

HIGH INCIDENCE OF TESTICULAR HYPOPLASIA IN BRANGUS-IBAGÉ BULLS IN MATO GROSSO DO SUL STATE: CASE REPORT

ALTA INCIDÊNCIA DE HIPOPLASIA TESTICULAR EM TOUROS BRANGUS-IBAGÉ NO ESTADO DO MATO GROSSO DO SUL: RELATO DE CASO

L. Z. OLIVEIRA^{1*}, A. S. DO CARMO¹, V. F. M. H. LIMA¹, F. M. LIMA², M. Z. COSTA²

SUMMARY

This study describes a high incidence of testicular hypoplasia observed during breeding soundness examination conducted on a commercial farm in Mato Grosso do Sul state. Sixty-eight Brangus-Ibagé bulls aged between 36 and 48 months were evaluated and eight animals were diagnosed with testicular hypoplasia, which corresponded to an incidence of 11.8%. The hypoplastic animals presented flaccid testicular consistency and small size of scrotal circumference (mean of 28.9 cm) compared with the other animals evaluated, which presented a firm-elastic testicular consistency and mean scrotal circumference of 36.6 cm. In the semen evaluation of hypoplastic animals, low progressive motility (mean of 47%) and high percentage of major and total defects (means of 56% and 62%, respectively) were observed. The animals that were approved in the breeding soundness examination presented mean progressive motility, major defects and total defects of 68%, 17% and 23%, respectively. Given the genetic character of testicular hypoplasia, the immediate removal of hypoplastic animals from breeding was recommended. Finally, it was suggested to investigate the origin of these animals in order to avoid that new animals from this lineage are acquired by the owner.

KEY WORDS: Brangus. Testicular pathology. Semen characteristics.

RESUMO

Neste trabalho, relata-se um caso de alta incidência de hipoplasia testicular observada durante exame andrológico realizado em uma fazenda comercial no estado do Mato Grosso do Sul. Foram avaliados 68 touros Brangus-Ibagé com idade entre 36 e 48 meses e observou-se oito animais com hipoplasia testicular, o que correspondeu a uma incidência de 11,8% desta patologia. Os animais hipoplásicos apresentaram consistência testicular flácida, bem como tamanho médio do perímetro escrotal bastante reduzido (28,9 cm) em comparação aos demais animais avaliados, que apresentaram média do perímetro escrotal de 36,6 cm e consistência testicular firme-elástica. Na avaliação do sêmen dos animais com hipoplasia testicular, observou-se baixa motilidade progressiva (média de 47%) e alta porcentagem de defeitos maiores e totais (média de 56% e 62%, respectivamente). Nos demais animais aprovados no exame andrológico, a média de motilidade progressiva, defeitos maiores e defeitos totais foram 68%, 17% e 23%, respectivamente. Dado o caráter genético da hipoplasia testicular, recomendou-se o descarte ou retirada imediata destes animais da reprodução. Por fim, sugeriu-se a investigação da origem destes animais de modo a evitar-se que novos animais oriundos dessa linhagem genética sejam adquiridos pelo proprietário.

PALAVRAS-CHAVE: Brangus. Patologia testicular. Características seminais.

¹ UNESP – Jaboticabal/SP. * Via de Acesso Prof. Paulo Donato Castellane s/n. (Depto. Medicina Veterinária Preventiva e Reprodução Animal). ZIP: 14884-900, Jaboticabal/SP. e-mail: leticiazoccolaro@yahoo.com.br;

² FEA – Andradina/SP.

INTRODUCTION

Many farmers have little or no information on the fertility of their bulls, and since generally their animals are raised together, it is difficult to identify those infertile or subfertile (MENEGASSI, 2010). Subfertile bulls have the ability to produce offspring, which is undesirable since this alteration can be of genetic nature (VALE FILHO, 1979).

