Survey on Changes of Aortic and Pulmonary Blood Velocity Before and After Acetylpromazine Administration in Dog

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ABSTRACT
The development of the Doppler ultrasound technique provided a noninvasive, particular and available method of examining the blood flow of deep lying blood vessels, heart chambers and cardiac valves. The feasibility of measuring pulmonary and aortic blood flow continuously using a 3.5 – 5 MHz phased array transducer, was assessed in 20 dogs before and after administration of acpromazine. Results of this study imply that there is no significant change in the value of maximum velocity $v_{\text{max}}$ of pulmonary and aortic arteries before and after using acpromazine in dogs, however both of the pulmonary and aortic $v_{\text{max}}$ in systole are decreased after sedation comparing before that.

INTRODUCTION
Doppler echocardiography provides a means to non-invasively evaluate the anatomy and function of the heart non-invasively, and is playing an increasingly important role in the evaluation and management of patients or animals with all forms of cardiac disease [1,2,3]. It has now become a routine for the diagnosis and evaluation of heart diseases in veterinary medicine [4]. This is especially true in large animals in which most of the non-invasive cardiac diagnostic tools are of limited value because of the size and the specific anatomy and physiology of the heart in those species [5]. One of the most important tools available to veterinarians to thoroughly and painlessly treat pets is the advent of anesthetics. These anesthetic agents allow veterinarians to sedate and anesthetize animals with negligible chance of serious side effects. There is no report of measurement in changes of the velocity of blood flow in the pulmonary and aortic arteries before and after injection of acetylpromazine. Therefore, this study was undertaken to detect these possible alterations.

MATERIALS AND METHODS
This study was conducted on 20 clinically healthy adult indigenous Iranian dogs of both sexes [10 male and 10 female] weighing 18 to 25 Kg. All the animals were deformed and vaccinated against rabies. The heart rate, respiratory rate and body temperature were within normal range. Tow weeks before the start of the experiment all the animals were kept under similar management and feeding practices. All dogs were determined to be free from cardiac disease on the basis of clinical, electrocardiographic and 2D echocardiographic examination. Before imaging, the coat was shaved from the 3rd to the 5th right and left intercostal space just caudal to the triceps muscle mass, from 3 to 5 cm below the olecranon to 3 to 5 cm above it. The shaved areas were then copiously rinsed with water and acoustic coupling was obtained using ultrasonography gel. Echocardiography was performed using a 3.5 – 5 MHz phased array transducer. Electrocardiography was performed simultaneously. Dogs were examined at standing position. The forelimb of the investigated hemithorax was slightly pulled forward during investigation.

All images were recorded on videorecorder for subsequent analysis. Continuous wave Doppler echocardiography was performed to measurement of blood flow peak velocity. Acetylpromazine [Kla laboratoria, Belgian] was given 0.1 mg/kg intramuscularly and the animals were allowed to quietly rest for 10-
15 minutes while the drug takes effect. Then the procedure was repeated. All data are presented as the mean ± SD. The inter- and intra-group comparisons were analyzed with repeated measures analysis of variance. A $V_{\text{max}}$ change in the pulmonary and aortic arteries from the control was determined, which was the values before the administration of acepromazine. A two-sided $P < 0.05$ was considered to be significant.

**Results:**
Mean values of $V_{\text{max}}$ obtained from the animals used in this study before and after administration of acepromazine are compared in Table 3.1. General impressions of the aortic and pulmonary arteries obtained from all dogs before using acepromazine were comparable to those obtained in healthy normal dogs, Kirbeger et al. and Madron et al. reported $V_{\text{max}}$ of aortic flow in normal healthy dogs as 1.675 cm/sec and 1.45 cm/sec, respectively. [6,7].The $V_{\text{max}}$ obtained in our dogs before treatment was equal or slightly lower than previously reported data in adult dogs.

The $V_{\text{max}}$ decreased in both the aortic and pulmonary arteries after using acepromazine but none of them was significant statistically.

<table>
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<th>Table 3.1: Comparison of $V_{\text{max}}$ [m/s] before and after injection the acepromazine in 20 healthy dogs.</th>
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<td>Aortic $V_{\text{max}}$ [m/s] before injection the Ace.</td>
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**Discussion:**
Tranquilizers are psychopharmacologic drugs whose primary therapeutic action is to relieve anxiety [anxiolysis]. They have other effects in addition to anxiolysis. While they do not produce sleep, analgesia or sedation and drowsiness. They have virtually no analgesic effects but appear to potentiate the analgesic effects of opioids. Centrally, phenothiazines mediate their effects via dopamine blockade particularly in the reticular formation. Peripherally they block dopamine and adrenergic receptors resulting in vasoilation and hypotension. Acepromazine decreases heart rate, arterial blood pressure, body temperature, respiratory rate but not minute volume. Other side effects include hyperglycemia, antipyretic, anticholinergic, antiemetic, antihistaminic and antispasmodic effects. In high doses, they have been shown to raise the arrhythmogenic dose of epinephrine in halothane-anesthetized dogs. Gastrointestinal secretions are reduced. The seizure threshold is also decreased [8, 9].

The technique using a Doppler flowmeter to examine the pulmonary area was described by Light using continuous wave mode [10, 11]. Doppler echocardiography has been shown to be feasible, repeatable and accurate, and has been demonstrated to be a powerful tool to detect cardiac abnormalities or drug-or training-induced cardiac changes [3, 12, 13].

Little or no correlation has been found between velocities spectra and age, sex or breed in dogs [6, 7]. The results concerning the relationship between body weight or heart rate and blood flow velocity in this species were more controversial: some authors showed no correlation between blood flow measurements and body weight or heart rate, whereas others demonstrated a positive relationship between blood flow measurements and the heart rate, and a negative relationship between blood flow measurements and body weight [6, 7, 14, 15]. Therefore, body weight seems to be an important factor affecting cardiac dimensions in canine [2]. Aortic and pulmonary $V_{\text{max}}$ values obtained in the present study were logically smaller than corresponding data reported previously. On the contrary, they were closely comparable to values reported by others [16].

The standardized imaging technique for pulsed-wave Doppler measurements previously developed in normal dogs has been shown in this study to be applicable to dogs sedated with acepromazine. The specific reference $V_{\text{max}}$ values established in healthy dogs in this study should be taken into account when evaluating a dog getting a sedative.

**REFERENCES**

