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PERCEPTION OF OWNERS REGARDING CLINICAL SIGNS BEFORE AND AFTER RHINOPLASTY IN BRACHYPHALIC DOGS WITH STENOTIC NARES

PERCEPÇÃO DE TUTORES QUANTO AOS SINAIS CLÍNICOS PRÉ E PÓS RINOPLASTIA EM CÃES BRAQUICEFÁLICOS PORTADORES DE ESTENOSE DE NARINA

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RESUMO

Um questionário prospectivo contendo questões objetivas sobre ocorrência e frequência de sinais clínicos relacionados à síndrome dos braquicéfalos foi presencialmente aplicado a 26 responsáveis por cães braquicefálicos portadores de estenose de narina, antes e 30 dias depois da rinoplastia. Os sinais investigados foram: tosse, espirro, espirro reverso, engasgo, disfagia, ronco acordado, ronco ao dormir e intolerância ao exercício. Trinta dias após a rinoplastia, observou-se redução significativa na ocorrência de todos os sinais: ronco ao dormir: 26 (100%) para 18 (69,2%); intolerância ao exercício: 25 (96,2%) para 10 (38,5%); espirro: 25 (96,2%) para 14 (53,8%); ronco acordado: 21 (80,7%) para 16 (61,5%); engasgo: 21 (80,7%) para 8 (30,8%); espirro reverso: 18 (69,2%) para 7 (26,9%); tosse: 17 (65,4%) para 6 (23%); disfagia: 14 (53,8%) para 3 (11,5%). Isso posto, conclui-se que houve redução da frequência e ocorrência dos sinais clínicos em cães braquicefálicos portadores de estenose de narina após a realização da rinoplastia. O uso de questionários direcionados ao tutor mostrou-se ferramenta útil na avaliação da evolução da sintomatologia clínica antes e depois da rinoplastia e na resposta ao tratamento cirúrgico da síndrome dos braquicéfalos.

PALAVRAS–CHAVE: síndrome respiratória, questionários, qualidade de vida.

ABSTRACT

A prospective questionnaire containing objective questions about the occurrence and frequency of clinical signs related to brachycephalic syndrome was applied face to face with 26 owners of brachycephalic dogs with stenotic nares, before and 30 days after

rhinoplasty. The signs investigated were: coughing, sneezing, reverse sneezing, choking, dysphagia, snoring while awake, snoring when sleeping and exercise intolerance. Thirty days after the rhinoplasty, there was a significant reduction in the occurrence of all signs: snoring when sleeping: 26 (100%) to 18 (69.2%); exercise intolerance: 25 (96.2%) to 10 (38.5%); sneezing: 25 (96.2%) to 14 (53.8%); snoring while awake: 21 (80.7%) to 16 (61.5%); choking: 21 (80.7%) to 8 (30.8%); reverse sneezing: 18 (69.2%) to 7 (26.9%) after; coughing: 17 (65.4%) to 6 (23%); dysphagia: 14 (53.8%) to 3 (11.5%). The conclusion is that there was a reduction in the frequency and occurrence of clinical signs in brachycephalic dogs with stenotic nares after rhinoplasty. The use of questionnaires addressed to owners proved to be a useful tool in assessing both the evolution of clinical symptoms and the response to surgical treatment of brachycephalic obstructive airway syndrome.

KEYWORDS: respiratory syndrome, questionnaires, quality of life.

INTRODUCTION

The great popularity of brachycephalic dogs among owners led to the need of a better knowledge of diseases related to these breeds (MEOLA, 2013). When it comes to brachycephalic breeds, changes related to the upper portion of the airway are noteworthy. These changes predispose the development of a serious respiratory disease known as brachycephalic obstructive airway syndrome (BOAS) or brachycephalic syndrome (BS) (PACKER et al., 2015).

Brachycephalic obstructive syndrome is widely found today in clinical and surgical medical routine, due to the great popularity of theses breeds (MEOLA, 2013). The primary anatomical abnormalities, like stenotic nares, enlargement of the soft palate and hypoplastic trachea, lead to the narrowing of the airway, causing secondary changes, such as everted laryngeal saccules, nasopharynx inflamation, laryngeal paralysis and laryngeal colapse (MEOLA, 2013; DUPRÉ, HEIDENRICH 2016).

