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A Retrospective Study of Canine Pyometra in Segar Veterinary Hospital, Kuala Lumpur, Malaysia Year 2012-2016

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Abstract

A retrospective study was used to analyse canine pyometra cases in Segar Veterinary Hospital, Kuala Lumpur, Malaysia from May 2012 to May 2016 and to investigate the relationship between pyometra and breed and age of dogs. The study was done through secondary collection of data from ambulatoirs of pyometra cases which were diagnosed based on anamnesis, examination of clinical signs and ultrasonography and/or radiography. The data collected includes breed categorised into small, medium, and large breeds, whereas the age are categorised into puppies, adulthood and geriatric. The data was then analysed with tree classification analysis and CATPCA (Principal Components Analysis for Categorical Data) analysis using SPSS program. A total of 80 cases of pyometra were recovered from female dog patients over the study period. Small breed dogs at 72.5% (n=58) and geriatric dogs at 62.5% (n=50) had the highest percentage of pyometra. The breeds Mongreal, German Shepard Dog, Mini Schnauzer, Silky Terrier, Toy Poodle, Beagle, Chow Chow, Golden Retriever, Rottweiler, Cocker Spaniel, White Terrier, Siberian Husky, and Pekingese aged older than 5.5 years had 100% from 37 cases of open-cervix pyometra. Geriatric and small breed dogs are inclined to have open-cervix pyometra. However adult and medium or large breed dogs have a higher possibility to have closed-cervix pyometra. These results serve to highlight the importance of public awareness regarding canine pyometra and further researches are needed to find out the effects of hormone therapy, frequency of births, and the bacteria present in uterus with pyometra.

Keywords: Canine pyometra, Open-cervix Pyometra, Closed-cervix Pyometra, Age and Breed.

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1. INTRODUCTION

Bitches have a single oestrous cycle during a breeding season so they are mono-oestrous and have spontaneous ovulation (Concannon, 2009). Pyometra (chronic purulent inflammation of the uterus) is a common reproductive disorder which affects nearly one fourth of all female dogs before they reach 10 years of age. The disease occurs mainly in middle-aged and older bitches and in the luteal phase of estrus cycle. Its pathogenesis is a consequence of repeated exposure to progesterone. Pyometra can also be caused by imbalance of hormones due to hormonal therapy to avoid pregnancy (Bigliardi et al., 2004). Cystic endometrial hyperplasia (CEH) often precedes the disease. CEH allows commensal bacteria originating from the vagina to proliferate in the uterus at the end of estrus. The progressive degenerative process of development of cystic endometrial hyperplasia is usually proposed as the initiating lesion for pyometra in bitches; this is mediated by progesterone and potentially aggravated by estrogens (Verstegen et al., 2008). There are two types of pyometra depending on the patency of the cervix, which are the open-cervix pyometra and closed-cervix pyometra. Open-cervix pyometra is identified with an obvious sign which is a sanguineous to mucopurulent discharge from the vagina. However, as closed-cervix pyometra lacks the easily recognized, early signs of a serious problem, namely the purulent vaginal discharge, bitches with closed-cervix pyometra is often quite ill at the time of diagnosis compared with dogs with open-cervix pyometra. The severity of illness at the time of examination depends to a large degree on the ability of the owner to recognize that a problem exist and seek veterinary care (Feldman and Nelson, 2004a). Bitches with pyometra exhibits multiple signs signifying reproductive and systemic disorders. Other than the obvious purulent discharge or vulva haemorrhage (especially for open-cervix pyometra), the clinical signs that can be seen includes dehydration, polydipsia, polyuria, lethargy, abdominal pain, anorexia, vomit or diarrhoea, fever or hypothermia, abnormal mucosal colour, tachycardia and increased heart rate are also the characteristic symptoms of pyometra (Smith, 2006). Pyometra in bitches is polysystemic diestrual disorder which if not treated can induce high mortality, because it may cause sepsis and endotoxemia. Bitches with pyometra requires rapid medical intervention to prevent death and to preserve fertility (Fransson and Ragle, 2003; Kutzler et al., 2014). So far, there has not been any research paper available about the analysis of pyometra in female dogs in Segar Veterinary Hospital, Kuala Lumpur, Malaysia. The data obtained is analysed using tree classification analysis and CATPCA (Principal Components Analysis for Categorical Data) analysis, where the cases of pyometra is analysed based on breed and age of dog. The results will be presented in a tree

classification diagram and a joint plot of categorical points diagram. With the results, we will be able to learn the factors that affect the occurrence of pyometra in female dogs, such as the breed and age of the dog. Thus, preventive measures can be taken in order to lower the risk of pyometra cases in female dogs.

