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**COMPARISON BETWEEN RADIOGRAPHY
AND ENDOSCOPY FOR DIAGNOSIS OF
ELONGATED SOFT PALATE IN DOGS**
(With 9 Figures)

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**مقارنة التصوير الشعاعي بالتنظير الداخلي لتشخيص استطالة
الحفّاف في الكلاب**

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تعتبر استطالة الحفّاف (شراع الحنك) في الكلاب أحد المشكلات المتكررة في الطب البيطري والتي تستلزم ضرورة الدقة في التشخيص حتى تتجنب تقصير الحفّاف في الحيوانات السليمة نتيجة الخطأ في التشخيص. الهدف من هذا البحث هو مقارنة وسيلتين من وسائل التشخيص وهما التصوير الشعاعي والتنظير الداخلي في تشخيص حالات استطالة الحفّاف في الكلاب. أجرى البحث على عدد (١٨) كلباً من سلالات مختلفة ، تعاني جميعاً اضطرابات وضيق تنفسي. تم فحص جميع الحيوانات تحت تأثير خليط من الكيتامين مع الزيلازين كمخدّر. أجرى التصوير الشعاعي حيث كانت الحيوانات في وضع الرقود الجانبي وتم عمل التصوير الشعاعي لمنطقة البلعوم والحنجرة في ثلاثة أوضاع مختلفة للرأس والرقبة (في وضع مستقيم للرأس مع الرقبة ، الوضع الثاني بشد الرأس والرقبة بشدة لأعلى والوضع الثالث يثنى الرأس على الرقبة للأمام). استخدم تنظير التألق لمتابعة حركة الحفّاف أثناء التنفس. سجلت زيادة سمك الحفّاف وإمتهاده إلى داخل تجويف الحنجرة خلف لسان المزمار في حالات استطالة الحفّاف التي فحصت بالتصوير الشعاعي. أجرى التنظير الداخلي بعد جعل الحيوان في وضع الرقود الصدري وتمت متابعة شكل وحركة الحفّاف أثناء التنفس . يسحب الحفّاف إلى داخل تجويف الحنجرة في أثناء الشهيق مسبباً ضيق التنفس. أثناء الزفير يتحرك الحفّاف إلى الأمام ضاعطاً على لسان المزمار مسبباً صوت شخير. أظهرت الدراسة تميز الفحص بالمنظير عن التصوير الشعاعي في فحص وتشخيص حالات استطالة الحفّاف.

SUMMARY

Elongation of the soft palate in dogs is a frequent problem in veterinary clinics. Accurate diagnosis of this problem is very important to avoid resection of the soft palate in healthy dogs. The aim of this paper is to

interpret two different diagnostic techniques; radiography and endoscopy for diagnosis of the elongated soft palate. The study was performed on 18 dogs, suffering from respiratory distress signs. All animals were examined under the effect of ketamine/xylazine anaesthesia. For radiography, the patient was positioned in lateral recumbency where three latero-lateral radiographic views for the pharyngeal region were made, (slightly stretched head and neck, over stretched head, and arched neck). Fluoroscopy was performed for accurate examination of the soft palate movement during inspiration and expiration. In case of elongation, the soft plate appeared thickened and extended caudally over the epiglottis till the entrance of the larynx. The endoscopical examination was made with the patient in sternal recumbency. During inspiration the soft palate extended into the larynx causing an inspiratory dyspnea. However, during expiration, the soft palate pressed the epiglottis forward causing a forcing expiration, which was represented by stertorous respiratory sound. In conclusion, endoscopy appeared to be more accurate in diagnosis of the elongated soft palate than radiography.

Key words: Soft palate, endoscopy, radiography.

INTRODUCTION

The soft palate is a musculomembranous organ, which separates the oral cavity from the pharynx, and close off the airways (nasopharynx) during swallowing to prevent food and liquids from going into the lungs. In dogs the soft palate is particularly long and thick, where it comes in contact with the epiglottis in the resting respiratory state (Getty 1975).

