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Antibiotic Sensitivity of *Pasteurella multocida* Isolated from Cattle and Buffaloes

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Abstract: Fifteen isolates of *Pasteurella multocida* from clinical cases of haemorrhagic septicemia in cattle and buffaloes were confirmed by morphological, cultural, biochemical characteristics and slide agglutination test using antiserum against Robert type-I. Enrofloxacin and norfloxacin were highly sensitive to 93.7 and 75 percent of isolates, respectively and no resistance was observed, followed by gentamicin (62.5%), amoxicillin (37.5%), combination of trimethoprim + sulphamethoxazole (31.2%) and ampicillin (18.7%). Norfloxacin and enrofloxacin should be considered as drug of choice in haemorrhagic septicemia keeping in view acute nature of the disease. Use of ampicillin and amoxicillin should be discouraged due to the emergence of β lactamase activity in isolates. The maximum percentage of isolates was resistant to erythromycin (81.2%) and kanamycin (62.5%), followed by oxytetracycline (37.5%) and doxycycline (25%).

Key words: Antibiotic sensitivity, haemorrhagic septicemia, *Pasteurella multocida*

Introduction

In Pakistan, many outbreaks of haemorrhagic septicemia (HS) have been recorded and described the involvement of *Pasteurella multocida* Robert type-I strain (Ahmad and Anjum, 1972; Islam, 1975; Aslam *et al.*, 1988), which is equivalent to Carter's type-B and Heddleston's type-II (Bain *et al.*, 1982). Haemorrhagic septicemia is considered amongst the most formidable diseases of cattle and buffaloes for gigantic economic losses, worth more than Rs. 2.17 billion per annum (Anonymous, 1996). The disease is experienced in all parts of the country, particularly the plains. It is seasonal in occurrence and outbreaks are mostly experienced in summer winter rainy seasons of the country. The young animals of less than two years of age fall into an early prey to this malady. Previously, sulphamezathine was considered as drug of choice for the treatment of HS (Kazimi and Anwar-Ul-Haq, 1981). But later on, low recovery rate, 26.67 percent has been recorded with the most widely used sulphadimidine for the treatment of HS (Sharif, 1993). Now a days, new effective antibiotics are available for veterinary use. In order to sort out the best treatment choice under field conditions, antibiotic sensitivity of *Pasteurella multocida* isolated from the field cases was carried out using latest antibiotics available in veterinary practice.

Materials and Methods

Nasal swabs and whole blood samples using EDTA were collected under sterile conditions from 26 cattle and 45 buffaloes showing the clinical signs of haemorrhagic septicaemia from different

areas of Faisalabad. A schematic method for the isolation of microorganism from samples was followed as described by Malik (1995). Fifteen isolates of *Pasteurella multocida* were confirmed by morphological, cultural, biochemical characteristics and slide agglutination test using antiserum against Robert type-I (Cruickshank, 1975; Wijewardana *et al.*, 1982).

All the isolates of *Pasteurella multocida* were examined for their sensitivity to various antibiotics available in the market. The results were interpreted in accordance with the standards laid down Haneef *et al.* (1990) by measuring the diameter of the inhibitory zone as under:

Absence of inhibition zone	Resistant (-)
1-2 mm inhibition zone	Weakly sensitive (+)
3-5 mm inhibition zone	Moderately sensitive (+ +)
6-10 mm inhibition zone	Quite sensitive (+ + +)
Above 10 mm inhibition zone	Highly sensitive (+ + + +)

Results and Discussion

The results concerning antibiotic sensitivity against the field isolates and reference strain of *Pasteurella multocida* Robert type-I are presented in Table 1.

The 93.7% of isolates were highly sensitive to enrofloxacin while 75 percent to norfloxacin and no resistance was observed. Raza (1996) reported 80% survival among animals treated with norfloxacin but Das *et al.* (1999) reported very low sensitivity (27.2%) to norfloxacin. In contrast to the results of Das *et al.*

Table 1: Percentage of *Pasteurella multocida* isolates and reference strain sensitive to various drugs.

Drug µg per disc)	Percentage of sensitive isolates				
	Highly (+ + + +)	Quite (+ + +)	Moderately (+ +)	Weakly (+)	Resistant (-)
Enrofloxacin (10)	93.7	6.2	-	-	-
Norfloxacin (10)	75	25	-	-	-
Gentamicin (10)	62.5	12.5	18.7	-	6.2
Amoxicillin (10)	37.5	12.5	25	6.2	18.7
Trimethoprim + Sulphamethoxazole (1.25 + 37.75)	31.2	25	31.2	6.2	6.2
Ampicillin (25)	18.7	12.5	25	25	18.7
Doxycycline (30)	-	18.7	31.2	25	25
Oxytetracycline (30)	-	18.7	25	18.7	37.5
Kanamycin (30)	-	-	25	12.5	62.5
Erythromycin (15)	-	-	-	18.7	81.2

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(1999), the present study and clinical trail of Raza (1996) revealed that enrofloxacin and norfloxacin should be considered as drug of choice in the field cases of HS in cattle and buffaloes because of acute nature of the disease.

Gentamicin was highly sensitive to 62.5 percent of isolates. Das *et al.* (1999) reported comparatively low sensitivity (18.1%) to gentamicin and Raza (1996) also observed low survival rate (30%).

Sharif (1993) and Ramzan (1995) observed high 93.3 and 90 percent survival rate in HS treated with amoxicillin. Das *et al.* (1999) also reported high sensitivity (90.9%) to amoxicillin but the present study showed that amoxicillin and ampicillin were effective against 37.5 and 18.7 percent of the isolates. Comparison of resistance with biochemical tests revealed that the isolates resistant to amoxicillin and ampicillin has β lactamase activity. Therefore, use of amoxicillin and ampicillin should be discouraged due to the emergence of β lactamase activity in the isolates resulting in resistance against β lactame antibiotics in *Pasteurella multocida*.

Kazimi and Anwar-Ul-Haq (1981) effectively controlled outbreak of HS by administrating sulphamezathine in buffalo calves. Later on, due to development of resistance low recovery rate (26.67%) with the use of sulphadimidine was reported (Sharif, 1993). Similarly, results of Das *et al.* (1999) showed complete resistance of *Pasteurella multocida* to trimethoprim + sulphamethoxazole. The present study revealed, low percentage of isolates was highly sensitive (31.2%) as well as resistant (6.2%) to combination of trimethoprim + sulphamethoxazole.

The maximum isolates were resistant to erythromycin (81.2%) and kanamycin (62.5%), followed by oxytetracycline (37.5%) and doxycycline (25%). Das *et al.* (1999) reported complete resistance to oxytetracycline and Ramzan (1995) also observed only 40 percent recovery rate in animals treated with oxytetracycline for HS.

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