Hepatitis E virus (HEV) in Finnish pigs

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INTRODUCTION

Hepatitis E virus (HEV) is an important cause of fecally transmitted viral hepatitis especially in the developing world. Recently, HEV isolates have been identified in humans and swine in many countries where it is not considered to be endemic. HEV appears to be common among pigs around the world. HEV is also considered to be a potential zoonotic agent. It is suggested that swine could function as a reservoir of the HEV strains that can infect humans.

OBJECTIVES

- To investigate if endemic hepatitis E virus is present in swine in Finland
- To investigate if there are non-travel related cases of hepatitis E virus that could be of zoonotic origin in humans in Finland

MATERIALS AND METHODS

- Individual serum and/or fecal samples from 113 pigs on 11 different swine farms in the southern part of Finland
- Serum samples from 64 human patients diagnosed with non-A, B, C hepatitis
- All samples were tested for HEV RNA by real-time RT-PCR targeting a 68 bp fragment of ORF2
- Human serum samples were tested also for IgM and IgG antibodies to HEV by ELISA an immunoblotting

RESULTS

Swine HEV

- HEV RNA was detected in the samples of 12 (10,6%) individual pigs from 3 (27,3%) different swine farms
- Of the positive pigs
  - 58,3% (7/12) were from farm 1
  - 16,7% (2/12) from farm 2
  - 25% (3/12) from farm 3
- Numbers of pigs tested and positive for HEV RNA according to the age are presented in Table 1 and distribution of the HEV RNA positive pigs by age in Figure 1.

Age	Pigs tested	HEV RNA positive (%)
< 3 months	14	2 (14,3)
3-4 months	39	9 (23,1)
> 4 months	41	1 (2,4)
Unknown	19	0 (0)
Total	113	12 (10,6)

Table 1. Numbers of pigs tested and positive for HEV RNA according to the age of the animal.

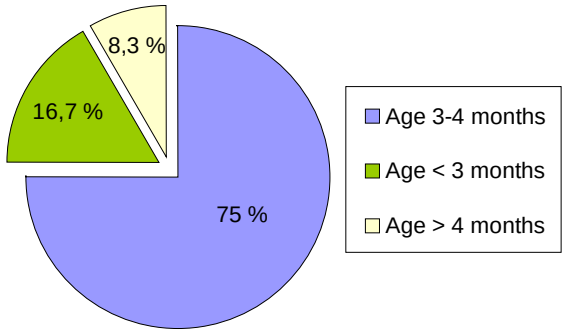

Figure 1. Distribution of the HEV RNA positive pigs by age group.

Human HEV

- Antibodies against HEV was found in the samples of 10 patients, of which
  - 6 were positive for both IgM and IgG
  - 1 was positive for only IgM
  - 3 were positive for only IgG
- HEV RNA was detected in the samples of 7 of the 10 anti-HEV positive patients
- Five of the 7 HEV RNA positive patients had a history of recent travel to an area where HEV is endemic

CONCLUSIONS

- There is endemic hepatitis E virus among pigs in Finland
  - On some swine farms the infection may be more prevalent than on others
  - The virus seems to appear mostly in pigs between 3-4 months of age
- Further investigation is required to tell whether there are hepatitis E virus cases that are non-travel related in humans in Finland, and if those cases are of zoonotic origin

CURRENT AND FUTURE WORK

- We are currently investigating the prevalence of HEV in pigs from different swine farms brought together at the age of 8-12 weeks to be raised in mixed groups for 3 months to get information on
  - the prevalence of HEV in pigs of different ages
  - natural spreading of HEV among pigs raised in the same pen
  - whether or not HEV causes symptoms in pigs tested positive for HEV
- Sequencing and typing of the viruses found from both swine and humans is currently under investigation to see how closely they are related

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