OCCURRENCE OF KLEBSIELLA SPP. IN POULTRY: A POTENTIAL THREAT AFFECTING PUBLIC HEALTH

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ABSTRACT

The aim of the current study is to investigate the occurrence of Klebsiella spp. in poultry in Egypt. Methods and findings: Two hundred fifty chicken specimens were collected and cultured. Klebsiella spp. were isolated and identified. Results: 30/250 (12%) Klebsiella isolates could be recovered. Conclusions: The isolation of Klebsiella spp. from poultry highlights their possible role in the epidemiology of such pathogens.

INTRODUCTION

Klebsiella pneumoniae is a Gram-negative bacilli belonging to family Enterobacteriaceae and is the causative agent of many nosocomial infections. Recently, pathogenic strains of K. pneumoniae have been attributed to multi-systemic abscessation in both human and animals. Although K. pneumoniae causes a well-recognized zoonosis, information including adequate diagnostic methods or treatments for non-humans is scarce (Gast, 2003). Klebsiella spp. is an environmental contaminant that occasionally causes embryo mortality, yolk sac infections, and mortality in young chickens, turkeys, and ostriches. In addition, the organism has been associated with respiratory, ocular, septicemic, and reproductive diseases of poultry (El-Tras et al., 2010; Kabilika et al., 1999; Lin et al., 1996; Orajaka and Mohan 1985 and Plessser et al., 1975). Actually, it is a part from normal intestinal flora of poultry, but it could cause infections whenever the immune system of affected bird is compromise (Anonymous, 2006). It has been isolated from hatching eggs. Its incidence rate is (8.8%) (Dashe et al., 2013). In human, Klebsiella spp. have been identified as colonizing hospital patients, where
spread is associated with the frequent handling of patients (e.g., in intensive care units). Patients at highest risk are those with impaired immune systems, such as the elderly or very young, patients with burns or excessive wounds, those undergoing immunosuppressive therapy or those with HIV/AIDS infection. Colonization may lead to invasive infections. On rare occasions, _Klebsiella_ spp., notably _K. pneumoniae_ and _K. oxytoca_, may cause serious infections, such as destructive pneumonia (Ainsworth, 2004). A characteristic syndrome has emerged in which liver abscess is accompanied by _K. pneumoniae_ bacteremia and sometimes by endophthalmitis or meningitis. This is typically a community-acquired infection (Yu et al., 2007). Occurrence of _Klebsiella_ spp. in poultry flocks signifies a great hazard in poultry industry and consequently humans. Therefore, the current study was conducted to investigate the occurrence of _Klebsiella_ in poultry in Egypt.

**Methods:**

**Sampling:**

Two hundred fifty specimens (yolk sac, liver and gall bladder) were collected from dehydrated chicks showed diarrhea and off food in sterile containers and brought back to the laboratory of Microbiology Department, Faculty of Veterinary Medicine, and Cairo University. **Culture:** Under complete aseptic conditions, specimens were cultured and _Klebsiella_ spp. have been isolated and identified according to (Forbes et al., 2002). Specimens were directly inoculated on MacConkey’s agar from which mucoid late fermenter colonies were picked up for further biochemical identification. Indole production test, Methyl red test, Voges-Proskauer test, Citrate utilization test, Urea hydrolysis test and Triple sugar iron agar test were carried out to confirm the identity of the isolates.

**RESULTS**

**Culture results:** _Klebsiella_ colonies on MacConkey’s agar were mucoid late fermenter colonies.

**Biochemical results:** summarized in (Table 1)
Table (1): Result and interpretation of six different biochemical tests on suspected mucoid late fermenter colonies.

<table>
<thead>
<tr>
<th>Result</th>
<th>Indole</th>
<th>Methyl red</th>
<th>Voges-proskauer</th>
<th>Citrate utilization test</th>
<th>Urea hydrolysis test</th>
<th>TSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colorless ring</td>
<td>Yellow color</td>
<td>Red color</td>
<td>Blue color</td>
<td>Pink color</td>
<td>Yellow butt and slant with Gas production</td>
<td></td>
</tr>
<tr>
<td>Interpretation</td>
<td>Negative</td>
<td>Negative</td>
<td>Positive</td>
<td>Positive</td>
<td>Positive</td>
<td></td>
</tr>
</tbody>
</table>

Isolated species: summarized in (Table 2).

Table (2): Isolation of Klebsiella spp. in poultry

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of samples</td>
<td>250</td>
<td>---</td>
</tr>
<tr>
<td>Isolated klebsiella spp. from poultry</td>
<td>30</td>
<td>12</td>
</tr>
<tr>
<td>Klebsiella pneumoniae</td>
<td>23</td>
<td>76.7</td>
</tr>
<tr>
<td>Klebsiella oxytoca</td>
<td>7</td>
<td>23.3</td>
</tr>
</tbody>
</table>

DISCUSSION

Klebsiella pneumoniae is an important opportunistic pathogen accounting for many nosocomial bacterial infections. Epidemiological studies have revealed that the majority of Klebsiella infections are preceded by colonization of the patient’s gastrointestinal (GI) tract (Badr and Abd El-Monaem, 2008). In the present study, Klebsiella spp. has been isolated from poultry, representing a frequency of 12%. The isolation rate of klebsiella is very variable, ranging from 8.8 % (Dashe et al., 2013) up to 60 % (Ajayi and Egbini, 2011). Nowadays it is well known that Klebsiella represent a source of community acquired Pneumonia (CAP) (Prasad, 2012). This could be considered as a public health threat due to the potential hazard of transmission to humans (Sharp, 1991). More epidemiological studies are needed to study the prevalence and pathogenicity of other potentially pathogenic serotypes of Klebsiella spp.

REFERENCES


Prasad R. (2012): Community Acquired Pneumonia: Clinical Manifestations. JAPI. VOL 60
