

ETIOLOGY OF ACUTE RHINITIS IN DOGS, REARED UNDER DIFFERENT FARM TECHNOLOGICAL SOLUTIONS

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ABSTRACT

An investigation out about the influence of rearing conditions to acute rhinitis in 83 German Shepherd dogs at 8 – 10 months of age was carried out. The animals were reared in farms with two different technological solutions: individual boxes or double box with central corridor. The premises were built by materials with different thermal conductivity coefficients. The purpose of the study was to analyze the leading cause of acute rhinitis occurrence: rearing technology or thermal conductivity properties of premises. It was shown that the main cause for the development of rhinitis in dogs was the high thermal conductivity coefficient ($\lambda \geq 5.0$) of construction materials used in farm facilities where animals were housed.

Key words: rhinitis, dogs, rearing condition, etiology, thermal conductivity.

Introduction

Canine rhinitis is a conditional disease which affects most commonly animals reared under inadequate technologies (Pierson, 1999). Cold is a predisposing factor for this infection as it activates the action of conditionally pathogenic microflora, foreign bodies, air irritants (ammonia, hydrogen sulfide, dust etc.). Secondary infections (pharyngitis, laryngitis, bronchitis etc.) are also frequently seen. Therefore, the course of rhinitis in dogs is dependent on the rearing conditions – it is manifested only provided that several conditions, mainly cold, are present.

The pathology causes a lot of discomfort for animals. Spring and autumn were identified to be seasons of rhinitis as well as other illnesses (Corzo et al., 2003).

The specific clinical signs are frequent sneezing, rubbing of the nose with the front paws and licking. Then, discharge from the nose, initially occasional and transparent, then thick, often purulent after development of infectious processes is observed. At drying, a crust is formed at nostril margins. The respiration of the dog is affected, as when the discharge from the nose is very thick, it snuffles. An inflammation of the skin around of nostrils consequently to the incessant rubbing with the paws could be seen. When nostrils are obstructed, the dog begins to breathe through the mouth. Two form of rhinitis are encountered – acute and chronic. The acute form passes into chronic with time (Lefevre et al., 2008), if not adequately treated.

In the world practice, two main technological solutions are known for rearing of dogs (Villement, 2000; Pierson, 1999; Uzunova, 2012) – housing of dogs in individual boxes including a shed and walking yard, and a double box with common yard and central corridor, where two dogs, always compatible from hierarchical point of view, could be housed. The facilities are closed, open or semi-open (Filipov, 1985). The second technological solution is considered more contemporary and acceptable (Ordinance 44, 2006) from ethological point of view (Andrew, 2004) due to the incontestable more successful socialisation of dogs (Compan and Scapini, 2002).

It is however outlined (Uzunova and Koleva, 2005) that dogs housed in double boxes (the more contemporary technology) exhibited higher incidence of rhinitis and cold-induced diseases in general as compared to dogs reared in individual boxes due to the fact that when dogs are housed together, there is a greater opportunity for contact and therefore, easier transfer of infection by the

airborne route. Other researchers (Cadore, 1999) believe that materials used for construction of boxes and their thermal conductivity coefficients were more important than the technology (Stoyanchev and Uzunova, 1999). The review of the literature gives rise to the following question about rhinitis etiology, so far remaining unsolved – which is the more important cause for appearance of the disease – the rearing technology or the quality of building materials from which the premises were made?

The purpose of the study was to analyze the leading cause of acute rhinitis occurrence in dogs: rearing technology or thermal conductivity properties of premises.

Materials and methods

Studies were performed in the autumn in four farms (located in Sofia and Plovdiv) – kennels with various technological rearing solutions, housing German Shepherd dogs used for military purposes. The dogs were 83, 8 to 10 months of age, all male, distributed as followed:

Farm No 1 – 20 male dogs;

Farm No 2 – 25 male dogs;

Farm No 3 – 18 male dogs;

Farm No 4 – 20 male dogs.

The methods used for diagnosis of the disease and identification of its etiology were:

1. Ethological investigation of dogs confirmed to suffer from rhinitis – 7 specific behavioural activities – 48-hour observation (feeding, drinking, locomotion, rest, curiosity, anxiety, depression) using the visual chronometric method and scoring according to 2- and 3-point scoring system (this system for evaluation is also utilized in other fields, for instance for evaluation of dogs intelligence). The behavioural activities of study subjects were recorded with a video camera.

2. Frequency table analysis

3. Veterinary medical inspection and evaluation of the four kennels – using special check-lists which include all elements of dogs' development (farm location, number of animals, veterinary activities, feeding, drinking, cleaning etc.). The data from the evaluation will be presented in the results section.

