ULTRASONOGRAPHIC MEASUREMENTS OF BULBO URETHRAL GLANDS IN DEVELOPING MURRAH BUFFALO

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ABSTRACT

The study was undertaken in buffalo-bull calves to study developmental dimensions of the bulbo-urethral gland (BUG) from 1 to 30 months of age with ultrasound scanning of the gland. The mean circumference of the BUG in the present study from 1st to 30th month increased significantly @ 0.37 cm per month. The increase in mean circumference of BUG exhibited a pattern parallel to increase in body weight. The mean length of BUG increased significantly @ 0.16 cm per month during the study period. The correlation co-efficient of length of BUG with age was r^2 = 0.75 and with body weight was r^2=0.76. The mean width of BUG from 1st to 30th month ranged between 1.02 ± 0.06 to 3.15 ± 0.11 cm. It increased @ 0.07 cm per month. The correlation co-efficient between age and BUG width was r^2=0.68 and between body weight and BUG was r^2=0.70.

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Key words: Buffalo, bull calves, Bulbourethral, Prepubertal, Development

INTRODUCTION

The bulbo-urethral gland (BUG) plays an important role in male reproduction. Its secretion is antimicrobial in action. This is located close to ischial arch. It's a paired gland, however due to strong cover of urethrelis muscle; it is palpated as a hard single gland in bull (Chandolia *et al.*, 1997). Due to this hard covering, there is difficulty in its manual assessment in patho-physiological conditions. Due to difficulties in taking its in-situ dimensions, its age related dimensions are not available in developing buffalo-bull calves. Present study was designed to assess developmental changes in dimensions of BUG in Murrah buffalo-bulls from one month to 30 months of age, which is considered as pubertal age in well fed buffalo-bull calves.

MATERIALS AND METHODS

The study was done on six developing male-calves of Murrah buffaloes. Ultrasonography was done every month on these calves starting from one month of age and continued till 30 months of age (expected puberty time). To obtain and record ultrasound images of the BUG, a real time B-mode diagnostic ultrasound scanner (Scanner-200Vet, Philips, Pie Medical, The Netherlands), equipped with a linear array probe with dual frequency 5.0 and 7.5 MHz attached with Panasonic VCR for recording and thermal printer (Mitsubishi) for printing was used. Since the ultrasonographic procedure is non invasive, transrectal ultrasound scanning was tolerated well by the animals without any sedation. In the young calves the trans-rectal ultrasonography was done by tying the transducer firmly to a thick round and half feet long glass rod with the help of transparent adhesive packaging tape. This was done to avoid insertion of hand in young calves, as the insertion of hand was not possible due to narrow anal-lumen. The transducer face was pressed firmly along the rectal mucosa. Each animal was restrained in a simple crush. The transducer was moved along the dorsal surface of the reproductive tract for orientation.

The transducer face was lubricated with a suitable coupling medium and was covered with lubricated condoms before insertion into the anus.

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The probe was moved across the reproductive tract in a thorough and systemic manner as advocated by Ribadu et al. (1999). A dark room with all basic facilities to restraint the animals were used for viewing the monitor

For statistical purpose, the age groups from 1 to 30 months have been divided into five blocks i.e. 1 to 6 month (Block 1); 7 to 12 month (Block II), 13 to 18 (Block III); 19 to 24 (Block IV); 25 to 30 months (Block V). Data obtained has been analyzed at two levels within block and between blocks. The data were analyzed using One way Analysis of variance (ANOVA).

RESULTS AND DISCUSSION

Since both the lobes of the glands are attached together, combined circumference was taken. The mean circumference (Fig 4) of the bulbo-urethral gland ranged from 6.17±0.37 cm at one month of age to 17.21±0.38 cm at thirtieth month. On an average, there was an incremental increase @ 0.37 cm per month. The blocks' (block1, 2, 3, 4 & 5) values of the mean circumference of bulbo-urethral gland were 7.15±0.18, 9.92±0.19, 11.37±0.19, 12.53±0.29 and 14.81±0.32 cm, respectively. These values were significantly ($P<0.05$) different from each others.

Within first block (1-6 months), the circumference of bulbo urethral gland from 1st and 5th month was not significantly different among each other, similarly the circumference from 2nd to 6th month was also not significant among each other ($p<0.05$). The value at one month was significantly different from the values at six month of age.

