Detection of antibodies against Mycoplasma gallisepticum and Mycoplasma synoviae in day-old broiler chicks and broilers

Ανίχνευση αντισωμάτων έναντι του *Mycoplasma gallisepticum* και του *Mycoplasma synoviae* σε νεοσσούς και ορνίθια κρεοπαραγωγής.

Γ.Κ. Γεωργιάδης

**ΠΕΡΙΛΗΨΗ.** Κατά τη δεκαετία του 1990, στην Κλινική Παθολογίας των Πτηνών, εξετάστηκαν 882 σερα για την ανίχνευση αντισωμάτων έναντι του *Mycoplasma gallisepticum* (M.g.) και του *Mycoplasma synoviae* (M.s.), που συνήθως εμπλέκονται στα αναπνευστικά νοσήματα των κρεοπαραγωγών ορνιθίων. Από τους σερα, οι 188 προέρχονταν από νεοσσούς ημέρας και οι 694 από κρεοπαραγωγά ορνίθια με αναπνευστικά προβλήματα. Η μέθοδος που εφαρμόστηκε ήταν η ταχεία σεροσυγκόλληση σε πλάκα. Από τους σερα των νεοσσών, 40 (ποσοστό 21,27%) ήταν θετικοί έναντι του M.g., ενώ 76 (ποσοστό 40,42%) ήταν θετικοί έναντι του M.s. Από τους σερα των κρεοπαραγωγών ορνίθια, θετικοί έναντι του M.g. ήταν 133 (ποσοστό 19,16%), ενώ έναντι του M.s. 356 (ποσοστό 51,29%). Όπως φαίνεται από τα αποτελέσματα της μελέτης αυτής, η συχνότητα των θετικών σερα ως προς το M.s. είναι υψηλότερη σε σχέση με αυτή ως προς το M.g., τόσο στους νεοσσούς, όσο και στα κρεοπαραγωγά ορνίθια. Το γεγονός αυτό δείχνει και τη μεγαλύτερη σηµασία που παρουσιάζει το M.s. στην εμφάνιση των αναπνευστικών νοσημάτων στα πτηνά αυτά.

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**Detection of antibodies against *Mycoplasma gallisepticum* and *Mycoplasma synoviae* in day-old broiler chicks and broilers.**

Georgiades G. K.

**ABSTRACT.** During the last decade, in the Clinic of Poultry Diseases, 882 sera were examined for the detection of antibodies against *Mycoplasma gallisepticum* (M.g.) and *Mycoplasma synoviae* (M.s.), which are usually involved in the respiratory diseases of broilers. Out of these sera, 188 derived from day-old broiler chicks and 694 from broilers with respiratory disease. Rapid serum agglutination test was used as diagnostic method. Among day-old broiler chick sera, 40 (21.27%) were M.g. positive, while 76 (40.42%) were M.s. positive. Among broiler sera, 133 (19.16%) were M.g. positive, while 356 (51.29%) were M.s. positive. The results of the present study show that the prevalence of the M.s. positive sera is significantly higher (P<0.001) than this of the M.g. positive sera, not only in day-old broiler chicks, but also in broilers, which indicates the greater importance of M.s. in the occurrence of respiratory disease in these birds.

**Keywords:** Mycoplasma gallisepticum, synoviae, chicks, broilers

**INTRODUCTION**

Various mycoplasma species are encountered in chickens including *M. gallisepticum*, *M. synoviae*, *M. iowae*, *M. gallinarum*, *M. gallinaceum*, *M. pullorum*, *M. iners*, *M. lipofaciens*, *M. glycophilum*, *Acholeplasma laidlawii* and *Ureaplasma gallorale*. Among them, *Mycoplasma gallisepticum* and *Mycoplasma synoviae* are usually associated with respiratory disease in broilers. 

*Mycoplasma gallisepticum* (M.g.), which was originally considered as the primary mycoplasma species involved in the respiratory diseases in broilers, may cause an uncomplicated mycoplasmosis. The severity and duration of the disease depends on the virulence of the involved
Mycoplasma synoviae (M.s.) infections are worldwide in distribution. They may occur as systemic, affecting the synovial membranes of joints and tendon sheaths (infectious synovitis) or subclinical respiratory infections. In the USA, M. synoviae was more frequently associated with respiratory disease in broilers.

The factors affecting the severity and duration of CRD originally caused by M.g. (viruses, bacteria, management practices) might also exacerbate infections with M.s., resulting in severe economic losses. Immunosuppression caused by infectious bursal disease (Gumboro disease) as well as low environmental temperatures enhance air sac lesions produced by M.s.

