

PENILE HYPOPLASIA IN A ROTTWEILER: A CASE REPORT

C Gobello, ¹, JC De Luca ², Y Corrada³, M García⁴,
P Peral García²

¹Clínica de Pequeños Animales. ²Centro de Investigación en Genética Básica y Aplicada (CIGEBA). ³Servicio de Diagnóstico por Imágenes. ⁴Profesión libre Facultad de Ciencias Veterinarias. Universidad Nacional de La Plata.

Abstract: *Penile hypoplasia is a rare congenital disorder that has been described in a few breeds of dogs. The aim of this article was to report a case of penile hypoplasia in an inbred Rottweiler dog. An otherwise healthy, 3 years old Rottweiler male dog, was referred to our Faculty because of inability to copulate. The male had a history of normal libido. Testis appeared normal either in size and consistency, while the penis and prepuce were small in relation to the size of the dog. Manual semen collection was impossible due to the small size of external genitalia and the aggressiveness of the dog. Serum testosterone concentrations were 1.63 and 3.35 ng/ml before and after hCG stimulation test. Cytogenetic analysis showed a normal male karyotype. The modal chromosome number was 78 and the sex chromosome constitution was XY. Pedigree analysis showed that the dog was full sib. F Wright inbreeding coefficient was 0.25. This coefficient showed that there is a 25 % probability that this dog shares their genes with a common ancestor. As a preventive measure, consanguineous mating should always be discouraged. Moreover, knowing that congenital malformation is heritable, the importance to eliminate affected dogs from natural or assisted reproductive programs should also be emphasized by practitioners.*

Key words: dog - penile hypoplasia - intersex -inbreeding

HIPOPLASIA DE PENE EN UN ROTTWEILER: INFORME DE UN CASO

Resumen: *La hipoplasia de pene es un raro desorden congénito que ha sido descrito en pocas razas de perros. El objetivo de este artículo es reportar un caso de hipoplasia de pene en un perro macho consanguíneo de raza Rottweiler. Un perro de raza Rottweiler, macho, saludable, de 3 años de edad, fue referido a nuestra Facultad por la incapacidad para copular. El macho tenía una historia de libido normal. El examen físico reveló que ambos testículos eran normales en tamaño y consistencia, mientras que el pene y el prepucio eran pequeños en relación al tamaño del perro. La colección manual de semen fue imposible debido al pequeño tamaño de los genitales externos y a la agresividad del perro. La concentración sérica de testosterona fue de 1.63 y 3.35 ng/ml antes y después de la prueba de estimulación con hCG 1000 UI IM. El análisis citogenético mostró un cariotipo macho normal. El número cromosómico fue de 78 y la constitución cromosómica sexual resultó XY. El análisis del pedigrí evidenció que el perro era hijo de hermanos enteros. El coeficiente de consanguinidad F Wright fue de 0,25. Este coeficiente demostró que hay un 25 % de probabilidad de que este perro compartiera sus genes con un antecesor común. Como una medida preventiva los "servicios" entre animales consanguíneos, deben ser siempre desalentados. Más aún, conociendo la base hereditaria de las malformaciones congénitas, los veterinarios deben enfatizar la importancia de eliminar los perros afectados de los programas reproductivos naturales o asistidos.*

Palabras claves: perro- hipoplasia de pene- intersexo- consanguíneo

Fecha de recepción: 18/06/03

Fecha de aprobación: 21/08/03

Dirección para correspondencia: C.Gobello, Facultad de Ciencias Veterinarias. Universidad Nacional de La Plata. C.C. 296, (B1900AVW) La Plata, ARGENTINA.

E-mail: cgobello@fcv.unlp.edu.ar

INTRODUCTION

Congenital anomalies of the reproductive track of the male dog are an unusual finding in canine clinical practice. Persistent penile frenulum, hypospadias, deformity of the os penis and penile hypoplasia have been described as the most frequent congenital anomalies of the penis in this species (1, 2, 3). Penile hypoplasia is a rare disorder that has been described in the Cocker Spaniel, Collie, Doberman pinscher and Great Dane (3, 4, 5). This congenital anomaly is asymptomatic in the dog and often appears as a finding on the breeding soundness exam.

