Research using primary-care veterinary clinical records: A case study of patellar luxation in dogs

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Background

Canine patellar luxation is one of the most common orthopaedic disorders of dogs [1]. It is a welfare concern because it can lead to lameness, osteoarthritis and pain [2], and is reported to be especially common in some small breeds of dog [3].
This study aimed to explore the VetCompass Programme database of dogs attending primary-care veterinary practices in England to report on the prevalence, risk factors and clinical management of patellar luxation.

VetCompass Clinical data

The VetCompass Programme [3] collates de-identified electronic clinical record data from primary-care veterinary practices in the UK for epidemiological research. Practitioners can record summary diagnosis terms from an embedded VeNom Code list of standardised terminologies during episodes of care. Information available includes patient demographic (species, breed, date of birth, sex, neuter status, insurance status and bodyweight) and clinical information (free-form text clinical notes, summary diagnosis terms and treatment, with relevant dates) data fields.

Methodology

Ethical approval: RVC Ethics and Welfare Committee (URN: 2015 1369).
A cross-sectional study design using cohort clinical data was used to estimate the prevalence and risk factors.
The sampling frame included all dogs with at least one clinical record uploaded to the VetCompass database from September 1st, 2009 to August 31st, 2014.
Case definition: a definitive diagnosis recorded of patellar luxation (or synonym) based on physical and/or radiological examination.
Case-finding: initial screening for candidate cases using VeNom recorded diagnoses and free-text search terms (*patella, MPL, LPL, PL, slipping pat, floating pat, trochlear groove, kneecap lux, femoral groove, floating kneecap, slipping kneecap, kneecap disloc*) before manual review of the candidate cases.
A random subset of candidate cases were manually reviewed for case inclusion.
Additional clinical data were extracted on confirmed cases.
Risk factors evaluated included *purebred, breed, Kennel Club breed group, adult bodyweight, breed-relative bodyweight, age, sex, neuter* and *insurance status.*
Statistical analysis used Stata Version 13 (Stata Corporation).
The period prevalence with 95% confidence intervals (CI) was described.
Because a subset of the candidate cases were verified, probability weightings denoting the inverse of the probability that each sampled observation was included in the review were assigned and the Stata *survey* function was used for prevalence estimation.
Risk factor assessment used multivariable mixed-effects logistic regression modelling.
The area under the ROC curve was used to evaluate the quality of the model fit.
Statistical significance was set at $P < 0.05$.

Prevalence

The study: 210,824 dogs attending 119 clinics in England.
A subset of 854 confirmed cases were identified.
Prevalence in dogs overall: 1.30% (95% CI: 1.21-1.39).
Limb affected: 27.8% bilateral vs.62.2% unilateral (33.9% left & 28.3% right stifle).
Medical management: 39.0%
Surgical intervention: 13.2%
Referral for further case management: 3.7%
Median age at surgery: 2.9 years (IQR 1.5-5.6, range 0.4-13.1).
Median diagnosis to surgery: 15 days (IQR 5-43, range 0-901).

Risk factors

Final multivariable model - area under the ROC curve: 0.826

Variable	Category	Odds Ratio	95% CI	P-value
Breed	Crossbred	Base		
	Pomeranian	6.7	4.1-10.9	< 0.001
	Chihuahua	6.0	4.5-8.1	< 0.001
	Yorkshire Terrier	5.5	4.3-7.1	< 0.001
	French Bulldog	5.4	3.1-9.3	< 0.001
	Pug	3.7	2.3-5.9	< 0.001
	Lhasa Apso	3.1	1.9-5.1	< 0.001
	Bichon	2.9	1.9-4.3	< 0.001
	Bulldog	2.9	1.7-5.0	< 0.001
	Cavalier King Charles Spaniel	2.5	1.8-3.5	< 0.001
	West Highland White Terrier	1.9	1.3-2.8	< 0.001
	Jack Russell Terrier	1.5	1.1-2.0	0.008
	Shih-tzu	1.2	0.7-2.0	0.439
	Staffordshire Bull Terrier	0.5	0.3-0.7	0.001
	Other breed-types	0.4	0.3-0.5	< 0.001
Breed relative bodyweight	At or above breed mean	Base		
	Below breed mean	1.4	1.2-1.6	< 0.001
Age (years)	< 3.0	Base		
	3.0 - <6.0	0.9	0.7-1.1	0.203
	6.0 - <9.0	0.9	0.7-1.1	0.147
	9.0 - <12.0	0.7	0.6-0.9	0.016
	> or = 12.0	0.4	0.3-0.6	< 0.001
Sex	Male	Base		
	Female	1.2	1.1-1.4	0.003
Neutered	Entire	Base		
	Neutered	2.3	1.7-3.0	< 0.001
Insured	Uninsured	Base		
	Insured	1.9	1.6-2.2	< 0.001

Conclusions

The study suggests that patellar luxation, with an overall 1.3% prevalence, should be considered a welfare priority for dogs and that control strategies for this disorder should be considered as worthwhile breeding goals, especially in the predisposed breeds identified.
Primary-care clinical records can be a useful source of data for epidemiological and clinical research.

References

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