The used methods were compliant with animal welfare requirements.

Results

The studied dogs were confirmed to be affected by acute seasonal rhinitis of unknown etiology:

- Farm No 1 – 6 dogs;

- Farm No 2 – 9 dogs

- Farm No 3 – 7 dogs;

- Farm No 4 – 2 dogs.

Total number of dogs with rhinitis – 24.

The disease was classified as seasonal, as it was always observed during the transitory seasons – spring and autumn, for the third time in farms 1 and 2 and for the second time in farms 3 and 4.

At farms 1 and 2 the dogs were reared outdoor in individual boxes (sheds with yards) with concrete floor, walls and roof covered with asbestos tiles (thermal conductivity coefficient $\lambda=5.24$ kJ/ m³.h.°C) without ceiling, facing south. No bedding materials were used, only wooden slats from processed wood ($\lambda = 0.34$ kJ/ m³.h.°C), placed on the box floors. The partitions between the boxes

were made by metal tubes. At present, this is still the most common technological solution for rearing of dogs in the world.

At farm No 3, dogs were also reared in double boxes with a common central corridor in an open premise, facing south, concrete boxes without ceiling, but only covered with waved asbestos tiles. The partitions were of metal tube elements, and the floor was bedded with bitumen-treated wooden shavings ($\lambda = 0.46 \text{ kJ/ m3.h.}^\circ\text{C}$).



Figure 1: Farm № 1 and 2.



Figure 2: Farm № 3

At farm No 4, the animals were reared in individual boxes, outdoor, but built from brick ($\lambda = 1.89 \text{ kJ/m3.h.}^\circ\text{C}$) floor, walls and roof without ceiling covered with brick tiles ($\lambda = 2.10 \text{ kJ/m3.h.}^\circ\text{C}$).

The partitions between the boxes were from masonry for the solid part ($h=100$ cm; $\lambda = 2.10$ kJ/m³.h.°C) and metal tube grid ($h=70$ cm). The floor was bedded with straw ($\lambda = 0.17$ kJ/m³.h.°C).

The area necessary for a German Shepherd dog was 3.5 m² for the shed and 6 m² for the walking yard.

At all farms, feed was offered manually, once daily, in inoxidable inox plates with rounded margins to preserve dogs from injury. Water was also offered in inoxidable inox plates with rounded margins, heavy enough to prevent their turning up and water spilling (farms 1, 2 and 3).

The results from ethological monitoring of dogs affected by rhinitis are described in Table 1.

Table 1: Characteristics of the behaviour of dogs affected by acute rhinitis

	Feeding	Drinking	Locomotion	Rest	Anxiety	Depression
1	0	3	1	3	3	3
2	0	3	1	3	3	3
3	1	3	1	3	2	3
4	0	3	0	3	2	3

Legend: 0 points – lack of behavioural activity; 1 point – weak behavioural activity; 2 points – intermediate behavioural activity; 3 – strong behavioural activity



Figure 3: Dog with acute form of rhinitis

Only at farm 3, which differed by its technological solution (double box, yard and central corridor), drinking was performed through one source of water per four boxes.

All four farms were located at appropriate places (4 to 8 km) from settlements, industrial enterprises, other farms, railroads and highways.

The location of premises was at sunny, dry places, protected from higher air movement velocities (more than 0.3 m/s).

Dogs were reared outdoor, i.e. their environment was characterized with uncontrolled microclimate.

All elements needed for rearing of dogs in kennels were available – a kitchen with refrigerators for storage of foods, warm water, quarantine room, hospital ward, storehouses, premise for the personnel. Only a maternity ward and a carcass collection site were not present.

The yards for walk of dogs at all farms were with areas between 50 and 65 m², with well-maintained grass, fenced and located at the lowest part of farms.

The cleaning of manure was done on a daily basis, manually, in the afternoon. Excreta were stored in cemented rectangular manure pits with a capacity of 1500 L faeces (for 20 dogs, according to farms' capacity).

All dogs were microchipped with the respective identification number.

Veterinary activities such as disinfection, disinsection, deratisation, vaccinations, and treatment against parasites) were duly realized as required.

Dead animals were transported to incinerators with a specialised vehicle. At farms, neither necropsy nor burying of dead bodies was practiced.

