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Etiological analysis and therapeutic aspects of suppurative oral wounds of unknown causes in Labrador retriever dogs in the industrial regions of Odisha

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Abstract
Labrador Retriever Dogs (n=7) between 6 months to 1 year from the industrial areas of Angul, Jharsuguda, Rourkela and other parts of western Odisha were taken into study. Vital parameters of the animals were recorded to analyse the current health status of the dogs. The prevalence of the symptoms is most predominant in the winter season when the mercury drops to 4-9 ºC. All of them showed the clinical signs of itching, alopecia, redness in the oral region and around the nose. There was swelling and inflammation in the affected part. The inflammation lesions further aggravated into punctured wound with secretion of fowl smelling pus. The animals were first treated with general antibiotics like Cefedoxime syrup and Meloxicam to control inflammation due to unknown bacterial infection. Animals were then subjected to Hematological tests, Serum biochemical analysis (Lactic Dehydrogenase, Aspartate Aminotransferase, Alkaline Phosphatase). Pus was collected from the punctured wound and was subjected to Antibiotic Sensitivity Test. Pus samples were also sent for bacterial cultures revealed that gram positive Staphylococcus aureus and gram negative Escherichia coli being the causative agents. Skin scrapings were also collected from the adjoining parts and were sent for Skin Scrapping test showed negative results towards possible Demodex infestation. Hematological and serum biochemical analysis of the Healthy Labrador Retriever dogs (n=7) of the same age group and regions which were presented for routine health check up were carried out for control values.

Keywords: Diagnosis, etiology, Labrador, oral wounds, treatment

Introduction
Industrial pollution is one of the significant threats to the animal health. Industrial effluents deteriorate the environment up to such extent that it harbors growth and proliferation of various opportunistic bacteria like Staphylococcus and Escherichia etc. These species of bacteria on access to open skin wounds rapidly infect and causes pus formation with necrosis of the tissue. This study was carried out in the industrial regions of the western Odisha viz. Anugul, Jharshguda, Rourkela and parts of Sambalpur. Rapid industrialization in these regions has lead to the contamination of the soil and water with harmful bacteria. A detailed knowledge about the causative agent, mode of transmission and the pathogenesis of the disease causing agent is essential to arrive at an efficient treatment protocol for the disease. The development of new diagnostic aids and tools has contributed to the proper isolation and identification of the pathogens. The study was carried to investigate the cause of the oral suppurative wounds in the Labrador Retriever dogs in these areas. The clinical signs are studied extensively to design an effective treatment protocol.

Materials and Methods
Labrador Retriever Dogs (n=7) between 6 months to 2 years from the industrial areas of Angul, Rourkela, Sambalpur and Jharsuguda of western Odisha were taken into study. Vital parameters of the animals were recorded to analyze the current health status of the dogs. Animals were then subjected to Hematological tests (Complete Blood Count) and serum biochemical analysis (LDH, ALT, ALP) using modified IFCC methods. Pus collected from the punctured wound and was subjected to Antibiotic Sensitivity Test.

Pus samples were also sent for bacterial cultures to identify the infectious bacterial agent. Skin scrapings were also collected from the adjoining parts and were sent for Skin Scrapping test for detection of presence of Demodex infection. The animals were administered with the susceptible antibiotic as the drug of choice. The wounds were washed with Chlorhexidine. Necrotic tissue over the punctured wounds was removed carefully with maintaining proper aseptic conditions.

Fig 1: Progress of the disease from simple alopecia to suppurative wound.

Fig 2: Dogs after recovery.

Results and Discussion

Identification of the etiological agent:

Hematological analysis: The average values of various hematological parameters (Haemoglobin %, Total Leucocyte Count, Differential Count) of affected and healthy animals are presented in Table 1. These values conclude that the affected animals have significantly lower values of haemoglobin concentration, significantly higher Total leucocyte Count and higher percentage of Neutrophils as compared to their healthy counterparts. The lower Hemoglobin concentration may be due to lack of essential nutrients for hemoglobin synthesis like Vitamin B12, Folic Acid and minerals like iron, copper, cobalt due to less feed intake [1]. Pain in the affected oral parts hinders food intake in the affected dogs. Significantly higher total leucocyte count in the affected dogs is suggestive of infection [2]. However, neutropenia is the indication of complicated skin and soft tissue infection [3]. The affected animals also recorded negative for *Dirofilaria immitis* larvae. These rules out the probability of any blood parasites.

