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Surveilience of Antibiogram and Percent Antibiotic Resistance for Infectious Omphalitis in Different Poultry Housing Areas in Punjab and D. I. Khan

Zahid Munir, C.S. Hayat, Alam Zeb, M. Akram Muneer[1] and Inam-ul-Haq
Gomal College of Veterinary Sciences, D.I.Khan - Pakistan
[1]University of Veterinary and Animal Sciences, Lahore - Pakistan

Abstract

150 cases of yolk retention, septic yolk and omphalitis selected from different poultry housing areas of Lahore, Gujranwala, Muridke, Kasure, Raiwind and D. I. Khan were subjected to bacterial culture, seroscreening and sensitivity testing. *E. coli, Staphylococcus aureus, Aspergillus fumigatus*, Salmonella, *Pasturella multocida* were isolated in 85%, 47%, 21%,17%,13% cases respectively. 13% cases were seropositive for *Mycoplasma gallisepticum*, 8% were for *Mycoplasma synoviae* and 11% for *Salmonella pullorum*. Antibiogram-resistance surveillance (calculated on %age basis for 25 cases with 5 replicates per area) indicates that Oxytetracycline was resistant in 17% cases in Lahore, 14% cases in Gujranwala, 7% cases in Kasure, 10% cases in Muridke, 8% cases in Raiwind and 12% cases in D. I. Khan. Neomycin was resistant in 14% cases in Lahore, 7% cases in Gujranwala, 4% cases in Kasure, 8% cases in Muridke, 9% cases in Raiwind and 8% cases in D. I. Khan. Furazolidon was resistant in 22% cases in Lahore, 42% cases in Gujranwala, 15% cases in Kasure, 10% cases in Muridke, 10% cases in Raiwind and 17% cases in D. I. Khan. Ceftiofur sodium was resistant in 5% cases in Lahore, 3% cases in Gujranwala, 7% cases in Kasure, 1% cases in Muridke, 4% cases in Raiwind and 0% cases in D. I. Khan. Norfloxacin was resistant in 15% cases in Lahore, 21% cases in Gujranwala, 7% cases in Kasure, 13% cases in Muridke, 7% cases in Raiwind and 9% cases in D. I. Khan. Enrofloxacin was resistant in 12% cases in Lahore, 6% cases in Gujranwala, 4% cases in Kasure, 4% cases in Muridke, 11% cases in Raiwind and 0% cases in D. I. Khan.

Key words: Antibiogram, Antibiotic Resistance, Infectious omphalitis, Poultry housing, Punjab

Corresponding author: Zahid Munir,
Gomal College of Veterinary Sciences,
D .I. Khan - Pakistan

Introduction

Infectious omphalitis is one of the major causes of early chick mortality in broiler, layer and breeder flocks (Anonymous, 2000; Anjum, 1997; Singh, 1993 and Jorden, 1990). Causes of omphalitis are observed more often in flocks housed in winter. The incidence of omphalitis recorded during the year 2001 -2002 varied between 5- 10 % in chicks aging day 1-5 (Bhattacharjee, 1996) the syndrome was observed as cause if mortality upto 3-4 weeks of age (Ghodasara, 1992) the most frequently isolated bacteria from cases of omphalitis were *E coli* (85%) (Anonymous, 2000; Sharbha, 1999; Anjum, 1997), *Staphylococcus aureus* (47%) (Anonymous, 2000; Deeming, 1995; Ali, 1993) Aspergillus fumigatus (21 %) (Schonhfen, 1991) Salmonella (17%) (Anonymous, 2000; Anjum, 1997; Ali, 1993) and *Pasturella multocida* (13%). Serologically 11% day old cases were positive for salmonella pullorum, 13% were Positive for *Mycoplasma gallisepticum* and 8 % cases were positive for *Mycoplasma synoviae*. The sources of these organisms were variable including faecal contamination of eggshell at breeder houses, poor hatchery hygiene, poor quality control measures, contaminated chick boxes or supply on contaminated vehicles, contaminated feeding of day old chick in improper disinfection of farms after previous flock etc(Anonymous; 2000). It is well established that continuous, sub therapeutic and misuses of antibiotics has led to the development of drug resistance (OIE, WHO, FAO). Therefore, surveillance of antibiogram and percent antibiotic resistance of different generic groups of broad spectrum and 3rd generation antibiotics against infectious omphalitis was conducted in different poultry housing areas near Lahore and D. I. Khan. The percent sensitivity and resistance for different anti biotic groups were calculated and tabulated.

