



Surveillance On ESBLs Salmonella Serovars In Chickens

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Abstract

In the present study a total of 240 samples were collected from clinically diseased chicks and examined for the presence of Salmonella. Fifty bacterial isolates were recovered and proved to be belonged to Salmonella serovars with an incidence of 20.8%. Salmonella isolates were serologically typed as S.Kentucky 20% (10/50), S. Infantis 24% (12/50), S. Hiedelberg (10% (5/50), S. Labadi 6% (3/50), S. Enteritidis 14% (7/50), S. Typhi 4% (2/50), S. Agona 4% (2/50), S. Pullorum 2% (1/50), and S. Newport 6% (3/50). A large percentage of isolates were resistant to Ampicillin (90%), Nalidexic acid (88%), Sulphamethoxazole + Trimethoprim (82%) and Tetracyclines (82%). Approximately 86% of the isolates demonstrated multiple-resistance (i.e. resistance to 3 groups antimicrobial types). Phenotypic detection of ESBLs by using screening test (Cefinase®) revealed that 32% of isolates were positive for extended spectrum beta lactimase (ESBLs).

Key words : (Salmonella ,Antibiotic sresistance , ESBLs).

INTRODUCTION

Salmonellosis is a food borne disease of primary concern in industries and developing countries. It is one of the major public health problems in terms of socio-economic impact (Gracia and Finlay, 1994). Poultry birds have frequently been incriminated as a mean of salmonella contamination and consequently act as major source of the pathogen in humans (Baümeler et al., 2000). Salmonella spp. is Gram negative, usually motile rods. The bacterial genus Salmonella is divided into two species Salmonella enteric and Salmonella bongori; Salmonella enteric itself is comprised of 6 subspecies. They are S. enteric subsp. enterica, S. enteric subsp. arizonae, S. enteric sub spp. diarizonae, S. enterica subsp. indica, S. enterica subsp. houtenaer I, II, III a, III b, IV and VI, respectively (Popoff and Minor, 1997). Salmonellosis, because of its public health significance, has become one of the most important bacterial diseases affecting poultry. Resistance of Salmonella to commonly used antimicrobials is increasing both in the Veterinary and public health sectors and has emerged as a global problem (Molla et al., 2003). The present study was done for the

isolation and characterization of Salmonella spp. from broilers by using enrichment and selective media and their identification by conducting different biochemical tests along with studies on the their antibiotic sensitivity and resistance patterns.

Presence of extended spectrum beta lactimase ESBL organisms in poultry farms portend great danger in livestock and humans in particular since the importation of ESBL-producing bacterial strains through this route has the potential to cause widespread dissemination of antibiotic resistant pathogens which cause community-acquired infections (Winokur et al., 2000 and Brinas et al., 2003). Several clusters of virulence genes are important for the adhesion to specific cell types of the mucosa, the invasion of enterocytes and for the triggering of fluid secretion leading to the diarrheal symptoms. Pathogenesis of Salmonella depends on its ability to survive and replicate inside host cells. This virulence trait is linked to the ability to cause systemic infections and a large number of genes are required to enable Salmonella to cope with nutritional limitations, to avoid clearance by the host immune system or survive damage

So the aims of the present study were detection the incidence of ES β L Salmonella serovars which

MATERIALS AND METHODS

Samples:

A total of 240 samples were collected randomly from broilers clinically diseased chicks diarrheic, loss of appetite and huddling together. These were 45 liver, 60 yolk sacs, 40 lung, 50 caecum and 45 spleen. The samples were then brought to the Microbiology. Dept. Faculty. of Vet. Med. Cairo University, in sterile wide-mouth screw capped bottles under cooling and then analyzed for the presence of Salmonella.

Isolation of Salmonella:

Under complete sterile condition, were examined for isolation and identification of Salmonellae according to the ISO 6579 (2002), the recovered isolates were serotyped in the Central Lab for Beta (β) -lactamase detection using Nitrocefine disks (Cefinase[®])

According to the manufactured instruction, the Cefinase disc was impregnated with the chromogenic cephalosporin, Nitrocefine. This compound exhibits a very rapid colour change

RESULTS

Out of 240 examined samples 50 Salmonella isolates were recovered with an incidence of 20.8%. Recovered Salmonella isolates were serologically typed as S. Kentucky 20% (10/50), S. Infantis 24% (12/50), S. Hiedelberg 10% (5/50), S. Labadi 6% (3/50), S. Enteritidis 14% (7/50), S. Typhi 4% (2/50), S. Agona 4% (2/50), S. Pullorum 2% (1/50), and S.

DISCUSSION

Poultry is one of the main reservoirs of Salmonella (Mohamed et al., 1999). Salmonellosis in poultry is worldwide problem both for poultry and as a vehicle for human disease (Sharp, 1991). In our study the incidence rate of Salmonella serotype were 20.8%, the serotyping of recovered Salmonella isolates revealed that there were as S. Kentucky 20% (10/50), S. Infantis 24% (12/50), S. Hiedelberg 10% (5/50), S. Labadi 6% (3/50),

recovered from chickens and its public health important.

Quality Control on Poultry Production (CLQP) in Dokki, Giza, Egypt, according to Kauffmann and Das Kauffmann (2001).