Because of the pathophysiology of BOAS, important clinical sings are observed, including snoring, stertor, stritor, dyspnoea, mucosal cyanosis, sleep disturbances, exercise intolerance, difficulty in recovering from exercise, gastrointestinal and cardiac abnormalities, hyperthermia and postobstructive pulmonary edema. These clinical signs have deleterious effects on the quality of life of the animals and, in many cases, represent high mortality risk (EMMERSON, 2014; PACKER; TIVERS, 2015; DUPRÉ; HEIDENRICH, 2016).

The diagnosis of the syndrome begins with an accurate anamnesis, and the detection of the characteristic clinical signs. Direct visualization of the stenotic nares and enlargement of the soft palate are performed. In some cases, the use of sedation or anesthesia is necessary to perform a laryngoscopy (BROCKMAN et al., 2005). Imaging exams also assist in the diagnosis, in addition to allowing the evaluation of comorbidities of the respiratory system (PACKER; TIVERS, 2015).

Despite the extreme importance of other components of brachycephalic syndrome, it is known that stenotic nares are commonly found in the clinical routine, being present in 80 to 100% of the diagnosed cases. Because it is the most frontal anatomical alteration, it offers a great resistance to the air flow, increasing the inspiratory effort performed and the severity of clinical signs. As a result, stenotic nares play an

important role in the pathophysiology of the disease, directly impacting the welfare of the animals (HAIMEL; DUPRÉ, 2015; DUPRÉ, 2016; PACKER et al., 2019).

The treatment introduced should be based mainly on surgical correction of the anatomical abnormalities that cause the airway obstruction, but the association of drug support with surgical treatment is recommended, with the aim of reducing airway inflammation and improving gastrointestinal clinical signs (TRAPPLER; MOORE, 2011).

As for the prognosis, each case must be evaluated individually, according to patient's age and the evolution of the disease (TORREZ; HUNT, 2006). However, the vast majority of animals submitted to surgical procedures show clinical improvement (LODATO, 2012).

Since stenotic nares are the most frontal obstruction, they are the main point of obstruction of the upper portion of the airways, and have great importance in the syndrome (OECHTERING, 2016). However, rhinoplasty for the correction of this abnormality is an easier surgical procedure, is less subject to complications and does not require the patient's hospitalization. The objective of the current study was to evaluate, from the point of view of owners, the clinical response of dogs with BOAS to rhinoplasty.

MATERIALS AND METHODS

This project was approved by the Ethics Committee on the Use of Animals at Federal Fluminense University, under the protocol number 686/2015.

Brachycephalic dogs, male or female, over four months of age, with stenotic nares, regardless of having other anatomical abnormalities common to the syndrome, were included in the study. They were treated at Federal Fluminense University Hospital of Veterinary Medicine "Firmino Mársico Filho", (HUVET- UFF), from March 2015 to March 2016. The dogs were included after a clinical evaluation and the signature of a consent form by their owners. During the patient's clinical examination, direct inspection of the nostrils was performed in order to examine the stenotic nares.

All dogs underwent physical and clinical examination (cardiopulmonary auscultation, evaluation of capillary refill time, body temperature, degree of hydration), hematologic and serum biochemical evaluation (measurement of urea, creatinine, glucose, total proteins, albumin, globulin, alkaline phosphatase, alanine aminotransferase (ALT), aspartate aminotransferase (AST)), electrocardiographic and echocardiographic evaluation and radiographic evaluation consisting in chest radiography at inspiration and expiration, in right and left lateral and ventro-dorsal positions, and direct laryngoscopy to assess the rest of the upper respiratory tract for the diagnosis of BOAS.

A prospective questionnaire adapted from POHL et al. (2016) was applied to the person responsible for each animal, at the time of the first evaluation and 30 days after the surgery. It was composed of objective questions regarding the owner's perception of the occurrence and frequency of clinical signs related to BOAS.