2. Materials and Methods

The secondary data was collected from Segar Veterinary Hospital, Kuala Lumpur, Malaysia and data analysis was done at Faculty of Veterinary Medicine, Universitas Airlangga. The period of data collected is from May 2012 to May 2016. The study case is pyometra in female dogs. The data about cases of pyometra occurred in Segar Veterinary Hospital, Kuala Lumpur, Malaysia, is collected from the ambulatoir or medical records. The ambulatoir contains data of the patients that supports the research, such as date of inspection, age, weight, diagnostic method of pyometra and the therapy given to the patient. The data that supports the research includes canine pyometra cases based on age and dog breed. The data collected from medical records or ambulatoir from Segar Veterinary Hospital, Kuala Lumpur, Malaysia, is further evaluated to find out if breed and age of the bitches are risk factors of canine pyometra. The data is also analysed to find out if there is any relationship between age and dog breed with pyometra cases using tree classification analysis and CATPCA (Principal Components Analysis for Categorical Data) analysis; the analysis is done by using program SPSS (Statistical Programs for Social Scientific) version 22.0. The output result obtained is the distribution frequency and is presented in the form of Tree Classification diagram and Joint Plot Category Points diagram.

3. Results and Discussion

According to the tree classification diagram in Figure 1, at an age of more than 5.5 years old, the following breeds' occurrence of open-cervix pyometra is almost 100% from 37 cases including Mongreal, German Shepard Dog, Mini Schnauzer, Silky Terrier, Toy Poodle, Beagle, Chow Chow, Golden Retriever, Rottweiler, Cocker Spaniel, White Terrier, Siberian Husky, and Pekingese; are significantly more inclined to having open-cervix pyometra rather than closed-cervix pyometra. However, dogs with the same breed aged 5.5 years old and younger have a percentage of 76.9% open-cervix pyometra from 10 cases, which is slightly lower compared to those in the higher age group.
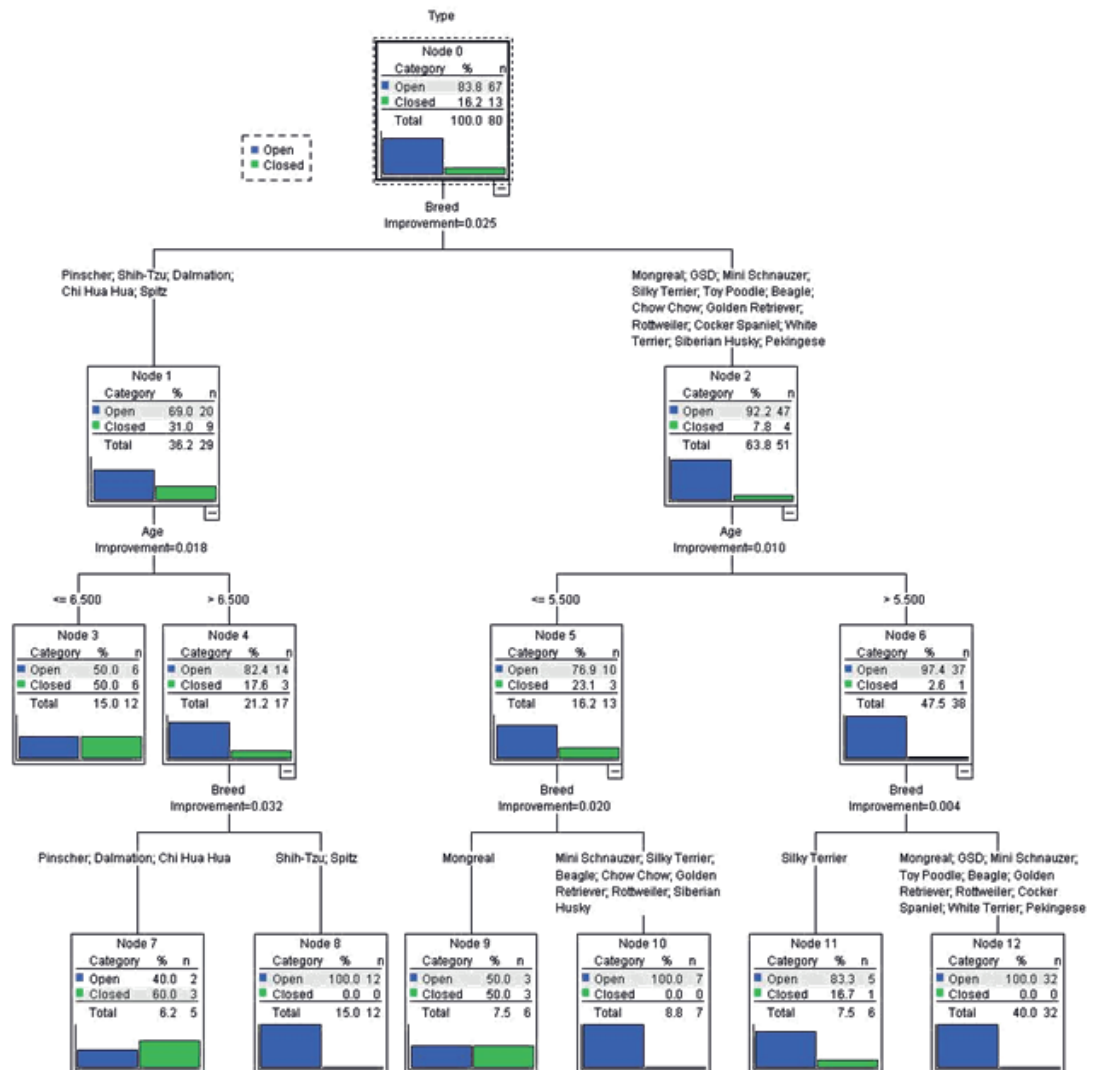
Figure 1: Tree Classification Diagram about Type of Pyometra Cases in Dogs Based On Age and Dog Breeds.

