ABSTRACTS

ISCFR 2012

July 26-29, Whistler, Canada

7th International Symposium on Canine and Feline Reproduction

In a joint meeting with

EVSSAR 2012

15th Congress of the European Veterinary Society for Small Animal Reproduction

Editors: Gary England, Michelle Kutzler, Pierre Comizzoli, Wojciech Nizanski, Tom Rijsselaere and Patrick Concannon

Reprinted in IVIS with the permission of the ISCFR Organizers
Clinical and molecular characteristics of pyometra in dogs

Hagman, R

Department of Clinical Sciences, Swedish University of Agricultural Sciences, SE-750 07 Uppsala, Sweden.
ragnvi.hagman@slu.se

In countries where elective neutering of healthy dogs is not generally practiced, uterine diseases such as pyometra are common. In Sweden, where only 7-10% of all dogs are neutered/spayed, nearly 25% of all female dogs are diagnosed with the disease before 10 years of age and in certain high-risk breeds this proportion exceeds 50% (1).

Various signs associated with genital and systemic disease are present in dogs with pyometra. A haemorrhagic or purulent vaginal discharge is often present (provided the cervix is open) and dehydration, polydipsia, polyuria, lethargy, abdominal pain, anorexia, vomiting or diarrhea, fever or hypothermia, abnormal color of the mucous membranes and elevated heart- and respiratory rates are often observed. Leucocytosis with neutrophilia and left shift in the differential white blood cell count, thrombocytopenia, hypoalbuminaemia and hyperproteinaemia are frequent findings. Alterations in acid-base balance and electrolyte levels, liver- and kidney function variables are also commonly induced. (2,3) Plasma levels of the acute phase protein C-reactive protein (CRP) and the inflammatory mediator prostaglandin F2alpha metabolite (PGM) are useful in the prediction of SIRS and associated with hospitalization length (2,3). The safest treatment of pyometra is surgical ovariohysterectomy (immediate removal of the source of infection) which also prevents recurrence. Medical treatment is an option in some cases to preserve fertility.

In pyometra, the bacterial infection and endotoxins are potent inducers of an inflammatory response, which is apparent in the uterine tissue. Recently, the inflammatory response in infected uterine tissue during pyometra has been more closely explored. In one study of the molecular patterns involved in the uterus in pyometra, numerous (<800) genes were found upregulated (4). Many of these genes are associated with chemokines, cytokines, inflammatory cell extravasation, antibacterial action, the complement system and innate immune responses. A major feature in pyometra uteri was the upregulated expression of a large panel of proteases. In particular, there was a profound upregulation of various matrix metalloproteinase (MMP) members including collagenases (MMP-1/13), MMP-9 and MMP-7. Toll-like receptor (TLR) 4 was shown to be upregulated and there was also a clear upregulation of TLR 2. Increased transcription of genes encoding TLR 2 and 4, lipopolysaccharide ligands, prostaglandin F2alpha metabolite (PGM) are useful in the prediction of SIRS and associated with hospitalization length (2,3). The safest treatment of pyometra is surgical ovariohysterectomy (immediate removal of the source of infection) which also prevents recurrence. Medical treatment is an option in some cases to preserve fertility.

Pyometra is regarded as a medical emergency since rapid therapeutic intervention is necessary to prevent a fatal outcome. A serious consequence of the uterine infection (mainly Escherichia coli) is endotoxaemia and progression into the systemic inflammatory response syndrome (SIRS)(3). Presence of SIRS has previously been detected in over 50% of bitches suffering from the disease, and higher levels of endotoxin as well as presence SIRS have been linked with poorer prognosis (2,3). In one study of the molecular patterns involved in the uterus in pyometra, numerous (<800) genes were found upregulated (4). Many of these genes are associated with chemokines, cytokines, inflammatory cell extravasation, antibacterial action, the complement system and innate immune responses. A major feature in pyometra uteri was the upregulated expression of a large panel of proteases. In particular, there was a profound upregulation of various matrix metalloproteinase (MMP) members including collagenases (MMP-1/13), MMP-9 and MMP-7. Toll-like receptor (TLR) 4 was shown to be upregulated and there was also a clear upregulation of TLR 2. Increased transcription of genes encoding TLR 2 and 4, lipopolysaccharide ligands, prostaglandin synthesis enzymes and MMPs have similarly been demonstrated in pyometra uteri in other studies (5-6). A large number (<700) of genes were down-regulated in the uteri of dogs with pyometra including a massive down-regulation of a number of homeobox and zinc finger genes (4). More knowledge of the complex local and systemic inflammatory response may allow identification of novel disease biomarkers or future targets for treatment.