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SOME STUDIES ON PSEUDOMONAS AERUGINOSA INFECTIONS IN PIGEONS IN SOHAG GOVERNORATE

(With 3 Tables)

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**بعض الدراسات عن ميكروب السيدوموناس ايروجينوزا في الحمام
في محافظة سوهاج**

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أجريت الدراسة على عدد ١٠٠ من الحمام جمعت من مناطق مختلفة في محافظة سوهاج، وقد أسفرت النتائج عن عزل ٦ حالة ايجابية لميكروب السيدوموناس ايروجينوزا بنسبة ٦%، وبإجراء العدوى الصناعية للميكروب في زغاليل الحمام عمر ١ شهر ثبت أن الحقن تحت الجلد كان الأكثر تأثيراً حيث وصلت نسبة النفوق ١٠٠% في حين كانت ٦٠% في الحمام الذي حقن عن طريق الفم، وبإجراء اختبار الحساسية على المعزولات وجد أنها جميعاً عالية الحساسية لكل من الأميكين، الأنروفلوكساسين والبوليمكسين بي والكولستين سلفات وكذلك الجنتاميسين بينما لم يؤثر كل من الأميسللين والأرثرومايسين والأكسي تتراسيكلين.

SUMMARY

In this study 100 cases of pigeons were collected from different localities at Sohag Governorate. 6 positive cases of *Ps.aeruginosa* were isolated with an incidence of 6%. The experimental infection in one-month-old squabs by different routes showed that subcutaneous route was highly effective with mortality rate 100%, while oral route resulted in 60% mortality. In vitro antibiotic sensitivity test revealed that the examined isolates were highly sensitive to amikin, enrofloxacin, polymyxin B, colistin sulfate and gentamycin and were resistant to ampicillin, erythromycin and oxytetracyclin.

Key words: *Pseudomonas*, pigeons.

INTRODUCTION

Nowadays, a great attention was payed toward pigeons as a trial to fulfill excessive demands of the increased population from the animal protein. The pigeons meat have known for their good taste and delicacy as well as a suitable source of protein of high biological value. (Casanovas *et al.*, 1995) demonstrated that the fecal bacterial flora of pigeons may be source of infections diseases to man in the city of Barcelona.

Pseudomonas infection of birds are of great importance because epidemics may spread rapidly through poultry flocks causing mortality in all ages, their resistance to different antibiotics make it too difficult to be treated. Also, *Pseudomonas aeruginosa* is one of the source of serious economic losses and is considered as one of most dangerous diseases which affects poultry industries all over the world. It causes morbidity, mortality and the clinical signs including septicemia, diarrhea and respiratory signs (Saif-Edin, 1983), Shahata *et al.*, 1988 and Tanios and Samia, 1999). *Ps.* infection in pigeons did not receive much care in our country, therefore the present work was done to give an idea about the following points:

- a- Prevalence of *Pseudomonas aeruginosa* infection among pigeons.
- b- Experimental infections using the isolated organisms in pigeons.
- c- In vitro sensitivity test of the isolated against different antibiotics.

MATERIALS and METHODS

1- Samples:

A total of 100 samples were collected from clinically diseased and freshly dead pigeons of different ages at Sohag province. The collected samples were packed in box and aseptically transferred to the laboratory without delay where they were immediately examined for bacterial isolations.

2- Bacteriological examination:

The samples were taken aseptically from cloacal, internal organs including liver, heart, spleen, lungs and intestine of clinically diseased and freshly dead pigeons and inoculated in nutrient broth and incubated at 37C° for 24 hours then subcultured onto selective *Pseudomonas* –agar base medium and incubated at 37C° for 24 hours to observe the non lactose fermenting colonies and subcultured onto nutrient agar plate and blood agar to observe the pigmentation and haemolysis. The identification was done according to (Quinn *et al.*, 2002).

3- In vitro- sensitivity:

The isolated of *Pseudomonas aeruginosa* were examined for their susceptibility to the different antibiotics. The paper discs supplied by Bio-Merieux and Oxoid namely Enrofloxacin (10ug), Colistin sulfate (10ug), Amikin(30ug), Flumequine(10ug), Ampicillin(10ug), Erythromycin(15ug), Streptomycin(10ug), Chloramphenicol(10ug), Gentamycin(10ug), Polymyxin B(10ug) and Oxytetracyclin(30ug). The disc diffusion technique of sensitivity to different chemotherapeutic agents were done according to (Finegold and Martin, 1986).