This results are in accordance with previous studies of breed risk of pyometra in dogs where the breeds with increased risk are rough Collies, Rottweilers, Cavalier King Charles Spaniels, Golden Retrievers, Bernese Mountain Dogs and English Cocker Spaniels compared with baseline dogs. The present study further compared the increased risk of open-cervix pyometra in the breeds mentioned above, compared with the closed-cervix pyometra. The breeds German Shepard Dog, Mini Schnauzer, Silky Terrier, Toy Poodle, Beagle, Chow Chow which are at risk compared to previous studies possibly reflects that more of these breeds were included in the present study (Jitpean et al., 2012).

Table 1 show the number and percentage of canine pyometra based on the life stages that is adulthood and geriatric. Geriatric bitches had the highest number of pyometra cases at 50 cases and 62.5% while bitches in their adulthood which had

TABLE 1: Total number and percentage of Canine Pyometra cases based on Life stage.

Year	Life stage						Total	
	Puppies		Adulthood		Geriatric			
	Number (n)	Percentage (%)	Number (n)	Percentage (%)	Number (n)	Percentage (%)	Number (n)	Percentage (%)
2012	0	0	4	5.00	6	7.50	10	12.50
2013	0	0	8	10.00	6	7.50	14	17.50
2014	0	0	9	11.25	10	12.50	19	23.75
2015	0	0	5	6.25	14	17.50	19	23.75
2016	0	0	4	5.00	14	17.50	18	22.50
Total	0	0	30	37.50	50	62.50	80	100.00

pyometra are as much as 30 cases at 37.5%. In the present study, no pyometra cases from puppies were found.

These results are consistent with previous studies about the incidence of pyometra and their potential risk-factors which shows that the average age of the dogs affected by pyometra was frequently between 8-11 years, and the age of all cases was more than 4 years, probably accompanying the lowering of physiological resistance with aging (Fukuda, 2001; Hagman et al., 2011). Egenvall et al. (2001) reported no significant difference in the age at which dogs of different breeds presented with pyometra, however, the study only included dogs up to the age of 10 years, and so these figures may be skewed for breeds which have a higher mean age of pyometra presentation. The present study have cases where the dogs are as young as 2 years old, this could be explained as small breed dogs tend to achieve sexual maturity earlier than in larger dog breeds. Small breeds enter their first heat between 6 and 10 months of age, while some normal large-breed dogs do not begin their estrous cycle until 18 – 24 months of age (Feldman and Nelson, 2004b).

Based on the type of breed categorised into small, medium and large breed, the small breed had the highest number of canine pyometra among the other breeds that is 58 cases at a percentage of 72.5%. This is followed by medium breed with 18 cases or 22.5% and large breed with 4 cases at 5%. A genetic predisposition for pyometra has not been demonstrated, however, a number of studies have described over-representation within certain large dog breeds, including rottweiler, golden retriever and Cavalier King Charles spaniel (Egenvall et al., 2001). A previous study in United Kingdom also showed an increased prevalence in larger dog breeds (bullmastiff, golden retriever, and dogue de Bordeaux) though it is thought that the population

TABLE 2: Total number and percentage of Canine Pyometra cases based on type of breed.

Year	Type of Breed						Total	
	Small		Medium		Large			
	Number (n)	Percentage (%)	Number (n)	Percentage (%)	Number (n)	Percentage (%)	Number (n)	Percentage (%)
2012	8	10.00	3	3.75	0	0	11	13.75
2013	10	12.50	3	3.75	1	1.25	14	17.50
2014	12	15.00	4	5.00	3	3.75	19	23.75
2015	15	18.75	3	3.75	0	0	18	22.50
2016	13	16.25	5	6.25	0	0	18	22.50
Total	58	72.50	18	22.50	4	5.00	80	100.00

study could be skewed due to the preference of larger dog breeds (Gibson et al., 2013).

