

Brief Communication

MICROBIAL, IMMUNOLOGICAL AND TOXICOLOGICAL
ASPECTS OF CANINE PYOMETRA*

There is agreement that uterine infection is necessary for the development of the varied picture of clinical pyometra which includes changes in the kidneys and other organs (*Børresen* 1975). Some important clinical manifestations of the pyometra syndrome have been explained in terms of an endotoxaemia (*Åsheim* 1964, *Schalm* 1965).

The aim of the present investigation was to estimate the frequency of *E. coli* infected pyometras as opposed to other microbial pyometra infections in the Oslo region, to perform a quantitative examination of circulating agglutinating antibodies against the specific *E. coli* isolated from each individual uterus and to detect possible circulating bacterial endotoxins in serum.

Materials and methods

Eighty-three unselected pyometra patients admitted to the Department of Obstetrics, The Veterinary College of Norway, are included in the investigation. During surgery, the pyometra pus was aspirated into a syringe and isolation of microorganisms was performed. A pre-operative venous blood sample for the collection of serum was taken from 58 pyometra patients and from 21 healthy dogs.

The preparation of antigens of bacteria was done according to *Krogstad* (1974).

The agglutination test was performed on sera from dogs with growth of *E. coli* from uterus and on 15 control sera. The Widal-agglutination test on inactivated sera was carried out according to *Krogstad*.

The *Limulus* amebocyte lysate test** was used for demonstration of endotoxin in serum, and the elimination of endotoxin-inhibiting substances in serum on this test was performed according to *Moravek et al.* (1974).

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** Mallinckrodt Chemical Works, St. Louis, Mo., USA.

Results and comments

Bacteriology. Hemolytic or non-hemolytic *Escherichia coli* was isolated from the uteri of 86 % of the pyometra patients. Only 1 pus sample out of 83 showed no microbial growth, and from the remaining cases either β -hemolytic streptococci, *Klebsiella*, *Proteus vulgaris*, *Staphylococcus aureus* or *Micrococcus* sp. was isolated.

The predominance of *E. coli* in pyometra is in accordance with findings in other countries (*Grindlay et al.* 1973, *Sandholm et al.* 1975).

Immunology. Homologous reaction titres using the Widal-test on sera from 25 pyometra patients were usually of the order of 1:80 while a titer of 1:320 was demonstrated in 1 case. Two sera showed no agglutination against either corresponding or other *E. coli* antigens. One of these was the only dog known to have been treated with large doses of cortisone.

There seemed to be only limited cross reactions between different sera and non-homologous *E. coli* strains, and when these occurred, the titres were relatively low, usually not exceeding 1:20. These results indicate the occurrence of several serologically different types of *E. coli* in canine pyometra. Eleven unselected *E. coli* pyometra strains were tested for agglutination with sera from 15 clinically healthy dogs of which only 2 gave agglutination with *E. coli* (titres of 1:20).

Detection of endotoxins in serum. Thirty-three sera from pyometra dogs, 26 with *E. coli*, 4 with *Streptococcus* group L, 2 with *Proteus vulgaris* and 1 negative were examined for content of endotoxins with the *Limulus* amebocyte lysate test. None of the undiluted sera showed positive endotoxin reaction and only 4 sera in dilution 1:40 showed positive reaction. Two of these were from the cases where *Proteus vulgaris* was isolated, the remaining 2 from dogs where hemolytic *E. coli* was isolated. None of the 21 control sera showed positive endotoxin reactions. The method for the detection of circulating endotoxins seems to have been used diagnostically only in the human clinic. Several factors may influence endotoxin testing in dogs. The liver is active in clearing immune complexes from the circulation (*Sandholm et al.*) and thus may act as an endotoxin filter (*Rutenburg et al.* 1967). The serum endotoxin inhibitors seem to be of particular importance and appear to be most thoroughly studied in

man (*Moravek et al.*). No reports on these substances in dog sera have been found although several experiments indicate definite species differences in the various responses to experimental endotoxin challenge (*Hinshaw 1971*). Thus there may be quantitative as well as qualitative differences in inhibitor effects between canine and human sera.

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