Elongation of the soft palate most commonly occurs in brachycephalic dogs, and often accompanies other upper respiratory tract problems (Backer 1972, and Knecht 1979). Other breeds may be affected specially aged dogs (Bright and Wheaton 1983), that makes the elongated soft palate a frequent problem in veterinary practice. Surgical procedure for correction of the problem may appear innocuous but it can result in life threatening complications (Bright and Wheaton 1983). Therefore, accurate diagnosis of the elongated soft palate is very important to avoid it's resection in healthy animals. Depending first on the clinical signs of upper respiratory tract disorders, radiography and endoscopy are the most common methods of diagnosis (Mayerhofer & Walde 1977, Harvey 1982, and Finland 2000).

The present study aimed to interpret the two different methods used in diagnosis of the elongated soft palate in dogs.

MATERIALS and METHODS

The study was carried out on 18 dogs; 8 males and 10 females, of different breeds, (German Shepard dog, Boston terrier, Mixed breeds, Hovawart, Beagle, cocker spaniel, Norwich- Terrier and German curly hair dog), which were all presented with clinical signs of upper respiratory tract disorders. The age of the animals ranged between 2-15 years old. The most common clinical signs observed were respiratory distress, inspiratory dyspnea, snoring and stridor during inspiration and expiration, gurgling, excessive salivation with froth formation and cyanosis of the mucous membranes specially after exercise or excitement. In some cases, the elongation of the soft palate was accompanied with inflamed tonsils which appeared enlarged and out of their pockets.

The severity of the signs varies according to the age of the animal and the duration of the condition.

Anaesthetic considerations:

The animals were allowed to have rest for a short time before induction of anaesthesia, to avoid hypoxia due to the stress on the animal.

Premedication was made with atropine sulphate 0,05 mg/kg i.v., and Diazepam 1,0 mg/ kg i.v. Induction of anaesthesia was done using ketamine 3,0 mg/kg i.v., and xylazine 0,3 mg/kg i.v. Preparations for emergency endotracheal intubation were always available to allow rapid intervention.

Radiographic examination:

Soon after induction of anaesthesia, the animal was positioned in lateral recumbency with slight stretching of the head and neck. A latero-lateral radiographic view for the pharyngeal region was made during ins- and expiration. The position of the head was determined exactly when the bulla tympanica were superimposed correctly above each other. This position was obtained by the use of fluoroscopy. Therefore radiographic views were made with the head over-stretched and with an arched neck. Fluroscopy was also used to examine the soft palate movement during ins- and expiration.

Endoscopic examination:

A rigid 10 mm Ø, 33 cm long, 0° laparoscope was used in inspection of the soft palate. The animal was positioned in sternal recumbency with the forelimbs protected at the elbows and the head and neck in straight position. The mouth was opened with a mouth speculum and the head was held in position by lying one hand under the ramus of the mandible. The tongue was positioned in the middle of the mouth cavity in a normal position. Examination of the soft palate movement during inspiration and expiration was firstly made with opened nares. To ensure the diagnosis, the nares were closed with hand pressure to allow mouth respiration, where re-examining of the soft palate during ins- and expiration was then made.

Slight stretching of the tongue and pressing of it backward was done to determine the degree of difference in the elongation of the soft palate with each movement.

RESULTS

Radiographic examination:

In latero-lateral radiographic examinations of the pharyngeal region, the free end of the normal soft palate appeared in contact with the tip of the epiglottis (Fig. 1).

The soft palate appeared elongated in 8 animals. It was considered to be elongated when it appeared thickened and, its free end lied caudal to the tip of the epiglottis to a considered degree (Fig. 2).

Fluoroscopy was useful to ensure the correct position of the bulla tympanica in correlation to the head position and to observe the movement of the soft palate and the epiglottis during ins-and expiration. The length and thickness of the soft palate varied considerably with over stretching or arching of the head and neck. During over stretching of the head, the soft palate appeared shortened, where during arching of the neck, it appeared elongated (Fig. 3).

Endoscopic examination:

The soft palate appeared endoscopically elongated in the 18 examined animals. Closing the nares allowed forced inspiration through mouth breathing, which, resulted in more pressure on the soft palate and the epiglottis. This allowed a better observation of the movement of the soft palate and epiglottis during ins- and expiration. During inspiration, the soft palate was grasped into the larynx resulting in narrowing of the laryngeal lumen and the pharyngeal region was filled with white frothy saliva (Fig. 4&5), this was manifested clinically with inspiratory

dyspnoea. During expiration the soft palate pressed the epiglottis forward (Fig. 6) causing forced expiration, which was represented clinically in the stertorous -type breathing. In the respiratory rest stage, the soft palate overlapped the epiglottis making folds on its tip (Fig. 7). The free ends of the epiglottis and the soft palate were swollen (Fig. 8).