Biochemical serum analysis: The average values of the biochemical serum levels of Lactic Dehydrogenase (LDH), Aspartate Aminotransferase (AST), Alkaline Phosphatase (ALP) of affected and healthy dogs is presented in Table 2. In industrial regions the possibility of metallic and non-metallic elements and chemical toxicity can never be ruled out [4]. There are reports of toxicity in dogs various industrial regions [5, 6]. Liver is the primary detoxifying organ of the body. The level of toxicity in the animal's body can be diagnosed through hepatic function. Lactic Dehydrogenase, Aspartate Aminotransferase, Alkaline Phosphatase are the markers of hepatic damage in canines [7]. Thus the serum analysis concludes that there is non- significant increase in the levels of LDH and AST, while there is significant decrease in the levels Alkaline Phosphatase in the affected dogs as compared to their healthy counterparts. The mixed results in the serum biochemical values are suggestive that there is minimal influence of the industrial environment in the etiology of the lesions.

Skin Scrapping Tests: Skin scrapings taken from every animal were digested with potassium hydroxide (10% KOH) and seen in microscope for probable external parasite infestation. However, tests from the affected dogs showed negative for any external parasitic infestation and mite infestation. This result inferred that the causative agent may be of bacterial or viral origin.

Antibiotic Sensitivity Test: Pus sampled collected from each animal were subjected to Antibiotic Sensitivity Test. Antibiotic Sensitivity Test is a qualitative test which gives a clear cut list of antibiotics which are sensitive and resistance to the bacteria. The list of sensitive and resistant antibiotic in the all the affected dogs are listed in Table 3. The test suggest that the bacteria is sensitive to Amoxicillin + clavulanate, cefopodoxime, Lincomycin and Linozelide while semi-resistant to Cefotaxime, Gentamicin, Ceftriaxone with Tazobactam and resistant to Roxythromycin, Azithromycin, Amikacin and Cefexime. Antibiotic Sensitivity Test plate representation from an affected dog is shown in figure 3.

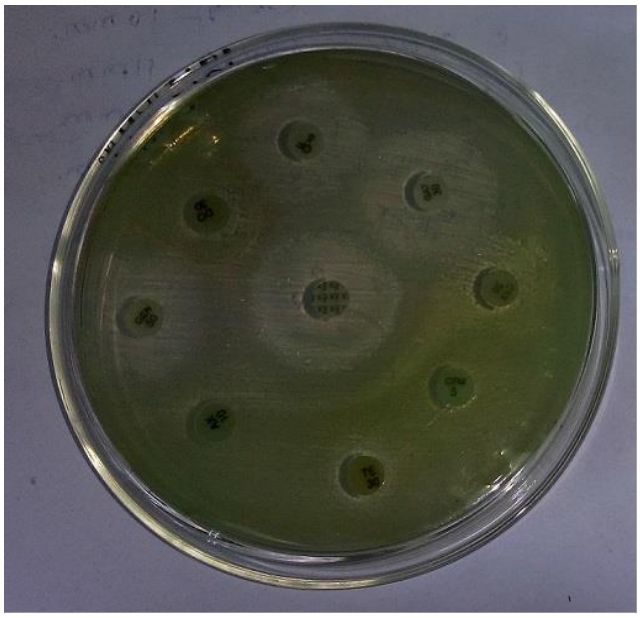

Fig 3: Antibiotic Sensitivity Test for affected animal number 4 showing sensitive for Amoxicilin + clavulanate, Linozelide, Cefalexin. Semi-resistant for Cefopodoxime, Cefexime and resistant for Enrofloxacin, Azithromycin, Doxycycline

Bacterial Culture: Pus samples collected from each affected animal was sent for bacterial culture and the bacterial causative agent was found out to be gram positive *Staphylococcus aureus* in five out of seven affected animals. Gram positive Staphylococcus and gram negative *Escherchia coli* were found to be the causative agent in two out of seven cases. Staphylococcus is an opportunistic bacteria that readily invade when fresh wound comes in contact with the soil.