4- Experimental infection:

A total of thirty, one-month-old pigeons squabs were purchased from the local market, Sohag province were used in this study, squabs were observed and proved to be free from *Pseudomonas* organism, 3×10^8 colony forming unite adjusted by Macferland density technique of viable identified organism of *Pseudomonas aeruginosa* (Finegold and Martin, 1986) were inoculated orally and subcutaneous. Symptoms appeared on infected pigeon squabs were recorded. The dead Squabs were undergoes postmortem findings and reisolation of causative agents.

RESULTS

The clinical signs observed in the diseased pigeons were depressed, respiratory difficulties and diarrhea. While postmortem lesions, general hemorrhages were seen on the surface of the visceral organs. The relative incidence of the recovered *Pseudomonas aeruginosa* was shown in Table (1), 6 isolates were identified to be *Ps.aeruginosa* with an incidence of 6%.

The results of antibiogram on the *Ps. aeruginosa* revealed that amikin, enrofloxacin, polymyxin B, colistin sulfate and gentamycin were the most effective while ampicillin, erythromycin and oxytetracyclin had no effect (Table 2).

As shown in Table (3), the pigeon squabs that infected via s/c revealed death of the most within the first 18 hours while the groups that infected via orally revealed death of 6 pigeon squabs after 24 hours and no symptoms were observed in control group.

Table 1: Incidence of *pseudomonas aeruginosa* isolates from pigeons.

| Examined samples | No. of samples | Positive sample | |
|------------------|----------------|-----------------|---|
| | | No | % |
| Pigeons | 100 | 6 | 6 |

Table 2: Shows the results of antimicrobial discs.

| Antimicrobial agents | Sensitivity of <i>Ps.aeruginosa</i> isolates |
|----------------------|--|
| Enrofloxacin | +++ |
| Colistin sulfate | +++ |
| Amikin | +++ |
| Flumequine | ++ |
| Ampicillin | - |
| Erythromycin | - |
| Streptomycin | + |
| Chloramphenicol | ++ |
| Gentamycin | +++ |
| Polymyxin B | +++ |
| Oxytetracyclin | - |

+++ = Highly sensitive
 ++ = Moderately sensitive
 + = Weakly sensitive
 - = Resistant

Table 3: show the results of experimental infection of pigeon squabs with *Ps.aeruginosa* (0.5 ml of 3×10^8 c.f.u / ml).

| Group No. | No. of infected birds | Route of inoculation | Daily death post infection | | | | | | | | | | Total No. of death | Mortality rate |
|-----------|-----------------------|----------------------|----------------------------|---|---|---|---|---|---|---|---|----|--------------------|----------------|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 14 | | |
| 1 | 10 | Orally | - | 2 | 3 | - | 1 | - | - | - | - | - | 6 | 60% |
| 2 | 10 | S/c | 9 | 1 | - | - | - | - | - | - | - | - | 10 | 100% |
| 3 | 10 | Control | - | - | - | - | - | - | - | - | - | - | | 0% |

C. F. u = colony forming unite
 S/C = subcutaneous

DISCUSSION

Pseudomonas aeruginosa is a widely distributed in nature as a non pathogenic microorganism, the saprophytic nature and their widely distribution in different environmental sources and their opportunistic inducing of disease among different birds, although the importance of *Pseudomonas aeruginosa* infections but no available literature studied the infection of *Ps.aeruginosa* among pigeons.

In this study, bacteriological examination revealed that the prevalence of *Ps.aeruginosa* among pigeon samples in a total percentage 6%. A much lower percentage was reported by (Shahata *et al.*, 1988 and

Younes *et al.*, 1990) who recovered *Ps.aeruginosa* from dead growing chickens with an incidence of 4.7% and 4.6% respectively. On other hand, (Saif-Edin, 1983 and EL-Shorbagy *et al.*, 2001) isolated *Ps.aeruginosa* from chickens and quails with an incidence of 21% and 17.5% respectively.

The experimental infections in pigeon squabs with *Ps.aeruginosa* via orally and subcutaneous revealed that, the subcutaneous route of inoculations was the most effective, producing mortality rate 100% while the oral route induced mortality rate 60%. These results were similar to those recorded by (Shahata, 1981, Saif-Edin, 1983, Shahata *et al.*, 1988, Abdel-Gwad *et al.*, 1998, Tanios and Samia 1999 and EL-Shorbagy *et al.*, 2001) who recorded that *Ps.aeruginosa* causes 100% mortality when inoculated subcutaneous in different age of birds.

In vitro antibiogram sensitivity of the *Ps.aeruginosa* isolates against the different antibiotics, revealed that amikin, enrofloxacin, polymyxin B, colistin sulfate and gentamycin were the most effective while ampicillin, erythromycin and oxytetracyclin had no effect. Similar results were obtained by (Saif-Edin, 1988, Shahata *et al.*, 1988 and EL-Shorbagy *et al.*, 2001).

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