In all examined animals with an elongated soft palate the tonsils were enlarged and lied out of their pockets (Fig. 9).

DISCUSSION

The obstruction of the air ways which occurred from the elongated soft palate became worse with excitement and exercise which can cause acute respiratory insufficiency and cardiac arrest. Similar findings were also observed by Mayerhofer and Walde (1977).

Although the endoscopical examination of the soft palate was made by Gum (1985) and Kraft (1993) without the use of anaesthesia specially, in quite animals to avoid the complications that may occur in such animals, the radiographic and endoscopical examinations of the animals under anaesthesia in the present study were free from complications and allowed easier handling and positioning of the animals without danger for the examiner or the animal. This technique was also preferred by Mayerhofer and Walde (1977).

The anaesthetic regime mentioned in this study was completely safe for all examined animals and allowed a short time depression of respiration and rapid recovery from anaesthesia without complications. Bright & Wheaton (1983) stated that preparations for rapid intubation of the animal and applying artificial respiration, when complications from anaesthesia takes place, are helpful in rapid surviving of the animal and in decreasing the risk of the anaesthesia.

Radiography was considered the method of choice in diagnosis of elongated soft palate by Mayerhofer and Walde (1977). They used a latero- lateral radiographic exposure for the head and neck region. The movement of the soft palate and the epiglottis during ins- and expiration was evaluated using fluoroscopy. The same position and technique were used in the present study. However, Mayerhofer and Walde (1977) determined the head position through straight holding the head with slight stretching of the head and neck. In the present study this was not enough to reach an accurate position for the head without the need of fluoroscopy to let the outer lines of the right and left bulla tympanica above one another. This method was beneficial to obtain a symmetrical

position of all pharyngeal structures and accurate diagnosis of the elongated soft palate. In agreement to Mayerhofer and Walde (1977), the outward or inward movement of the head resulted in a significant change in the thickness and length of the soft palate resulting in false diagnosis.

During the endoscopic examination of the present cases, the accurate position for diagnosis of the elongated soft palate was obtained when the head was held in straight position and the tongue lied in the middle of the oral cavity. Pressure with the hand in the mandibular space resulted in upward pushing of the epiglottis and false elongated appearance of the soft palate. The same occurred when the head was over stretched or with grasping of the tongue.

The increased thickness of the elongated soft palate that was observed in the present study by endoscopy and radiography may be attributed to the inflammatory edema, due to to-and fro-movement of the swallowed soft palate into the larynx (Bright 1990).

The endoscopy appeared to be more accurate in diagnosis of the elongated soft palate than radiography, because it was helpful in all examined cases. However, by radiography we could only diagnose 8 cases from the examined animals. This can be attributed to the accurate and easier seeing of the soft palate movement, thickness and length during ins- and expiration by endoscopy than radiography. In addition to this, endoscopy is safer than radiography because it does not expose the animal and the examiner to the danger of radiation hazards as in radiography. Other affections of the soft palate which, can not be seen by radiography as inflammation, edema, cleft soft palate or injuries can only be diagnosed by endoscopy.

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LEGENDS OF FIGURES

- Fig. 1:** Normal soft palate; the free end of the soft palate is in contact with the free end of the epiglottis (arrow).
- Fig. 2:** An elongated soft palate with increase in thickness and the free end lie caudal to the free end of the epiglottis (white arrow), the black arrow shows the symmetric super imposition of the two tympanic bulla.
- Fig. 3:** Over stretching of the head leading to asymmetric position of the tympanic bulla. (black arrow) and false diagnosis of the elongated soft palate (white arrow).
- Figs. 4&5:** The inward grasping of the soft palate into the larynx during inspiration with formation of excessive white frothy saliva.
- Fig. 6:** The forward pressing of the soft palate to the epiglottis during expiration.
- Fig. 7:** During the respiratory rest stage the elongated soft palate appeared folded above the free end of the epiglottis.
- Fig. 8:** An oedematous swelling of the free ends of the soft palate and the epiglottis.
- Fig. 9:** Swelling and inflammation of the tonsils in animals with an elongated soft palate.



