Effect of a Combination of Butorphanol and Detomidine on Endoscopic Assessment of Laryngeal Function of Thoroughbred Yearlings

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1. Introduction
This experimental, observer-blinded, crossover study examined the effects of intravenous administration of a combination of butorphanol and detomidine on left-to-right rima glottidis ratio (L:R RGR), cross-sectional area of the rima glottidis (CSARG), and grade of laryngeal function of Thoroughbred sales yearlings at rest.

2. Materials and Methods
Forty-six Thoroughbred yearlings underwent endoscopic examination of the larynx before (group 1) and after being administered butorphanol (0.01 mg/kg, IV) and detomidine (0.01 mg/kg, IV; group 2). L:R RGR and CSARG were measured from images captured from a video recording at the point of maximal abduction of the arytenoid cartilages. Recordings were reviewed by three clinicians to assess agreements of the grade of laryngeal function, using the 7-grade Havemeyer endoscopic laryngeal grading scale. Intraobserver and interobserver scores were analyzed to determine agreement.

3. Results
The L:R RGR and CSARG of group-1 yearlings did not differ significantly from that of group-2 yearlings. The mean intraobserver agreement of grade of laryngeal function of yearlings in group 1 was 93.1%, with a mean kappa statistic of 0.86. The mean intraobserver agreement of grade of laryngeal function of group-2 yearlings was 92.9%, with a mean kappa statistic of 0.88. The mean interobserver agreement of grade of laryngeal function of group-1 yearlings was 92.8%, with a mean kappa statistic of 0.84. The mean interobserver agreement of grade of laryngeal function of group-2 yearlings was 92.7%, with a mean kappa statistic of 0.87. The correlation between CSARG and grade of laryngeal function was significant for both groups (P<.001). All three observers assigned the same grade of laryngeal function to 35 of 45 (77.8%) of the yearlings in group 1 and
33 of 45 (73.3%) of the yearlings in group 2. One video recording of a yearling was determined, by two of the observers, to be too brief to assign a grade of laryngeal function, which was excluded for statistical analysis. The median grade of laryngeal function in group 1 was II.1 and I in group-2 yearlings.

4. Conclusion and Clinical Significance
Administering butorphanol and detomidine to Thoroughbred yearlings, before examining the upper respiratory tract endoscopically, with the horses at rest, does not significantly affect the grade of laryngeal function. To provide a clinical scenario, a nose twitch was applied to all yearlings in group 1, which may have affected laryngeal movements.

Acknowledgments

Declaration of Ethics
The Authors have adhered to the Principles of Veterinary Medical Ethics of the AVMA.

Conflict of Interest
The Authors have no conflicts of interest.