CRYPTORCHIDISM, in which the testes fail to descend into the scrotum by six months of age, is a developmental disorder in male dogs (Johnston and others 2001). Cryptorchidism predisposes the animal to testicular neoplasia, therefore the retained testes should be surgically removed for the health of the animal (Johnston and others 2001). Cryptorchidism predisposes the dogs (Johnston and others 2001). Cryptorchidism predisposes the animal to testicular neoplasia, therefore the retained testes should be surgically removed for the health of the animal (Johnston and others 2001). Cryptorchidism predisposes the dogs (Johnston and others 2001). Cryptorchidism predisposes the animal to testicular neoplasia, therefore the retained testes should be surgically removed for the health of the animal (Johnston and others 2001).

Anti-Müllerian hormone (AMH) is produced by Sertoli cells in different species of mammals, including dogs, and plays a crucial role in sexual differentiation; that is, AMH induces the regression of the paramesonephric ducts during the early embryonic development in male foetuses (Banco and others 2012). AMH has been used to differentiate cryptorchidism from anorchidism in humans (Lee and others 1997). In addition, AMH has been reported to be higher in cryptorchid stallions than in intact and castrated ones (Claes and others 2013). Therefore, the present study was conducted to evaluate AMH concentration in cryptorchid dogs compared with intact and castrated ones.

The Animal Care Committee of the Faculty of Veterinary Medicine, University of Tehran approved the present study in terms of ethics. The dogs enrolled in the study were over six months of age and mostly of toy breeds. The owners signed the informed consent form prior to enrolment of the animal in the study.

Blood samples were collected via the cephalic vein of bilateral cryptorchid (n=10), intact (n=7) and castrated (n=7) dogs. Human MIS/AMH Gen II ELISA kit (Beckman Coulter, Brea, CA, USA) was used to measure serum AMH concentration. To validate canine serum AMH assay, parallelism of dilutions of sera from cryptorchid (n=1) and intact (n=1) dogs with AMH standard curve was assessed prior to using the kit for the evaluation of AMH concentrations in dogs.

Dilution curves of cryptorchid (n=1) and intact dogs were parallel with the AMH standard curve (Fig 1).

Initially, datasets were tested for normal distribution using Kolmogorov–Smirnov test (UNIVARIATE procedure). Given that the assumptions of parametric tests were not achieved, Kruskal–Wallis one-way analysis of variance (ANOVA) was used to analyse the data. All analyses were conducted in SAS (Statistical Analysis System software, SAS/STAT V9.2, SAS Institute, Cary, NC, USA). Data are presented as medians.

AMH concentrations in intact (median: 1.27 ng/ml; range: 0.69–2.55 ng/ml) and cryptorchid (median: 1.61 ng/ml; range: 0.85–5.96 ng/ml) dogs were higher than those in castrated dogs (median: 0.08 ng/ml; range: 0.08–0.12 ng/ml; P<0.01; Fig 2). However, AMH concentration did not differ between intact and cryptorchid dogs (P>0.05).

The present study revealed that AMH could serve as an indicator for the presence of testicular tissue regardless of whether the testes have descended into the scrotum or not. A higher concentration of AMH in intact dogs than in castrated dogs has been reported previously (Ano and others 2014). Likewise, evaluating AMH concentrations in castrated, intact and cryptorchid stallions, Claes and others (2013) found significantly higher concentrations of AMH in intact and cryptorchid stallions than in castrated stallions. Moreover, measurement of serum AMH concentration has been indicated as a reliable method to determine the presence of testicular tissue in humans (Lee and others 1997). Therefore, AMH could serve as a biomarker for differential diagnosis of cryptorchidism from cases with non-palpable testes due to anorchidism or castration.

**FIG 1:** Parallelism of sera from intact and cryptorchid dogs with anti-Müllerian hormone standard curve.

**FIG 2:** Dot plot of anti-Müllerian hormone (AMH) concentrations in castrated, intact and cryptorchid dogs.

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Although the concentration of AMH in cryptorchid dogs was numerically higher than that in intact dogs, the difference was not statistically significant. Ano and others (2014) observed a considerably higher concentration of AMH in a cryptorchid dog with Sertoli cell tumour than in intact dogs. Claes and others (2013) reported higher concentrations of AMH in cryptorchid stallions than in intact stallions. Nevertheless, the effect of cryptorchidism on testicular secretion of AMH in dogs remains to be elucidated in further studies with more cases and controls.

References
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