The pyometra population in this study may be skewed by an increased preference of small breed dogs as a companion animal in Kuala Lumpur, Malaysia due to lower maintenance cost, easier handled compared to larger dog breeds and many other factors. The study done by Egenvall et al. (2001) was done in a four season country where extreme differences in climate and temperatures could affect the cause of pyometra. Further investigation would be needed to assess whether this indicated a true breed predisposition.
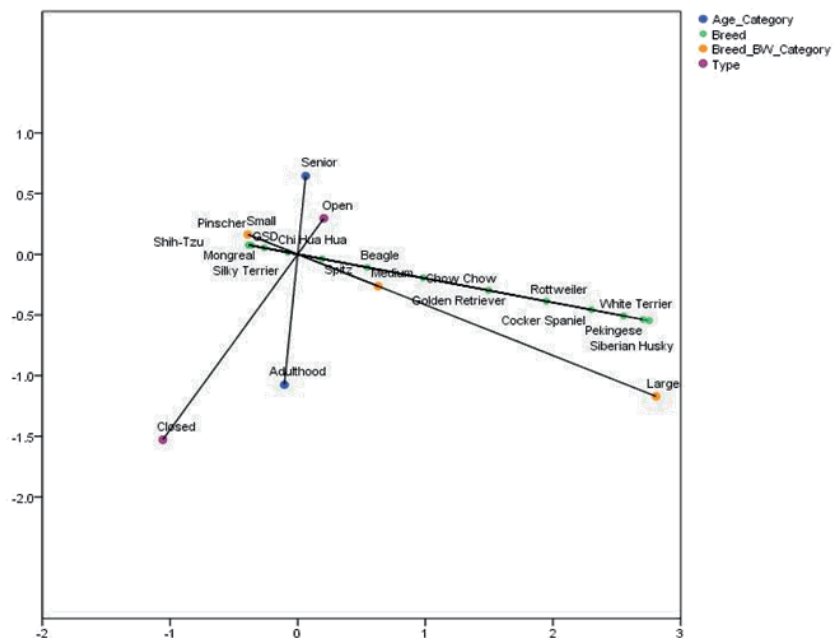
CATPCA analysis uses optimal scaling to generalize principal components analysis to accommodate variables of mixed measurement levels. The point for geriatric dogs which are aged 7 years and above are far more nearer to the open-cervix pyometra point, whereas the point for adult dogs with a range from 2 to 6 years old is nearer to the closed-cervix pyometra point; indicating a relationship where geriatric dogs are more predisposed to have open-cervix pyometra and adult dogs have a higher possibility of having closed-cervix pyometra. There is also a correlation between the breeds of dogs based on body weight and the type of pyometra cases. Small breed dogs are seen to have a higher possibility of having open-cervix pyometra compared to medium or large breed dogs.

However, in a previous study by Gibson et al. (2013) there was a significant younger age at pyometra presentation from the larger dog breeds (bullmastiff and dogue de Boedeaux). In the previous studies, it was discussed that in some breeds the risk of pyometra may increase more and at a younger age than others, potentially as a result of a genetic predisposition for developing pyometra than other breeds so the possibililily of instituting breeding programmes for disease control might be considered (Egenvall et al., 2011).

The diagram also shows a correlation where geriatric dogs are more inclined to have open-cervix pyometra whereas closed-cervix pyometra is more frequently seen in adulthood bitches. This is slightly different with previous studies where closed-cervix pyometra is more common in old (>8 years), intact female dogs (Mylonakis et al., 2014). In another previous study, dogs with open-cervix the median age was 9.0 years and dogs with closed cervix pyometra the median age was 9.6 years, just slightly older than dogs affected with open cervix pyometra (Jitpean et al., 2017). The difference in results could be biased from the fact that closed-cervix pyometra is often left undiagnosed or undetected by dog owners due to the lack of the tell-tale clinical sign of pyometra that is vaginal discharge.

4. Conclusion

The risk factors of canine pyometra in Segar Veterinary Hospital, Kuala Lumpur, Malaysia in the period May 2012 to May 2016 that is at the age of more than 5.5 years old, the following breeds had 100% from 37 cases of open-cervix pyometra, including Mongreal, German Shepard Dog, Mini Schnauzer, Silky Terrier, Toy Poodle, Beagle, Chow Chow, Golden Retriever, Rottweiler, Cocker Spaniel, White Terrier, Siberian Husky, and Pekingese; are significantly more inclined to having open-cervix pyometra.

Small breed and senior dogs are seen to have a higher possibility of having open-cervix pyometra while medium or large breed and adult dogs have a higher possibility of having closed-cervix pyometra. There should be further researches done to find out the effects of hormone therapy, frequency of births, and the bacteria present in uterus with pyometra.

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