

**PROTEUS INFECTION IN QUAILS
IN ASSUIT GOVERNORATE**

(With 2 Table and 3 Figures)

By

HEBAT- ALLAH ABD EL- HALIM MOHAMED

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عدوى ميكروب البروتيس في السمان في محافظة أسيوط

هبة الله عبد الحليم محمد

تم جمع ١٢٠ عينة سمان نافق حديثاً عمر ١- ٢٨ يوماً وقد أمكن عزل ميكروب البروتيس ميرابليس من هذه الحالات بنسبة ٢٥% كما تم تصنيف الميكروب بيوكيميائياً ثم تم عمل عدوى حساسية على كتاكيت سمان عمر ٢١ يوم بالميكروب المعزول وذلك بالحقن في الغشاء البريتوني والذي أدى إلى ظهور خمول وحركات عصبية بالطائر ، إضافة إلى احتقان بالكبد والترئة والكلى مع ترسيب حمض اليوريك في الحالبين ونسبة نفوق وصلت إلى ١٠٠% . كما تم عزل الميكروب من الطيور المعدية صناعياً في التجربة ثم تم عمل اختبار حساسية للميكروب المعزول والذي أوضح أن الدانوفلوكساسين والريمكتان كانت هي المركبات الأكثر تأثيراً.

SUMMARY

One hundred, and twenty freshly dead quail chicks (1 -28 days old) were collected. *Proteus mirabilis* (Pr. mirabilis) was isolated at rate of 25% from these cases. Experimental infection of healthy quails (21 days old) intraperitoneally by the isolated organism showing nervous signs, tremors of the body and leg muscles and coma. Gross lesions revealed congestion of the liver, lung and kidneys with precipitation of uric acid in the ureters with mortality rate reached to 100%. Reisolation of the organism from experimentally infected quails was succeeded. Sensitivity test revealed that the Danofloxacin, and Rimactan are the most effective drugs in vitro.

Key words: Proteus - quails.

INTRODUCTION

Pr. organism is conform to the family Enterobacteriaceae and it is characterized by swarming (the movement of cells in periodic cycles of migration and consolidation) on media solidified with agar to produce concentric rings on the plate around the point of inoculation. During migration, the swarm cells are long and possess many flagella, during consolidation, swarm cells divide for a period of time before producing another generation of swarm cells. Some strains produce a single uniform film without periodic cycles, some strains neither swarm nor spread and merely form distinct colonies. Factors critical to the initiation of swarming appear to be the development of the elongated swarm cells, the increased manufacture of flagella and the production of extracellular slime. On blood agar most *Pr. mirabilis* and *Pr. vulgaris* strains are swarming and the bacteria tend to turn the blood agar a chocolate-brown colour. Normally the bile salts in MacConkey agar prevent the swarming of *Pr. species* but if the surface of the agar is moist, swarming may be seen even on this medium (Coetzee and Socks 1960).

Pr. strains are widely distributed in nature. The more common species are *Pr. mirabilis* and *Pr. vulgaris*. Both species occur in the intestines of mice, rats, monkeys, dogs, cats, cattle, pigs, birds, reptiles and in a large proportion of the human population (Wilson and Miles 1975).

Various species of *Pr.* which exist mainly as saprophytes are known to cause septicemic disease in man and animals under certain conditions (Murdoch and Baker 1977, O'Driscoll, 1977).

Gorden and Jordan (1982) commented on the probable role played by *Pr. species* in causing embryonic death and reduced hatchability in poultry.

Pr. infection was incriminated as the cause of severe depression, coma and high mortality in successive broods of quail chicks (Sah *et al.*; 1983).

Poultry bacterial Pathogens such as *Proteus mirabilis* is one of the most common important bacterial infections that causes economic losses in Poultry industry. Additionally, it is of public health hazard (Safwat *et al.*; 1984, Yousief 1985, Skeeles 1991, Nagaraja *et al.*; 1991, El-Gharib *et al.*; 1993 and Lin and Chin-ling, 1996).

The aim of this work is to:

- Isolation and identification of *Pr.* organism.
- Experimental infection of isolated organism to 3 -weeks old quail chicks.

- Sensitivity test to show the most effective drugs against isolated organism.

MATERIAL and METHODS

Material:

1- Specimens:

- * Specimens from lung, heart blood and liver were collected from freshly dead 120 quail chicks.

2- Media:

*** Solid media:**

- Nutrient agar plates and slopes.
- MacConkey's agar plates.
- Blood agar plates.
- Urea agar base.
- T. S. I. agar.

*** Liquid:**

- Nutrient broth.
- Sugars (glucose and sucrose).
- Citrate (for citrate utilization test).

- * Semi solid agar tubes for motility test and gelatin for gelatin liquefaction test.

