Acta vet. scand. 1980, *21*, 152—154.

Brief Communication

ELEVATED IMMUNOGLOBULIN LEVELS IN THE DIAGNOSIS OF INTRAUTERINE PARVOVIRUS INFECTIONS IN PIGS

In serum of normal precolostral piglets only traces of immunoglobulins of the IgG type and of IgA have been found (*Prokesova et al.* 1969, *Prokesova & Rejnek* 1971, *Jønsson* 1973). Upon exposure to an appropriate antigen, however, the immunocompetent fetus is capable of increased immunoglobulin production. Thus, porcine parvovirus (PPV) is able to pass the porcine placenta and to provoke an increased immunoglobulin synthesis and a specific antibody response in the fetus (*Johnson & Collings* 1971, *Bourne et al.* 1974). In consequence demonstration of specific antibody in fetal fluids has been recommended as a diagnostic test for intrauterine PPV infections (*Joo et al.* 1976). Furthermore determination of IgM and IgG in porcine fetuses has been suggested as a screening test for intrauterine infections (*Dalsgaard et al.* 1979).

In this work the value of immunoglobulin determinations by rocket immunoelectrophoresis as a screening test for intrauterine PPV infections was examined using fetal fluids from herds with records of fetal death. Fluids from the thoracic cavity or in case of complete dehydration extracts in PBS of brain tissue were tested. When several fetuses from the same herd were received, samples from fetuses of about the same size were pooled. The samples were subjected to IgG and IgM determination by rocket immunoelectrophoresis (*Dalsgaard et al.*) and to PPV antibody assay by indirect immunofluorescent antibody test supplemented with counter immunoelectrophoresis and/or hemagglutination inhibition test (*Sørensen et al.* 1980). A total of 444 samples were examined (Table 1). Of 212 PPV antibody positive samples increased levels of both IgG and IgM were found in 132 (62 %). Twenty-one (10 %) had increased IgM and 10 (5 %) had increased IgG only. In total 163 samples (77 %) had increased levels of IgG and/or IgM (Ig). However, in 49 PPV antibody positive samples (23 %) no increase in content of IgG and IgM was found. In 4 PPV antibody negative samples increased Ig levels were demonstrated. The specificity of these was not determined.

Table 1. Detection of PPV specific antibody and immunoglobulin in fluids from pig fetuses.

Number of samples	PPV ab[1] pos.	IgM and G[2]	IgM[3]	IgG[4]	Ig[5]
212	212/212	132/212 (62%)	21/212 (10%)	10/212 (5%)	163/212 (77%)
232	0/232	2/232	1/232	1/232	4/232
Total 444	212/444 (48%)	134/444	22/444	11/444	167/444 (38%)

[1] Samples with PPV antibody/samples examined.
[2] — — increased content of IgM and of IgG/samples examined.
[3] — — — — of IgM only/samples examined.
[4] — — — — of IgG only/samples examined.
[5] Total number of samples with increased content of IgG and/or IgM/ samples examined.

The occurrence of increased levels of IgM and IgG or of IgM alone in 72 % of the PPV antibody positive samples is in agreement with results obtained by *Bourne et al.*, who found that the fetus responded upon PPV infection initially with IgM synthesis. However, in 5 % of the samples examined an increased content of IgG was found without detectable IgM. The circumstance that 23 % of the PPV antibody positive samples did not contain increased Ig levels as measured by rocket immunoelectrophoresis may possibly be attributed to short intervals between infection and death of the fetuses and/or insufficient sensitivity of the test. Whatever the cause, it renders the Ig determination insufficient as initial screening test for intrauterine PPV infections. As a supplementary test, however, its value should not be underestimated. It is remarkable that of 167 samples with increased Ig, 163 (98 %) were found PPV antibody positive. Of infectious agents causing a humoral antibody response in the porcine fetus following intrauterine infection, PPV is apparently predominant in Danish herds.

Antibody demonstration in fetal fluids as evidence for intrauterine infections in pigs is based on the circumstance that transfer of serum proteins from mother to fetus does not occur due to the strong placental barrier (*Sterzl et al.* 1966). Still it could be argued that leakage in the barrier could occur in consequence of pathological conditions. Such leakage, however, would probably not be restricted to PPV antibody but would involve transfer of antibody to a variety of viruses and other microbes.

To establish that leakage of antibodies had not occurred, 86 of the samples with increased Ig levels and/or with PPV antibody were also examined for antibody to enterovirus of the Talfan type, a commonly present virus in Danish herds (*Rasmussen* 1969). The samples were examined in dilution 1/20 using the indirect immunofluorescent antibody test as described elsewhere (*Sørensen et al.*) using Talfan virus infected cell cultures as antigen, fixed and stored frozen until use. Talfan virus antibody, however, was not detected in any of the 86 samples, thus supporting the antibody determination in the diagnosis of intrauterine infections.

K. J. Sørensen, J. Askaa and *K. Dalsgaard*
The State Veterinary Institute for Virus Research,
Lindholm, Kalvehave, Denmark.

REFERENCES

Bourne, F. J., J. Curtis, R. H. Johnson & D. F. Collings: Antibody formation in porcine fetuses. Res. vet. Sci. 1974, *16,* 223—227.

Dalsgaard, K., E. Overby, J. J. Metzger & A. Basse: Rapid method for screening of immunoglobulins in porcine fetuses, using rocket immunoelectrophoresis. Acta vet. scand. 1979, *20,* 313—320.

Johnson, R. H. & D. F. Collings: Transplacental infection of piglets with a porcine parvovirus. Res. vet. Sci. 1971, *12,* 570—572.

Joo, H. S., C. R. Donaldson-Wood & R. H. Johnson: Rapid diagnostic techniques for detection of porcine parvovirus infection in mummified foetuses. Aust. vet. J. 1976, *52,* 51—52.

Jønsson, A.: Transfer of immunoglobulins from mother to offspring in the pig. Acta vet. scand. 1973, Suppl. 43, 1—64.

Prokesova, L. & J. Rejnek: Active synthesis of IgA in newborn precolostral piglets. Folia microbiol. (Praha) 1971, *16,* 476—478.

Prokesova, L., J. Rejnek, J. Sterzl & J. Travnicek: Isolation and characterization of immunoglobulins in the serum of precolostral piglets. Folia microbiol. (Praha) 1969, *14,* 372—376.

Rasmussen, P. G.: A study of enterovirus strains in Danish pigs. Nord. Vet.-Med. 1969, *21,* 664—667.

Sterzl, J., J. Rejnek & J. Travnicek: Impermeability of pig placenta for antibodies. Folia microbiol. (Praha) 1966, *11,* 7—10.

Sørensen, K. J., J. Askaa & K. Dalsgaard: Assay for antibody in pig fetuses infected with porcine parvovirus. Acta vet. scand. 1980. In press.

(Received March 4, 1980).

Reprints may be requested from: K. J. Sørensen, the State Veterinary Institute for Virus Research, Lindholm, DK-4771 Kalvehave, Denmark.