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Clinical Report

Generalized Subcutaneous Emphysema Following Debarking via Laryngofissure Approach in a Dog

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Abstract

Case Description- Seventeen dogs (fifteen adult small breed dogs and two adult large breed dogs) who tolerated ventriculocordectomy operation in small animal clinics.
Treatment and Outcome- Induction of anesthesia was done using routine anesthetic agants. After dorsal recumbency, incision of ventral midline cervical skin (thyroid region), the entire vocal folds and cords were removed. The incision line was sutured in layers. There was no post-operative complication in 16 dogs and all dogs were muted but generalized subcutaneous emphysema was observed in one dog (toy terrier breed) within a few hours after operation.
Clinical Relevance- Authors of the present clinical study met generalized subcutaneous emphysema formation in one dog out of 17 muted dogs by laryngofissure approach as a new post-operative complication.
Key words: Emphysema, Debarking, Laryngofissure, Dog.

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Introduction

The aim of devocalization is to remove laryngeal tissue that can emit sound. Debarking is performed by oral or laryngofissure approach.[1,2] The most complications after ventriculo-cordectomy include scar tissue within larynx and trachea, mucosal edema, hemorrhage, cough, gag, glottic stenosis and altered vocalization[1,2,3,4]. No generalized emphysema has been entitled as a post–operative complication following debarking in dog through oral and laryngofissure approach so far[1]. Emphysema is a pathologic accumulation of air in tissues so the air may drive from a skin laceration, discontinuity of the tracheal mucosa and pulmonary lesion[2]. The characteristic lesion is a soft, mobile, swelling which crackles like stiff paper when palpated with no pain, nor heat[5,6,7]. There is also no ill unless the pharyngeal area is sufficiently involved to cause asphyxia[1]. Authors of present clinical report observed generalized subcutaneous emphysema following laryngofissure method in one dog.

Case Description

Fifteen small and two large breed dogs were conducted as the clinical report. The clinical features were normal with no pathologic disorders in upper respiratory system and alimentary canal.

Treatment and Outcome

After physical restraint, dogs received dextrose-saline solution (20 ml/kg/hr) with atropine sulfate (0.03 mg/kg, SC) half an hour before anesthesia. Cefazolin (22 mg/kg, IV) was administrated as a prophylactic antibiotic before operation. Propofol (7.5 mg/kg, IV) was administrated for the induction and maintenance of the anesthesia[3]. Dogs were placed in dorsal recumbency with the neck extended. A ventral midline cervical skin incision was made from the level of basihyoid bone to the third tracheal ring.

The larynx was approached with separation of sternohyoid muscle. The border of the thyroid and cricoid cartilages was identified, cricothyroid ligament was incised, and ventral midline incision was extended cranially through the body of the thyroid cartilage. The entire vocal fold from arytenoids cartilage dorsally and the thyroid cartilage ventrally were excised. The mucosal defect were closed with a simple continuous pattern 4-0 polydiaxonone suture in dogs, the cricothyroid ligament and thyroid cartilage were apposed with simple interrupted sutures using 4-0 polydiaxonone. Finally, muscles, subcutaneous, and skin were closed using 3-0 polyglactin 910 and 3-0 nylon, routinely.

Chlorpromazine (2 mg/kg, bid) was administered for two weeks and dexamethasone for three days (1 mg/kg, sid). To control the likelihood of post-operative infection, amoxicillin (22 mg/kg, bid) was administered for three days. Animals were feed soft food for one week post-operatively.

All animals tolerated laryngofissure operation and muting rate was 100% in the clinical study for mean 9.8 months follow-up, but one dog out of 17 (toy terrier breed, male, 5.8%) showed crackled sound generalized emphysema the day after surgery which was started from ventral cervical aspect on the incision site of the surgery and being spread most part of subcutaneous tissue on the body and limbs within 18 hours after operation. Lateral radiography was confirmed free air under skin (subcutaneous) around thoracic and abdominal region, proximal part of limbs and elevation of the heart from the sternum and also the vessels of the pulmonary and

mediastinum were more distinguishable (Fig. 1). Hematologic profiles (CBC) were in normal value. Dog was re-operated; dehiscence of cartilage suture line was detectable immediately following re-exposure of the surgical site. Thyroid cartilage and cricothyroid ligament were sutured. Subcutaneous air was absorbed during 4 days clinically.

