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Short Communication

Bacteriologic survey on infectious cellulitis in broiler chickens in Masjid Soleiman slaughterhouse, Iran

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ABSTRACT

Over the past several years increasing of cellulites in some regions of the country has been reported. During August and September of 2005, 4.48% of total slaughtered broilers were condemned due to cellulitis in Masjid Soleiman slaughterhouse. Four out of 98 slaughtered flocks were infected to cellulitis. The condemnation rates in infected flocks were: flock 1: 1.55%, flock 2: 0.993%, flock 3: 0.639% and flock 4: 1.66%. Bacteriologic examinations using standard biochemical techniques showed *E.coli* has been the most commonly isolated bacteria (90%). Sensitivity test showed diverse results which may represent different levels of various antibiotics consumption by poultry flocks.

Keyword: Cellulitis, *E.coli*, Masjid Soleiman

INTRODUCTION*

Avian cellulitis, sometimes referred to as Inflammatory Process (IP), caused by gram positive and gram negative bacteria, is a diffuse spreading, edematous, infective inflammation of the deep subcutaneous tissues, occasionally extending into the muscle, which is characterized by sheets of caseated and fibrino heterophilic exudates in subcutaneous tissues located in the skin between the thigh and midline (Ghanbarpour et *al* 2003, Peighambari *et al* 1995, Saif *et al* 2003). The condition occurs primarily in broilers and less in turkeys (Ghanbarpour et *al* 2003). Cellulitis is caused by damages to the skin in 2-3 week-old chickens, by introduction of bacteria and yielding plaque-like lesions under the skin. The mortality in mild and sporadic cases, without septicemia is very low (Elfadil *et al* 1996, Ghanbarpour *et al* 2003).

Escherichia coli is the predominant bacteria isolated from cellulitis lesions although many other types of bacteria such as *Staphylococcus aureus, Streptococcus dysgalactiae, Proteus vulgaris, Aeromonas, Citrobacter ferundi, Pseudomonas aeruginosa, Aerobacter, Enterobacter, Pasteurella multocida, anaerobes such as Clostridium (colinum, septicum, perfringens)* and *Arcanobacterium (Actinomyces, Corynebacterium) pyogenes* have

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been associated with cellulitis. By the way, cellulitis in turkeys appears to be a different syndrome and is caused by the anaerobic bacteria *Clostridium perfringens* (Glunder 1990). *E. coli* isolated from cellulitis lesions were capable of causing systemic disease in broilers. It has also reported that an isolate of *E.coli* from airsaccultis in a turkey was capable of causing cellulitis in broilers (Elfadil *et al* 1996). It seems *Escherichia coli* remains the most commonly isolated, although not *all E.coli* are capable of causing cellulitis, and the group of *E. coli* that can cause cellulitis has quite a diverse range of characteristics (Ondeka *et al* 1997). It appears that *the E.coli* capable of causing cellulitis must have some special characteristics such as virulence factors. The virulence factors include aerobactin, colisin and cytotoxin are required for *the E.coli* strain to be causative (Norton *et al* 2006, Peighambari *et al* 1995). There are some different related factors such as: farm management, breed and sex, heat stress, nervousness of flocks, environmental and temperature conditions, density, lighting programs, wet and unsuitable litters, ventilation, nutritional entities, calorie/ protein ratio, feed additives, amino acids and vitamin defeciency could be associated with an increase in skin scratches that could lead to cellulitis (Elfadil *et al* 1996, Glunder 1990). The severity of the disease is related to genetic status and immunosuppressive diseases such as Infectious Bursal Disease (IBD) and Chichen Infectious Anemia (CIA), which cause lesions in 2-4 hrs or less to 72 hrs.

Due to lack of sufficient data regarding cellulitis, this study was carried out to assess cellulitis and condemnation rate in slaughtered broilers in city of Masjid Soleiman / Khoozestan province, located in a torrid zone in summer 2005.

MATERIALS AND METHODS

The study was carried out in industrial slaghterhouse in Masjid Soleiman.

Selection of carcasses: The carcass inspection for observing probable lesions of cellulitis were done after the carcasses has been defeathered. The lesions were first noticed on the lower abdomen with areas of yellow and thickened skin. Other areas were contained feet, thighs and top of the tail and in general areas with low or no feather coverage. Closer examination of the areas revealed plaques of pus underneath the skin, and underlying muscles with small hemorrhages. The degree of inflammation and the size of the lesions were vary from one carcass to another, with some localized lesions to an extensive serpurulent inflammation covering the abdomen. Suspected carcasses were selected for bacteriological examinations. Ten carcasses with no visible lesions were also selected as controls. The carcasses were shipped on ice to the bacteriology laboratory.

