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STUDIES ON PSEUDOMONAS AERUGINOSA INFECTION IN RABBITS.

(With 2 tables)

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دراسات عن ميكروب السودوموناس إرجينوزا فى الأرانب

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لدراسة مدى تعرض مزارع الأرانب الحكومية والخاصة بمحافظة أسيوط للإصابة بميكروب السودوموناس إرجينوزا أجريت الفحوص البكتريولوجية لعدد ١٠٠ أرنب حديثة الوفاة. أوضحت الخواص المورفولوجية والتفاعلات البيوكيميائية عزل ٦ عترات من ميكروب السودوموناس إرجينوزا بنسبة ٦٪. بفحص ضراوة بعض العترات المعزولة تبين أن السودوموناس إرجينوزا ضارية للأرانب عمر ٦-٨ أسابيع بنسبة وفيات تصل إلى ٦٠٪.

SUMMARY

A total of 100 freshly dead rabbits collected from different governmental and private farms at Assiut province were subjected to post mortum and bacteriological examination. Six *Pseudomonas (Ps.) aeruginosa* strain were isolated; idenificaion was based on morphological and biochemical characters. Experimental infection in susceptible rabbits led to 60% mortality.

Key words: *Rabbits - Infection - Pseudomonas Aeruginosa*

INTRODUCTION

Pseudomans. aeruginosa was firstly described by schroetter (1872) under the name of Bacterium aeruginosa, while Migula (1900)

named the organism as *Ps. aeruginosa*. Pigoury et al.(1959) isolated *Salmonella typhimurium* mixed with Ps. From internal organs of rabbits aged 2-3 months showing symptoms of rhinitis, tympanitis and yellowish diarrhoea, mortality was 40%. *Ps. aeruginosa* had been reported in chinchillas by Devos et al. (1966) and was isolated from a subcutaneous absecess in a rabbit by Giorge (1966). Watson,. and Watson.. (1966) isolated from a herd of chinchillas *Ps. aeruginosa* which was frequently associated with enteritis.

Ps. aeruginosa was recovered 7 times from lungs and once from liver of 100 apparently healthy slaughtered. rabbits by Ghoniem et al. (1971).Olah et al. (1990) isolated *Ps. aeruginosa* from lungs of 2 rabbits out of 215 rabbits in a large rabbit farm that had died showing respiratory disease; poor environmental conditions were considered to predispose the animal to infection. Katoch et al. (1993) examined 35 rectal swabs from rabbits with digestive diseases and found that *Ps. aeruginosa* was recovered from 2 rabbits.

Ps. aeruginosa infection in rabbits did not receive much care in our country, therefore the work reported in this paper was undertaken to give an idea about the following.

- The incidence of *Ps. aeruginosa* in dead rabbits of different ages.
- Experimental infection of the isolated organism in susceptible animals.

MATERIAL and METHODS

Materials

1- Specimens:

A total of 100, freshly dead rabbits of various ages, sex and of different breeds, were collected from governmental and private farms at Assiut province.

2- Media:

A. Liquid: Peptone water, nutrient broth, glucose phosphate peptone, 1% peptone broth, semisolid agar, sugars (glucose, lactose, galactose, sucrose, dulcitol and maltose).

B. Solid: Nutrient agar, MacConkey's agar, Simmon's citrate agar, triple sugar iron agar, urea agar base, were prepared according to Cruickshank et al. (1975).

3- Reagents, chemicals and stain used were Kovac's, urea, methyl red, oxidase, Andrade's indicator, Gram's stain (Cruickchank et al., 1975).

4- Experimental animals and Ration (feed). 14 native rabbits 6-8 weeks old from local markets.

METHODS

I- Isolation and Identification of *Ps. aeurginosa.*

Samples from individual rabbits including heart, liver, spleen and lungs were collected aseptically. Loopfuls from these organs were inoculated into nutrient broth tubes and incubated at 37°C for 18-24 h. followed by subculturing on nutrient agar, MacConkey's agar plates at 37°C for 24-48 h. Suspected colonies were picked up and subjected to further identification based on the following characters and tests. (colonial morphology, pigment-production, Detection of musty smell, Gram's stain, oxidase test, growth on nutrient broth, motility test, sugar fermentation and special biochemical tests.)

II- Pathogencity test.

