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Research Article

SEROTYPING AND ANTIMICROBIAL SENSITIVITY OF ESCHERICHIA COLI ISOLATED FROM GASTROINTESTINAL TRACT DISORDERS IN SHEEP

S. KUMAR*, K. K. JAKHAR, S. KAPOOR[1] AND A. SHARMA[1]
Department of Veterinary Pathology, [1]Department of Veterinary Microbiology,
College of Veterinary Sciences
Lala Lajpat Rai University of Veterinary & Animal Sciences, Hisar -125 004

ABSTRACT

A total of 72 tissue samples were collected from 30 sheep showing the gross pathological lesions of gastrointestinal tract disorders during October, 2010 to March, 2011. Of the 72 samples, *E. coli* was isolated from 48 samples. Of the 30 sheep, 14 sheep were found positive for *E. coli.* Infection was prominent in sheep of less than 1 year of age and was more in males. Out of 48 isolates, only 18 were serotyped and of these, 13 belonged to 'O' serogroup whereas the remaining five isolates were untypable. The most prevalent serotype was O168 (5) followed by O60 (4), O1 (1), O91 (1), O102 (1) and O116 (1). In- vitro drug sensitivity pattern revealed sensitivity to polymixin B, ofloxacin, amikacin, ampicillin, colistin, furoxone, amoxycillin+clavulanic acid, cefixime, amoxicillin, amoxycillin+sulbactum, doxycycline, ciprofloxacin, cefpodoxime, co-trimoxazole and nalidixic acid in decreasing order.

Key words: *Escherichia coli,* gastrointestinal, host disorder, antibiogram, sheep

Escherichia coli is associated with a variety of pathological conditions in man and animals. Different strains of *E. coli* have different attributes of virulence and thus produce different diseases in sheep (Peer *et al.*, 2001). Birth weight (Yapi *et al.*, 1990) and weather (Starr, 1981) stress may decrease immunity and predispose an animal to *E. coli* infection. The present study reports the prevalence of different *E. coli* serotypes in sheep showing various pathological lesions and their *in-vitro* antimicrobial sensitivity pattern.

MATERIALS AND METHODS

A total of 30 sheep were brought for postmortem examination during six month period from October, 2010 to March, 2011. Seventy two tissue samples from intestine, abomasum, liver, mesenteric lymph nodes, spleen, lungs, kidneys and pancreas were collected from these animals for *E. coli* isolation. Isolation of *E. coli* was attempted on MacConkey's lactose agar. Purified colonies were further subjected to biochemical tests (Oxidation-fermentation test, nitrate test, H_2S production on triple sugar iron medium, indole, methyl red, Voges-Proskauer, citrate utilization test and urease test) and sugar fermentation tests as recommended for confirmation of cultures. Random isolates were sent for serotyping to the Central Research Institute, Kasauli, Himachal Pradesh. The isolates were subjected to *in-vitro* drug sensitivity testing using 15 antimicrobials by the single disc diffusion method (Bauer *et al.* 1966). The results were recorded as percent sensitivity to antimicrobials.

*Corresponding author: sourabhchauhan50@gmail.com

RESULTS AND DISCUSSION

Out of 30 sheep, 14 sheep were positive for *E. coli.* Likewise, *E. coli* could be isolated and confirmed from 48 of the 72 tissue samples. Eighteen isolates were serotyped and of these 13 were identified as 'O' serogroup and the remaining 5 were untypable. The most prevalent serotype was O168 (5) followed by O60 (4), O1 (1), O91 (1), O102 (1) and O119 (1). O60 serotype was observed in intestine and spleen samples while O168 (3), O60, O1, O91 in liver, O60, O168, O102 in lungs and O116 and O168 from heart blood were observed (Table 1). O60 was isolated from

Table 1
Organ-wise distribution of *E. coli* serotypes isolated from sheep carcasses

Serotypes	Intestine	Abomasum	Mesenteric lymph nodes	Pancreas	Liver	Lungs	Heart blood	Spleen	Kidneys
O168	-	-	-	-	3	1	1	-	-
O60	1	-	-	-	1	1	-	1	-
O1	-	-	-	-	1	-	-	-	-
O91	-	-	-	-	1	-	-	-	-
O102	-	-	-	-	-	1	-	-	-
O116	-	-	-	-	-	-	1	-	-
(UT)	-	-	-	-	1	1	2	-	1

diarrhoeic lambs as the most prevalent serogroup by Chatterjee and Kashyap (2006). Peer *et al.* (2001) reported O91 and O168 serotypes from intestinal samples and rectal swabs of lambs suffering from colibacillosis. O168 serotype was also isolated from diarrhoeic faecal samples (Wani *et al.*, 2004). The results of this study suggest possible role of O60, O91 and O168 serotypes in causing diarrhoea and various gastrointestinal tract disorders in sheep.