M.g. and M.s. are transmitted laterally and vertically. Lateral transmission occurs via the respiratory tract. Infection with M.s. may reach 100% in a flock because it is transmitted faster than M.g., although many birds may not show signs or produce lesions in the joints. Vertically transmitted natural and experimental infections are very essential in the spreading of the disease. Following experimental infection of broiler breeders, M.s. was found in the trachea of their day-old progeny, whereas the number of infertile eggs and dead embryos was increased six to thirty one days post inoculation.

Despite the broad use of recommended vaccines (e.g. against IB and ND) and of new medicinal drugs, recent experience indicates that respiratory diseases in broilers still remain a problem of great economic concern in Greece. The results of the serologic tests used in the Clinic of Poultry Diseases for the detection of antibodies to M.g. and M.s. were investigated in order to demonstrate the role of M.s. in the development of respiratory disease in broilers.

MATERIALS AND METHODS

Out of 882 totally examined sera from 1990 to 1999 for the detection of antibodies to M.g. and M.s., 188 derived from 26 one-day-old chick flocks and 694 from 93 broiler flocks with respiratory disease.
Ερευνή παρατηρήθηκε αύξηση των αγονών αυγών και των θανάτων των εμβρύων, 6-31 μέρες μετά τη μόλυνση.

Επειδή τα τελεσμάτα επιβεβαιώνουν την οθόνη της διαπίστωσης για τον εμβρύο και την εμβρυώνα, η ενστάλαξη του αντιγόνου M.s. ή M.g. ισχύει με αρνητικούς αντικειμενοσκευαστή μικροσκόπια από την εμφάνιση των καταστάσεων αυτών.

Τα αποτελέσματα αυτών παρουσιάζονται ακολούθως.

**ΥΛΙΚΑ ΚΑΙ ΜΕΘΟΔΟΙ**

Τα αποτελέσματα αυτών παρουσιάζονται ακολούθως.

Το σκοπό της απόδειξης του αντιγόνου M.s. και, (M.g.) αντισώματα έναντι των μυκοπλασμάτων M.g. και Ms., οι 188 προέρχονταν από 26 αγορά νεοσσών και από 694 από 93 αγορά νεοσσών ορνιθιων κρεοπαραγωγής.

**ΑΠΟΤΕΛΕΣΜΑΤΑ**

Σύμφωνα με τα αποτελέσματα της δοκιμής ορολογίων, στους νεοσσούς αντισώματα έναντι του M.g. αντισώματα έναντι του M.s. αντισώματα έναντι του M.g. αντισώματα έναντι του M.s. από 13 σμήνη, ενώ αντισώματα έναντι του M.s. από 76 οροί από 18 σμήνη. Από τους οροί των κρεοπαραγωγών ορνιθιων που εξετάστηκαν, 133 (ποσοστό 40.42%) που προέρχονταν από 31 σμήνη ήταν θετικά αντισώματα. Επιπλέον, η διακύμανση αυτών των αντισώματων έναντι του Μ. ήταν θετικό στη συνέχεια, κατά τη δεκαετία του 1990, ως προς την παρουσία αντισώματα έναντι των M.s. ή M.g. ήταν θετικό στη συνέχεια, κατά τη δεκαετία του 1990, ως προς την παρουσία αντισώματα έναντι των M.s. ή M.g.

**ΣΥΖΗΤΗΣΗ - ΣΥΜΠΕΡΑΣΜΑΤΑ**

Όπως πρόκυπτε από τα αποτελέσματα των εξετάσεων, το πρόβλημα των αναπνευστικών εγκαταστάσεων, στην παράδοση των Πτηνών κατά τη δεκαετία του 1990, ως προς την παρουσία καταστάσεων αυτών.

Rapid serum agglutination test was used to demonstrate the presence of antibodies to M.g. and M.s. in day-old chicks' and broilers' sera. Glass plates and colored M.g. and M.s. antigens (Intervet) were used for the test.

A drop of the examined serum was added to a drop of the antigen (M.g. or M.s.) on each well-cleaned glass plate (according to the manufacturer). Serum and antigen were mixed by rotating the plate and the test was interpreted (occurring or not of blue colored flocculation) within two minutes. Each test included positive and negative reference sera. Statistical analysis was performed using "statistix" software.

**RESULTS**

According to the results of the rapid serum agglutination test, 40 one-day-old chick sera (21.27%) from 13 flocks were M.g. positive and 76 one-day-old chick sera (40.42%) from 18 flocks were M.s. positive. Furthermore, antibodies to M.g. were detected in 133 broiler sera (19.16%) from 31 flocks, whereas antibodies to M.s. were detected in 356 broiler sera (51.29%) from 65 flocks.