Discussion

The results of the study indicated that all four farms were consistent with veterinary hygienic requirements with respect to:

1. Location vs settlements, other farms, factories, enterprises;
2. Structure – all necessary premises for rearing working dogs in a kennel without breeding were available. That is why a maternity ward was lacking.;
3. Technological solutions (rearing systems) – at farms No 1, 2 and 4 the animals were housed according to the most commonly used technological solution used so far in almost all countries with developed cynology. Only farm No 3 was an exception, as an avant-garde, modern but still rarely encountered housing system was adopted here – a double box with common yard and central corridor. Previous studies of ours have shown that it is still hardly accepted by farms due to insufficient information about the ethological status of dogs. All pairs of digs were hierarchically compatible to avoid any behavioural pathology.

This is the most contemporary technological solution for rearing of dogs regardless of their breed, despite that the need for further research was mentioned.

4. Feeding and provision of water were compliant with veterinary hygiene standards;
5. There were no deviations in walking activity of dogs, as the construction of walking areas corresponded to veterinary norms. Everywhere, the covering was from grass, which is not erroneous but presumes the development and presence of parasites, insects, especially at higher air humidity. Therefore, seas sand or special tiles with low thermal conductivity coefficients are preferred for that purpose.
6. Microclimatic parameters did not show any deviations from the reference values.;
7. Prophylaxis was duly performed.
8. The hygiene, manure cleaning, disinfection, disinsection and deratisation were as per the veterinary norms.
9. The results from Table 1 show that feeding of dogs was most substantially affected. This is logical taking into consideration that anorexia, according to ethology science, is one of the first signs of developing pathology. Our results confirmed this statement beyond any doubt. A partial to almost entire loss of appetite was established. (0–1 points).

Water drinking remained unaffected (3 points);

The locomotion and rest of animals were also affected. They were almost immobile (0–1 points) and lied down most of the time (3 points);

All diseased dogs demonstrated high extent of anxiety and depression (2–3 points). This was normal having in mind the clinical picture of the disease. The general condition of animals was affected.

Therefore, in rhinitis, the most seriously affected behavioural changes were the appetite, locomotion (prolonged lying down), general condition (lethargy). Decreased appetite was attributed to the fact that dogs' olfaction is the most affected sense in dogs with rhinitis. The number of diseased animals suggested that the pathology was the most prevalent at farm No 2, followed by No 3, No 1 and No 4.

In general, rearing of working dogs was meeting the requirements of veterinary medical standards at all four farms. Nevertheless, as per the history of disease, the rhinitis appeared regularly following a seasonal pattern (spring, autumn, winter). The diagnosis was posed on the basis of the clear clinical signs only, without microbiological examinations.

This expectedly posed the question about the cause for the development of the stubborn pathology.

On the basis of the farm structure, we concluded that the highest prevalence of rhinitis was observed in dogs from farm No 2, which structure was proper, but all premises were built of concrete (a material with very high thermal conductivity coefficient, hard, uncomfortable and cold). There was not a solid partition between the boxes, allowing the contact between dogs and spread of the infection via the air-born route. A lower number of diseased dogs were present in farms No 1 and 3, whose structure was similar but the design – different. Farm No 1 consisted of individual boxes while farm No 3 has adopted the most contemporary dog rearing technology (double box, common yard and central corridor). Nevertheless, the prevalence of the disease at these two farms was almost the same (6 dogs at farm 1 and 7 dogs at farm 2). The results were rather unexpected due to the fact the second technological solution was affirmed as the best one for the moment, especially with respect to the better socialization of dogs but was obviously not the best with regard to more resistant immune system. That is why because despite the avant-garde design, premises were built again from materials with high thermal conductivity coefficient (concrete).

We have also identified other important factors, mostly as the appearance of infectious diseases (rhinitis) was regarded – this conditionally pathogenic disease appears only when the environmental conditions were not compliant to veterinary hygiene standards (Uzunova and Koleva, 2005).

Conclusion

Therefore, from etiological point of view, the quality of materials the premises were built of (especially their thermal conductivity coefficient) were more important than the adopted rearing technology. If building materials are not appropriate, additional materials decreasing the value of λ should be used. Another thing that is necessary is a solid (not only made of tubes) partition between the boxes in order to assure a smaller contact between the animals to reduce the risk of infection spread via the airborne route. This assumption is mostly valid for infections, cold-induced diseases spread via the airborne route. This originates from the clinical picture of the pathology (sneezing, cough, nasal discharge). The problem with non-infectious diseases is somewhat different, but in all instances, an integral application of modern technological solutions and advanced design of facilities using materials with adequate thermal conductivity properties (low thermal conductivity coefficient

λ) are necessary. Thus, the behaviour and immune system of dogs would be sustainable, satisfactory and without deviations. Every element of rearing environments influences the general conditions of animals, so if it is characterised with no deviations from the norm, the welfare of animals would be certainly guaranteed.

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