The selection of bulls through breeding soundness examination aims to identify abnormalities in the genital tract and in the semen that may impair fertility (PIMENTEL, 2000) and also aims to select animals that display good reproductive performance (FONSECA et al., 1997). This is one of the most important steps for the management of herds that adopt the system of natural mating, especially when considering that the male transmits 50% of their genotype to a large number of females (QUIRINO, 1999). Moreover, the bulls are responsible for more than 90% of the genetics of the herd, although they represent only 5% of the herd (AMARAL et al., 2003). Therefore, the sire must have the reproductive potential evaluated before being used and high cautious must be taken when purchasing these bulls (MENEGASSI, 2010).

The different testicular pathologies that affect fertility may be genetic, congenital or acquired (BICUDO et al., 2007). Among the diseases of genetic origin, there is testicular hypoplasia. Testicular hypoplasia is caused by the expression of an autosomal recessive gene with incomplete penetrance, which interferes in the spermatogenesis (VALE FILHO et al., 1979, STEFFEN, 1997, NASCIMENTO & SANTOS, 2003). Animals may show unilateral or bilateral, being partial or total hypoplasia. Bulls that present unilateral partial or unilateral total hypoplasia, or bilateral partial, are subfertile. It means that they have the ability of mating and capacity of fertilization, thus transmitting this pathological condition to the offspring (BICUDO et al., 2007).

In Brazil, the incidence of this pathology has been described in about 5% of the cattle herd (VALE FILHO & PINTO, 1988, ACUÑA & CAMPERO, 1997). This case report, however, describes a high incidence of testicular hypoplasia observed during breeding soundness examination performed in a commercial herd of Brangus-Ibagé bulls managed extensively.

CASE DESCRIPTION

In a commercial farm at Mato Grosso do Sul, breeding soundness examination was performed on 68 bulls from the same synthetic breed (Brangus-Ibagé breed: 5/8 Angus X 3/8 Nelore), extensively reared, fed on pasture and mineralized salt, aged between 36 and 48 months. The breeding soundness examination consisted basically of a general clinical examination and special examination of the genitals, measuring scrotal circumference (SC) as well as physical and morphological examination of semen, according to

standard procedures developed by the Brazilian College of Animal Reproduction (CBRA, 1998).

Scrotal circumference was measured at the largest diameter of the testicles using a millimeter graded tape. Semen was collected by electroejaculation using a Torjet 65, Eletrovet, Sao Paulo. Both progressive motility (%) and sperm vigor (on a scale from 0 to 5) were evaluated immediately after collection. Another semen sample was collected in a buffered saline solution (HANCOCK, 1957) for further evaluation of sperm morphology. Sperm morphology characteristics were determined using a phase contrast microscope (ICS standard 25, Zeiss, Oberkochen) where 200 cells were analyzed from each sample, under 1000X magnification lens. Morphological characteristics were classified as follows: major, minor and total defects according to Blom (1973).

Testicular size and consistence may reflect pathological condition and/or functionality of the testicles, and are correlated with the quantity and quality of sperm production (ADRIK 1976, SILVA et al., 1993). Therefore, scrotal measurement and consistency should be within the standard range for each breed and age (SILVA et al., 1993). The testicles of healthy bulls above 24 months of age are generally symmetrical, with a firm and elastic consistency (SILVA et al., 1993). At 36 months, Brangus- Ibagé bulls have mean SC of about 35 cm (MORAES et al., 1998). As for semen quality, CBRA (1998) recommends that bulls should be approved for reproduction only if progressive motility is higher than 30%, sperm vigor is higher than 3 and the percentages of major and total defects are lower than 20% and 30%, respectively.

During breeding soundness examination, 66.2% (45/68) of the bulls had testicular and seminal parameters within standards recommended by CBRA (1998) and were, therefore, approved for reproduction. Although they had been approved during general clinical and genitals special examinations, 17.7% (12/68) of the bulls were considered temporarily inapt for reproduction since they displayed high sperm pathology. Finally, 16.2% (11/68) of the bulls were considered inapt for reproduction, since they failed both in genitals examination and semen evaluation. Among these 11 bulls, eight (11.8%; 8/68) were diagnosed with testicular hypoplasia and three (4.4%; 3/68) were suspected of having the disease (Table 1).

