Studies On Bacterial Diseases Causing Early High Mortalities In Rabbits

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ABSTRACT

This study was carried out on 850 fattening rabbits 2-5 weeks post weaning at one of the largest rabbit projects at Sharkia Governorate (13000 doe, 8 fattening rabbitries). The bacteriological examination of liver, lung and heart specimens from rabbits revealed that the incidence of *E. coli, S. aureus, P. multocida, S. pyogenes, K. pneumoniae* and *S. typhimurium* were 29.8%, 8.5%, 5.3%, 3.8% 1.5% and 0.25% respectively. Antibiogram results showed that all the isolates were susceptible to enrofloxacin, trimethoprim-sulphamethoxazole and gentamicin, meanwhile all isolates were resistant to neomycin and chloramphenicol. Field treatment trials with enrofloxacin, trimethoprim–sulphamethoxazole and gentamicin gave good recovery.

INTRODUCTION

Bacterial diseases affecting rabbits cause severe economic losses all over the world *(1)*. Intensive breeding was accompanied by serious losses due to high mortalities caused by various bacterial infections *(2, 3)*. *Escherichia coli* causing diarrhea among rabbits in European countries and Brazil *(4)*. EPEC is frequent in rabbit-fattening units of Western Europe. It causes high mortality and growth retardation leading to substantial economic losses *(5)*. Colibacillosis of rabbits is caused by enteropathogenic strain of E.coli and classified as colibacillosis of newborn and nursing rabbits and colibacillosis of weaned rabbits *(6)*. Staphylococcus is a common infection of rabbits caused by *Staph. aureus*, characterized by suppurative inflammation of any organ *(2)*. Sreptococcosis causes an acute septicemic syndrome in young rabbits. Pasteurellosis is one of the most important bacterial diseases affecting rabbits all over the world causing severe economic losses. Affected rabbits may have signs of rhinitis (snuffles), pneumonia, otitis media or interna, abscesses and genitourinary tract infection *(7-9)*. Salmonellosis is uncommon disease of rabbits but it can produce epizootics of high morbidity and mortality.Itis primary a septicemic disease with a brief clinical course, but diarrhea and abortion may be observed in some rabbits *(10, 9)*.

A few efforts had been attempted in Egypt to investigate the prevalent diseases in rabbits *(11)*. The goal of the present work was to fulfil the clinical and laboratory diagnosis of bacterial diseases causing high mortality in fattening rabbits, 2-5 weeks post weaning, with trial of field treatment.

MATERIAL AND METHODS

(I) Rabbits and clinical history

The present study was carried out at one of the most largest rabbit projects at Sharkia Governorate (13000 doe, 8 fattening rabbitries). High mortalities began with the end of the second week and continued till the beginning of the fifth weeks post weaning then diminished. This phenomenon was recorded in more than 100 periods in different fattening rabbitries. The clinical signs and post-mortem lesions were recorded.

(II) Samples

Under complete aseptic precaution, liver, lung and heart blood samples were taken from 400 (110 diseased and 290 freshly dead) fattening rabbits, 2-5 weeks post weaning.

(III) Isolation and identification

The samples were inoculated into brain heart infusion broth and incubated at 37°C for 24 hours. Sub culturing was carried out onto nutrient agar, blood agar, MacConkey's agar and mannitol salt agar media which were

incubated at 37°C for 24 hours. Direct bacteriological smears were prepared from the growing colonies then stained with Gram stain for morphological identification. The obtained pure cultures were identified biochemically *(12).*

(IV) Antimicrobial sensitivity tests

In vitro antibiotic sensitivity test of different bacterial isolates to enrofloxacin, rifamycin, trimethoprim - sulfamethoxazol, gentamicin, oxytetracycline, flumequine, streptomycin, neomycin, erythromycin and chloramphenicol was carried out using disc diffusion method *(13).*

(V) Field treatment trials

Four hundred and fifty diseased rabbits were divided into 3 (I, II, III) equal groups. Each group was kept in a single battery and fed on pellets. Group I was injected with enrofloxacin (10mg/kg.b.wt) intramuscular for 3 successive days then received the same dose in drinking water for 2days. Group II received trimethoprim-sulphamethoxazole (1 ml/ liter of drinking water) for 5 successive days. Group III was injected with gentamicin (5 mg/kg body b.wt) intramuscular for 3 successive days.

RESULTS

Clinical findings

The symptoms differ from case to another; sometimes deaths occur without any clinical signs. The main clinical symptoms were diarrhea, bloat, rough coat, decreased food intake, recumbency and later on death. Some rabbits suffered from respiratory symptoms in the form of cough, sneezing, nasal discharges. However in more than 100 periods in different seasons, different species and different rabbitries high morbidity and mortality rates were recorded with the end of the second week and continued till the beginning of the fifth week post weaning then decreased.