Penile hypoplasia is an usual component of some intersex states related to the phenotypic sex such as male pseudohermaphroditism (6). An abnormal karyotype has been identified in some animals with penile hypoplasia, so karyotyping should be always indicated in these cases (3). Androgen deficiency may be associated with genetic abnormalities of the sexual development (3). Therefore, the function of hypothalamus- pituitary-Leydig axis should also be evaluated in these patients. No treatment is usually indicated, unless an hypoplastic preputial opening is also present and urine pooling and infections are present (3).

Dog karyotype was standardized during the 11th European Colloquium on Cytogenetic of Domestic Animals by an International Committee (7). The normal diploid chromosome number for this species is 78, being the autosomes acrocentric; while X and Y are the large and small submetacentric chromosomes, respectively (8, 9, 10).

Inbreeding results from mating of closely related individuals and it can be estimated through the F Wright coefficient. This coefficient expresses the probability of an individual to carry identical genes from a common ancestor and ranges from 0 - 1. Inbreeding is known to reduce reproduction efficiency in many species, including dogs (11, 12, 13, 14). Breeding programs including dogs with a coefficient ranging from 0.12 to 0.56 can experience reduced reproductive performance (14). The aim of this article was to report a case of penile hypoplasia in an inbred Rottweiler dog.

CASE REPORT

Animal, history and physical exam

An otherwise healthy, 3 years old Rottweiler male dog, was referred to our Faculty because of inability to copulate. The male had a history of normal libido and failure to achieve penetration during attempts to mate. No data about the sib-

lings were available. At physical examination, testes and prostate appeared normal either in size and consistency while the penis (6 cm) and prepuce were small in relation to the size of the dog (Figure 1). Although, the preputial opening was normal, complete manual exteriorization of the penis was difficult.



Figure 1. Penile hypoplasia in the Rottweiler dog.
Figura 1. Hipoplasia peniana en un perro Rottweiler

Ancillary tests

Manual semen collection was impossible due to the small size of external genitalia and the aggressiveness of the dog. Unfortunately, the owner did not permit electroejaculation. Ultrasonography was indicated to evaluate the testes and the prostate.

Blood samples were collected for testosterone determinations before and 4 hours after the administration of hCG (Endocorion®, Elea) 1000 UI IM. Serum testosterone concentrations were measured by a commercial a solid phase radioimmunoassay kit (Coat-A Count, DPC®, Los Angeles USA). Cytogenetic analysis was carried out on blood lymphocyte cultures. Heparinized blood samples were cultured during 72 hours at 37 C° in Ham F 12 culture medium (Gibco BRL, Gaithersburg, USA), supplemented with Pokeweed (Gibco BRL, Gaithersburg, USA). Slides were stained with Giemsa 5%. Wright coefficient was calculated from the pedigree provided by the Argentine Kennel Club according to the equation previously described (11).

RESULTS

Ultrasonography (Hitachi EUB 415, Band B/M modes, 7.5 MHz transducer) revealed no abnormalities neither in the testes nor in the pros-

tate. Serum testosterone concentrations were 1.63 and 3.35 ng/ml before and after hCG administration. Cytogenetic analysis showed a normal male karyotype. (Figure 2). The modal chromosome number was 78 and the sex chromosome constitution was XY. Pedigree analysis showed that the dog was full sib and F Wright inbreeding coefficient was 0.25.



Figure 2. Dog karyotype showing a 78, XY chromosome complement.

Figura 2. Cariotipo del perro mostrando un complemento cromosómico de 78, XY

DISCUSSION

This is, to our knowledge, the first report of penile hypoplasia in a Rottweiler. A complete history and physical examination constitute the initial diagnostic approach to this reproductive complaint. Penis length in normal dogs ranges from 6.5 to 24 cm (3), being the length in this dog below the lower limit.