The clinical signs investigated were: coughing, sneezing, reverse sneezing, choking, dysphagia, snoring while awake, snoring when sleeping and exercise intolerance. The signs were classified as 0 when absent, 1 when occasional (the clinical sign was observed once every 15 days), 2 when frequent (the clinical sign was observed one or more times every 7 days) and 3 when very frequent (the clinical sign was observed one or more times every day). Owners answered two identical questionnaires, one at the

time of the patient's first clinical evaluation and another 30 days after the rhinoplasty, and had no access to previous answers.

The results were tabulated in Microsoft Excel® spreadsheets and analyzed using the statistical program SAS University Edition®. Fischer's exact test was used for the evaluation of clinical signs (qualitative variables) before and 30 days after the rhinoplasty, in order to confirm whether or not there was a significant effect between the evaluation days.

RESULTS AND DISCUSSION

In the present study, we decided to evaluate clinical signs that could be easily identified by owners, with more objective answers. The questions focused exercise intolerance, snoring when sleeping, snoring while awake, sneezing, reverse sneezing, coughing, choking and dysphagia. Owners had no difficulty to identify these clinical signs.

The prospective questionnaire was applied to 26 owners of brachycephalic dogs with stenotic nares. A similar prospective study was carried out by Pohl et al. (2016), in which dogs were submitted to multiple surgical corrections of the upper airways and evaluated before and six months after. They differ in these aspects from the research now conducted, in which only the rhinoplasty was performed, since the stenotic nares are the main point of obstruction, directly influencing the progression of the disease, and also because this is an easily performed procedure, accessible to all surgeons, with less chance of complications.

Results regarding the occurrence of clinical signs observed before the animals were submitted to rhinoplasty are shown in figure 1. All 26 owners reported that animals presented snoring when sleeping (100%). Sneezing and exercise intolerance were mentioned by 25 owners (96.2%), snoring while awake and choking by 21 (80.7%), reverse sneezing by 18 (69.2%), coughing by 17 (65.4%) and dysphagia by 14 (53.8%). All animals showed at least three of these signs.

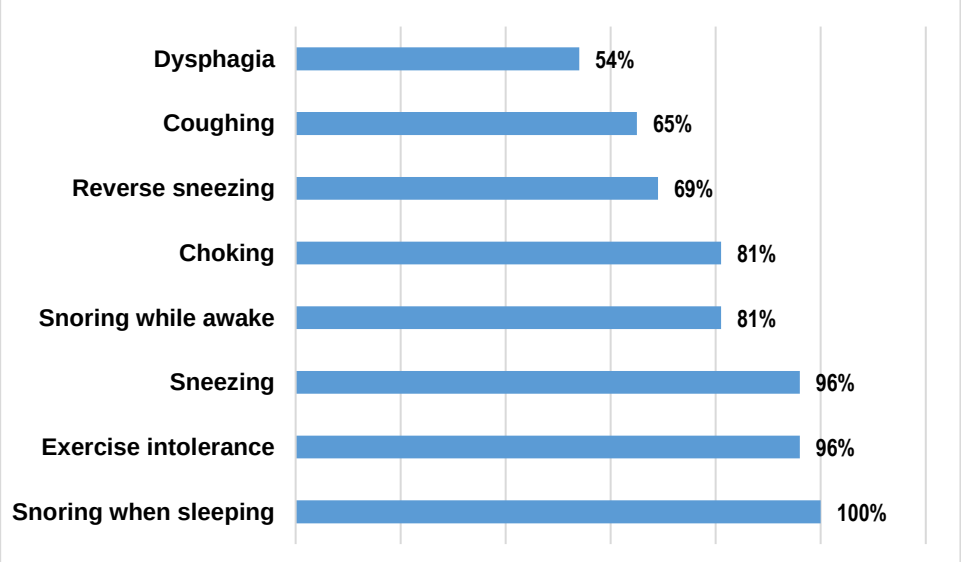

Figure 1- Percentage bar graph of the occurrence of clinical signs reported by owners of 26 brachycephalic dogs with stenotic nares, before undergoing rhinoplasty.