The rabbits used in this study were considered healthy and free from *Ps. aeruginosa* infection.

10 rabbits were inoculated subcutaneously with 0.5 ml of 24h. broth culture/rabbit using isolated organism while the last four rabbits were left as control.

RESULTS

I- Examination of dead rabbits:

P.M. examination revealed congestion of lungs, spleen and liver, peticheal haemorrhages on the internal organs, catarrhal and haemorrhagic enteritis, whitish necrotic foci in liver, cataharral inflammation of respiratory tract, abscesses in subcutaneous tissues. Six strains of *Ps. aeruginosa* were isolated from these rabbits (Table 1).

II- Pathogenic effect of *Ps. aeruginosa.*

14-balady rabbits, were used in this experiment. They were healthy free from parasites and diseases. 10-rabbits were

inoculated by S/C. route each one with 0.5 ml of 24 h. broth culture. The last 4 rabbit were inoculated with sterile broth "control". During the observation period (one month) clinical signs, P.M. lesions were recorded and trials for reisolation of inoculated organism were carried-out.

Results:

- Inoculated rabbits showed signs of respiratory tract troubles which were the main clinical manifestation. Besides there were loss of appetite, ruffled fur, increased thirst, depression, disinclination to move, inclination to separate in the corner of cage followed by purulent conjunctivitis, coughing, sneezing, anoroxia, diarrhoea and tympany and finally prostration before death. Six out of 10 rabbits inoculated with the organism died within 4-8 days after infection and the daily mortality are illustrated in table (2).

  The P.M. lesions of dead animals includes. congestion of internal organs, caecum filled with mucous fluid, peticheal haemorrhages on liver, spleen, catarrhal enteritis. Pneumonia could be observed in most of the examined cases and in few cases subcutaneous absesses were observed. The cotrol group of 4 rabbits did not show any signs of illness and survived till the end of 30 days.

  Reisolation trials were positive from internal organs especially the heart blood, liver and lungs of dead rabbits.

DISCUSSION

Due to lack of animal protein in Egypt, rabbit breeding is considered an important source of high quality protein since it demands simple requirements to start as well as its short production cycle and the large number of offsprings it gives.

In the present study, some light is thrown on the role of *Ps. aeruginosa* infection which may be incriminated as a cause of diseased condition affecting rabbits.

The results indicate that *Ps. aeruginosa* was recovered from 6% of the examined dead rabbits. The same organism was isolated previously by Pigoury et al. (1959) and Devos et al. (1966) from

chinchillas while Giorge (1966) detected *Ps. aeruginosa* from a subcutaneous abscess in a rabbit.

A closely similar percentage of isolation was reported on two occasions, one obtained by Ghoniem et al. (1971) who recovered *Ps. aeruginosa* 7 times from lungs with an incidence of 7% and the other by Katoch et al. (1993) who recorded 5.71%. A much lower percentage was reported by Olah et al. (1990) who isolated the organism from 2 lungs out of 215 rabbits with an incidence of 0.93%.

The clinical symptoms and P.M. pictures of diseased and dead infected rabbits reported in this study resemble these observed by many workers (Pigoury et al., 1959; Giorgi ,1966; Watson. and Watson, 1966 and Ohah et al., 1990).

Experimental infection of susceptible animals showed that the isolated strain were pathogenic with a mortality rate of 60%. So our attention was drawn to the importance of *Ps. aeruginosa* among rabbits since it caused a high rate of mortality among susceptible rabbits.

Finally it may be concluded that the application of the usual hygienic measures is the only reliable method for the protection of rabbits from such infection.

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Table (1): Isolation of identified strains of Ps. aeruginosa from the examined rabbits

No. of examined rabbits	Isolation of Ps. aeraginosa organism			
	Positive		Negative	
	No. of cases	%	No. of cases	%
100	6	6%	94	94%

Table (2): Mortality rate of rabbits inoculated with Ps. aeruginosa

Group	No. of rabbit infected	Dose of inoculum/rabbit	Daily deathes post infection 1 2 3 4 5 6 7 8 30	Total No. of deathes	No. of survivors	Mortality rate
Test	10	0.5 ml broth of Ps	2 2 1 1	6	4	60%
Control	4	0.5 ml sterile broth	----------	-	4	00.00%