Environmental considerations: Environmental considerations should also be taken into account while evaluating the etiological factors of a disease condition [8]. Environmental factors such as season/ time of the year, temperature, humidity, duration of sunshine, rainfall are also reported to be etiological factors causing diseases. Here the current reports suggest that the animals with such type of lesions are predominantly affected in winter season in months of late December to whole of January when the mercury drops to 4-9^{o}C and less.

Progress of infection

Taking all the diagnostic methods into considerations and the results obtained, very cold temperature causing frost bite is the cause of the oral lesions in these affected Labrador Retriever dogs. Severe frost bite results in inflammation. Rubbing of the inflamed oral mucosa with the rough surfaces often results in sloughing off and wounds. The fresh wounds become an entry site for the opportunistic bacteria like Staphylococcus who enter and proliferate. Proliferation of bacteria in the oral mucosa spreads the infection to nearby normal tissues. This reaches up to the level of nose when untreated. Staphylococcus is the major cause of wound suppuration [9]. In the course of infection the wounds become suppurative resulting in the formation of pus like fluid giving foul odour. Necrosis of tissues was also seen in the affected areas

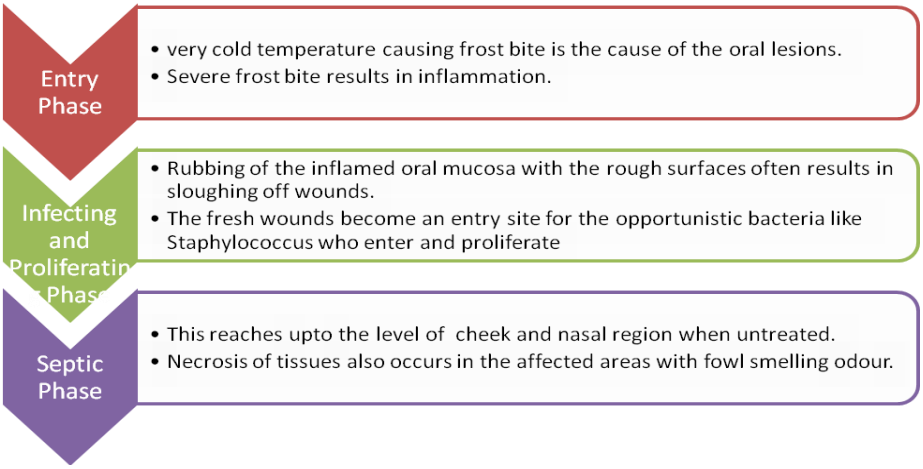

Fig 4: Progress of disease in a nutshell.

Table 1: Hematological parameters of affected dogs in comparison to normal dogs.

Animal No.	Hemoglobin (g %)	Total Leucocyte Count (per µL)	Neutrophils	Lymphocyte	Eosinophils	Monocyte	Basophils
1	8.4	22350	68	22	4	6	0
2	9.2	20600	70	19	4	7	0
3	9.8	19750	72	17	3	8	0
4	10.2	21450	75	20	1	4	0
5	9.0	22900	69	23	3	4	1
6	9.6	24250	71	20	3	6	0
7	10.4	18900	67	25	2	5	1
Normal	11.2	13950	64	24	4	8	0

Table 2: Biochemical serum enzyme analysis of affected dogs in comparison to normal dogs

Animal No.	LDH	AST	ALP
1	156.89	42.59	178.85
2	124.26	35.51	196.63
3	188.24	38.65	180.42
4	136.54	41.23	152.56
5	220.64	50.14	201.01
6	196.23	48.52	163.89
7	188.89	37.6	158.21
Normal	110.56	32.48	135.21

Lactic Dehydrogenase (LDH), Aspartate aminotransferase (AST), Alkaline Phosphatase (ALP)

Table 3: Sensitivity towards different antibiotics as seen in Antibiotic Sensitivity Test.

