

In Mongolia, the Highly Contagious Disease is extended by a Sheep

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Introduction

There are more and more cases of the zoonotic pathogen hepatitis E virus everywhere. Pigs, deer, and wild boars are the main reservoirs for the zoonotic HEV-3 and HEV-4 genotypes, which are associated with infections in Asia, including Mongolia. Recent research has shown that sheep are the virus's hosts in a number of nations. Our study's objectives are to identify HEV RNA in sheep liver and faeces samples from Mongolia, identify the virus's point of origin, and describe the virus' chain of infection. According to our findings, HEV genotype 4 was found in sheep and was closely related to HEV genotype 4 in pigs in the same region. Pigs are fed raw sheep internal organs for fattening on Mongolian pig farms. Pigs, wild boars, cows, deer, rabbits, camels, and humans are hosts for the viral infection known as hepatitis E, which is brought on by the Pasmahepevirus [1]. It has recently been found in many different species of animals, including domestic small ruminants. Nomadic people from Mongolia live there with their sheep, goats, and cattle. Pork has become more popular and swine diseases have emerged as a result of the changes in Mongolian lifestyle. One of them, Hepatitis E, has emerged as a zoonotic infectious disease that requires attention.

The issue with HEV in pigs is that infected pigs expel the virus into the environment even though they don't exhibit any clinical symptoms. We looked for HEV RNA in sheep that had spent a lot of time being raised in Mongolia. And those creatures that are currently cohabitating with pigs in the same area. In the same region, we also carried out a longitudinal analysis of HEV infection in pigs, and we discovered that they had the same genotype and cluster of HEV [2]. By using RT-PCR, we examined 400 faeces and 120 livers (from pigs and sheep) for this study in the Mongolian province of To. HEV was found in 2% (4/200) of sheep faeces and 15% (30/200) of pig faeces. Pigs and sheep tested positive for HEV RT-PCR and confirmed to have genotype 4 by ORF2 sequence analysis. The findings imply that HEV infection is common in both pigs and sheep and that immediate action is required to prevent infection. This case study highlights the evolving character of Infectious diseases connected to raising livestock. Based on these cases, it will be necessary to re-evaluate livestock management and public health issues. One of the most common viral causes of acute human hepatitis worldwide is the hepatitis E virus, which belongs to the family Hepeviridae, subfamily Orthohepevirinae, and genus Pasmahepevirus. HEV-3 and HEV-4 are the only genotypes out of eight that have been identified as zoonotic. The primary reservoirs of these genotypes are generally acknowledged to be Suidae. In China, HEV-4 has been found in goats, cows, cow's milk, and sheep. In Asia, Africa, and Latin America, the illness is endemic [3].

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Description

Anti-HEV antibodies have been found in sheep and goats all over the world. Also confirmed is the high degree of similarity between human and ruminant HEV sequences. This raises questions about how these animals might spread HEV through zoonotic transmission. In relation to this, it has been proposed that consuming tainted milk, meat, and/or dairy products. In the study area, sheep and pig serum samples were collected, and HEV antibodies were looked for. This study employed in-house ELISA, as previously mentioned. By using HEV genotype 3 VLPs as antigens in an enzyme-linked immunosorbent assay (ELISA), anti-HEV antibodies were found. An anti-pig IgG antibody-HRP conjugate and an anti-sheep IgG antibody-HRP conjugate (Bethyl Laboratories Inc., Montgomery, TX, USA) were used as secondary antibodies in a previous report's method for the detection of antigen-bound IgG. The serum samples were diluted 1:100 with PBS containing 0.05% Tween 20, 10% of Block Ace, and incubated for 1 hour at room temperature. Afterwards, 50 L of TMB (3,3',5,5'-tetramethylbenzidine) was added to the secondary antibody reactions. Baltimore, MD, USA) was added, and after an additional ten minutes at room temperature of incubation, 50 L of 2 M sulfuric acid was added to stop the reactions. A microplate spectrophotometer was used to measure the optical density (OD) value at 450 nm (Thermo Fisher Scientific Inc., Waltham, MA, USA). Pigs that had been experimentally infected with HEV provided the positive control sera, and healthy, non-infected pigs provided the negative control sera.

The average value plus two standard deviations of the negative samples (n = 5) was calculated, and the cut-off value was set at 0.295. The sensitivity and specificity of this ELISA test were 90.0% (95% CI: 68.30-98.77) and 91.67% (95% CI: 73.0-98.97), respectively, in 20 experimentally infected pigs and 24 negative pigs. Pigs and other animals have been found to carry HEV all over the world, including in Asia. The HEV genotypes that are most frequently found in Asia are those that are known to cause zoonoses. We used molecular techniques in this study to show how common HEV is in Mongolian pigs and sheep. However, the sequences of the viruses obtained in this study were different from those previously reported. HEV genotype 3 has previously been found in Mongolia. Additionally, our findings demonstrated the effective detection of HEV RNA in faeces. An important factor in the spread of viruses among pigs on farms is virus shedding. These findings suggest that sanitary control on pig farms is a crucial issue for the country's healthy livestock management. There are worries that meat contaminated with HEV could have negative effects, especially for pregnant women and other hepatitis virus carriers since meat is a staple of the Mongolian diet. The prevalence of HEV in swine livers necessitates caution on the part of workers at slaughterhouses and factories that process meat. The HEV gene sequence found in Mongolian pigs is strikingly similar to cases previously reported, which suggests that the virus may have spread to Mongolia as a result of the importation of live pigs [4]. According to the history of live piglet imports from China, there are two possible origins for Mongolian HEVs. HEV genotype 3 and genotype 4 resemble Asian isolates, such as those from China and Japan. The discovery of a single HEV-4 genotype cluster in HEVs derived from sheep raises the possibility that pigs and sheep can exchange HEVs. Young pigs under 6 months of age frequently have the virus found in their faeces, and this age is a risk factor for the virus being shed in the environment.

On the other hand, there is a risk of HEV infection in the livers of pigs that are shipped to market because the virus can be found in the liver even at

an age of over 6 months. The main worry is that infected pigs' virus shed will spread to other pigs. Each year, foreign introductions, primarily from China, replace 10–20% of the pig population. Piglets are fattened on farms, and fattened pigs are killed for their meat. The statistical analysis revealed that the importation of pigs from other countries was a significant factor and that there may be additional causes. Young pigs under 6 months of age frequently have the virus found in their faeces, and this age is a risk factor for the virus being shed in the environment. On the other hand, there is a risk of HEV infection in the livers of pigs that are shipped to market because the virus can be found in the liver even at an age of over 6 months. The main worry is that infected pigs' virus shed will spread to other pigs. Each year, foreign introductions, primarily from China, replace 10–20% of the pig population [5].

Conclusion

Piglets are fattened on farms, and fattened pigs are killed for their meat. The statistical analysis revealed that the importation of pigs from other countries was a significant factor and that there may be additional causes. The source of the infection might be the food. All of the pigs were fed mill offal as a fattening food, with the exception of piglets. A cross-sectional study found a statistically significant difference between the use of mill offal and small ruminant offal. Sheep that graze close to pig farms may get sick from the hay or water that free-range pigs contaminate. Gender was not discovered to be connected to the analysis of risk estimation.

Acknowledgement

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Conflict of Interest

There is no conflict of interest by author.

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