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STUDIES ON SALMONELLA INFECTION OF SHEEP IN EGYPT

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SUMMARY: Two hundred and fifty faecal samples were collected from Koom Oshim Fattening Unit and El-Marg Sheep and Goat Farm and the internal organs of one hundred and fifty sheep were collected from Cairo & Giza abattoirs. Among living sheep the incidence was 4.8% while from slaughtered sheep, it was 8.66%. The mesenteric lymph nodes were the best sites for isolation of Salmonella where the recovery rate was 6.0%. Thirty Salmonella isolates were recovered from sheep. *S. typhimurium* was the predominant serovar. *S. naner-gou*, *S. stanlry*, *S. rissen* and *S. typhi* have been also recovered.

INTRODUCTION

Salmonellæ are primarily enteric microorganisms causing gastroenteritis. Infected animals recover spontaneously or after treatment commonly harbour the organism in their gut. These, so called salmonella carrier disseminate the organism intermittently in their faeces. Many workers gave reports on the isolation of salmonellosis among sheep as Lotfi and Kamel (1964) 3.8%, Khan (1979) 4.0%. Doutre et al. (1976) 4.7%, El-Nawawi et al. (1982) 2.0% and Safwat et al. (1985) 5%. The infection may be reactivated when the animals are subjected to any source of

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Studies on salmonella infection of sheep in Egypt.....

stress, whereby the rate of dissemination of the organism increases *S. typhimurium*, *S. dublin* *S. muenster* and *S. enteritidis* were the most predominant serovars isolated from sheep and goat in Egypt (Lotfi and Kamal, 1964 & Abd El-Galil et al., 1972).

Sheep infected with salmonella play an important role in transmitting this organism to other animals as well as to human beings. Thus consumption of sheep meat infected with salmonella could be undoubtedly responsible for cases of food poisoning.

The aim of the present work was to identify and serotype the salmonella microorganisms in both living and slaughtered sheep.

MATERIAL AND METHODS

Samples from field cases:

A total of 250 faecal samples was collected from both 140 apparently healthy adult sheep and 110 lambs of 3-6 months old. Samples were taken from Koom Oshim Fattening Unit (85 adult sheep and 65 lambs) and El-Marg Sheep and Goat Farm (55 adult and 45 lamds).

Samples from slaughtered sheep:

A total of 450 internal organs (150 samples from each of mesenteric lymph nodes, gall bladders and intestinal contents) representing 150 apparently healthy sheep slaughtered at Cairo abattoir (50 sheep) were taken aseptically and transferred rapidly to the laboratory immediately for bacteriological examination.

Isolation and identification of salmonella:

All samples taken were directly transferred to "Selenite F" broth. The enrichment broth tubes were incubated for 6-18 hrs, and then streaked onto MacConkey agar (Difco), S.S. agar (Difco) and brilliant green phenol red agar

M. Refai, et al.

(Difco) and incubated for 24 hrs at 37 C. The suspected well isolated smooth colonies were picked up and tested for biochemical activities and serological identification according to Edwards and Ewing (1972) and Kauffmann (1973). Sera were obtained from Difco Laboratories, Detroit, Michigan, U.S.A.

RESULTS

From the results shown in Table (1), salmonellae could be recovered from the faeces of 12 out of 250 living sheep with an incidence of 4.8%. The infection was higher in adult (5.71%) than in young lambs (3.63%).

The infection in koom Oshim Fattening Unit exceeds that of the El-Marg Sheep and Goat Farm. In both farms, the infection was considerably higher in adults in comparison to that of lambs. Quick slide agglutination tests were carried out on each of salmonella strains for serovars typing. Results revealed that 83.33% of the strains proved to be S. typhimurium followed by S. nanergou in an incidence of 16.67%.

The rate of isolation of salmonella from the internal organs reached 8.66%. The summarized results given in Table (2) show that the frequency of isolation of salmonella from Cairo and Giza abattoirs had been recorded and ranged to be 12% and 2% respectively. It was interesting to note that samples obtained from Giza abattoir showed a less degree of infection. Serological typing of 18 isolates obtained from various organs of slaughtered sheep revealed the recognition of five serovars; S. typhimurium (10) S. nanergou (5); S. stanley; S. rissen and S. typhi (one each) in an incidence of 55.55%; 27.78%; 5.55%; 5.55% and 5.55% respectively as shown in Table (3). It was evident that salmonella was isolated more usually from the mesenteric lymph nodes (50.0%). The gall bladder and intestinal contents show a less degree of infection being 27.78% and 22.22% respectively. Therefore, the mesenteric lymph nodes represent the most common organ that usually harboured

Table (1): Prevalence of salmonellae in apparently healthy living sheep

Animals	Koom Oshim Fattening Unit		El-Marg Sheep and Goat Farm		Total Incidence		
	No. of cases examined	No. of positive isolation (%)	No. of cases examined	No. of positive isolation (%)			
Adult sheep	85	6	7.05	55	2	3.64	8 (5.71%)
Lambs	65	3	4.62	45	1	2.22	4 (3.64%)
Total	150	9	6.00	100	3	3.00	12 (4.80%)