Animal No.	Sensitive	Semi-resistant	Resistant
1	Amoxicilin + clavulanate, cefopodoxime	Cefexime, Ceftriaxone + Tazobactam	Enrofloxacin, Gentamicin, Amikacin
2	Amoxicilin + clavulanate, Cephalexin	Ceftriaxone + Tazobactam, Amikacin	Gentamicin, Cefotaxim
3	Amoxicilin + clavulanate, Cefipime	Cefexime, Enrofloxacin, Amikacin	Gentamicin, Azithromycin, Erythromycin
4	Amoxicilin + clavulanate, Linozelide, Cefalexin	Cefopodoxime, Cefexime	Enrofloxacin, Azithromycin, Doxycycline
5	Amoxicilin + clavulanate, Lincomycin	Ceftriaxone + tazobactam, Cefopodoxime, Cefexime	Azithromycin, Roxythromycin, Gentamicin
6	Cefalexin, Lincomycin	Cefotaxime, Cefopodoxime, Azithromycin	Cefepime, Roxythromycin, Cephalexin
7	Cephalexin, Linozelide	Enrofloxacin, Cefexime	Gentamicin, Amikacin

Therapeutic measures: The animals were administered with the susceptible antibiotic as the drug of choice. The wounds were washed with Chlorhexidine (0.2 %). Necrotic tissue over the punctured wounds was removed carefully with maintaining proper aseptic conditions. Chloramphenicol powder (500 mg) was mixed with 2.5ml of Glycerol to form a paste. The paste was applied over the lesion to act as local antibiotic. Clove oil applied tropically to prevent foul smell from the wounds. Animals were then monitored twice in a week along with the hematological and biochemical tests done to check the progress in the treatment. Ivermectin was injected to the dogs subcutaneously @ 200 microgram per kg body weight as a onetime therapy for suspected demodex infestation when the dogs were presented first time for the treatment.

Supportive fluid therapy was administered to the dogs as most of them were unable to take food orally due pain the affected area. Nurtient supplements such as Vitamin B-C complex syrup @ 2.5-5ml depending upon the body weight, mineral supplements to cope up with body requirements and improve hemoglobin concentration in blood. Cod Liver Oil tablets @ 1 tab per day for a week were supplemented to boost immunity.

The animals took on an average of two months for complete recovery. The photos of recovered animals were shown in figure 2.

Conclusion

The disease causing agents are multifactoral. A number of etiological agents must be taken into consideration while evaluating the cause of a disease condition. The study carried out to investigate the cause of oral suppurative wounds in Labrador dogs used various diagnostic aids to decipher the cause of the disease. It is concluded that the role of adverse climatic condition should not be ruled out while evaluating the probable disease causing agents.

References

1. Swanson KS, Kuzmuk KN, Schook LB, Fahey Jr. GC. Diet affects nutrient digestibility, hematology, and serum chemistry of senior and weanling dogs. Journal of Animal Science. 2004; 82:1713-1724.
2. Dash S, Jyotiranjan T, Das LP, Sahoo R, Mohapatra S, Das M. Management of demodicosis (*Demodex canis*) associated with secondary bacterial infections in Dog. The Pharma Innovation Journal. 2017; 6(9):372-375.
3. Dryden MS. Complicated skin and soft tissue infection. Antimicrob Chemother. 2010; 65(3):35–44.
4. Tchounwou PB, Yedjou CG, Patlolla AK, Sutton DJ. Heavy Metals Toxicity and the Environment. *EXS*. 2012; 101:133-164. doi:10.1007/978-3-7643-8340-4_6.
5. Harris WR, Silberman D. Leaching of metal ions from fly ash by canine serum. Environmental Science and Technology. 1988; 22:109-112.
6. Xavier FG, Kogika MM, Spinosa H deS. Common causes of poisoning in dogs and cats in a Brazilian veterinary teaching hospital from 1998 to 2000. Veterinary and Human Toxicology. 2002; 44(2):115-116.
7. Center SA. Interpretation of Liver Enzymes. Vet Clin Small Anim. 2007; 37:297-333.
8. Rappaport SM, Smith MT. Environment and Disease Risks. Science. 2010; 330(6003):460-461. doi:10.1126/science.1192603.
9. Archer GL. *Staphylococcus aureus:* A Well-Armed Pathogen. Clinical Infectious Diseases. 1998; 26:1179-81.