In 2nd block (7th to 12th month), the mean circumference of bulbo-urethral gland at 7th month was significantly lower than values at 11th and 12th months. Other values varied non-significantly ($P>0.05$). The values at 13th month in 3rd block (13th to 18th) were significantly lower ($P<0.05$) than all other values except at 14th month ($P>0.05$).

In the 4th block (19th to 24th), values at 24th months were significantly higher than values at 19th to 21st month of development. In 5th block (25th to 30th), the circumference of bulbuo-urethral was significantly higher than all other values. From one to fifth month of development, circumference of bulbuo-urethral increased @ 0.19 cm per month. From sixth to fourteenth month it changed @ 0.45 cm per month. Further from fifteenth to twenty fifth month it increased @ 0.19 cm per month. . From twenty sixth to thirty (17.21±0.38 cm) months it changed @ 0.64 cm per month.

The change of mean circumference exhibited a parallel pattern with the change of body weight gain. The correlation co-efficient between age and bulbo-urethral circumference was $r^2=0.86$ and between body weight and bulbo-urethral circumference was $r^2=0.87$ i.e. highly significant with age and body weight. Little and woods (1987) reported bulbo-urethral width 19.7±4.6 mm and length 32.4±6.7 mm in stallions by ultrasonography. The growth of bulbourethral might be linked to growth of testis (Razek and Ali, 2005). It indicated that the development of circumference of bulbourethral is directly dependent up on age and body weight. Abdou (2009) observed minor variations in dimension of bulbourethral gland of Murrah buffalo after puberty.

The mean length of bulbo-urethral gland ranged from one (2.42±0.22 cm) to thirty month (7.21±0.16 cm). It increased significantly @ 0.16 cm per month. The mean length of the gland in all five blocks of six month 1, 2, 3, 4and 5 was 2.78±0.09, 3.88±0.08, 4.45±0.14, 4.53±0.14 and 5.95±0.21 cm, respectively, which was significantly different among each others ($p<0.05$).

In 1st block, the mean length of bulbo-urethral gland increased incrementally. It was significantly higher at 3rd month onwards as compared to length at 1st month. Other values varied non-significantly ($P>0.05$). Within 2nd block the change in mean length of bulbo-urethral gland from all 7th to 12th month was non significant ($p>0.05$). Similarly, within 3rd and 4th blocks, the mean length of bulbo-urethral gland was

also non significant (p>0.05). In 5th block the mean length of bulbo-urethral gland at 29th and 30th month was significantly (P<0.05) higher than all other values. The increase in the length of bulbo-urethral gland from one to six month was @ 0.14 cm per month. The increase from seven month to fifteen months was 0.08 cm per month only. From sixteenth month to twenty-fifth month, the increase was @ 0.076 cm per month. From twenty-sixth month to thirty month, the change was @ 0.30 cm per month indicating a higher significant change in the length of the gland (p<0.001). Abdou (2009) reported that buolbo-urethral glands do not vary significantly in weight or dimensions in bulls from puberty onwards. The changes in the present values are from very young age to puberty in buffalo-bulls. Little and Woods (1987) reported the bulbo-urethral length as 32.4 ± 6.7 mm in stallion by ultrasonography, which is higher than present values in buffalo bull.

The correlation co-efficient between age and bulbo-urethral length in the present study was (r^2=0.75) and between body weight and bulbo-urethral length was (r^2=0.76) i.e. highly significant with age and body weight. According to Roberts (1986) this gland in cow bull has a diameter of 2.5 to 5.0 cm. In case of boar, it was about 12 cm long and 2.5 to 3.0 cm in diameter. The variation might be observed in different breed and species (Roberts, 1986).

In the present study, the length of bulbo – urethral gland also showed pattern of growth as of circumference. It became almost double at eighteen months and triple at thirty months of age just like circumference. The correlation co-efficient between age and bulbo-urethral length in the present study was (r^2=0.75) and between body weight and bulbo-urethral length was (r^2=0.76) i.e. significant with age and body weight. This indicated that the length of bulbo-urethral gland was directly influenced by the age and body weight like its circumference.

The mean width of bulbo-urethral gland from one month (1.02±0.06 cm) to thirty month (3.15±0.11 cm) changed significantly @ 0.07 cm per month (p<0.05).

