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ESCHERICHIA COLI ASSOCIATED WITH SWOLLEN HEAD SYNDROME IN BROILER CHICKENS

(With 4 Tables)

By

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إيشيريشيا كولاي المصاحبة لظاهرة تورم الرأس في دجاج التسمين

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أجريت هذه الدراسة على ١٥٠ عينة ممثلة لعدد خمسة قطعان دواجن تسمين ما بين الأسبوع الثانـــي والأسبوع السادس من العمر مصابة بحالات تورم الرأس في نطاق محافظة الدقهلية، حـيث أنـــه تـــم أخـــذ العيـــنات من دجاج سليم ظاهريا وآخر مريض إكلينيكيا. وبالفحص البكتريولوجـــي للعيـــنات تم عزل الميكروب القولوني من كل العينات التي تم فحصها بنسبة ٧٨,٧% ، حيث كانت النسبة في كل من السليم ظاهريا والمريض إكلينيكيا ٧٢ % و٨٥,٣% علـــى التوالي وبالتصنيف السيرولوجي للمعزولات كانت كالتالي O_2 بنسبة ٣٥,٦% ، O_{78} بنســـبة ٣٠,٥% ، O_5 بنســـبة ٢٠,٣% وعترات كانت غير مصنفه بنسبة ١٣,٦%. ويعمل إختبار الحساسية للمعزولات وجد أنها أكثر حساسية لمادة الأنروفلوكساسين ، الجنتاميسين ، الإرثرومايسين ، سيفوتاكسين والاستربتوميسين.

SUMMARY

A total of 150 samples were taken from five broiler chicken flocks showing swollen head syndrome between 2nd and 6th weeks of age in Dakhlia governorate, where the samples were taken from apparently healthy as well as clinically diseased chickens. Bacteriological examination of the total number of collected samples revealed the isolation of *E. coli* with percentage of 78.7% where the isolation from apparently healthy and clinically diseased with percentage of 72.0% and 85.3% respectively. Serological identification of the isolates revealed that the serotype O_2 (35.6%), O_{78} (30.5%), O_5 (20.3%) and untyped strains (13.6%). By using antimicrobial agents, *E. coli* isolates were more sensitive to enrofloxacin, gentamycin, erythromycin, cefotaxin and streptomycin.

Key words: *Escherichia coli, swollen head syndrome, broiler chickens.*

INTRODUCTION

Swollen head syndrome (S.H.S.) is an acute upper respiratory disease of chickens with multiple causes, adversely affecting broiler livability and growth rate in many areas of the world (Alexander, 1991 and Hafez and Lohren, 1990). The disease was initially observed in chicken in South Africa and was confirmed by (Morley and Thomson, 1984). SHS has been reported in Egypt by Ahmed, (1991); Hebat Allah, (1997) and Abd-Rabu (1999), it characterized by swelling of peri- and infra-orbital sinuses, torticollis, nasal discharges and variable mortality (O'Brien, 1985). Pneumovirus (PV) was reported to be the primary causative agent of SHS in broiler (Morley and Thomson, 1984 and Naylor and Jones, 1993).

Escherichia coli has been a consistent feature of SHS, and it was isolated from internal organs, middle ear, brain and subcutaneous exudate of the head in outbreaks of SHS in broilers (Pattison *et al.*, 1989; Droual and Woolock, 1994 and Nakamura *et al.*, 1997).

Bacteriological examination of SHS cases in broilers revealed the isolation and identification of pathogenic *E.coli* which invades the conjuntiva and subcutaneous regions of the head as a subsequent secondary infection and responsible for the clinical appearance of SHS (Shane, 1991, Jons *et al.*, 1991 and Stehling *et al.*, 2003).

Therefore, *E. coli* is thought to be the main secondary complicating agent of SHS in broiler chickens (Lu *et al.*, 1994; Georgiades *et al.*, 2001 and Wafaa and Tanios, 2002).

This study was carried out for isolation and identification of *E. coli* associated with SHS from broiler farms in Dakahlia governorate, and testing the activites of some antimicrobial agents on the *E. coli* isolates.

MATERIALS and METHODS

(1) Samples:

A total of 150 samples collected from five broiler flocks from apparently healthy and clinically diseased chickens between 2nd and 6th week of age in Dakhlia governorate.

(2) Media:

Media used for bacteriological examination included nutrient broth, MacConkey agar, Triple sugar iron agar, peptone water 1% for indole test, glucose phosphate broth for methyl red and voges proskauer tests, Simmon's citrate media and 1% peptone, glucose, sucrose,

mannitol and lactose were used .The different media and reagents were prepared according to the techniques described by Cruikshank *et al.*, (1975).

(3) Bacteriological examination:

Samples were collected from caseous materials and exudate of heads, nasal secretions, sinus contents and tracheal scraping of apparently healthy and diseased or freshly dead chickens, inoculated in nutrient broth and incubated at 37°C for 24 hours.

Subcultures were made onto MacConkey agar plates and incubated at 37°C for 24 hours. Suspected colonies were picked up and identified morphologically and biochemically. (Cruickshank *et al.*, 1975 and Brenner, 1992).

