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Review Article

Phylogeny of *Escherichia coli* and *Klebsiella pneumonia* Affecting Camels in Iraq/ Reveiw

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Abstract

Camels are one of the important types of semi-ruminants in Iraq supporting people in arid and semiarid areas with beef and milk. Pneumonia is the second important disease in camel following skin affections in occurrence and economic significance. Consequently, this study aimed to focus on the causative agent of pneumonia in order to make programs of prevention and treatment especially with the emergence of antibiotic resistance. *E.coli* and *Klebsiella pneumonia* are the most common bacteria isolated from camels with pneumonia in Iraq. One of the principles used to control the antimicrobial susceptibility is to detect the species of the pathogen with molecular methods to make relation with others in Iraq and close countries. Phylogeny of *E.coli* and *Klebsiella pneumonia* has done to detect the relation of these strain with others detected in neighbor countries in which it was 99% relative of *E.coli* to those isolated in Egypt and it was 97% relative of *Klebsiella* to those isolated in India. This will be significant for future studies to identify the genes responsible for resistance in order to find useful drugs and vaccines. It is helpful to avoid dealing with countries having isolates different from those isolated in Iraq due to the wide variety between the phylogeny of their sequence especially Germany and China.

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Introduction

Camels were previously deliberated resistant to most of the diseases commonly affecting livestock, but as more studies were directed, camels were found to be susceptible to a big number of pathogenic causes. For some diseases such as pneumonia, pox, mange, and enterotoxaemia; camels were certainly more susceptible and established more severe signs than other ruminants in the same ecozones. Pneumonia is one of the most communal bacterial diseases of camels and is caused by a large number of microbes [1].

Respiratory diseases epidemic in camels characterized by abrupt death has occurred newly in the Afar and Oromia regions during 2005/2006 [2]. In 2007 a similar disease was described from the Somali and Oromia regions of Ethiopia. Surveys of these outbreaks by a number of Veterinary Institutes and Laboratories in Ethiopia have miscarried to isolate the precise etiological cause of the disease. Yet there is a necessity to identify the causes of respiratory diseases in camels in direction to design better control policies [3].

Findings studied in [4] confirmed the role of *K. pneumonia* as an important etiological agent for causing pneumonia with sudden mortalities in suckling neonatal dromedary camels. *E.coli* and *Klebsiella pneumonia* has been isolates from ticks infesting camels in Basrah of Iraq [5]. *E.coli* and *Klebsiella pneumonia* has been detected in lungs from camels in Sudan [6] and in Ethiopia as a normal flora [7]. Counterwise, they were isolated in only pneumonic camels in Iraq [8].

Respiratory infection was recorded as the first important disease in camel with lots of bacterial causative agents including *E.coli* and *Klebsiella pneumonia* [6].

Detection of the causative agents is very important for choosing the treatment and control of the disease. In Iraq it was recorded that *E.coli and Klebsiella pneumonia* are the most common cause of pneumonia in camel. Furthermore, the study investigates the phylogeny of *E.coli and Klebsiella pneumonia* using the global web site "National Center for Biotechnology Information" (NCBI).

Depending on the 16S ribosomal RNA gene as partial sequence, strain of *E.coli* detected from pneumonia in camel in Iraq (MH109500) was highly related (99%) to strain isolated in Egypt (KY906967) as shown in Figure (1). Egypt is one of the largest countries having camels and it is closed to Iraq with big commercial relation with Iraq exporting many items in food and animal products which may be the related cause of close sequence of *E.coli*. Other isolates in Germany (HF572917), China (JX975420),India (KJ461698 and KT260807), France (JX267102) and USA (MH759765) was poorly related (67%) to the E.coli isolated in camel of Iraq due to the wide distance.

