

Review

Diagnosis and Clinical Implications of Male Dog Infertility Problems in a Developing Country

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ABSTRACT

Male infertility problems have been related to several phenomenon viz., sperm production, viability and fertilizing capacity; sexual desire (libido) and ability of the male to mate. Several causes of infertility have been identified. Among these causes, testicular hypoplasia, segmental aplasia of the wolffian duct, cryptochidism, testicular degeneration and infectious infertility have been reviewed. Cryptochidism is the most common disorder of sexual development occurring in as many as 13% of male dogs. Breeding practices are indiscriminate and uncoordinated in Nigerian Mongrels where over 80% of the male dogs are free roaming. Basic fertility services are lacking in the developing countries. This means that many dog owners could not access fertility services, and where they do; the facilities are not adequate. Therefore, until a proper programme is put in place, male dog infertility in developing nations like Nigeria will continue to present clinical and research problems to the veterinarian in small animal practice.

Key Words: Male dog; Infertility; Diagnosis; Clinical implications

INTRODUCTION

Infertility can be classified based on the stud dog's previous breeding history. This approach is the easiest in practice. A dog that has never sired a litter despite numerous matings should be considered congenitally infertile until proven otherwise (Feldman, 1989). Many fertile bitches in heat have been presented to stud dogs but fail to conceive mainly due to several infertility problems in the male. An articulated diagnostic procedure in the evaluation of infertile stud dogs, offers the best chance of identifying the problems and it enables the veterinarian to formulate a rational therapeutic plan.

Male infertility problems have been related to several phenomenon via; sperm production, viability and fertilizing capacity; sexual desire (libido) and ability of the male to mate (Hafez, 1980). These problems are commonly classified as either primary or acquired infertility (Feldman, 1989; Gustaffson & Galloway, 1988). Among the causes of primary infertility, testicular hypoplasia, segmental aplasia of the wolffian duct, cryptochidism, testicular degeneration, and infectious infertility have been identified. This paper reviews the clinical and research implications of these conditions in canine breeding programmers in a developing country like Nigeria.

INFERTILITY PROBLEMS

The identification of the causes of infertility is the major task a veterinarian or a breeder should shoulder. Some causes of male dog infertility are reviewed.

Testicular hypoplasia. This condition, have been reported in dogs. It is the underdevelopment of the testes. As in other species (Bull, Boar), this may occur in a varying degree resulting in a variable decrease in sperm production. The condition, have a hereditary predisposition (Gustaffson & Galloway, 1988). Abnormalities of chromosome numbers such as XXY syndrome have been described in dogs. This gives rise to a phenotypic male with hypoplastic testes, devoid of spermatogenesis (Meyers-Wallen & Patterson, 1989). The condition may be unilateral or bilateral in nature. Total aspermia results from cases of total bilateral hypoplasia. Hypoplastic testes are either hard or soft in consistency (Gustaffson & Galloway, 1988)

Segmental aplasia of the Wolffian duct. This defect occurs when small or large segments of one or both ducts (e.g. epididymis, vas deferens) are missing. Males with unilateral tubal deficiencies or occlusions often have normal fertility, but those with bilateral conditions are sterile (Hafez, 1980). A careful scrotal palpation is necessary to differentiate between segmental aplasia of the epididymis and testicular hypoplasia (Gustaffson & Galloway, 1988).

Cryptochidism. In dogs, cryptochidism is the most common disorder of sexual development, occurring in as many as 13% of male dogs presented to small Animal clinics (Dunn *et al.*, 1968). The condition, occur as a result of failure of one or both of the testis to descend from the abdominal cavity into the scrotum. It could be unilateral or bilateral in nature. Bilateral cryptochids are sterile, while unilateral cryptochids are fertile (Hafez, 1980). Although the condition occurs in isolation, it was

also reported to occur in association with intersexuality (Meyers-Wallen & Patterson, 1989).

Normally, canine testes descend to the scrotum by 10 days after birth (Gier & Marrion, 1969). If by eight weeks of age, the testes are not within the scrotum, a diagnosis of cryptorchidism is warranted. Cryptorchid dogs have been reported to have an increased risk of development of sertoli cell tumour (Rief *et al.*, 1979). Isolated cryptorchidism is likely to have a genetic predisposition since it occurs in some breeds more than others (Hayes *et al.*, 1985). The inheritance of canine cryptorchidism is unknown but the simplest model consistent with available evidence is sex-limited autosomal recessive inheritance. Treatment is limited to castration (Meyers-Wallen & Patterson, 1989).