Materials and Methods

About 150 cases were recorded at random from clinically diseased flocks suffering from anorexia, retained liquefied and discolored yolk with putrefied foul smell and omphalitis and omophlebitis. 3-5 chicks from each case were selected and cultured on different lab-media (Nutrient agar, Mckonkey's agar,

Sabaurad's agar, Blood agar, Selenite broth) from yolk and their sera were collected for sero-screening of *Salmonella typhosa*, *Salmonella pullorum*, *Mycoplasma synoviae* and *Mycoplasma gallisepticum*. Finally mixed cultured were tested for antibiogram according to disc diffusion method by National Committee for clinical Laboratory standard; (1990) using standard sensitivity disc of oxytetracycline, neomycin, furazolidon, ceftiofur sodium, norfloxacin, enrofloxacin. Zone of inhibition (Koneman and Stephen, 1997**)** for each disc on all mixed cultures were recorded 24 hours post application of disc and comparatively analyzed and was finally area wise interpretation on percent sensitivity and resistance were calculated and tabulated.

Results and Discussions

The main target of micro organism in infectious omphalitis is yolk. Yolk provides nutrition to developing chicks. In normal health chicks due to abdominal contractions, yolk in the sac is internalized before hatching through umbilicus at 19^{th} day in setter (Anonymous; 2000). Yolk sac is attached with intestine through stalk. A slight quantity of yolk is absorbed into intestine through stalk while most of yolk is digested by secretions of endothelium and is diffused in to circulation via the vasculature in the yolk sac. The absorption of yolk after hatching is completed almost in 5-7 days. But when yolk becomes infected provides a media for the rapid multiplication of organisms (Jorden, 1990). These organisms may remain localized in yolk or spread via haematogenous route in other parts of body. The most frequently isolated bacteria from cases of infectious omphalitis were Escherichia coli(85%) (Aonyumous, 2000; Shardha, 1999; Anjum, 1997), *Staphylococcus aureus* (47%) (Anonymous, 2000, Deeming, 1995; Ali, 1993) *Aspergillus fumigatus* (21%) (Schonhfen, 1991), Salmonella (17%) (Anonymous, 2000; Anjum, 1997; Ali, 1993) and *Pasturella multocida* (13%). Serologically 11 % day old cases were positive for Salmonella pullorum, 13% were positive for *Mycoplasma gallisepticum* and 8% cases were positive for *Mycoplasma synoviae*. The results of culture and sensitivity test carried out on 150 –samples with mixed infection of about mentioned organisms collected during December 2001-December 2003 and percent degree of sensitivity of resistance worked out for different areas of sampling are summarized in Table A.

As the areas wise percent sensitivity and resistance for antibiogram (Table A) is concerned the results of Lahore area indicate that Furazolidon, oxytetracycline and norfloxacin are low –moderately sensitive while neomycin, ceftiofur sodium and enrofloxacin are high-moderately sensitive. The resistant cases recorded for oxytetracycline were 17 %, neomycin 14 %, Furazolidon 22 %, ceftiofur sodium 5 %, norfloxacin 15 % and enrofloxacin 12 %. For Gujranwala (Table A) neomycin is moderate-highly sensitive while oxytetracycline, ceftiofur sodium and enrofloxacin are moderately sensitive and Furazolidon and norfloxacin are low sensitive. The resistance cases recorded were oxytetracycline = 14 %, neomycin = 7%, Furazolidon = 42 %, ceftiofur sodium =3 %, norfloxacin = 21 % and enrofloxacin = 6 %.

For Kasur area (Table A) oxytetracycline and neomycin are moderately sensitive with 7% and 4% resistant in cases respectively and ceftiofur sodium and enrofloxacin are highly sensitive with 4 % and 7 % resistant cases and Furazolidon and norfloxacin are low sensitive with 15 % and 7 % resistant cases.

For Muridke (Table-A) oxytetracycline and neomycin are moderately sensitive with 18% and 8 % resistant cases. Ceftiofur sodium is highly sensitive with 1 % resistant cases. Enrofloxacin, Norfloxacin and Furazolidon are low sensitive with 10 %, 6 % and 9 % resistant in cases.

For Raiwind poultry housing areas (Table A) oxytetracycline, neomycin and enrofloxacin are moderately sensitive and ceftiofur sodium is highly sensitive with 7 % resistant cases while furazolidon and norfloxacin are low sensitive with 10 % and 7 % resistant cases respectively.

