

morphology using eosin-nigrosin, and acrosome integrity using FITC-PSA. Data were analyzed using repeated measures, with a post-hoc Bonferroni test. For total and progressive motility, there were effects of group ($p = 0.023$ and $p = 0.0008$, respectively); for total abnormalities, there were effects of group ($p = 0.001$ and a group*week interaction ($p = 0.003$); and for acrosome integrity, there were effects of group ($p = 0.046$) and week ($p = 0.0001$). On all days, all end points were significantly improved for all treatments compared to control. All 4 treatments improved motility, whereas improvements in total abnormalities and acrosomal integrity were dose-dependent (greatest improvement with 1 mM). Total and progressive motility were improved by ~ 5 - 10 percentage points, whereas total abnormalities and intact acrosomes were improved by ~ 7 and 12 percentage points, respectively. Bowed midpiece, ruffled acrosome and distal midpiece reflex were highest in the control group. In summary, exogenous melatonin or l-arginine in semen extender mitigated HS-induced reductions in quality of frozen-thawed ram sperm by improving motility and acrosome integrity and reducing total abnormalities.

Keywords: Ram, sperm, melatonin, l-arginine, Heat stress

References

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An example of incorrect storage of bull semen samples on spermogram assessment

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Sperm morphology assessment and interpretation is an integral part of bull breeding soundness evaluation. Historically the spermogram has been classified into primary, secondary, and tertiary; major or minor; compensable or uncompensable abnormalities; and reporting individual sperm defects. Abnormalities that might occur after semen collection (tertiary abnormalities) are often discussed. However, these abnormalities are generally not well defined nor explained. We report tertiary abnormalities that were detected because of incorrect samples submitted for morphological assessment. Samples from a cohort of bulls were collected for morphological assessment as part of breeding soundness examination. The samples were examined grossly, crush side motility was assessed by diluting the sample in isotonic phosphate buffered saline (PBS). An ejaculate aliquot was placed in 10% buffered formol saline (BFS) for morphological

assessment via differential interference contrast microscopy at 1000 x magnification. In this case, some of the PBS diluted samples were inadvertently sent for morphological assessment in the first instance. The results appeared aberrant, with a large proportion of loose and detached heads, and abnormal tails. The correctly stored samples were located and subsequently assessed. PBS and BFS samples ($n = 13$) had substantial differences in spermograms between the storage methods. The BFS samples had 12/13 spermograms with $\geq 68\%$ morphologically normal sperm. By comparison, 1/13 of the PBS samples had $\geq 68\%$, with 5/13 having fewer than 20% normal sperm. There were 2 samples in the BFS cohort that had $\geq 19\%$ loose or detached heads, compared to 12 in the PBS cohort that had $\geq 35\%$, 7 of which had $\geq 55\%$ loose or detached heads. Most of the abnormalities detected in the PBS samples were a combination of loose and detached heads. Interestingly, the tails, particularly the detached tails, were noticeably devoid of the plasma membrane for some or most of the principal piece and other parts of the tail. These were typically not documented in the interpretation of the spermogram, as most were recorded as detached heads. Particular tertiary abnormalities are not often described in the literature. The inadvertent error of assessing the incorrect samples has given an opportunity to report abnormalities that are most likely due to incorrect storage of samples for morphological assessment of an ejaculate. It is clear from these observations that appropriate collection and storage of samples for morphological assessment is carried out when assessing spermograms. Incorrect sample preparation and storage should be considered as a reason for an abnormal spermogram, especially when a large proportion of detached heads, with or without tail plasma membrane abnormalities, are detected in a semen sample.

Keywords: Bull, spermogram, tertiary morphological abnormalities, detached heads

Obstructive urolithiasis in a dromedary camel

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A 9-year-old, castrated, male dromedary camel was presented with an inability to urinate for 1.5 days. The camel had a history of severe malnutrition and had been castrated prior to onset of puberty. The camel was maintained in a petting zoo and had received an excessive amount of grain prior to his presentation. The animal was bright, alert and responsive with moist and pink mucous membranes, but had mild icteric sclera and was posturing to urinate. There were perineal urethral pulsations accompanied by tail flagging. Severe enlargement of the bladder was diagnosed via transrectal palpation and ultrasonography. The bladder was ~ 12 inches in diameter with a thickened wall and mucus debris within