The discard index of 16.2% observed in this study is in agreement with results previously described by other authors (SILVA et al., 1981, MORAES et al., 1998, MENEGASSI, 2010). However, the incidence of testicular hypoplasia of 11.8% is well above the reported in the literature. Vale Filho & Pinto (1988) reported an incidence of 5% for testicular hypoplasia in Brazil. Acuña & Campero (1997) reported a discard rate of 3.8% for bulls between 18 and 24 months, which included cases of testicular hypoplasia. Menegassi (2010) reported discards of 2.6% due to testicular and/or epididymis alterations for bulls between two and three years old and discards of 3.5% for bulls above three years old.

Table 1 - Data from breeding soundness examination performed on 68 Brangus-Ibagé bulls, aged from 36 to 48 months, extensively reared on a commercial farm in Mato Grosso do Sul, July 2010.

| <i>Bulls</i> | <i>n (%)</i> | <i>SC (cm)</i> | <i>Mot (%)</i> | <i>MaDef (%)</i> | <i>MiDef (%)</i> | <i>TotDef (%)</i> |
|-------------------------------|--------------|----------------|----------------|------------------|------------------|-------------------|
| Apt (mean) | 45 (66.2) | 36.7 | 68.0 | 17.2 | 5.9 | 23.1 |
| Temporarily Inapt (mean) | 12 (17.7) | 36.2 | 50.0 | 59.9 | 2.6 | 62.5 |
| Discard (mean) | 11 (16.2) | 28.9 | 47.1 | 55.6 | 6.1 | 61.7 |
| Unilateral partial hypoplasia | 2 (1.5) | | | | | |
| Bull 1 | | 31.0 | 50.0 | 30.0 | 19.0 | 49.0 |
| Bull 2 | | 31.0 | 60.0 | 39.0 | 6.0 | 45.0 |
| Bilateral partial hypoplasia | 5 (2.9) | | | | | |
| Bull 1 | | 28.0 | 70.0 | 39.0 | 4.0 | 43.0 |
| Bull 2 | | 29.0 | 40.0 | 74.0 | 1.0 | 75.0 |
| Bull 3 | | 29.0 | 50.0 | 68.0 | 10.0 | 78.0 |
| Bull 4 | | 29.0 | 20.0 | 62.0 | 2.0 | 64.0 |
| Bull 5 | | 28.0 | 40.0 | 77.0 | 1.0 | 78.0 |
| Bilateral total hypoplasia | 1 (7.3) | | | | | |
| Bull 1 | | 26.0 | - | - | - | - |
| Suspect hypoplasia | 3 (4.4) | | | | | |
| Bull 1 | | 32.0 | 40.0 | 35.0 | 2.0 | 37.0 |
| Bull 2 | | 32.5 | 50.0 | 32.0 | 0.0 | 32.0 |
| Bull 3 | | 33.0 | 50.0 | 34.0 | 3.0 | 37.0 |

SC: Scrotum circumference; Mot: Motility; MaDef: major defect; MiDef: minor defect; TotDef: total defect.



Figure 1 - Unilateral Partial Testicular Hypoplasia in Brangus-Ibagé bull at 48 months (A); Bilateral Partial Testicular Hypoplasia in Brangus-Ibagé bull at 48 months (B); Bilateral Total Testicular Hypoplasia in Brangus-Ibagé bull at 48 months (C). Mato Grosso do Sul, 2010.