The mean width of bulbo-urethral gland in all five blocks of six month 1, 2, 3, 4 and 5 was 1.18±0.03, 1.44±0.03, 1.70±0.06, 1.73±0.06 and 2.35±0.11 cm, respectively, it was significantly different (p<0.05) among each other.

In block 1 i.e. from 1st to 6th month width of bulbo-urethral did not vary significantly (P>0.05). In block 2, 3 and 4, variation in the width of the gland was non-significant. In block 5, width of bulbo-urethral gland at 29 and 30th month was significantly higher than all other values in the block. From one to thirteen month, it increased 0.05 cm per month. From fourteenth to twenty-fifth month it changed @ 0.03 cm per month. From twenty sixth to thirtieth month it changed @ 0.18 cm per month. The rate of increase in width of bulbo-urethral was highest near puberty in developing Murrah buffalo bull.

The correlation co-efficient between age and bulbo-urethral width in the present study was (r^2=0.68) and between body weight and bulbo-urethral width was (r^2=0.70) i.e. significant with age and body weight.

Weber *et al.*, (1988) reported the height of bulbo-urethral gland as 1.53 ± 0.4 through ultrasonography and 1.92±0.4 cm through direct measurement. Both of these values are lower than the values in the present study. The reason could be difference of species. In the present study the width of bulbo-urethral gland also showed a similar pattern of growth like its length and circumference. It became almost double at eighteen months and triple at thirty months of age just like length and circumference. The correlation co-efficient between age and bulbo-urethral width in the present study was (r^2=0.68) and between body weight and bulbo-urethral width was (r^2=0.70) i.e. significant with age and body weight, however, lower correlation coefficient indicates that the width of bulbo-urethral gland is comparatively less dependent upon age and body weight. Ultrasonographic characteristics of bull testis and accessory sex glands have been reported by by Pechman and Eilts (1988), Eilts and Pechman (1988) and Weber *et al.* (1988).

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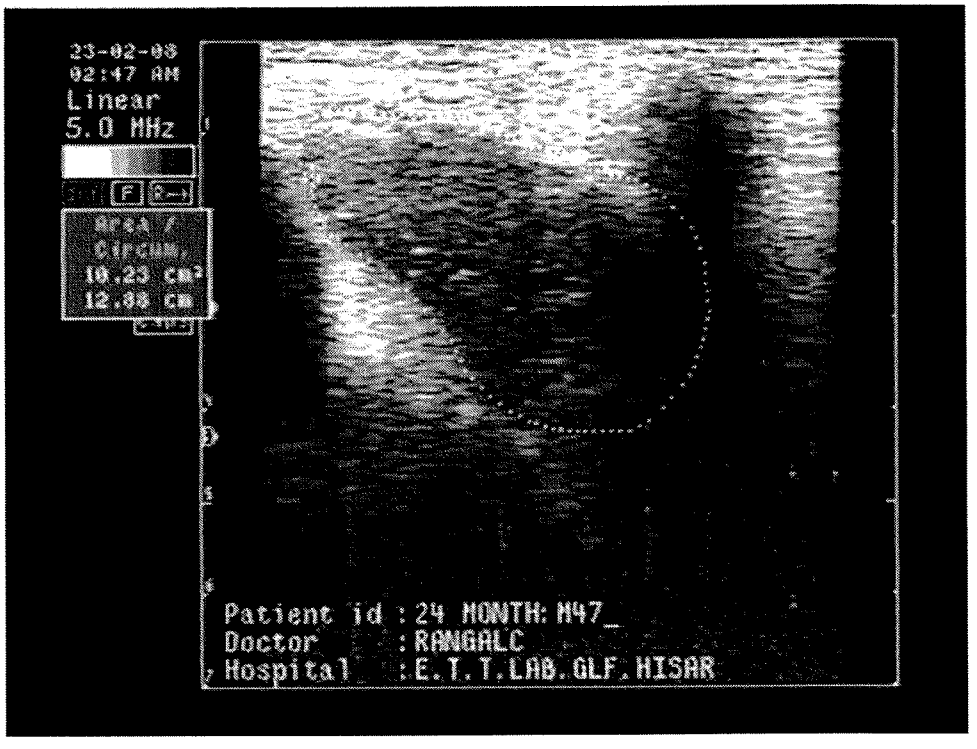

Fig 1. Snap Showing circumference of bulbo-urethral gland