*** Reagents:**

- Methylc red.
- Kovac's.
- Voges – Proskauer.

*** Stain:**

- Gram's stain.

3- Pathogenicity test :

- Twenty, 21-days – old healthy quail chicks were obtained from the faculty of Agriculture farm in Assiut University. The birds were tested before experiment and proved to be free from Pr. and other organism.

4- Antibiotic sensitivity discs:

*** Include:**

- Danofloxacin (5µg), Gentamycin (10µg), Rimactan (30µg), Norfloxacin (10µg), Trimethobrim (5µg), Ampicillin (10µg), Streptomycin (10µg), Erythromycin (15µg), and Doxycycline (30µg).

Methods:

1- Specimens: From Liver, heart blood and lung were cultured in nutrient broth tubes and incubated at 37°C for 24 hour then loopfull from broth was subcultured on to nutrient agar, MacConkey's agar, and blood agar Plates and incubated at 37°C, for 24 hour, suspected colonies to be *Pr. mirabilis* were kept on to slope agar tubes for further identification by biochemical reactions (urease, methyl red, voges-proskauer, indol, gelatin liquifaction, citrate utilization and fermentation of glucose, and sucrose).

2- Pathogenicity test:

Twenty, 21 days old quail chicks were used, fifteen from them were inoculated intraperitoneally with 0.2 ml of 24 hour broth culture of *Pr. mirabilis* (Sah *et al.*; 1983) the remaining five quail chicks left as control.

3- Sensitivity test:

The determination of sensitivity of the isolated organism against different antibiotic discs were done according to Finegold and Martin *et al.*, (1982).

RESULTS

Postmortem examination of dead quails revealed septicemia (congestion and enlargement of liver, spleen and kidneys).

Bacteriological examination revealed that the suspected colony was compact pale, non-lactose fermenter on MacConkey's agar, characterized by fishy smell and swarming appearance on the surface of nutrient agar and non haemolytic on blood agar. By Gram's stain, the organism is gram-negative, straight motile rod.

Biochemical reactions showed that the suspected isolate of *Pr. mirabilis* produced H₂S, liquefy gelatin, ferment glucose, positive for urease, methyl red, and it was negative for indole and Voges-proskauer.

According to cultural characters of the colonies, morphology of the organism and the biochemical reactions, the isolates proved to be *Pr. mirabilis* (according to Lautrop 1975).

The frequency of the isolated *Pr. mirabilis* was 25%.

Biotyping of *Pr. mirabilis* isolates according to citrate utilization and sucrose fermentation (Edwards and Ewing 1972) revealed that the isolates were biotypes I and III. (Table I).

Pathogenicity test:

Quail chicks inoculated intraperitoneally showing severe depression, tremors of the body and leg muscles, nervous signs and coma ensued rapidly (Fig.1) and mortality reached to 100% within 3 days postinoculation. Gross lesions revealed congestion of liver (Fig. 2), lungs, kidneys and brain (Fig. 3) and the ureters were filled with urates (Fig. 4) also enteritis was observed.

Control group was clinically healthy without any signs or lesions.

Reisolation of *Pr. mirabilis* from liver, spleen, heart blood and lung of inoculated quail chicks was succeeded.

The effect of the different antibiotics on the isolated *Pr. mirabilis* are illustrated in table 2.

DISCUSSION

Poultry bacterial pathogen such as *Pr. mirabilis* is from the most common important bacterial infections that causes economic losses in poultry, additionally it is of public health hazard (EL-Ghariat *et al*; 1993 and lin and chin-ling 1996).

In this study, bacteriological examination revealed that *Pr. mirabilis* was recovered from 25% of dead quail chicks. This percent is less than that reported by sah *et al*; (1983) they recorded mortality of quails reached 70 – 90%. The postmortem lesions revealed congestion of liver, lungs and kidneys and the ureters were filled with urates as reported by authors.

Experimental infection of isolated organism to 3-weeks old quails intraperitoneally revealed tremors of the body and leg muscles with nervous signs and mortality rate reached to 100% within 3 days postinoculation. We differed with the result of Sah *et al*; (1983) who inoculated one week old quails intraperitoneally with the same dose of *Pr. mirabilis* they observed 80% mortality to the infected quails within 48 hours postinoculation. Also they reported that young chickens and growing quails above 2 weeks of age appeared to be resistant to infection, suggesting age resistance, but in our study we showed that 3 weeks old chickens quails were susceptible to infection.

Sensitivity test revealed that the Danofloxacin and Rimactan were most effective drugs against isolated organism. We somewhat differed with Hoque *et al*; (2002) who showed that Gentamycin was most effective while we found that Gentamycin is moderate sensitive

We concluded that *Pr. mirabilis* infection is of a special significance and causing high losses among young birds. The high mortality might be

attributed to septicemic shock due to the toxic effect associated with the lipopolysaccharide fraction of the organism.