Testicular hypoplasia is a hereditary condition caused by an autosomal recessive gene with incomplete penetration (VALE FILHO et al., 1979, STEFFEN, 1997, NASCIMENTO & SANTOS, 2003). This pathology is characterized by incomplete development of the germination layers of the seminiferous tubules (BICUDO et al., 2007) and its severity varies according to the expression of the gene responsible for it. Therefore, depending on the degree of impairment of the testicular parenchyma, it may be seen greater or lesser degree of alterations in bull fertility, in testicular consistency and size, as well as in sperm motility and morphological abnormalities, being also possible to detected absence of sperm cells in the ejaculate (SILVA et al., 1993, NASCIMENTO & SANTOS, 2003, BICUDO et al., 2007).

In this study, during clinical examination of the scrotum and testicles, two bulls were detected with unilateral partial testicular hypoplasia (Figure 1; A), five had bilateral partial testicular hypoplasia (Figure 1; B) and one had total bilateral testicular hypoplasia (Figure 1; C). These hypoplastic bulls had more flaccid testicular consistency and reduced average of SC (28.9 cm) compared to healthy bulls which presented 36.6 cm of SC and firm-elastic testicular consistency. Semen evaluation of hypoplastic bulls resulted in means of 47.1%, 61.7% and 55.6% for progressive motility, total and major defects, respectively. In the assessment of bulls that were approved after the breeding soundness examination, the means were 60.8%, 17.2% and 23.1% for

progressive motility, major and total defects, respectively (Table 1).

Both bulls diagnosed with unilateral partial testicular hypoplasia displayed marked asymmetry, with the right testicle characterized as hypoplastic and approximately 2.0 cm smaller than the left testicle (Figure 1; A). These bulls had 31.0 cm of SC and average sperm motility, major and total defects of 55.0%, 34.5% and 47.0%, respectively (Table 1).

The five bulls diagnosed with partial bilateral hypoplasia, displayed both testicles smaller (Figure 1; B). Scrotum circumference varied from 28.0 to 29.0 cm. Moreover, motility, major and total defect mean values were 44.0%, 64.0% and 67.6%, respectively (Table 1).

According to Steffen (1997), total bilateral hypoplasia is the most evident and easily diagnosed form of the disease, because the testicles are very small and no sperm is present in the semen. The bull diagnosed with total bilateral hypoplasia had both testicles very small (Figure 1; C), with 26 cm of SC. The semen had no sperm cells even after repeated collections (Table 1).

Among the evaluated bulls, three 48-month bulls were discarded due to suspected testicular hypoplasia. They present flaccid testicular consistency, reduced SC and means of 46.7%, 33.7% and 35.3%, for sperm motility, major and total defects, respectively (Table 1).

Non-classical hypoplasia and testicular degeneration can be difficult to diagnose only by clinical examination, since both may present similar symptoms at some point (BICUDO et al., 2007). Performing spermogram regularly and a gametic production curve would be indicated as an alternative for differential diagnosis between these two changes (VALE FILHO et al., 1979, STEFFEN, 1997). However, the reduced testicular size of the three suspected bulls associated with the possibility of parentage between these bulls and the others diagnosed as hypoplastic, increased the probability of being three cases of non-classical type of hypoplasia. In this case, the gene responsible for this pathology would be mildly expressed compared to the gene expression in the classical cases of hypoplasia. Additionally, on commercial farms, it is usually required an immediate decision on the fate of the bulls; therefore, due to the genetic nature of this abnormality, the bulls with a positive diagnosis of hypoplasia or suspected to have hypoplasia should be eliminated from reproduction (VALE FILHO et al., 1979; STEFFEN, 1997).

CONCLUSION

This case report described a case of high incidence of testicular hypoplasia detected during breeding soundness examination performed before the breeding season, on a commercial farm. It is, therefore, very important to perform such examination to determine cattle reproductive efficiency in a short and long period, since this evaluation can establish the fate of the bulls and the genetics of the cattle.

Given the hereditary nature of testicular hypoplasia, it was recommended that the hypoplastic bulls and the suspected of being so, be removed from the farm or immediately castrated. Finally, it was suggested to investigate the origin of these animals to avoid that new animals from this bloodline are acquired by the farmer.

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