

BACTERIAL PATHOGENS DETECTED AMONG DOMESTIC ANIMALS IN LUDHIANA AND THEIR RESISTANCE TO VARIOUS ANTIBIOTICS.

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ABSTRACT

A total of 611 clinical samples from various species of domestic animals were analyzed for the presence of pathogenic bacteria and their sensitivity to common antibiotics. *Staphylococci* and *E. coli* were found to be the most common pathogens in these samples. *E. coli* from most of the species were resistant to Penicillin and Enrofloxacin while *Staphylococci* from cows were found to be resistant to Ampicillin.

KEYWORDS: *Staphylococci*, *E. coli*, *Bacillus*, Antibiotics, Resistance, Sensitivity.

INTRODUCTION

A large number of antibiotics are commonly used in domestic animals as well as in humans for therapy and control of bacterial infections. The ever increasing bacterial resistance to various antibiotics is a major problem in the control of bacterial infections among animals. The prevalence and degree of bacterial resistance to antimicrobials in Veterinary medicine is increasing worldwide at a very fast pace. Indiscriminate use of antibiotics is considered the most important factor promoting the emergence and dissemination of antibiotic resistant microorganisms in Veterinary practice. There are many reports of evolving drug resistance in bacteria due to the excessive use of antibiotics (John et al., 1997). Furthermore, animals and their products are very important sources of resistant bacteria for the human population (Feinman, 1998; Levy, 1998). Studies on the sensitivity of bacteria to various antibiotics help in prescribing the most effective antibiotics for treating bacterial infections. Therefore, the present study was undertaken for the detection of bacterial pathogens among domestic animals and to study the pattern of their resistance to various antibiotics.

MATERIALS AND METHODS

A total of 611 clinical samples from various domestic animal species (Dogs-282, Cows-153, Buffaloes-124, Horses-38 and Poultry-14.) from Ludhiana and nearby areas collected during the period from January 2009 to June 2010 were subjected to microbiological investigations. The samples included milk, vaginal discharge, uterine discharge, nasal swabs, blood, abscess, pus, urine and feces. Samples were processed using standard protocols for identification of bacteria (Quinn et al., 2002). Antibiotic sensitivity test using disc diffusion method was carried out as per Bauer et al. (1966).

RESULTS AND DISCUSSION

The samples presented the following scenario of prevalence of bacterial infections. Among the 124 samples from buffaloes, 27 samples were found to be positive for pathogenic bacteria. Majority were *Staphylococci* (7) and *E. coli* (7) followed by *Bacillus* (5), *Arcanobacterium pyogenes* (2), *Gram negative rods* (2), *Klebsiella* (1), *Citrobacter* (1), *Pseudomonas* (1) and mixed infection (1). Majority of *E. coli* isolated from buffaloes (66.7%; n = 6) were found to be resistant to Penicillin. However, in another study, Paul et al. (2010) found that *E. coli* isolated from buffaloes were resistant to

Nalidixic acid and Erythromycin. In our study, most of the *Staphylococci* isolated from buffaloes (71.42%; n = 7) were found to be sensitive to Ceftriaxone. On the contrary, Sharma et al. (2007) found that maximum number of isolates (27.27%) of *Staphylococci* from buffaloes suffering from subclinical mastitis were sensitive to Cefotaxime and most were resistant to Ampicillin.

Among the 153 samples from cows, 37 samples were found to be positive for pathogenic bacteria. These included *Staphylococci* (13) and *E. coli* (10) followed by *Bacillus* (3), *Klebsiella* (2), *Proteus* (2), *Corynebacterium* (1), *Pseudomonas* (1), *Gram negative rods* (1) and mixed infection (4). *E. coli* isolated from all the samples from cows (100%; n = 7) were found to be sensitive to Gentamicin. *Staphylococci* isolated from cows (100%; n = 6) were found to be resistant to Ampicillin. Kumar et al. (2011) isolated 107 Methicillin resistant strains of *S. aureus* from milk samples of 195 infected udders of Sahiwal cattle and found that Methicillin resistant strains were also resistant to Streptomycin (36.4%), Oxytetracycline, 33.6% Gentamicin 29.9% and 26.2% each to Chloramphenicol, Pristinomycin and Ciprofloxacin. Upadhyay and Kataria (2009) observed antibiogram against 30 *S. aureus* isolates from cattle and goats and revealed that Azithromycin was the most effective antibiotic against all the isolates from both the species and the highest resistance (100%) was shown towards Cefixime followed by ampicillin (96%), Cloxacillin (80%), Azlocillin (50%) and Vancomycin (40%).

Out of the 282 clinical samples from dogs, 124 were found to be positive for pathogenic bacteria. These included *Staphylococci* (46), *E. coli* (32), *Bacillus* (16), *Gram negative rods* (8), *Pseudomonas* (7), *Corynebacterium* (4), *Arcanobacterium pyogenes* (3), *Streptococcus* (3), *Klebsiella* (2), *Citrobacter* (1), *Gram positive coccobacilli* (1) and mixed infection (2), respectively. *E. coli* isolated from all the canine cases were found to be resistant to Penicillin (100%; n = 17) and sensitive to Gentamicin (100%; n = 19) whereas *Staphylococci* isolated from the canine samples (100%; n = 20) were found to be sensitive to Gentamicin. *E. coli* isolated from the canine cases were found to be sensitive to Gentamicin (100%; n = 19), Amikacin (n = 13) and Neomycin (n = 10). *Pseudomonas* (66.7%) were resistant to Amoxicillin (n = 9) and Erythromycin (n = 6) and *Bacillus* (75%; n = 8) to Neomycin.