Testicular degeneration. Testicular degeneration is one of the causes of acquired infertility in the male Dog. A variety of causative factors such as hormonal disturbances, heat, stress, toxins, scrotal irritations or dermatitis and autoimmune disorders have been reported (Feldman, 1989; Gustaffson & Galloway, 1988). The clinical picture presented include low sperm motility, high incidence of sperm defects and palpable change of the testicles.

Infectious infertility. Many forms of infectious infertility have been reported in dogs. These conditions include orchitis, epididymitis, disk spondylitis, polyarthritis, posterior paralysis, fever and uveitis (Zoha & Welsh, 1982; Feldman, 1989; Nicolletti, 1989). *Brucella canis* seem to be the only bacterium known to cause infertility in the dog, but it is however believed that other bacteria may be a cause of infertility when they are found in large numbers in culture. The normal microflora of the genital tract (Feldman & Nelson, 1987; Hornbuckle & White, 1989) may predispose to infection in the presence of trauma.

Other conditions. Other conditions responsible for infertility in the dog have been reported. These include penile hypoplasia, persistent penile frenulum, penile confusion, fracture of the os-penis, balanoposthitis, paraphimosis, penile neoplasia, hypothyroidism, etc. (Roberts, 1971; Hall, 1976; Buckner, 1979; Pugh, 1987; Johnston, 1989)

DIAGNOSIS

Infertility in male dogs unlike the bitch is not an apparent problem, a thorough history and physical examination, semen evaluation, thyroid gland and leydig cells analysis, testicular biopsy, evaluation of epididymal aspirate and the measurements of plasma gonadotrophins is, therefore, extremely important in the diagnostic evaluation of the dogs fertility.

History and physical examinations. Usually, history coupled with physical examinations of the organ will reveal abnormalities that identify the cause of infertility (Feldman, 1989). History should be exhaustive to include reproductive,

kennel, pedigree, vaccinations and other medical protocols as described earlier (Buckner, 1979; Feldman, 1989).

Physical examination should evaluate obesity, debility, hair coat and skin conditions, lameness and abnormalities of the genitalia. The penis, scrotum and testes should be palpated to determine any abnormalities in size or consistency. The prostrate can be assessed radiographically for any enlargement as described by Christoph (1975).

Semen evaluation. Semen should be evaluated for motility, concentration and morphology of spermatozoa and bacterial culture. A normal semen is milky, without traces of blood or other extragenous substances. *Brucella canis* testing using the rapid slide agglutination test (RSAT) or tube agglutination test (TAT) should be performed (Feldman, 1989). The method of semen evaluation have been described earlier (Buckner, 1979).

Thyroid gland, testicular biopsy and leydig cells analysis. Functional loss of leydig cells will result in loss of libido while hypothyroidism will cause functional infertility. Primary testicular failure will lead to damage of the spermatozoa with resultant infertility. There is a loss of function of both the seminiferous tubules and the leydig cells (Buckner, 1979; Feldman, 1989).

Measurements of plasma gonadotrophins. Pituitary dysfunction with impaired secretion of gonadotrophins leads to decreased libido and impaired spermatogenesis, therefore plasma concentration of FSH, LH and Testosterone should be measured (Feldman, 1989)

CLINICAL IMPLICATIONS

In many developing countries, like Nigeria, male dogs are hardly presented to the small animal clinics for fertility evaluations. As a result, many infertility problems in the male dog go unnoticed. Owing to the free-roaming nature of the mongrels where over 80% of male dogs are not restricted; and where breeding practices are uncoordinated and indiscriminate in nature, the diagnosis and management of male infertility is difficult, if not least rewarding (Feldman, 1989).

History and physical examinations are extremely important in the diagnostic evaluation of male infertility problems. However, almost totally male dog owners in developing countries do not have or keep proper records of the reproductive history of their dogs. This impairs the clinical evaluation of male dogs and may eventually jeopardize their fertility. Recently, there have been an increasing rise in the demand and ownership of exotic breeds like the Alsatian, Doberman Pinscher, Rottweillers, etc. in Nigeria. Because of the enormous cost of importation of these dogs from overseas, these have necessitated the breeding of these dogs locally. This practice is going on with variable success rates due majorly to some infertility problems in this part of the world.

Infertility problems have been reported to be global in nature with a prevalence of approximately 8% in couples in

the developed nations. This may be higher in the developing countries. Access to fertility services is a problem that both the developing and the developed nations share, but basic fertility services are lacking in the developing countries (Collins, 2000), therefore many dog owners could not access adequate fertility services. This situation is frustrating to the small animal veterinarian in small animal practice and it constitutes a great impediment to the aspiration of the young growing canine breeding practices in Nigeria.

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