In Vitro Susceptibility Test of Ciprofloxacin on Different Clinical Isolates

Nwiyi Paul[1*], I. J. Ogbonna[2], Osagie Joseph[3]

[1]Department of Veterinary Microbiology and Parasitology, College of Veterinary Medicine
Michael Okpara University of Agriculture
Umudike, Aba State, Nigeria

[2] Department of Veterinary Microbiology and Parasitology, College of Veterinary Medicine
Michael Okpara University of Agriculture
Umudike, Aba State, Nigeria

[3]Lahore Medical Research and Diagnostic Laboratories
Benin-City, Edo State, Nigeria

[*]*Corresponding author's email: afodiokechukwu [AT] yahoo.com*

ABSTRACT---- ***Ciprofloxacin is a quinolone indicated for the treatment of gram positive and gram negative bacterial infections in animals. The study was aimed at evaluating the susceptibility pattern of six different bacteria isolates. The bacteria isolates were Staphylococcus spp., E coli, Pseudomonas spp, Klebsiella spp, Salmonella pullorum and Salmonella gallinarum. The bacteria used for the study were isolated from different animals including chicken. 10% of the total livestock in the farm was used as sample size. The study was skewed towards veterinary science because of the relevance of livestock in the study area. Disc diffusion method was employed and the interpretation of the result was in line with National committee of clinical Laboratory standards. (NCCLS).The rational for using 5 brands of ciprofloxacin was based on the complaint by many farmers on the performance level of some ciprofloxacin at the expense of others. The brands of ciprofloxacin designated as A, B, C, D, and E was obtained from Ariaria International market Aba, Abia State Nigeria. The result of the study showed that brand A and D had 100% effectively, while brand E had 60% affectivity. Staphylococcus spp was 100% susceptible to all the brands of ciprofloxacin followed by E. coli 96.4%, Pseudomanas spp 93.6%. klebsiella spp 90.2%, Salmonella pullorum and Salmonella gallinarum had 88.4% susceptibility for ciprofloxacin. The study showed that there was a significance difference (P<0.05) between brand A compare to all other brands.***