Among the 38 samples from horses, 26 were found to be positive for pathogenic bacteria. These included *Staphylococcus* (11) and *E. coli* (5) followed by *Pseudomonas* (1), *Proteus* (1), *R. equi* (1), *Shigella* (1), *Gram positive coccobacilli* (1), *Gram negative rods* (1) and mixed infection (4). All the *Staphylococci* isolated from horses (100%; n = 6) were found to be sensitive to Amikacin. Zunita et al. (2008) showed that all *Staphylococci* isolated from horses were susceptible to Chloramphenicol and Gentamicin. Mamman et al (2011) reported that Gentamicin, Amoxicillin and Ciprofloxacin were found to be the most effective antibiotics against *Staphylococci* isolated from the cases of ulcerative lymphangitis in horses.

In the present study, all the 14 samples from poultry were found to be positive for pathogenic bacteria. These included *E. coli* (8), *Staphylococcus* (7), mixed infection (4) and *Gram negative rods* (2). *E. coli* from half of the samples (50%; n = 7) from poultry were found to be resistant to Enrofloxacin. *E. coli* from majority of the samples (75%; n = 8) from poultry were found to be sensitive to Gentamicin. Sharada et al. (2010) isolated *E. coli* from moribund poultry birds with different pathological conditions and reported that their antibiogram profiles indicated maximum resistance to Nitrofurazone followed by Tetracycline and Cotrimoxazole and high sensitivity to Ciprofloxacin, Enrofloxacin, Chloramphenicol, Pefloxacin and Norfloxacin.

In the present study, the high levels of antibiotic resistance displayed by *E. coli* and *Staphylococci* isolated from the clinical cases emphasizes the need for bacterial culture with species identification and testing of susceptibility of the organisms to the available antibiotics in order to choose the most effective antimicrobial agents. Unscrupulous use of antibiotics to fight infection has resulted in the emergence of a large number of drug resistant organisms posing problems to the control of these

infections. Special emphasis needs to be given for judicious selection of antibiotics, preferably after antibiotic testing and judicious use of such antibiotics at an optimum dose for sufficient duration to ensure effective control of various diseases caused by these bacteria in the domestic animals.

CONCLUSION :

Staphylococci and *E. coli* were found to be the most prevalent bacteria among different species of domestic animals in this region. *E. coli* from majority of the species were found to be resistant to Penicillin and Enrofloxacin and sensitive to Gentamicin, Amikacin and Neomycin. *Staphylococci* from cows were found to be resistant to Ampicillin but sensitive to Ceftriaxone, Gentamicin and Amikacin in several species. High levels of antibiotic resistance displayed by *E. coli* and *Staphylococci* isolated from the clinical cases emphasizes the need for bacterial culture with species identification and testing of susceptibility of various organisms to the antimicrobials in order to choose the most appropriate antimicrobial agents. The antibiotics chosen should be specific and as per the results of bacterial sensitivity tests.

REFERENCES

1. Bauer A W, Sherris W M M, Turch J C and Kirby M (1966) Antibiotic susceptibility testing by standardized single disc method. *Am J Clin Path* **45**: 493-496.
2. Feinman S E (1998) Antibiotics in animal feed- drug resistance revisited. *ASM news* **64**:24-30.
3. John M E, Peters E, Weeraink A M, Fruit A and Verhoef J (1997) Wide spread occurrence of integrons causing multiple antibiotic resistance in bacteria. *Lancet* **349**: 1742-1743.
4. Kumar R, Yadav B R and Singh R S (2011) Antibiotic resistance and pathogenicity factors in *Staphylococcus aureus* isolated from mastitic cattle. *J. Biosci.* **36**: XXX-XXX.
5. Levy S B (1998) The challenge of Antibiotic resistance. *Sci. Am* **275**:46-53.
6. Mamman P H, Mshelia W P and Fadimu I E (2011) Antimicrobial susceptibility of aerobic bacteria and fungi isolated from cases of equine ulcerative lymphangitis in Kana metropolis, Nigeria. *Asian J. Anim. Sci.* **5**: 175-182.
7. Paul S K, Khan M S R, Rashid M A, Hassan J S and Mahmud M S (2010) Isolation and characterization of *Escherichia coli* from buffalo calves in some selected areas of Bangladesh. *Bangl J Vet Med* **8**(1): 23-26.
8. Quinn P J, Markey B K, Markey M E, Carter M E, Donnelly W J C and Leonard F C (2002) *Veterinary Microbiology and Microbial Disease*. Blackwell Science Ltd., Oxford.
9. Sharada R, Wilfred R S and Thiyageeswaran M (2010) Isolation, characterization and antibiotic resistance pattern of *E. coli* isolated from poultry. *American - Eurasian Journal of Scientific Research* **5**(1): 18-225.
10. Sharma N, Maiti S K and Sharma K.K. (2007) Prevalence, etiology and antibiogram of microorganisms associated with subclinical mastitis in Durg, Chhattisgarh State (India). *Int J Dairy Sci* **2**(2): 145-151.
11. Upadhyay A and Kataria A K (2009) Antibiogram of *Staphylococcus aureus* isolates obtained from clinically mastitic cattle and goats. *Vet. Practitioner* **10**(2): 145-147.
12. Zunita Z, Bashir A and Hafizal A (2008) Occurrence of multidrug resistant *Staphylococcus aureus* in horses in Malaysia. *Vet World* **1**(6): 165-67.

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