Comparative Study Considering the Therapeutical Conduct in Psittacine Pseudomonads

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Abstract. A comparative study was performed to assess the efficiency of more approaches for a total number of 158 clinical cases with pseudomonads. For all these cases, the diagnostic of this disease was confirmed by using bacteriological examination methods. The therapy included the administration of several types of antibiotics, chemotherapeutical substances and vitamins, for some cases even anti-inflammatory substances. The proficiency results were observed after the vitamins’ administration associated with the therapy with antibiotics, for a relative long period of time (Enrofloxacin, Streptomycin with Penicillin, Colistin-sulphite etc., administrated for 15 – 21 days) and anti-inflammatory-therapy (Dexamethasone).

Keywords: Pseudomonas, psittacine, therapy, antibiotics, dexamethasone

INTRODUCTION

In Pseudomonas genus, aeruginosa and fluorescens species are the most important from clinical point of view, especially for aviary pathology, in which this bacteria produces systemic and localized infections. Pseudomonas infections, either systemic or localized, are met on a large number of birds, either domestic or wild ones, and produce a series of losses to intensive agriculture, through their large distribution and the frequent emergence. The losses consist mostly of: high mortality rate, especially in chicken, the decrease of hatching percentage, decreases in egg production. The behavior of Pseudomonas aeruginosa and Psd. Fluorescens towards the action of the antibiotics remains on of the modern problems in pathology, in this sense being proven the natural resistance of the bacterium considering the majority of available antibiotics, relative often gaining of resistance towards antibiotics (initially sensitive to), and also the high toxicity of efficient antibiotics for the organism subjected to treatment.

The antibiotics activity towards the pseudomonads is manifested in concordance with their capacity to penetrate through the cell wall, with their resistance to the inactivating action of bacterial enzymes and the affinity of the antibiotic for several structures of the cell. In turn, Pseudomonas aeruginosa can prevent the action of the antibiotics, using one of these mechanisms: the elaboration of some alternative systems which can replace or substitute the inhibited one; the target enzyme action decrease, this preserving its normal structure and the substitution of its activity through other metabolic routes; the inhibiting agent exclusion from the target places, through the decrease of the cell wall permeability or the production of some surface macromolecules; the destruction of the antibiotic through hydrolysis, the substitution of some chemical groups of the antibiotic.
The first antibiotics which proved to be efficient towards Pseudomonas spp. were polymyxin B, used since 1947 and colistin (polymyxin E) used since 1950. However, they present a high toxicity especially considering the kidneys and the nervous system. In 1963 it was introduced gentamicin, for the treatment of Pseudomonas aeruginosa infections, an very active aminoglycoside, afterwads, due to the efficiency decrease, it was replaced with penicillin group antibiotics (carbenicillin, piperacillin, apalocillin, phurasocillin, pirbenicillin, ticarocillin, azlocillin, etc.), cephalosporins (ceftazidime, cephbroludine), aminoglycosides (tobramycin, amikacin, dobekacillin, sisломycin), cephalosulide and ceftazidime being the most efficient of all. Generally, Pseudomonas aeruginosa is resistant to most of the antibiotics and chemotherapeuticals, including kanamycin, in comparison to other fluorescent pseudomonads. Taking into account these facts, the research was conducted in order to construct an optimal therapeutical scheme, to fight against pseudomonads, which evolve at cage psittacines.

MATERIALS AND METHODS

The study was performed on a total number of 158 clinical psittacine cases, diagnosed with pseudomonad, 76 of them produced by Pseudomonas aeruginosa and 82 cases produced by Pseudomonas fluorescens. For all the cases, the pseudomonad diagnosis was confirmed through bacteriological methods (Api and Rida galleries).

As therapeutical approaches, there were different treatment schemes organized and applied, comprising only antibiotics, antibiotics and anti-inflammatory substances, antibiotics and vitamins, complex therapies with antibiotics in association with anti-inflammatory substances. There were used different antibiotics, either associated or alone: oxytetracycline, doxycycline, enrofloxacin, amoxicillin and clavulanic acid, streptomycin, streptomycin and penicillin. As anti-inflammatory substances, the most frequently used was dexamethasone. The antibiotics were administrated for a long period of time, for 15-21 days, and the administration of anti-inflammatories was unique and repeated at 48 hours, especially with the purpose of fighting against the toxic shock on clinical cases with subacute-chronical forms, with obvious nervous manifestations.