Post-mortem findings

In many cases no post-mortem lesions were observed. The main post-mortem lesions were paint brush hemorrhage on the serosal surface of the intestine, watery light brown to bloody tinged caecal content, the intestine filled with gases, congestion of the internal organs. In some cases necrotic foci in the liver were observed with congestion of other internal organs. The post mortem lesions of rabbits suffered from respiratory symptoms were congestion of the mucous membrane of the nasal cavity with presence of mucopurulent nasal discharges and congestion of the internal organs.

Bacterial isolation

Bacteriological examination of liver, lung and heart specimens obtained from 400 (110 diseased and 290 freshly dead) rabbits revealed the isolation of *E. coil* from 119 cases (29.8%), *S. aureus* 34 cases (8.5%), *P. multocida* 21 cases (5.3%), *S. pyogenes* 15 cases (3.8%), *K. pneumoniae* 6 cases (1.5%), *S. typhimurium* 1 case (0.25%) (Table 1).

***In vitro*, antimicrobial susceptibility test**

Table 2 revealed that the field isolates exhibited, *in vitro* high susceptibility to enrofloxacin and trimethoprim-sulphamethoxazole, gentamicin. The isolates were moderately sensitive to rifamycin, oxytetracycline and streptomycin. On the other hand all the isolates were resistant to neomycin, chloramphenicol.

Field treatment trials

The field treatment revealed that the recovery rates with enrofloxacin, trimethoprim- sulphamethoxazole and gentamicin treatment were 135 (90%), 127 (84.7%) and 118 (78.7%) respectively (Table 3).

Table 1. Bacterial isolates causing mortalities in fattening rabbits 2-5 weeks post weaning

Examined rabbits	*No.*	*E. coli*		*S. aureus*		*P. multocida*		*S. pyogenes*		*K. pneumoniea*		*S. typhimurium*	
		No.	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*
Diseased	110	28	25.5	8	7.3	5	4.6	3	2.7	2	1.8	0.0	0.0
Freshly died	290	91	31.4	26	9	16	5.5	12	4.1	4	1.4	1	0.34
Total	400	119	29.8	34	8.5	21	5.3	15	3.8	6	1.5	1	0.25

Table 2. Susceptibility of bacterial isolates recovered from rabbits to different antibiotics

Antibiotic	*Disc conc.*	*E. coli*	*S. aureus*	*P. multocida*	*S. pyogenes*	*K. pneumoniae*	*S. typhimurium*
Enrofloxacin	5ug	S	S	S	S	S	S
Trimeth + sulfa	25ug	S	S	S	S	S	S
Gentamicin	10ug	S	S	S	S	S	S
Rifamycin	5ug	S	S	R	S	S	R
Oxytetracycline	30ug	R	R	S	R	S	S
Streptomycin	10ug	R	S	S	R	S	R
Flumequine	30ug	S	R	R	R	R	S
Neomycin	30ug	R	R	R	R	R	R
Chloramphenicol	30ug	R	R	R	R	R	R
Erythromycin	15ug	R	S	R	R	S	R

Table 3. Results of field treatment by using of enrofloxacin, Trimethoprim-sulphamethoxazole and gentamicin

No. of rabbits	*Group I (150)*	*Group II (150)*	*Group III (150)*
Therapeutic regime	Enrofloxacin 10mg/kg b.wt. I.M. for 3 successive days then received the same dose in drinking water for 2days	Trimethoprim + sulphamethoxazole 1 ml/liter of drinking water for five successive days	Gentamicin 5mg/kgb.wt. I/M. for 3 successive days
Clinical improvement	135 (90%)	127 (84.7%)	118 (78.7%)

DISCUSSION

Rabbits are considered to be one of the significant sources for establishing food security. A great attention was payed towards rabbit industry to meet the great demands for meat consumption particularly in developing countries. High morbidity and mortality rates due to bacterial infection were considered to be the main obstacles facing rabbit industry especially in intensive breeding *(1, 14, 15)*. The clinical signs of rabbits in this study showed variation from case to another, sometimes sudden deaths occurred without any clinical signs. The main clinical signs observed were diarrhoea, bloat, rough coat, decreased food intake, retardation of growth, recumbency and finally death. High mortalities were observed in all fattening rabbitries, 2-5 weeks age post weaning. *E. coli* infection caused diarrhea, rough coat, dehydration and high mortality in weaned rabbits *(4- 6, 16)*. **Okerman** *(1)* recorded that scattered occurrences of individual rabbits dying suddenly, usually as a result of intestinal invagination are common in case of *E. coli* infection. Some rabbits suffered from respiratory manifestation in the form of cough, sneezing, nasal discharges. Similar observation were previously recorded *(1,17)* which recorded that the main clinical symptoms in rabbits infected with Past.multocida were sneezing, coughing, nasal discharges and sometimes sudden death without previous symptoms.

