginosa* were isolated as associated germs.

The treatment of the pyodermitis is a complex one, being represented by the association between the hygienic and dietary regimen and the local and general medical treatment, in relation to the clinical form. As a local treatment, the Rifatrol powder, by means of the antibiotic it contains, ensures the aseptic environment needed for the tissue respiration. All the other excipients fight off discomfort and provide a siccative environment that inhibits the development

of pathogenic germs. The results of the antibiogram recommend the administration of Rifampicillin and Kanamycin sol. 25 % as being the most effective medicine for general treatment.

As for the external otitis, it has been observed that it appeared more frequently in carnivores, evolving as a primary disorder in 63% of the cases, while in 37% of the cases it manifested itself in association with atopy, alimentary hypersensitivity, flea bites hypersensitivity and local contact allergy. From the clinical point of view, the following forms could be observed: eritematous, ceruminous, exudative, suppurative, ulcerative and proliferative forms, each of them presenting a specific symptomatology.

The mycological tests revealed types of yeast organisms such as *Malassezia pachidermatis* and *Candida albicans*, while the bacteriologic exam isolated streptococci, staphylococci, *E. coli*, *Archanobacter pyogenes*, *Proteus spp.*, and *Pseudomonas aeruginosa*, in pure culture or in association. The antibiogram revealed their sensitivity (86.6%) to Rifampicillin, which led us to come up with an original product called Rifaot, destined to be helpful for the local treatment of otitis.

The Rifaot powder contains: Rp / rifampicillin 10.0, Nistatine 2.0, Anestezine 13.0, zinc oxide 36.0 and talc ad 100.0. The product is packed in plastic bottle, with perforated stop for uniform powdering and for the easy access of the medicine to the drumhead. It is advisable that the powdering should be preceded by the appropriate cleaning of the hearing canal; the number of treatment sessions will vary according to the clinical form of the otitis. By means of its components, the product has antibacterial, antimycotic, analgesic, adsorbent and local siccative effects, fighting the bacterial flora, drying the tegument of the hearing canal and developing an environment that inhibits the development of the microbial flora and allows the tissue respiration.

The disorders of the anal glandular complex are frequently encountered in carnivores, and have as result the discomfort of the animal and digestive and cutaneous complications. Anal sacculitis is the most frequent disorder, with a prevalence of 32.48% in dogs and 11.45% in cats. The perianal phlegmatic dermatitis was rarely encountered, affecting especially the German shepherd dogs. Taking into account the fact that *E. coli* was isolated, in pure culture, in 52.4% of the cases in dogs and 60 % of the cases in cats, and that the antibiogram revealed the sensitivity

of the germ to Rifampicillin, the local treatment consisted of emptying the anal sacculitis and powdering the affected region with Rifatrol.

The perianal phlegmatic dermatitis requests surgical intervention, suture and Rifatrol powdering.

The Kanamycin sol 25% for veterinary use is an antibiotic which fights the germs that produce cutaneous, subcutaneous and urinary infections. The solution must be administered subcutaneously, intramuscularly or intravenously for the treatment of serious infections, the dosage varying for each breed. Taking into account the gravity of the infection, the dosage can be administered twice a day, at an interval of 12 hours.

The parenteral administration of kanamycin is tolerated by the tissues, without any local side effect. The treatment should be administered for a period of three to six days, depending on the general condition of the patient.

In the case of cystitis, the general treatment can be associated with the local one, the antibiotic being inserted in the bladder by means of a catheter.

The results presented in this thesis demonstrate that the original products called Rifatrol and Rifaot are useful for local treatment as continuity solutions, while Kanamycin sol. 25% can be successfully administered for the general treatment of some surgical disorders.