

Spermatogenesis and Fertility Following Orchiopexy and GnRH Treatment in an English Bulldog after Puberty with Bilateral Cryptorchidism

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(Accepted: September 30, 2009)

Abstract : An orchiopexy was performed in an 18-month old adult English bulldog with bilateral cryptorchidism. One month postoperatively, the dog was twice-treated with GnRH (50 ug/kg) at an interval of 2 weeks. Semen was collected and evaluated before and after surgery. Fertility was determined by artificial insemination. No spermatozoa were observed before orchiopexy and 2 months postoperatively. However, 6 live sperm were detected 4 months postoperatively and normal sperm characteristics (except sperm concentration) were present 7 months postoperatively. A female bulldog, inseminated with the semen from the bulldog 8 months postoperatively, delivered 6 offsprings. Spermatogenesis and spermatozoa with fertilizing capacity were recovered by postpubertal orchiopexy and GnRH therapy in a bilateral cryptorchid dog.

Key words : artificial insemination, cryptorchidism, dog, GnRH, orchiopexy.

Introduction

Cryptorchidism is a developmental defect in male dogs in which descent of one or both testes into the scrotum does not occur by 6 months of age (11). The incidence of cryptorchidism in dogs is considerably higher than any other domestic animals (9). The best treatment for canine cryptorchidism is bilateral castration to decrease the possible transmission of this hereditary defect, and to decrease the predisposition of the retained testis for neoplasia and torsion of the spermatic cord. However, surgical replacement of the testes into the scrotal sac (orchiopexy) (5,7,8) and medical treatment with GnRH (4) have been described as the treatment of choice for cryptorchidism when preservation of fertility is desired.

The optimum time for orchiopexy is before the age of puberty (2); if treatment is performed after puberty, it may be impossible for spermatogenesis to occur in the testes in human (3,10). However, few papers have been published to report spermatogenic function in cryptorchid (CR) dogs by orchiopexy and GnRH treatment after puberty (7,8). Therefore, the present case was to report recovery of spermatogenesis and fertility by orchiopexy and GnRH therapy in a postpubertal bulldog with bilateral cryptorchidism.

Case

An 18-month old English bulldog with bilateral cryptorchid-

ism in the inguinal region had a semen evaluation and azoospermia was diagnosed. The dog underwent orchiopexy bilaterally under anesthesia with ketamine (Ketamin, Yuhan, Korea) plus xylazine (Rumpun, Bayer, Korea) (1:1; 0.2 ml/kg) after atropine sulphate (Atropine, Daihan Pharm Co., Korea) (0.05 mg/kg) for pre-anesthesia. An incision was made on the skin over the inguinal region to expose the inguinal CR testes. The external appearance of the exposed testes was observed. Each hemi-scrotum was opened and the inguinal testis was returned to its normal anatomic position, and then ligated to the scrotal wall. Beginning 1 month postoperatively, the dog was twice-treated with GnRH (Gonadon, Donbang Co., Korea) (50 ng/kg) at an interval of 2 weeks. Semen was collected by digital manipulation 2, 4, and 7 months postoperatively and was examined for semen volume, sperm concentration, motility, viability, and morphology. Eight months postoperatively, artificial insemination (AI) was performed. One female English bulldog was inseminated on the 3rd and 5th days after the onset of estrus. When the female bulldog was raised by the hind-quarters, a bovine AI sheath was inserted deep into the vagina through which the semen was inseminated. The female dog was examined for pregnancy by ultrasound 30 days after AI; gravid dog was observed until parturition.

The exposed bilateral CR testes were smaller than normal canine testes of the same age, but the appearance was normal without degeneration or inflammation (Fig 1). No spermatozoa were observed in the semen sample from the CR bulldog collected 2 months postoperatively; however, 4 months postoperatively 6 live sperm were found. Seven months postoperatively, the ejaculated semen had normal sperm characteristics,