Bacteriology. Sterile cotton swabs were used to collect fibrinopurulent materials from the surface and depth of lesions in subcutaneous tissues, observing the strile conditions and were streaked onto three blood agar plates and one Mac Conkey agar plate. Mac Conkey plate and a blood agar plate were placed into aerobic incubator in 37 °C for 24 hrs. The two other blood agar plates were incubated under anaerobic and micro aerophilic conditions in 37 °C for 48-72 hrs. Thence, selected colonies stained by gram technique, and complementary examinations using culture in differential media were done for both gram positive and gram negative bacteria. Catalase test was used for gram positive bacteria and oxidase test along with culture into lactose broth, TSI agar, INVIC and EMB agar were used for negative bacteria, respectively.

The sensitivity test using penicillin, ampicillin, tetracycline, amikacin, streptomycin, bacitracin, cephlexin, gentamycin and sultrim discs for gram positive bacteria and flumequine, cyprofloxacin, enrofloxacin, lincospectin, tetracycline, erythromycin and sultrim discs for gram negative

bacteria onto Muller-Hinton agar was done. The results were read after 24 hrs incubation in 37 °C.

RESULTS ANA DISCUSSION

Cellulitis in broiler chickens is only detectable at slaughter, once the carcass has been plucked and scalded. It is one of the principal grounds for the condemnation of chickens in slaughterhouses (Derakhshanfar & Ghanbarpour 2002, Ghanbarpour *et al* 2003). In August and September 2005, from total of $17.9x10^4$ kgs slaughtered broilers, $18.8 x10^4$ kgs were condemned (4.48% of total slaughter were condemned due to cellulitis). Four out of 98 slaughtered flocks were infected to cellulitis. The condemnation rates in infected flocks were: flock 1: 1.55%, flock 2:0.993%, flock 3: 0.639% and flock 4:1.66%. Bacteriologic examinations using standard biochemical techniques from 80 carcasses suspected to cellulitis were identified 72 *E. coli* isolates (90%), 5 *Staphylococcus aureus* isolates (6.25%) and 3 *Streptococcus dysgalactiae* isolates (3.75%). The most frequent *E. coli* serotype was O78 (63.3%).

Sensitivity test results. The resistance percentages of *E. coli* isolates against different antibiotics were as following: flumequine (33.3%), cyprofloxacin (31.94%), enrofloxacin (54.16%), lincomycin + spectinomycin (1.38%), tetracycline (43.05%), erythromycin (86.11%) and sulfanamide + trimetoprim: (33.3%). The resistance percentages for *Staphylococcus aureus* isolates and Streptococcus *dysgalactiae* isolates were: penicillin (37.5%), ampicillin (25%), tetracycline (50%), streptomycin (50%), bacitracin (87.5%). Both groups of bacteria were sensitive to amikacin, cephalexin and sulfanamide+trimetoprim. As this study showed, the condemnation rate due to cellulitis in Masjid Soleiman in summer 2005 was 4.48%. Studies show that cellulitis is now one of the major causes of condemnation in broiler chickens in slaughterhouses all around the world, which makes it a source of major financial losses. In a study in 1999 by Montreal University, cellulitis was recognized the first cause of condemnation in broiler chickens in Canada. Same as our study, *E. coli* has been the most commonly isolated bacteria, in Ontario province of Canada and the USA (Glunder 1990, Norton & Hess 1999), although *Staphylococcus* and *Streptococcus* isolates were of the following degrees of importance. Peighambari et.al. studied *E. coli* islolates from cellulitis in 1995 in Canada and were able to reproduce the disease by isolated *E. coli* in experimental condition (Elfadil *et al* 1996, Norton *et al* 2006, Ondeka *et al* 1997, Peighambari *et al* 1995).

The present study also showed that the first cause of cellulitis was *E. coli*, in 72 cases (90%). Sensitivity test showed *E. coli* isolates were sensitive more to sulfonamid+trimetoprim than enrofloxacin, cyprofloxacin and flumiquine which may account for different levels of consumption by poultry breeders. The difference results emphasizes that the cellulitis is a multifactorial enemy that should be combated on multiple fronts. The increased incidence of cellulitis over the past several years is probably related to various factors. Considering different results, it seems decreasing the age of slaughtering, upgrading immunity status and improvement the welfare and management policies of broiler flocks lead to less carcass condemnations. Considering the importance of cellulitis, it is suggested that to do more complete studies in different weather conditions in other regions of the country to clarify the situation.

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