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Preventive Veterinary Medicine 69 (2005) 109–127

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PREVENTIVE
VETERINARY
MEDICINE

Incidence of and survival after mammary tumors in a population of over 80,000 insured female dogs in Sweden from 1995 to 2002

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Received 8 July 2004; received in revised form 25 January 2005; accepted 26 January 2005

Abstract

The main objective of this study was to describe the incidence of mammary tumors (MTs) and the survival after MTs, in female dogs between 3 and 10 years of age (insured for veterinary care and with life insurance in a Swedish animal-insurance company) from 1995 to 2002. Measures of incidence are presented crudely, by breed and across age categories and birth cohorts (1991–1998). The survivals until MT diagnosis and after a MT diagnosis were computed. The overall incidence for any MT claim was 111 dogs per 10,000 dog-years at risk (DYAR). The overall MT rate in the 1992 and 1993 birth cohorts was 154 dogs per 10,000 DYAR. The incidence for any MT claim increased with age and varied by breed, from 319 dogs per 10,000 DYAR in the English springer spaniel to 5 dogs per 10,000 DYAR in the rough-haired collie. At the ages 6, 8 and 10 years, 1%, 6% and 13% respectively, of all

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females had at least one MT claim. The MT mortality was 6 deaths per 10,000 DYAR and increased with age. The overall-case fatality was 6%.

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Keywords: Dog; Insurance; Database; Mammary tumor; Breed; Cox regression; Life-table; Cohort analysis; Poisson regression; Longitudinal study

1. Introduction

Mammary tumors (MT) are the most-common type of tumor in intact-female dogs (Brodey et al., 1983). There is little information concerning the current incidence of canine MT. Among commonly cited studies, Schneider (1970) reported an incidence of 145 per 100,000 dog-years at risk in female dogs in California, USA. Recently, Dobson et al. (2002) reported a standardized-incidence rate for MT of 205/100,000 dogs/year, based on a defined population of insured dogs in the UK.

In addition to the high incidence and potential of being fatal, similarities with human breast cancer have prompted several studies on the incidence and factors affecting the incidence of MT in female dogs (Schneider, 1970; Owen, 1979; MacEwen, 1990; Knapp and Waters, 1997; Schafer et al., 1998). High-risk breeds vary depending on study and geographic location. Toy and miniature poodles, English springer spaniels, Brittany spaniels, cocker spaniels, pulis, English setters, pointers, German shepherds, Maltese, Yorkshire terriers and dachshunds have been reported to have increased risk of developing MT, suggesting a genetic component (Mac Vean et al., 1978; Kurzman and Gilbertson, 1986; Boldizar et al., 1992; Yamagami et al., 1996; Moe, 2001). The age of onset (Priester, 1979; Boldizar et al., 1992; Moe, 2001), the effect of spaying (Misdorp, 1988; Rutteman et al., 2003) and hormonal treatments (Misdorp, 1988; Donnay et al., 1993; Stövring et al., 1997) were studied.

The risk of developing MTs in dogs is significantly decreased by ovariectomy at an early age as illustrated by an increasing risk of developing MTs of 0.5%, 8%, to 26%, depending on whether ovariectomy is performed before the 1st, 2nd, or any estrus thereafter, respectively (Schneider et al., 1969). Although earlier disputed there is also recent evidence for the importance of timing of spaying on survival of dogs with MTs. In a study by Sorenmo et al. (2000) dogs that were spayed <2 years before MT surgery had a significantly longer overall survival compared to the group of intact dogs and dogs that were spayed >2 years before MT treatment.

The Agria insurance database (Agria Insurance, PO 70306, SE-107 23 Stockholm, Sweden) has been used to study mortality up to an age of 10 years and morbidity up to an age of 12 years in Swedish dogs (Egenvall et al., 2000a,b,c, 2001). It has been shown that the dogs in this database are representative of Swedish dogs in general and that the database contains large numbers of individuals of breeds seen worldwide. The demographic validity (breed, age, gender) of the database is excellent, while the diagnostic validity in general is satisfactory (Egenvall et al., 1998). In other work by us, among insured females (up to 12 years of age), in 1996 1.4% had at least one veterinary-care claim reimbursed with a diagnosis of MT (unpublished data). Despite the lack of verification and classification by

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