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Theriogenology
ELSEVIER
Theriogenology 64 (2005) 505–509
www.journals.elsevierhealth.com/periodicals/the

Diagnostic applications of ultrasonography to stallion's reproductive tract

Malgorzata Pozor *

University of Florida College of Veterinary Medicine, Gainesville, P.O. Box 100136, Gainesville, FL 32610-0136, USA

Abstract

Although ultrasound evaluation of the reproductive tract of stallions was introduced to veterinary practice long ago, this examination is not always conducted during routine breeding soundness evaluation. The objective of this study was to investigate the clinical relevance of routine ultrasound evaluation of the stallion's reproductive tract. Breeding soundness evaluation of 113 stallions was performed, including ultrasonography of external and internal genitalia. Various pathological conditions were detected using this technique, with the most frequent being varicocele, thickened vaginal tunics and cystic structures. Varicocele and thickened vaginal tunics were associated with decreased quality of semen, while cysts of the epididymal head, urethra and uterus masculinus were frequently associated with ejaculatory problems. These findings suggested that routine ultrasound evaluation of breeding stallions may be very helpful in detecting pathological conditions that may impact their reproductive career.

Keywords: Stallion; Ultrasound; Reproductive tract; Testis; Accessory sex glands; Diagnosis

1. Introduction

Ultrasound examination of the stallion reproductive tract was described and introduced into veterinary practice many years ago. This technique is an excellent diagnostic tool for investigating various pathological disorders of the scrotum and of the internal genitalia of the stallion [1–4]. However, even though ultrasound equipment is widely available and

* Tel.: +1 352 392 4700; fax: +1 352 392 8289.
E-mail address: pozorm@mail.vetmed.ufl.edu.

0093-691X/$ – see front matter
doi:10.1016/j.theriogenology.2005.05.007

used routinely to examine the reproductive tract of mares, ultrasound examination of stallions is performed much less frequently, typically when there is a problem that requires reliable diagnosis. The goal of this study was to investigate application of ultrasonography in routine evaluation of breeding stallions.

2. Methods

One-hundred-and-thirteen stallions were evaluated for breeding soundness as a part of a larger study investigating various causes of fertility problems in horses. The stallions were 3–22-year-old and nine breeds were represented (Silesian, Arabian, Anglo–Arab, Thoroughbred, Oldenburg, Malopolski, Wielkopolski, Hanovarian, and Ardennes). The stallions were housed at six different facilities in Poland. A total of 100 stallions were enrolled in active breeding programs while the remaining 13 were experiencing fertility problems. A minimum two semen samples were collected from stallions using a Missouri model artificial vagina, while the stallions mounted a mare in estrus. After separating and discarding the gel fraction, determining the volume, color and consistency of semen, approximately 2 mL of raw semen was placed in a small tube for analysis of concentration and morphology of sperm. Total and progressive motility of spermatozoa were assessed in the raw semen using a microscope equipped with a warming stage (Nikon, Alphashot-2, Japan). Concentration of spermatozoa in semen was determined using a hemocytometer. Spermatozoal morphology was determined using phase-contrast microscopy under 1000× magnification.

Both scrotal testes and spermatic cords of each stallion were evaluated by manual palpation and then with B-mode ultrasound (PieMedical 200, Maastricht, Netherlands) equipped with a 5/7.5 MHz linear transducer. Transrectal ultrasound examination of accessory sex glands, ampullae, and pelvic urethra was also performed on each stallion. All detectable abnormalities were recorded and prints of their images were saved using a video printer (Mitsubishi P-91, Japan). The same operator performed all the ultrasound evaluations and in some cases evaluation was performed multiple times and included additional methods, such as color Doppler evaluation, electron microscopy of spermatozoa, or histopathological evaluation of testes and epididymides after castration.

3. Results

The results of this study are summarized in Tables 1–3. Various structural abnormalities of the reproductive tract were identified using ultrasonography. Varicocele and thickened vaginal tunics were diagnosed most frequently in both groups. Both of these conditions were associated with decreased semen quality, even though only 4 of 19 affected stallions had severe fertility problems. Varicocele appeared ultrasonographically as irregular echolucent areas, usually on the periphery of the spermatic cord, with no signs of pulsating blood flow. The average size of the varicocele was 15.5 mm (range, 8–24 mm). In one case, the central vein and its smaller branches were dilated while the veins within the pampiniform plexus were only slightly enlarged. The mean progressive motility of sperm in the second ejaculate of stallions with varicocele was 31% (5–75%) and the mean percent