A relatively high rate of *E. coli* infection was observed in sheep of less than 1 year of age (83%) as compared to sheep of more than 1 year age (17%) in the present study. The prevalence of gastro intestinal tract disorders in poor body weight lambs deprived of colostrum was significantly higher leading the infection to flare up and produce diarrhoea (Wray *et al.*, 1981). Infection was more prevalent in males (73%) than females (27%) in this study. Raza *et al.* (2007) reported more susceptibility of rams to gastrointestinal tract disorders which may be due to testosterone known for its immunosuppressive activity (Seli and Arici, 2002).

All the 48 isolates of *E. coli* showed maximum sensitivity to polymixin B, ofloxacin, amikacin (93.3% each), ampicillin (90.4%), colistin (87.5%), furoxone (75%), amoxycillin+clavulanic acid (63.6%), cefixime (50%), amoxycillin (45.4%), amoxycillin+sulbactum (40%), doxycycline (25%), ciprofloxacin, cefpodoxime, co-trimoxazole and nalidixic acid (12.5% each). Blanco *et al.* (1996) also reported antibiotic resistance against diffrent *E. coli* serotypes. They concluded that *E. coli* strains isolated from diarrhoeic lambs belonged to a large number of serogroups and may be reason for high variation in antibiotic resistance.

In conclusion, 13 serotypes of *E. coli* belonging to 'O' serogroup were recorded with more infection in males and in animals of less than one year of age. The *E. coli* organisms showed maximum sensitivity to polymixin B, ofloxacin and amikacin.

REFERENCES

Blanco, J., Cid, D., Blanco, E.J., Blanco, M., Quiteira, S.R.J. and Feunte, D.L.R. (1996). Serogroups, toxins and antibiotic resistance of *Escherichia coli* strains isolated from diarrhoeic lambs in Spain. *Vet. Microbiol.* **49**: 209-217.

Bauer, A.W., Kirby, W.M., Sherris, J.C. and Turck, M. (1966). Antibiotic susceptibility testing by a standardised disc method. *Am. J. Clin. Pathol.* **36**: 493-496.

Chatterjee, S. and Kashyap, S.K. (2006). Serotypes of Escherichia coli isolated from camel, cattle, sheep and poultry. *Indian Vet. J.* **83**: 479-482.

Peer, M.S., Sudhan, N.A. and Azmi, S. (2001). Prevalence of *Escherichia coli* in diarrhoeic lambs in Kashmir. *Indian J. Vet. Med.* **21**: 96.

Raza M.A., Iqbal, Z., Jabbar, A. and Yaseen, M. (2007). Point prevalence of gastrointestinal helminthiasis in ruminants in southern Punjab. *Pakistan. J. Helminthol.* **81**: 323-328.

Seli, E. and Arici, A. (2002). Sex steroids and the immune system. Immunol. *Allergy Clin. North Am.* **22**: 407-408.

Starr, J.R. (1981). Weather and lamb mortality in a commercial lowland sheep flock. *Agric. Meteorol.* **24**: 237-252.

Wani, S.A., Bhat, M.A., Samantha, I., Ishaq, S.M. Ashrafi, M.A. and Buchh, A.S. (2004). Epidemiology of diarrhoea caused by rotavirus and *Escherichia coli* in lambs in Kashmir valley, India. *Small Rum. Res.* **52**: 145-153.

Wray, C., Dawson, M., Afshar, A. and Lucas, M. (1981). Experimental Escherichia coli and rotavirus infection in lambs. *Res. Vet. Sci.* **30**: 379-381.

Yapi, C.V., Boylan, W.J. and Robinson, R.A. (1990). Factors associated with causes of preweaning lamb mortality. *Prev. Vet. Med.* **10**: 145-152.