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Table 1: Showing biotyping of pr. Mirabilis.

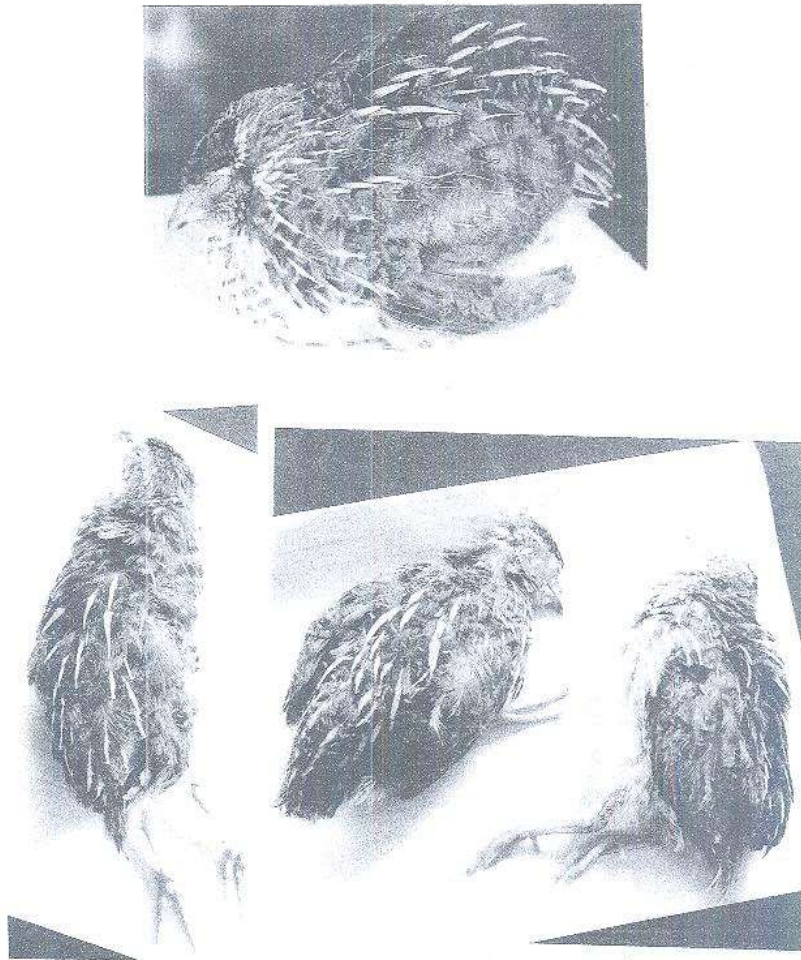
Biotype	Reactions	
	Citrate utilization	Sucrose fermentation
I	+ ve	+ ve
III	- ve	+ ve

Table 2: Illustrated the antibiotic test.

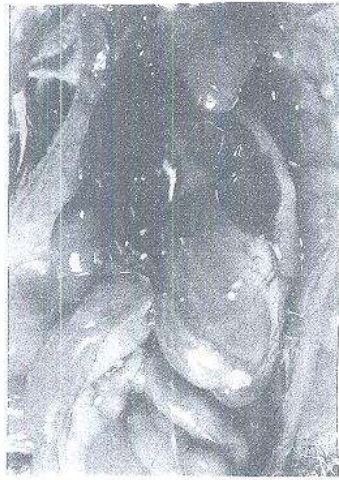
Antibiotic discs	Sensitivity of <i>Ps. aeruginosa</i> isolates
Danofloxacin	+++
Rimactan	+++
Norfloxacin	++
Gentamycin	++
Trimethobrim	-
Ampicillin	-
Streptomycin	-
Erythromycin	-
Doxycycline	-

+++ sensitive
++ weak sensitive

+ moderate sensitive
- resistant



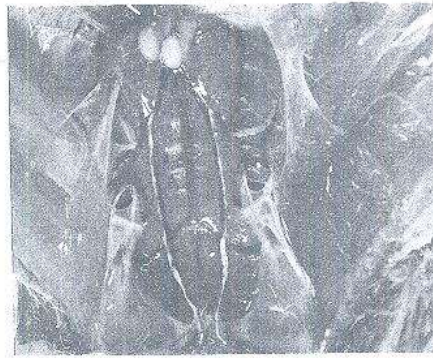
(fig. 1) Experimentally infected quails showing depression, coma and nervous signs



(fig. 2)
Congestion of the liver and lung
of Experimentally infected quails



(fig. 3)
Congestion of the brain of
Experimentally infected quails



(fig. 4)
Congestion of the Kidneys with deposition of ureats in the ureters of
Experimentally infected quails