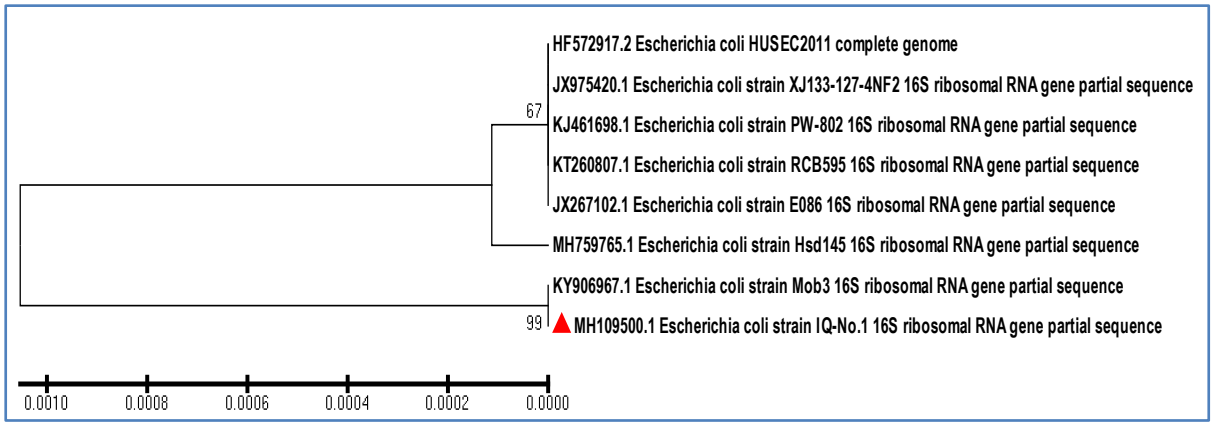

Fig. (1): Phylogeny tree for *E.coli*, camel isolate. Local isolate showed closed related to (KY906967.1) from Egypt. Other isolates showed poor relation to that of Iraq according to BLAST in NCBI.

From other side and depending on the same way above; *Klebsiella pneumonia* isolated in camels of Iraq was closely related (97%) to that isolated in India (LC373454 and LT599798); as shown in figure (2); which may be regarded to the large population of camels in India with the large import of animal products from India. In a similar way; it was related with less worth (96%) to isolates of China (KY303650 and MF37480), India (MG231204, MH021986, MG279103 and LC373453), Iraq (MG461523 and MG372024) (NCBI).

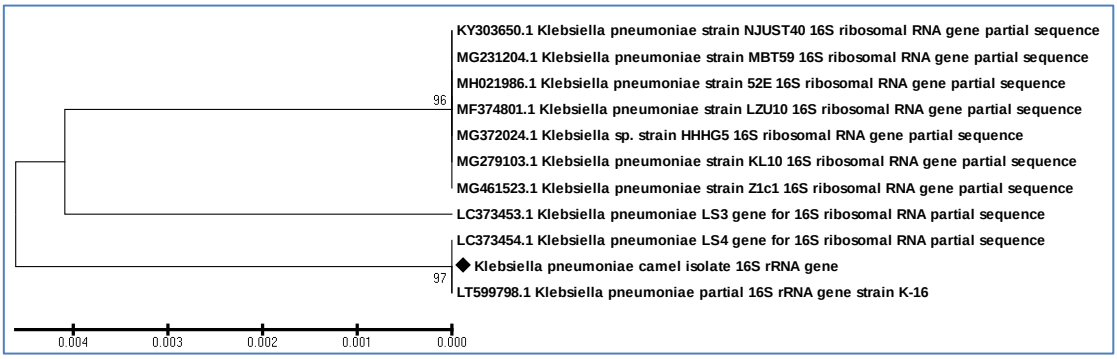

Fig. (2): Phylogeny tree of *Klebsiella pneumonia* from camel showed relation with different isolate.

Discussion

Being the second important disease in camels in other countries; it was highly recorded in Iraq (56%) [9] and (16%) [8]. These results made it necessary to research the phylogeny of the common infectious bacteria of this disease. Among other many bacteria isolated in deferent countries; *E.coli* and *Klebsiella pneumonia* were the most important due to their variety and ability to introduce deferent diseases in farm animals. In India it was recorded in two cases regarded to *Klebsiella pneumonia* [10]. This study deals with lots of others in close countries regarding pneumonia in camels with advanced phylogeny explanations [11]. It seems that good management has a big role in decreasing the incidence of pneumonia in camels which is obvious in United Arab Emirates [12] and it is less present in Iraq.

Conclusion

Pneumonia is an important disease in camels because that several cases living in arid areas die haven't any veterinarian services. *E.coli and Klebsiella pneumonia* are the most common causative agents of pneumonia in camels in Iraq. Infection with *E.coli* commonly related to population of camels in Egypt while it was more related to India in infection with *Klebsiella pneumonia*. Consequently; there is a need to conduct further research on bacterial infections of the lungs and also to distinguish them from those caused by other infectious agents using the Trans-Tracheal Wash (TTW) technique. Molecular assays should be done to identify the genes of resistance in order to find useful drugs and vaccines.

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Authors'contributions

HHN reviewed the previous papers. KhAM wrote the molecular portion. MHH completed the article and edited the final draft of the review. All authors read and approved the final manuscript.

Conflict of interest

The authors declare that there is no conflict of interest.

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