The administration path was frequently the oral one, because most of the pharmaceutical products can provoke irritations or local necrosis, through parenteral path. Generally, the administration of pharmaceutical products was made either directly (through oral forced administration), at 8-12 hours, considering the type of product or the type of antibiotic.

RESULTS AND DISCUSSIONS

All the clinical cases were monitored through the treatment period, periodically being performed bacteriological analysis in order to establish the efficiency of the applied treatments. The comparative analysis of the obtained results allowed to observe the inefficiency for most of the used antibiotics, especially when these were used as an unique therapeutical method. Better results were obtained in the cases were the antibiotics were associated during the therapy, or the antibiotics were associated with anti-inflammatory substances, for a period of 21 days.

The clinical cases in which the antibiotherapy was performed with cyclines or quinolones presented remissions of the clinical signs, but there were situations when the infections reappeared, when these needed a new anti-infectious therapy. In these cases,
generally the clinicians betook to the administration of certain types of antibiotics, frequently associated with dexamethasone.

In 4 cases diagnosed with Pseudomonas fluorescens, immediately after pseudomonad confirmation, a streptomycin associated with penicillin and dexamethasone was established, the treatment being applied for 21 days. Although the clinical signs was totally remitted, the bacteriological examinations (at 90 days and 180 days after therapy finalization), the diagnosis was reconfirmed, being necessary a new administration of anti-infectious products (antibiotherapy), for 21 days.

In 2 clinical cases diagnosed with Pseudomonas aeruginosa, in the first stage a therapy of oxytetracycline was established, for 15 days, though without any results. At 30 days after the first treatment, a new therapy was applied, this time with streptomycin, for 21 days, being observed the total remission of the clinical signs. At approximately 30-90 days from the second treatment, the clinical signs fell back on, and the pseudomonad diagnosis was reconfirmed through bacteriological examination. He antibiotherapy comprised enrofloxacin, associated with dexamethasone, for 21 days. Although the clinical signs were totally remitted, at control examinations (at 90 days and 180 days from therapy finalization), the diagnosis was reconfirmed, being necessary the reestablishment of a anti-infectious therapy.

Cefsulodine is efficient almost exclusively on Pseudomonas aeruginosa. However, its narrow specter has the disadvantage of frequent overinfections. This is the reason for which it is associated with different other antibiotics. Due to the lack of adverse reactions and the toxicity, it is considered the best antibiotic for the last 20 years. Ceftazidime is the most active cephalosporin, including here also the Pseudomonas aeruginosa strains that are resistant to cefsulodine, not presenting crossed resistance with carbenicillin. Among aminoglycosides, streptomycin and neomycin are weakly active on Pseudomonas aeruginosa strains, manifesting a marked resistance. Kanamycin was used in Pseudomonas aeruginosa infections, with good results, but the sudden emergence of a large number of resistant Pseudomonas aeruginosa strains determined a limitation in its use.

Gentamicin, used for pseudomonads since 1963, proved to be very efficient towards Pseudomonas aeruginosa strains, but it leads quickly to antibiotic resistance phenomena. Tobramycin, with a similar specter as gentamicin, is 2-4 times more active than this one. This antibiotic is active in 20-60 % on Pseudomonas aeruginosa strains resistant to gentamicin action, having a low incidence of toxic effects. It has been observed the emergence of several resistant strains for this antibiotic too (8). Aminoglycosides, with a anti-pseudomonads activity are: dibekacin, with an activity similar to tobramycin, sisomicin, netilmicin and 5-episomicin (derived from sisomicin), habekacin, derived from dibekacin, active on kanamycin-resistant germs, gentamicin, tobramycin. Taking into account these results, it is considered that the most active antipseudomonad aminoglycosides are appreciated to be tobramycin, dibekacin and sisomicin.

Considering the action of several antimicrobial agents towards the strains of Pseudomonas aeruginosa, it was observed in most of the situations, an almost total resistance to tetracycline, chloramphenicol and chemotherapeutics (14).

**CONCLUSIONS**

1. The antibiotics with the most intense action in pseudomonads cases are streptomycin associated with penicillin. It is recommended the association with dexamethasone. The therapy can be established for a period of 21 days.
2. The antibiotics from cycline or quinolone groups proved to be efficient in cage psittacine pseudomonads.

3. The treatment plan with the best results is: associated administration of antibiotics, eventually associated with dexamethasone (1 or 2 administrations).

REFERENCES