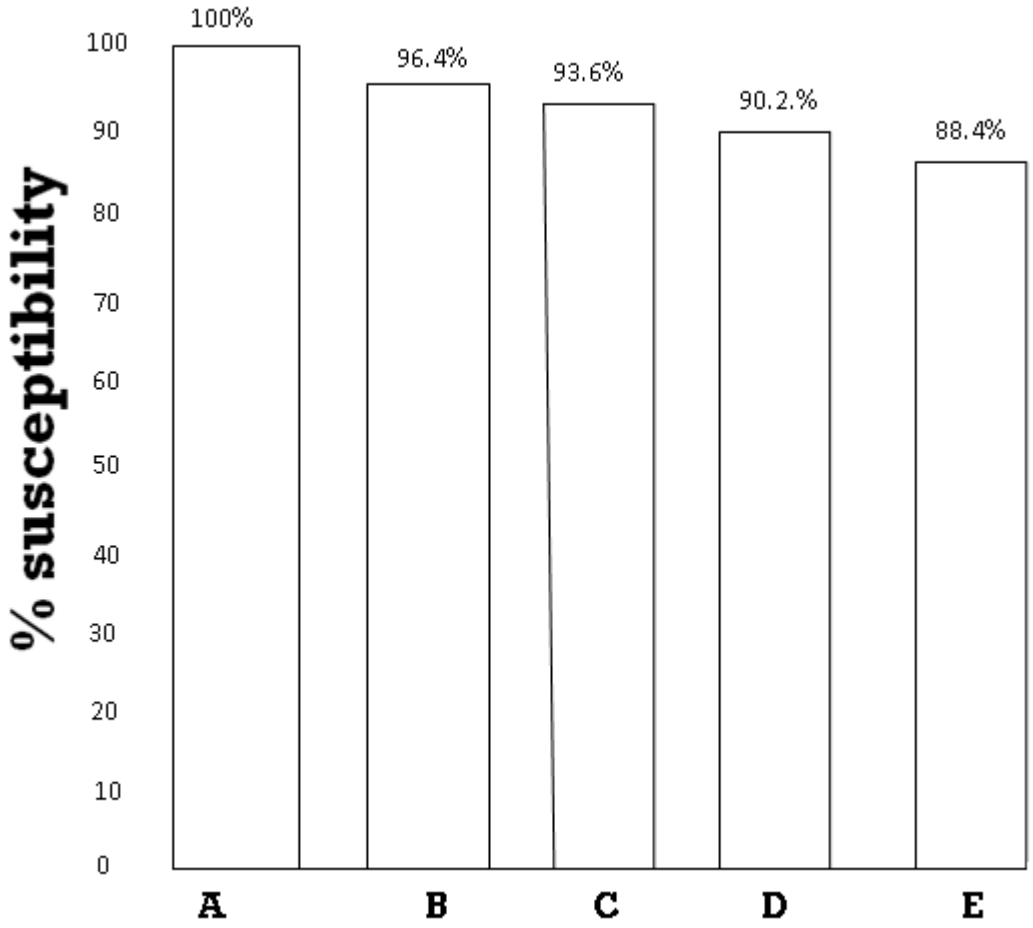
1. INTRODUCTION

The antibiotic ciprofloxacin is classified as a quinolon drug which has broad spectrum of activity (1). It has been known to have a bactericidal effect against gram positive and gram negative bacterial organisms. The activity of ciprofloxacin is consistent with beta-lactamases (2). Besides that, ciprofloxacin is very effective against the family enterobactericeae, it also posses high potency against gram positive cocci (3).The emergency of antibiotic being resistant to microorganism is an indication that the effectiveness of antibiotic have been abused/compromised (4). Though the need for new antibiotic agents or drugs is very high, the rate of drug development has seriously declined (5). A major health problem associated with the world and affecting every country to some extent is antimicrobial resistance. Use of ciprofloxacin has been on the increase for most gram positive and gram negative infection types (6-7). The consequences of excessive use of antimicrobial agents are microbial multi drug resistance (8). The susceptibility of a drug is an indication of the choice of antibiotic for eliminating microorganisms which could be gram positive or gram negative. The emerging antimicrobial resistance among bacteria may lead to possible antimicrobial failure therapeutically (9-10). Ciprofloxacin is a third generation drug of immense effectively used in arresting critical situation involving farm animals harbouring enteric infection and other bacteria. The rise in resistant organisms stresses the increasing importance of the need to continuous survey of antibiotics usage (11). Ciprofloxacin had been introduced as the first line of treatment in *Salmonella* Infection. However, there has been decrease susceptibility to ciprofloxacin causing treatment failure in the Indian subcontinent (12-14). The treatment of ciprofloxacin resistant enteric disease had now been narrowed down to third and fourth generation cephalosporins, azithromycin and tigelycline (15-16). This study was aimed at evaluating the susceptibility profile of ciprofloxacin to different gram negative and gram positive bacteria (*Staphylococcus spp, E. Coli, Pseudomonas spp, klebsiella spp, Salmonella pullorum a*nd *Salmonella gallnaruim).*

2. MATERIALS AND METHODS

One hundred and twenty clinical isolates were obtained from different animals and chicken. The organisms were isolated from three different animal types: chicken, cattle and fish. The Salmonella biovars were isolated from chickens, while the *E.coli* was isolated from cattle. *Pseudomonas spp* and *Klebsiella spp* were isolated from fish. Twenty isolates of each organism were used. For the chicken, isolates were obtained from processed faecal samples, and for the cattle, Staphylococcus organism were isolated from the mammary gland of cattle while for *Klebsiella spp* and *Pseudomonas spp* isolates were obtained from the surface of fish and its gill. Isolates of all the species were tested against each of the five brands of ciprofloxacin using in vitro sensitivity test by disc diffusion method (Kirby – White, 1966) and National Committee of Clinical Laboratory Standard (NCCLS) was used for interpretation of susceptibility. One to two colonies of each isolate was spread in a nutrient media and the plates allowed to dry within few minutes, then, the antibiotic disc was placed on it and incubated at 37^{O}C for 24hrs.The zone of inhibition for susceptibility was determined at ≥ 21mm, moderately susceptible at 20 – 14mm and isolates that were resistant to antibacterial drug showed zone of inhibition at < 13mm.

3. RESULTS AND DISCUSSION



Different brands of ciprofloxacin
Fig 1: shows susceptibility of different bacteria towards ciprofloxacin

TABLE 1: Susceptibility Pattern of Ciprofloxacin to Different Bacteria Isolates.

	Brands of Ciprofloxacin				
Names of organisms	A	B	C	D	E
Staphylococcus spp	+	+	+	+	+
E. coli	+	+	+	+	+/-
Pseudomonas spp	+	+	+/-	+	+/-
Klebsiella spp	+	+	+	+	-
Salmonella gallinarum	+	+/-	+/-	+	+/-
Salmonella pullorum	+	+/-	+/-	+	+/-

The result obtained showed that ciprofloxacin was most effective (100%) against *Staphylococcus spp*. It was observed that all the isolates exhibited varying degree of sensitivity to ciprofloxacin. *Staphylococcus spp* was closely followed by *E. Coli* which presented (96.4%), *pseudomonas spp* (93.6%), *klebsiella spp* (90.2%), while *Salmonella pullorum* and *Salmonella gallinarum* show susceptibility of (88.4%) among the test organisms. The in vitro study of ciprofloxacin shows that the drug is effective against all these bacterial as they revealed various degree of susceptibility to ciprofloxacin and this is in agreement with earlier study carried out in Karachi, Pakistan in 2001, which found that 92% strains of *Staphylococcus aureus* was inhibited by ciprofloxacin and still the most active B-lactamase agent against *Staphylococcus aureus*. (17). The study also shows that ciprofloxacin is highly effective against *Eshericha coli* and is safe to be used against infection caused by *E. coli.* The study also showed 93.6% of the organisms to be susceptible to third generation cephalosporins which highlights the significance of the antibacterial agent in infections caused by *Pseudomonas spp.* From the study, *Klebsiella spp* was less susceptible to ciprofloxacin than *E. coli*, even though 90.2% of the isolates were susceptible. *E.coli* and *Klebsiella spp* have been implicated in urinary tract infections for animals just as *Psuedomonas spp* and *Salmonella spp* have been responsible for food poisoning and food spoilage (18). The result obtain here was similar to the findings (19).The study shows that *Salmonella pullorum* and *Salmonella gallinarum* were sensitive with susceptibility at 88.4% for both organisms to ciprofloxacin indicating a resistance of 12.6%. This finding is in agreement with the finding (18). The study shows that all five different brands of ciprofloxacin were effective for the treatment of infections caused by *Staphylococcus spp, E. coli, Pseudomonas spp, Klebsiella spp, Salmonella pullorum* and *Salmonella gallinarum*. All the brands of ciprofloxacin used presented Mean Inhibitory Concentration (MIC) range of 18-38mm. This finding is in agreement with previous study (20).

4. CONCLUSION

The five brands of ciprofloxacin were susceptible to the six different bacteria isolates. Staphylococcus spp exhibited 100% susceptibility to ciprofloxacin. The extensive use of B-lactarn antibiotics in animals has resulted in pressure in bacteria to evolve towards resistance hence prescription of ciprofloxacin should be with caution so that the antibiotics resistance could be avoided.

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