Table (2): Incidence of Salmonellae in the examined abattoirs

Animal status	No. of examined cases	No. of infected cases	Incidence (%)
Cairo abattoir	100	12	12.00
Giza abattoir	50	1	2.00
Total	150	13	8.66

Table (3): Display of salmonella serovars isolated from sheep

Salmonella	Field cases	Slaughtered cases	
	(250 faecal samples)	(450 internal organs, bile, mesenteric lymph nodes and intestinal contents).	percentage from total isolates
	No. of isolates	percentage from total isolates	No. of isolates
<u>S. typhimurium</u>	10	83.33	10
<u>S. hanerougou</u>	2	16.67	5
<u>S. stanley</u>	-	00.00	1
<u>S. rissen</u>	-	00.00	1
<u>S. typhi</u>	-	00.00	1
Total	12	100.00	18
			100.00

- : Negative .

Table (4): Correlation between the salmonella serovars recovered and the sites of isolation .

Type designation	No. of isolates from internal organs of slaughtered sheep	Mesenteric lymph nodes		Bile contents		Intestinal contents	
		No. of isolates	Percentage from total isolates	No. of isolates	Percentage from total isolates	No. of isolates	Percentage from total isolates
<u>S. typhimurium</u>	10	6	33.33	2	11.11	2	11.11
<u>S. hanerkou</u>	5	2	11.11	1	5.55	2	11.11
<u>S. stanley</u>	1	1	5.55	-	0.0	-	0.0
<u>S. rissen</u>	1	-	0.0	1	5.55	-	0.0
<u>S. typhi</u>	1	-	0.0	1	5.55	-	0.0
Total	18	9	50.00	5	27.78	4	22.22

Studies on salmonella infection of sheep in Egypt.....

salmonellae as shown in **Table (4)**.

DISCUSSION

Salmonella infection of sheep continues to be an important problem in Egypt as well as other areas of the world. The present investigation demonstrates clearly the presence of salmonella carrier states among sheep. The occurrence and isolation of some serovars from sheep put an emphasis on the role of such animals in acting as carriers of salmonellae from which human infection occurs.

Out of 400 living and slaughtered sheep examined, 25 proved to harbour salmonellae in an incidence of 6.25%. Actually this percentage could be higher when compared with the findings of Abdel-Galil et al. (1972) who found that its incidence was 1,6%. The present findings nearly coincide with the results obtained by Abdel-Ghani et al. (1987) who found that the incidence of salmonellosis was 6.1%.

Salmonella serovars were isolated from adult sheep in rather high incidence (5.71%), while it was recovered in a lower percentage (3.63%) from young lambs. These findings tend to agree with Kumar et al. (1973) who showed that the number of isolates was higher in older than in younger animals.

The rate of salmonellae recovered in slaughtered sheep (8.66%) was also higher than that recorded by some authors either in Egypt or other countries such as Lotfi and kamel (1964) 3.8%; khan (1979) 4.0%; Doutre et al. (1976) 4.7%; El-Nawawi et al. (1982) 2.0% and Safwat et al. (1985) 5.0%. However, further surveys based on a wide scale of sheep is necessary to obtain results which can be statistically analysed.

The incidence in living cases (4.8%) was lower than in slaughtered sheep (8.66%) which may be due to the

M. Refai. et al.

intermittent dissemination of salmonellae in the faeces and the dense population of microflora in the faeces in contrast to the lymph nodes and internal organs. Such observation was recorded by Abdel-Ghani et al. (1987) where the incidence in their field cases was 3.7% and in slaughtered sheep was 14.0%.

In an effort to discover the possible predilection seats of such organisms, it was noticed from the present investigation in slaughtered sheep that the mesenteric lymph nodes were the most suitable site for isolation of salmonellae (6.0%), followed by the gall bladder (3.33%) and then the intestinal contents (2.67%).

The rate of salmonella recovery significantly higher in Cairo abattoir (12.0%) in contrast to that of Giza abattoir (2.0%) which may be due to the bad hygienic measures in the first one and the possibility of infection of the animals during their presence in slaughter house. Smith and Grau (1974) reported that animals held for slaughter may ingest salmonella in water which may be contaminated with effluent discharged from the same abattoir.

From the current literature, it seems that this is the first time to isolate :- *S. nanergou*, *S. stanley*; *S. rissen* and *S. typhi* from sheep in Egypt. Therefore, new salmonellae are now infecting Egyptian sheep. The occurrence and recovery of new serovars may be due to the introduction of foreign breeds which may create many problems concerning salmonellosis as many new serovars were introduced to the country with the imported domesticated animals.

*Studies on salmonella infection of sheep in Egypt.....***REFERENCES**

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M. Refai et. al..

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