There was a reduction in occurrence of all clinical signs after the animals were submitted to rhinoplasty. The comparison of the clinical signs observed by owners before and 30 days after the surgery is shown in figure 2.

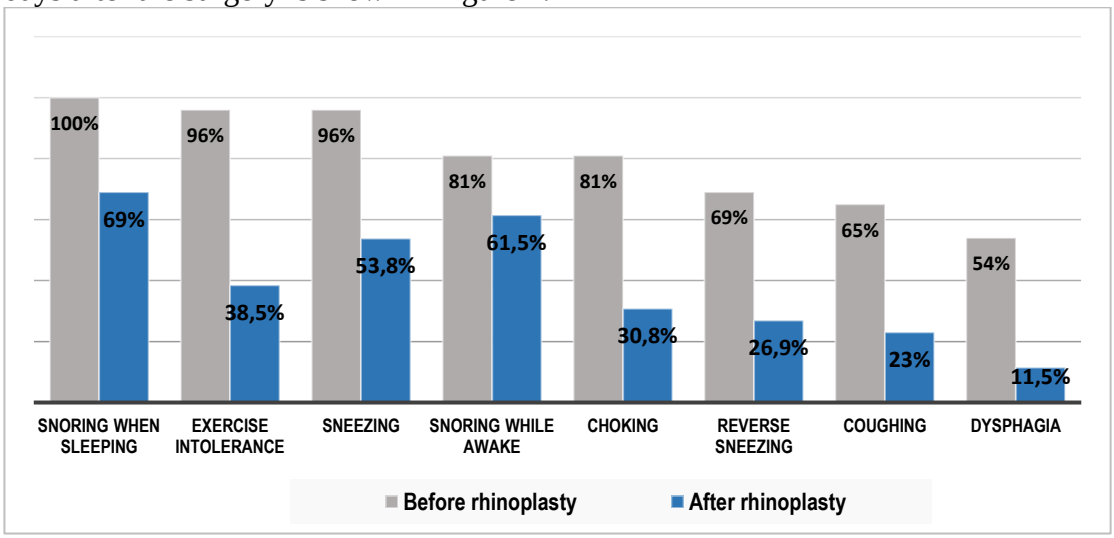

Figure 2 - Comparison of the percentage of occurrence of clinical signs observed by owners of 26 brachycephalic dogs with stenotic nares, before and 30 days after being submitted to rhinoplasty.

The frequency of clinical signs (absent, occasional, frequent and very frequent) reported by owners before the animals were submitted to surgery is described in Table 1.

Table 1- Frequency of clinical signs reported by owners of 26 brachycephalic dogs with stenotic nares before the animals were submitted to rhinoplasty.

Clinical Signs	Occurrence n (%)	Absent n (%)	Occasional n (%)	Frequent n (%)	Very Frequent n (%)
Snoring when	26	0	4	7	15
Exercise	25	1	5	6	14
Sneezing	25	1	1	10	5
Snoring while	21	5	2	11	8
Choking	21	5	8	9	4
Reverse	18	8	8	9	1
Coughing	17	9	1	6	1
Dysphagia	14	1	1	2	2

n = number of animals.

When applying Fischer's exact test to the data collected at different times of assessment (before and 30 days after rhinoplasty), significant differences were found in the decrease of the occurrence and frequency of all clinical signs (Table 2).

Table 2 - Results of Fischer's exact test to assess the occurrence and frequency of clinical signs according to the perception of owners of 26 brachycephalic dogs with stenotic nares, before and 30 days after undergoing rhinoplasty.

Clinical Signs	Results	p value
Snoring when sleeping	Significant treatment effect	0.0001
Exercise intolerance	Significant treatment effect	0.0001
Sneezing	Significant treatment effect	0.0001
Snoring while awake	Significant treatment effect	0.0001
Choking	Significant treatment effect	0.0001
Reverse sneezing	Significant treatment effect	0.0044
Coughing	Significant treatment effect	0.0069
Dysphagia	Significant treatment effect	0.0059

p> 0.05 not significant at 5%

The percentage of reduction in the occurrence of clinical signs reported by owners was calculated according to the presence or absence of these signs, before and 30 days after rhinoplasty (Table 3).