Post stimulation testosterone serum concentration was within the normal range (15). Moreover androgen deficiency was unlikely in this case as the dog presented normal testes and libido. Unfortunately, fertility could not be evaluated. Reproductive traits, in particular total sperm count and percentage of motility, measured in inbred beagle colonies with an average Wright coefficient of 0.304 ± 0.15 were depressed in a study (14). Wright's inbreeding coefficient of this dog showed that there was a 25 % probability that this dog shared its genes with a common ancestor. Inbreeding can increase the expression of recessive genes at homozygous state. The expression of these genes can induce congenital malformations (16).

Although an overall decline in reproductive performance is expected, consanguineous mating is a frequent practice among breeders looking for certain phenotypic characteristics. As a preventive measure, this kind of mating (excessive inbreeding) should always be discouraged. Moreover, knowing congenital malformations are heritable, the importance to eliminate affected dogs from natural or assisted reproductive programs should be emphasized by veterinary practitioners.

REFERENCES

1. Bloom F. The genitourinary system. Pathology of the dog and cat. Evanston IL Am Vet Publications. 1954; p: 334-354.
2. Feldman EC, Nelson RW. Clinical and Diagnostic Evaluation of the male reproductive tract. Canine and Feline Endocrinology and Reproduction 2nd. ed. W.B. Saunders, Philadelphia. (USA). 1996; p: 673-690.
3. Feldman EC, Nelson RW. Disorders of the penis and prepuce. Canine and Feline Endocrinology and Reproduction 2nd. ed. W.B. Saunders, Philadelphia. (USA). 1996; p: 691-696
4. Gustavsson I. The chromosome of the dog. Hereditas. 1964; 51: 187-189.
5. Hare WCD, Weber WT, McFeely RA, Yang T. Cytogenetics in the dog and cat. J Small Anim Prac. 1996; 7 : 575-592.
6. Johansson I. Rendel J Genetic and Animal J Genetic and Animals Breeding. Oliver and Boyd, Edinburg and London. 1968; 257: 378-387.
7. Johnston SD. Disorders of the External genitalia of the male. Ettinger, S.J, Textbook Veterinary Internal Medicine, 3rd ed. Philadelphia. W.B. Saunders. 1989; p: 2140-2160.
8. Mathey R. Chromosomes et systématique des canidés. Mammalia. 1954; 18: 225-230
9. Meyers-Wallen VN. Inherited disorders in sexual development. The American Genetic Association. 1999; 90: 93-95.
10. Meyers-Wallen VN. CVT Update: Inherited disorders of the reproductive tract in Dogs and Cats. Kirk, R. (ed). Current Veterinary Therapy. Small Animal Practice XIII, Philadelphia, W. B. Saunders Co.2000; p: 904-909.
11. Proescholdt T, De Young D. Infantile Penis in the canine. Iowa Vet. 1977; 59.
12. Rehfeld CE. Definition of relationships in relations in a closed Beagle colony. J Am Vet Med Assoc. 1970; 31: 732-732.
13. Rice VA, Andrews EJ, Warwick E J, Legates JE. Breeding improvement of Farm Animals, 6th ed McGraw- Hill book Co, New York. 1967; 188, 190

14. Shille VM, Olson PN. Dynamic testing in reproductive Endocrinology. Kirk, R. (ed). Current Veterinary Therapy. Small Animal Practice X, Philadelphia, W. B. Saunders Co. 1989; p 1282-1288.
15. Switonski M, Fisher P, Reimann N, Bartnizke S, Bullerdiek J, Ronne M, Pienkowska A, Ladon D, Graphodatsky A, Beklemisheva V, Long S, Bosma A, Moreno-Millán M, De Luca JC. International efforts for establishing standard karyotype of the dog (*Canis familiaris*). Committee for the standardized karyotype of the dog (*Canis familiaris*). Proc 11th. Europ. Colloq on Cytogenet of Domest Anim. 1994; p:150-152.
16. Wildt DE, Baas PK, Chakraborty PK, Wolfle TL, Stewart AP. Influence of inbreeding in reproductive performance ejaculate quality and testicular volume in the dog. Theriogenology. 1982; 17: 4445-4452.