Antimicrobial sensitivity test:

The behavior of all Salmonella isolates was checked for their sensitivity against the antimicrobial agents. The isolates were submitted to sensitivity tests according to the Bauer-Kirby method (Bauer et al., 1966). The antibiotics (Oxoid, Basingstoke, UK) used were: ampicillin (10 μ g), cefotaxime (30 μ g), ceftazidime (30 μ g), streptomycin (10 μ g), gentamicin (10 μ g), kanamycin (30 μ g), tobramycin (10 μ g), neomycin (30 μ g), nalidixic acid (30 μ g), ciprofloxacin (5 μ g), ofloxacin (5 μ g), chloramphenicol (30 μ g), tetracycline (30 μ g), and trimethoprim-sulfamethoxazole (25 μ g). Results were interpreted by measuring inhibition zones with a millimetre scale.

from yellow to red as the amide bond in the β lactam ring is hydrolyzed by a β lactamase. When a bacterium produces this enzyme in significant quantities, the yellow-colored disc turns red in the area where the isolate is smeared.

Newport 6% (3/50). Antibiogram revealed that a large percentage of isolates were resistant to Ampicillin (90%), Nalidixic acid (88%), Sulphamethoxazole + Trimethoprim (82%) and Tetracyclines (82%). Approximately 86% of the isolates demonstrated multiple-resistance (i.e. resistance to P3 antimicrobial types). Phenotypic detection of ES β Ls by using screening test (Cefinase[®]) revealed that 32% (16/50) of isolates were positive for ES β Ls.

S. Enteritidis 14% (7/50), S. Typhi 4% (2/50), S. Agona 4% (2/50), S. Pullorum 2% (1/50), and S. Newport 6% (3/50). The emergence of antimicrobial drug resistance is a matter of concern. Persons with infections caused by antimicrobial drug-resistant Salmonella spp., particularly nalidixic acid-resistant Salmonella spp., are more likely to die, are more likely to be hospitalized, for longer periods than patients with infections caused by susceptible strains (Lee et al., 1994; Helms et al., 2002 and Helms et al., 2004). The antibiogram of the present study show that large percentage of serotypes

(stains) were resistant to ampicillin (90%), Nalidexic acid (88%), sulphamethoxazole + trimethoprim (82%) and tetracyclines (82%). Ampicillin resistance was observed in all the isolated serotype, which is in agreement with the findings of (Suresh et al., 2000). They also observed a higher proportion of ampicillin-resistant salmonella strains isolated from eggs. The resistance to tetracycline was observed in 94.73% of the isolates, which is higher than that reported in different studies: 46.6% in Senegal and 36% in Portugal. Tetracycline has been one of the most commonly used antibiotics for production animals; from day-old chicks to broiler chickens, they are exposed to antimicrobial drugs during their growth phase. Therefore, resistance to drugs such as tetracycline could be expected since the members of this class (chlortetracycline and oxytetracycline) are approved for use in broiler ration for the purpose of growth promotion. The uncontrolled use of the antimicrobial agents in food animals may have contributed to the

CONCLUSION

From the present study it was concluded there were large percent of ESβLs Salmonella serovars recovered from chickens with high public health important.

RECOMMENDATIONS

- Survey of ESβLs producing isolates in poultry field is urgent and application of Cefinase® screening test for detection of ESβLs in Salmonella isolates in poultry was reliable and could decrease the time needed for detection.
- It is necessary to decrease the huge use of antibiotics in poultry field in Egypt.

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development of the pattern of resistance observed. The lack of stringent regulations and monitoring in dispensing of antibiotics in Veterinary establishments as well as the mass inoculation of herds of animals by some farmers has been raised as a contributory factor in the increase in antibiotic resistance. Administration of antimicrobial agents in chickens creates selection pressure that favors the survival of antibiotic resistant pathogens. Resistance of Salmonella to commonly used antimicrobials is increasing both in the Veterinary and public health sectors and has emerged as a global problem. Special emphasis has been put on Gram negative bacteria producing enzymes conferring resistance against beta lactam antibiotics, such as third and fourth generation Cephalosporins, Monobactams and Carbapenems, commonly known as extended spectrum beta-lactamases (ESBLs) (Molla et al. 2003). Our phenotypic of extended spectrum β-lactamase expression analysis revealed that the subsequently β-lactamase were 32%.

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الملخص العربي

في هذه الدراسة تم فحص ميكروبيولوجي لعدد 240 عينة مختلفة من طيور التسمين . وقد أظهرت نتائج تحليل العزل أن نسبة العزل الكلي للسالمونيليا بين طيور التسمين هو 20.8% وقد بينت نتائج التصنيف لمعزولات التسمين أن 20% (50/10) معزولة تابعة لسالمونيليا كنتاكي و 24% (50/12) سالمونيليا إنفانتيس و 14% (50/7) سالمونيليا إنترتيندس و 10% (50/5) سالمونيليا هيدلبرج و 2% (50/1) سالمونيليا بالورم و 6% (50/3) سالمونيليا نيوبورت و 6% (50/3) سالمونيليا لوبيدي و 4% (50/2) سالمونيليا أجونا و 4% (50/2) سالمونيليا تيفي. وكشف اختبار الحساسيه أن 86% من المعزولات كانت متعددة المقاومة للمضادات الحيوية (مقاومة لأكثر من 3 مجموعات) وكانت أعلى نسبة مقاومة لكل من الأمبيسيلين 90% و حمض الناليدكسيك 88% يليها السلفاميثوكسازول مع الترايميثوبريم و 82% و التتراسيكلين 82%. وتمت دراسة التحليل المظهري لوجود ظاهرة انزيمات البيتا لاكتاميز واسعة الطيف بين المعزولات باستخدام أقرص السفينيز والتي أوضحت النتائج ايجابية 32% من المعزولات. الكلمات الدالة: (السالمونيليا -مقاومة المضادات الحيوية - البيتا لاكتاميز)