Table 3- Percentage of decrease in the occurrence of clinical signs observed by owners of 26 brachycephalic dogs with stenotic nares, before and 30 days after undergoing rhinoplasty.

Clinical signs	Pre rhinoplasty n (%)	Post rhinoplasty n (%)	Decrease in occurrence n (%)
Snoring when	26	18	8 (30.8%)
Exercise	25	10	15 (60%)
Sneezing	25	14	11 (44%)
Snoring while	21	16	5 (23.8%)
Choking	21	8 (30.8%)	13 (61.9%)
Reverse sneezing	18	7 (26.9%)	11 (61.1%)
Coughing	17	6 (23%)	11 (64.7%)
Dysphagia	14	3 (11.5%)	11 (78.6%)

n = number of animals.

Exercise intolerance was a very common clinical sign observed in 25/26 (96.2%) animals, very frequently in 14/25 (56%). These results were similar to those of Roedler et al. (2013) and Pohl et al. (2016) who found, respectively, 88% and 92% prevalence of exercise intolerance. Thirty days after surgery, only 10 animals (38.5%) (p = 0.0001) presented this sign, with a 60% (p = 0.0001) decrease in occurrence.

Roedler et al. (2013) also observed that brachycephalic dogs became more intolerant to exercises performed in moderate to high temperatures, and detected the exacerbation of the signs at temperatures above 19ºC. The relationship between temperature and exercise intolerance was not investigated in this study because it was conducted in a tropical climate region, warm in all seasons.

As for the respiratory signs, before the rhinoplasty, 26 (100%) owners had reported that their dogs snored when sleeping, out of which 15 (57.7%) presented this

sign very frequently. Snoring while awake, reported in 21 (80.7%) dogs, was described as a frequent sign by 11 (52.4%) owners.

Thirty days after the procedure, reports of snoring when sleeping decreased from 26 (100%) to 18 (69.2%) ($p = 0.0001$), an improvement of 30.8% ($p = 0.0001$); reports of snoring while awake decreased from 21 (80.7%) to 7 (26.9%) ($p = 0.0001$), an improvement of 23.8% ($p = 0.0001$).

Similar results for snoring when sleeping had already been obtained by Torrez and Hunt (2006) when carrying out a retrospective telephone survey 1.6 to 6 years after performing multiple surgical procedures on the upper airways. The authors detected snoring when sleeping in 71% of the animals before surgery and 53.1% after surgery, a 26% reduction in occurrence. Improvements observed in this clinical sign can be explained by a lower inspiratory effort and a greater air flow in the nasal cavity, which reduces the turbulence in the naso and oropharynx region.

Recently, Pohl et al. (2016) obtained more expressive reductions than those showed in the current study. The authors investigated the occurrence of snoring when sleeping and snoring while awake before and six months after multiple surgical corrections, and found a 55% reduction in the occurrence of snoring while awake and 54% in the occurrence of snoring when sleeping. This fact may be associated with the use of multiple surgeries that allowed corrections in different points of airway obstruction.

Before rhinoplasty, reverse sneezing showed, in the present study, an occurrence of 18/26 (69.2%), being frequent in 9/18 (50%) dogs. Similarly, this clinical sign was mentioned by Roedler et al. (2013) and Pohl et al. (2016) as present in 73% and 75% of brachycephalic dogs, respectively. It was shown to be occasional in the majority 27% in the study conducted by Roedler et al. (2013). After rhinoplasty, only seven animals (26.9%) had reverse sneezing ($p = 0.0044$), an improvement of 61.1%.