Table 1: Biochemical activities of *E. coli*

Isolated bacteria	*Indole*	*M.R.*	*V.P.*	*Urease*	*H_2S*	*Citrate*	*Lactose with gas*	*Glucose with gas*	*Mannitol*	*Sucrose*
E. coli	+ve	+ve	-ve	-ve	-ve	-ve	-ve	+ve	+ve	+ve

(4) Serological identification:

E. coli "O" antisera from Behring Werk Ag. Marburg, Lahn, Germany were used for serotyping of the isolated strains. The procedure outlined by using polyvalent and monovalent E. coli antisera (Edward and Ewing, 1972).

(5) Antimicrobial sensitivity test :

The obtained *E. coli* isolates were tested for their sensitivity to the antimicrobial agents according to the method of Cruickshank *et al.*, (1975) by measuring the inhibition zone which was interpretated according to Manual of Bio-Merieux, (1986). The anitimicrobial sensitivity discs were kindly obtained from " Oxoid " .

RESULTS

The results of bacteriological examination , identification and antibiotic sensitivity test were recorded in table 2, 3 and 4

Table 2: Prevalence of *E. coli* among apparently healthy and clinically diseased broiler

Flock	Apparently healthy broiler			Clinically diseased broiler		
	No. of collected samples	No. of positive samples	%	No. of collected samples	No. of positive samples	%
1	15	12	80.0	15	15	100
2	15	11	73.3	15	12	80.0
3	15	12	80.0	15	14	93.3
4	15	10	66.7	15	12	80.0
5	15	9	60.0	15	11	73.3
Total	75	54	72.0	75	64	85.3

Table 3: Serological identification of isolated *E. coli* strains

Serogroup	No. of positive/total*	Percentage
O_2	42	35.6
O_{78}	36	30.5
O_5	24	20.3
Untyped	16	13.6

* Total – 118 isolates

Table 4: The antibiogram of isolated *E.coli* recovered from examined samples .

Type of antibiotics	Disc	Sensitive		Moderate		Resistant	
	Conc.	No.	%	No.	%	No.	%
Erythromycin	15µg	68	57.6	29	24.6	21	17.8
Flumoquine	10µg	12	10.2	31	26.3	75	63.6
Chlormphenicol	10µg	50	42.4	31	26.3	37	31.4
Gentamycin	10µg	70	59.3	23	19.5	25	21.2
Streptomycin	10µg	60	50.8	28	23.7	30	25.4
Ampicillin	20µg	35	29.7	33	27.9	50	42.4
Amoxycillin	30µg	36	30.5	36	30.5	46	38.9
Enrofloxacin	10µg	89	71.2	17	14.4	17	14.4
Tetracyclin	30µg	52	44.1	26	22.0	40	33.9
Cefotaxin	30µg	65	55.1	26	22.0	27	22.9

The percentage were calculated in relation to the total number of examined isolates .

DISCUSSION

Swollen head syndrome (SHS) is an emerging condition with multiple causes, *E.coli* is the most secondary bacterial cause of SHS in broiler, (Shane, 1991).

This work showed that the prevalence of *E.coli* from most examined samples in a total percentage of (78.7%), which isolated from apparently healthy (72.0%) and clinically diseased (85.3%), Table (2). These results were similar to those recorded by Parreire and Yano, (1998) isolated *E.coli* (72.0%) from chickens with SHS. Georgiades *et al.,* (2001), who isolated *E.coli* (87.5%) from the infraorbital sinuses of broiler chickens with SHS. Also Wafaa and Tanios, (2002) recovered *E.coli* strains (84.6%) from natural cases of SHS in broiler chickens. A lower percentage was reported by Rizk and Bkhiet, (2001) who isolated *E. coli* with an incidence of (15.5%) from broiler chickens with SHS. High incidence of *E.coli* in this study may be attributed to environmental conditions which play a significant role in interacting with infectious agents in the productions of respiratory diseases in poultry. (Kleven and Glisson, 1997).

Serological serotyping in this study revealed that *E. coli* serotypes were O_2 (35.6%); O_{78} (30.5%); O_5 (20.3%) and untyped strains (13.6%) with available antisera (Table 3). These serotypes were also isolated by Zallen, (1986); Al-Ankari *et al.,* (2001) and Wafaa and Tanios, (2002). Other serotype O_1 was indentified by White *et al.,* (1993).

As shown in Table (4) the results of antimicrobial sensitivity test for the *E.coli* isolates revealed that the E.coli isolates were more sensitive to enrofloxacin (71.2%), gentamycin (59.3%), erythromycin (57.6%), cefotaxin (55.1%), streptomycin (50.8%), tetracycline (44.1%), chloramphenicol (42.4%) and moderate sensitive to amoxycillin (30.5%), ampicillin (27.9%), flumoquine (26.3%) .

In this respect our results agree to some extent to those reported by Hamouda and Amer, (2000) who showed that the E.coli strains which isolated from SHS were sensitive to erythromycin, enrofloxacin and gentamycin .

From the results of our study, we can concluded that the *E. coli* infection is the main secondary bacterial cause of swollen head syndrome in broiler chickens and most serotypes of isolated *E. coli* were sensitive for enrofloxacin, gentamycin, erythromycin, cefotaxin and streptomycin. Also this study suggested that E.coli infection in broiler can not be eliminated by antibiotics treatment only but required hygienic measures to be taken to lower the infection risk.

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