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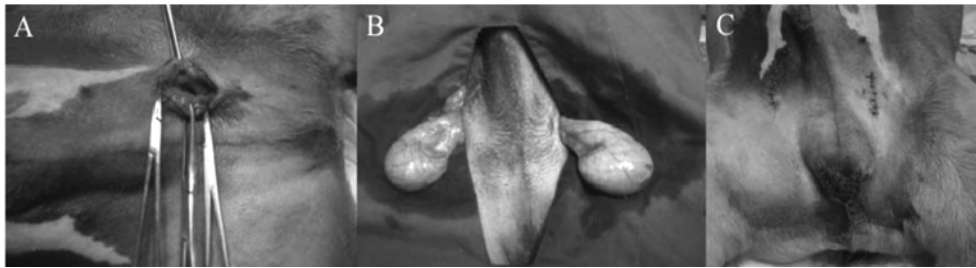


Fig 1. Orchiopexy in a bulldog with bilateral cryptorchidism. (A) Operative site, (B) Exposed cryptorchid testes, (C) Fixation of cryptorchid testes in the scrotum.

except for a low sperm concentration (2.5×10^6 spermatozoa/ml; Table 1). Eight months postoperatively, the sperm characteristics of the ejaculated semen were similar to 7 months postoperatively, and then a female bulldog was artificially inseminated with the semen collected from the CR bulldog. The female bulldog conceived and delivered 6 healthy offspring 61 days after the second AI.

Discussion

Inadequate secretion of GnRH, LH, or testosterone has been hypothesized as consequence of cryptorchidism due to the occasional descent of testes in human males at puberty, and occasional reports of successful treatment in canine cryptorchidism with gonadotropic agents (11). Even when orchiopexy is performed before the age of puberty, development of normal testicular function in the CR testis is impaired (1). In the present case, GnRH treatment after orchiopexy might have affected spermatogenesis in a postpubertal bulldog with bilateral cryptorchidism. Further studies are required to determine whether GnRH, orchiopexy, or both would affect spermatogenesis in bilateral CR adult dogs. One study reported that testes repositioned in the scrotum regained some spermatogenic function; increased diameter of the seminiferous tubules was identified in both the repositioned testis and scrotal testis (6). Unilaterally CR dogs from which the scrotal testis was removed and the retained testis surgically replaced in the

scrotum showed gradual improvement in semen quality by 1 year after surgery. Inseminates from these dogs successfully impregnated 3 of 11 females bred (5,7). The authors have previously reported that orchiopexy in young and adult dogs with unilateral cryptorchidism resulted in the spermatozoa in the CR testis 8 and 10 weeks postoperatively, respectively (8). In the present case, orchiopexy was performed in an adult dog with bilaterally inguinal CR. Both testicles had atrophied, but complete degeneration of the male reproductive system had not occurred. Spermatozoa reappeared in the CR testes 4 months postoperatively, caused a pregnancy 8 months postoperatively. Thus it is considered that spermatogenesis is stimulated and spermatozoa capable of fertilization are produced by orchiopexy and GnRH treatment, even postpuberty if degeneration of the testis is absent.

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Table 1. Semen characteristics for Bulldog of 7 and 8 months post-orchiopexy

Semen parameters	Results	
	7 months	8 months
Semen volume	5 ml	5 ml
Sperm concentration	2.5×10^6 /ml	3.5×10^6 /ml
Motility	85%	90%
Viability	90%	90%
Total morphologic abnormalities	8%	9%
Head	2%	2%
Neck	5%	5%
Tail	1%	2%

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양측성 잠복고환견에서 성성숙 후 고환하강고정술과 GnRH 투여를 통한 생식능력 회복례

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요 약 : 양측성 잠복고환을 가진 18개월 연령의 잉글리쉬 불독에서 고환하강고정술을 실시하였고 수술 1달 후 GnRH를 투여하였다. 수술 전후 정액검사를 실시하였으며 인공수정을 통해 생식능력을 검증하였다. 수술 전과 수술 2달 후 정액검사 결과, 무정자증으로 판단되었으나 수술 4개월 경과 후 6마리의 정자가 관찰되었다. 수술 7개월 후 정자수를 제외한 나머지 정자 소견에서 정상을 나타내었으며 수술 8개월 후 채취된 정액을 암컷 불독에게 인공수정한 결과 6마리의 건강한 산자를 생산하였다. 양측성 잠복고환견에서 성성숙 이후라 할지라도 고환하강고정술과 GnRH 투여를 통해 정자형성과 수정능력이 회복 가능함을 알 수 있었다.

주요어 : 인공수정, 잠복고환, 개, GnRH, 고환하강고정술.