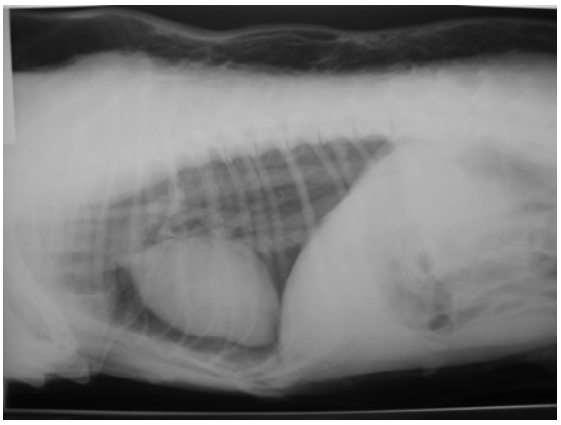

Figure 1. Laterolateral radiography; presence of free air under skin (subcutaneous) in thoracic and abdominal regions, elevation of the heart and recognizable of pulmonary and mediastinal vessels

Discussion

Nowadays, debarking in dog is performed by two methods, oral approach and ventral laryngotomy. Laryngofissure method for devocalization of dogs was introduced by Yoder and Starch in 1964[1,2,5]. Treatment of laryngeal paralysis was performed by bilateral ventriculo-cordectomy as well[1,3,5,7].

Debarking of 1000 dogs with oral approach resulted in 90% muted or aphonic at 3 to 4 months after operation[1]. On the other hand, the above method renders one dog nearly mute because not to remove entire vocal process, or most of it[1]. Therefore remaining the vocal cord enhances the potential to produce a bark[2]. Holt and Harvey observed glottic stenosis in nine dogs following oral approach cordrctomy[1]. Ventral laryngotomy method resulted in high percent muted dogs in comparison to oral approach[2]. Janssens showed success in muting 47 of 49 dogs (96%) by laryngofissure method[5]. Authors of the present study showed all dogs were muted by laryngofissure method[5]. Researchers believe ventral laryngotomy procedure should be suggested to provide better surgical exposure for more accurate vocal cord dissection in an effort to provide better long-term results than those obtain by vocal fold excision through the oral approach, although, oral approach is more economic than laryngofissure method. Local emphysema was reported in one dog as a post-operative complication of oral approach[2].

Local and/or general emphysema have not been reported by other authors following laryngofissure approach[2,6,8,9]. Some researchers met scar hemorrhage, mucosal edema, cough[1,2]. Ross *et al.* reported that aspiration pneumonia is the most important post-operative complication following ventriculocordectomy for treatment of unilateral or bilateral laryngeal paralysis[6]. No aspiration pneumonia was reported as a post-operative complication in our clinical study during mean 9.8 months. We met general emphysema in one toy breed dog of 17 (nearly 5.8%). Authors of present clinical report claim the cause of the emphysema was inaccuracy of placing suture on thyroid cartilage, so after re-operation and placing accurate and gentle suture, emphysema was relieved. No report was proved the role of the temper of dogs as an effective factor in occurrences

of dehiscence and emphysema. Treatment can result in the return of some degree of phonation because of inflammation on the mucosal layer of thyroid, though[1,2]. Some investigators reported returning of barking for several weeks to months[2]. We did not observed returning of bark in mean 9.8 months after operation. As post-operative complications of laryngofissure method is low, therefore authors recommend this method for debarking.

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چکیده

آمفیزم زیرجلدی منتشره متعاقب عمل قطع صدا با رهیافت شکاف حنجره در یک قلاده سگ

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توصیف بیماران و یافته های بالینی- برداشت جراحی طناب صوتی در هفده قلاده سگ (۱۵ قلاده سگ بالغ با نژاد کوچک و ۲ قلاده سگ بالغ با نژاد بزرگ) در درمانگاه های دام های کوچک انجام شد.

درمان و نتیجه آن- بیهوشی با داروهای متعارف انجام, و نگهداری شد. پس از حالت گماری بیمار در وضعیت پشتی و برش بر روی خط وسط سطح شکمی ناحیه گردنی (ناحیه تیروئیدی)، طناب‌ها و چین صوتی برداشته شد. سپس لایه های برش داده شده بخیه گردید. عارضه پس از جراحی در ۱۶ قلاده سگ مشاهده نشد. قطع صدا در همه سگ ها ایجاد شد. اما یک مورد آمفیزم زیرجلدی منتشر در یک قلاده سگ (نژاد کوچک) در طی چند ساعت اولیه پس از جراحی اتفاق افتاد.

کاربرد بالینی- نویسندگان مطالعه گذشته نگر حاضر، یک مورد آمفیزم زیرجلدی منشر را در ۱۷ قلاده سگ متعاقب قطع صدا با روش شکاف حنجره به عنوان یک عارضه پس از جراحی گزارش نمودند.

کلید واژگان- آمفیزم، قطع صدا، شکاف حنجره، سگ