Cough and sneeze parameters were mentioned by 17/26 (65.4%) and 25/26 (96.2%) of the owners, respectively, with occasional coughing in ten (58.8%) animals; Sneezing was occasional in ten (40%) animals, frequent in ten (40%) and very frequent in five (20%). Such results were notably superior to those found by Torrez and Hunt (2006) who, when analyzing the medical records of 64 brachycephalic dogs referred for multiple surgeries, found that 35.9% of them showed coughing and only 6.3% sneezing.

Increase in the frequency of reverse sneezing and the occurrence of coughing and sneezing is attributed, in the research now conducted, when compared to the results of Roedler et al. (2013) and Torrez and Hunt (2006), to the increasing selection of specimens with even more foreshortened muzzle, and the consequent decrease in the spaces of the naso and oropharynx. According to Pohl et al. (2016), the occurrence of reverse sneezing is due to intense irritation of the nasopharyngeal mucosa caused by the increase in the negative pressure of the cervicothoracic region, which causes the obstruction of the upper airways predisposing brachycephalics animals to acute conditions. It is suggested that coughing and sneezing occur in brachycephalics dogs by mechanisms similar to those that trigger reverse sneezing.

After rhinoplasty, there was a significant decrease in the percentage of sneezing, reverse sneezing and coughing. In the first evaluation, sneezing was observed in 25 (96.2%) animals, reverse sneeze in 18 (69.2%), and cough in 17 (65.4%). Thirty days after surgery, this number decreased to 14 (53.8%) dogs presenting sneezing ($p = 0.0001$), an improvement of 44% ($p = 0.0001$); seven (26.9%) dogs with reverse sneezing ($p = 0.0044$), an improvement of 61.1% ($p = 0.0044$); and six (23%) dogs with coughs ($p =$

0.0069), a 64.7% reduction (p = 0.0069) in this clinical sign. Pohl et al. (2016) obtained a lower percentage of reduction in reverse sneeze (33%).

Gastrointestinal clinical signs are widely described in dogs with anterior airway obstruction (DUPRÉ; HEIDENRICH, 2016). The statement was confirmed in this study with reports of choking and dysphagia. Choking was observed in 21/26 (81%) dogs, being frequent in 9/21 (42.9%). Dysphagia was detected in 14/26 (54%) dogs, being occasional in 10/14 (71.4%).

The high prevalence of digestive tract disorders had already been reported by Poncet et al. (2005). In their study, the researchers found, through endoscopy, that 97.3% of brachycephalic dogs had esophageal, gastric or duodenal abnormalities. In 2006, Poncet et al. conducted a new survey adding the relevant observation that, even without clinical signs, 98% of the dogs had gastrointestinal lesions. Roedler et al. (2013) found a lower prevalence of gastrointestinal disorders (46%), but did not make distinctions among specific clinical signs. For Poncet et al. (2006), the presence of gastrointestinal disorders and the intensity of these signs are related to the degree of airway obstruction.

In the present study, 30 days after surgery, a significant decrease in the occurrence of both signs was found, resulting in a decline of 61.9% (p = 0.0001) for choking and 78.6% (p = 0.0059) for dysphagia.

In the first evaluation, dysphagia was present in 14 (53.8%) dogs and choking in 21 (80.7%); 30 days after surgery, only three (11.5%) (p = 0.0059) and eight (30.8%) (p = 0.0001) animals, respectively, presented these clinical signs.

Recently, Pohl et al. (2016) questioned the owners about dogs' difficulty with eating, and obtained a prevalence of 47%, with a decrease of 55.2% in the occurrence after multiple surgical corrections of the syndrome.

Pohl et al. (2016) also highlighted the importance of raising awareness of abnormalities other than respiratory, such as gastrointestinal abnormalities, in addition to the need to choose reproduction specimens with fewer alterations in order to decrease the severity and frequency of clinical signs that directly imply the well-being of these animals.

CONCLUSION

There was a reduction in the frequency and occurrence of clinical signs in brachycephalic dogs after rhinoplasty, directly influencing the improvement of the quality of life of these animals. It was also seen that the use of questionnaires directed to owners is a useful tool in assessing the evolution of clinical symptoms and the response to surgical treatment of brachycephalic obstructive airway syndrome.

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