**DISCUSSION - CONCLUSION**

The results of the rapid serum agglutination test indicate that M.s. infections of day-old broiler chicks and broilers showing respiratory disease are more prevalent than M.g. infections, presenting statistically significant differences (P<0.001). High prevalence of M.s. infections is definitely associated with:

a) Frequent vertical transmission, which is primary in the case of M.s.

b) Elimination of the infection from a breeder flock, which is difficult in the field to prevent.

There is no medication to eliminate infection from a flock. Many M.s. strains are resistant to medicinal drugs, which are generally considered effective against mycoplasmas. In the case of M.s. infection may be associated with:

1. There is no medication to eliminate infection from a flock. Many M.s. strains are resistant to medicinal drugs, which are generally considered effective against mycoplasmas.

2. Lateral transmission of M.s. occurs rapidly in a breeder flock, and infection is permanent. Serologic tests are, therefore, positive for the majority of the birds and, consequently, slaughter is the only reasonable procedure to control infection, thus resulting in great economic losses and costs.

3. Currently, there are no vaccines adequately studied in the field to prevent M.s. infections. Periodically increased or decreased prevalence of infection may be associated with the originality of the day-old chicks (breeder flock infection) and the administration of new medicinal drugs, which are usually more effective in the beginning of their use in the field.
Πίνακας 1. Θετικοί κατά την ταχεία οροσυγκόλληση στα Mg και Ms οροί, προερχόμενοι από νεοσσούς κρεοπαραγωγής και κρεοπαραγωγά ορνίθια κατά τη δεκαετία του 1990

Table 1. Positive Mg- and Ms sera (Rapid Serum Agglutination test) from day-old broiler chicks and broilers from 1990 to 1999

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<tbody>
<tr>
<td>Mg</td>
<td>27</td>
<td>13</td>
<td>17</td>
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<td>Ms</td>
<td>32</td>
<td>12</td>
<td>18</td>
<td>28</td>
<td>14</td>
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ΣΥΝΟΛΟ

<table>
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<th>Bird type</th>
<th>Νεοσσοί</th>
<th>Κρεοπ/γά ορνίθια</th>
<th>ΣΥΝΟΛΟ</th>
</tr>
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<tbody>
<tr>
<td>Broiler chicks</td>
<td>131</td>
<td>104</td>
<td>235</td>
</tr>
<tr>
<td>Broilers</td>
<td>52</td>
<td>39</td>
<td>91</td>
</tr>
</tbody>
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The development and severity of mycoplasmosis is definitely influenced by multiple vaccinations using live IB strains. Such vaccinations are sometimes strongly...
The wide spread of infectious bursal disease (Gumboro disease) virus among chicken population plays a primary role in the severity of M.s. infections. It is now well established that lesions in the bursa of Fabricius produced by infectious bursal disease virus (even vaccine strains), mostly in young birds, result in immunosuppression reducing humoral immunity. Immunosuppression enhances the severity of the M.s. produced lesions, because resistance to M.s. is associated with humoral immunity (bursa-associated). Other stressful conditions, including low environmental temperatures, may also cause immunosuppression.

In conclusion, M.s. is the primary causative agent of mycoplasmosis and CRD. This fact should be seriously considered in the field because this outbreaks result in economic losses reaching to € 0.20 per bird, including mortality, medication and decreased carcass quality. It is difficult to accurately estimate the consequences in breeder flocks because, in many cases, day-old chicks are originated from abroad. Efforts to eradicate M.s. from breeder flocks are not always effective; vaccine strains against IB, ND and infectious bursal disease as well as methods of administration are therefore of great importance.
Farmers should give more attention and effort to management practices and, especially, to ammonia levels associated with humidity and ventilation in the poultry houses, which influence the development of respiratory disease and, consequently, mortality rates in broilers. Local irritation of the respiratory tract due to high ammonia levels enhances E. coli invasion of the air sacs. Infection with E. coli, the primary complicating factor of avian mycoplasmosis, results in CRD, a severe respiratory disease of great economic concern in broilers.

The EU Directives for the eradication of mycoplasmosis are proposed to the Greek State. These Directives mainly concern the control of breeder flocks using serological or bacteriological tests and embryo or day-old chicks examination for mycoplasma lesions. Such examinations should be carried out on representative samples taken periodically during the rearing and egg-production periods (e.g. before the beginning of egg-production and every 3 months thereafter). Vaccines should be administered with the permission of the Veterinary Authorities.

**BIBLIOGRAPHIA - REFERENCES**