As well as the area of D. I .Khan is concerned (Table A) oxytetracycline, neomycin and norfloxacin are moderately- highly sensitive while ceftiofur sodium and enrofloxacin are the more sensitive and Furazolidon is low sensitive with 12 %, 8 %, 9 %, 0 %, 0 % and 17 % resistant in different cases of infectious omphalitis in mixed type of culture isolated from cases.

From all above discussion, it can be concluded that

Serosurveillance for vertically transmitted diseases is regular requirement to minimize the challenge to poultry population at risk.

There must be a regular preparation/disinfection of farms prior to introduction of day old flocks, hygienic and quality control measures must be adopted at hatchery and challenge free supply must be assured in disinfected vehicles.

Antibiogram report can be used to prescribe different groups of antibiotics keeping in view its percent resistance and sensitivity and such surveillance report must be regularly established on area, Province and National levels to avoid blind, unnecessary sub therapeutic uses of resistant drugs which leads not only to the development of drug resistance, de grades meat quality and taste and effect upon consumer health as well transfer drug resistance to the micro biota of consumers but also is a greater economical threat in term of foreign exchange with resistant drugs.

Table A: Percent antibiogram distribution and resistance for infectious omphalitis in different areas of Punjab and D.I.Khan.

Area	OXY.	NEO.	FURA.	CEFT.	NOR	ENRO
Lahore	++++ 5% +++ 29% ++ 36% + 13% R --- 17%	++++ 12% +++ 47% ++ 16% + 11% R-- 14%	++++ 0% +++ 28% ++ 43% + 8% R--- 22%	++++ 16% +++ 44% ++ 30% + 5% R--- 5%	++++ 9% +++ 22% ++ 46% + 8% R--- 15%	++++ 20% +++ 31% ++ 33% + 4% R--- 12%
Gujranwala	++++ 13% +++ 27% ++ 30% + 16% R--- 14%	++++ 17% +++ 39% ++ 29% + 8% R--- 7%	++++ 7% +++ 12% ++ 23% + 16% R--- 42%	++++ 14% +++ 33% ++ 41% + 9% R--- 3%	++++ 4% +++ 16% ++ 35% + 24% R--- 21%	++++ 14% +++ 37% ++ 33% + 10% R--- 6%
Kasure	++++ 22% +++ 29% ++ 28% + 14% R--- 7%	++++ 13% +++ 41% ++ 37% + 5 % R--- 4%	++++ 1% +++ 18% ++ 46% + 20% R--- 15%	++++ 22% +++ 43% ++ 17% + 11% R--- 7%	++++ 7% +++ 21% ++ 56% + 11% R--- 7%	++++ 24% +++ 31% ++ 32% + 9% R--- 4%
Muridke	++++ 14% +++ 29% ++ 38% + 9% R--- 10%	++++ 13% +++ 33% ++ 35% + 11% R--- 8%	++++ 11% +++ 9% ++ 55% + 15% R--- 10%	++++ 17% +++ 53% ++ 20% + 9% R--- 1%	++++ 3% +++ 11% ++ 40% + 33% R--- 13%	++++ 12% +++ 27% ++ 43% + 14% R--- 4%
Raiwind	++++ 9% +++ 43% ++ 27% + 13% R--- 8%	++++ 8% +++ 41% ++ 30% + 12% R--- 9%	++++ 13% +++ 17% ++ 42% + 18% R--- 10%	++++ 24% +++ 50% ++ 12% + 10% R--- 4%	++++ 6% +++ 24% ++ 49% + 14% R--- 7%	++++ 21% +++ 33% ++ 27% + 8% R--- 11%
D. I. Khan	++++ 33% +++ 38% ++ 6% + 11% R--- 12%	++++ 27% +++ 55% ++ 7% + 3% R--- 8%	++++ 14% +++ 11% ++ 46% + 12% R--- 17%	++++ 22% +++ 60% ++ 14% + 4% R--- 0%	++++ 20% +++ 30% ++ 30% + 11% R--- 9%	++++ 17% +++ 63% ++ 14% + 6% R--- 0%

+ = 1mm zone of inhibition and lowest sensitive; ++ = 2mm zone of inhibition and low sensitive; +++ = 3mm zone of inhibition and moderate sensitive; ++++ = 4mm zone of inhibition and most/highest sensitive; R = Resistant

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