Post-mortem findings recorded were paint brush hemorrhage on the serosal surface of the intestine, watery light brown to bloody tinged caecal content, intestine filled with gases. Similar studies were cited in previous studies *(1, 11, 18)*. The post mortem lesions in rabbits suffering from respiratory symptoms were congestion of the respiratory passages and internal organs, mucopurulent nasal discharges in the nasal cavity. Similar pictures were recorded in previous several studies *(19, 2, 20)*. In many cases no post-mortem lesions were observed. Similar findings were recorded *(2)*. Some cases recorded congestion of the internal organ and the presence of necrotic foci in the liver.Similar finding was recorded in previous work *(3,19,21)*.

Bacteriological results revealed the isolation of *E. coli, S. aureus, P. multocida, S. pyogenes, K. pneumoniae* and *S. typhimurium* in percentages of 29.8%, 8.5%, 5.3%, 3.8%, 1.5% and 0.25% respectively which were the main bacterial pathogens that were responsible for high mortalities in rabbits 2-5 weeks post weaning. These results were consistent with previous studies recorded by *(11, 15)*. Antimicrobial sensitivity test *in vitro* showed high susceptibility to enrofloxacine, trimethoprim -sulphamethoxazole, gentamicin and completely resistant to neomycin and chloramphenicol. These results are nearly agreed with those obtained by several investigators *(22-24)*. The results of field treatment revealed that the rabbits treated with enrofloxacin had curative rate better than those treated with trimethoprim-sulphamethoxazole or gentamicin.

In conclusion, our findings showed that the highly fatal effect of bacterial diseases in fattening rabbits. Moreover enrofloxacin gave high recovery rate in treatment of bacterial infections in fattening rabbits.

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الملخص العربى

دراسات على الأمراض البكتيرية المسببة لوفيات عالية في العمر المبكر للأرانب

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تعتبر الأمراض البكتيرية من أهم مسببات الوفيات في الأرانب، لذا كان الهدف من هذه الدراسة هو إلقاء الضوء على التشخيص الإكلينيكي والمعملي للأمراض البكتيرية المسببة للوفيات في الأرانب بالإضافة إلى محاولات لعلاج هذه المسببات البكتيرية.

وقد أجريت هذه الدراسة على ٨٥٠ أرنب تسمين عمر ٢-٥ أسبوع بعد الفطام في واحدة من أكبر المزارع بمحافظة الشرقية (١٣٠٠٠ أم ، ٨ عنابر تسمين) .

وبإجراء الفحوصات الإكلينيكية وجد أنها تختلف من حالة إلى أخرى ولكن أكثر الأعراض شيوعا هو الإسهال وانتفاخات ونقص في تناول الغذاء تنتهي بجفاف ثم ينام الأرنب على جنبه ويموت. كما ظهر على بعض الأرانب أعراض تنفسية في شكل رشح وعطس، وبعض الأحيان يموت الأرنب بدون ظهور أي أعراض إكلينيكية .

وبإجراء الصفة التشريحية تبين أن الصفة السائدة هي وجود نزف على جدار الأمعاء مع وجود غازات وتدمم لمحتويات الأعور مع احتقان في الأعضاء الداخلية، كما لوحظ في بعض الأرانب وجود احتقان في أغشية الأنف مع وجود إفرازات صديدية واحتقان في الأحشاء الداخلية، ووجد في عدد قليل من الأرانب تنكرز في الكبد مع احتقان في الأحشاء الداخلية،وفي عدد من الأرانب لم يلاحظ أي آثار مرضية.

أسفرت نتائج العزل البكتيري عن عزل الميكروب القولوني العصوي، الاستافيلوكوكس أوريس، الباستريلا مالتوسيدا، استربتوكوكس بيوجين، والكلبسيلا نيموني والسالمونيلا تيفيميوريوم بنسبة ٢٩,٨%، ٨,٥%، ٥,٣%، ٣,٨%، ١,٥% و٠,٢٥% على التوالي. أظهرت نتائج العلاج الحقلي أن الأفضلية للعلاج كانت بإستعمال بالانروفلوكساسين.