Clinical and Etiological Differences in Laryngeal Saccular Cysts: Chronic Laryngeal Posturing and Mucus Entrapment

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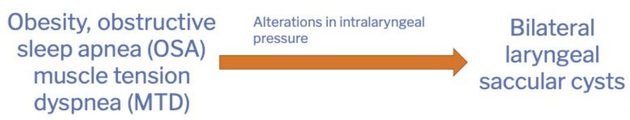
1. Background

- Laryngeal saccular cyst is an uncommon, benign structural anomaly of the larynx, characterized by a fluid-filled outpouching of the laryngeal saccule.
- The precise etiology of saccular cysts is somewhat unknown, but thought to relate to post-obstructive mucus retention.
- Saccular cysts can present as **large, unilateral cysts that may be obstructive,** or, more commonly**, small bilateral symmetric cysts found incidentally**
  - It is **unclear** whether there are etiologic differences between these two presentations
- Few studies have tracked clinical features and outcomes of laryngeal saccular cysts in a larger patient population.

2. Hypothesis

- **Our hypothesis is that unilateral saccular cysts and bilateral saccular cysts represent pathologies with two different etiologies.**
- In particular, we hypothesize that chronic alterations in intralaryngeal pressure (such as in OSA and muscle tension dysphonia [MTD]) lead to **bilateral** saccular cysts



3. Methods

- **Retrospective cohort study** including a total of **68 adult patients** diagnosed with laryngeal saccular outpouchings.
- Patient demographic and clinical data was abstracted from electronic medical records.
- Groups were split into patients with unilateral and bilateral lesions at presentation.
- Videostroboscopy footage was manually reviewed to confirm lesion characteristics including laterality and size change on vocal fold adduction.
- Statistical analysis was performed using a chi-squared test, Fisher's exact test, and unpaired t-test to determine associations between variables.

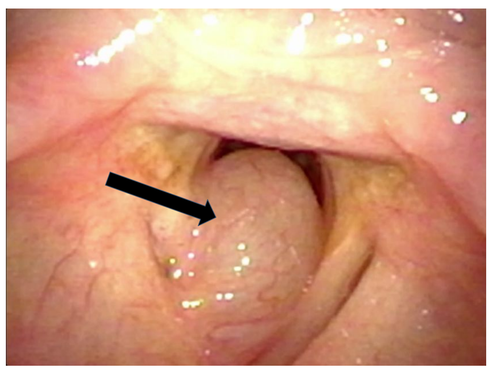


Figure 1: A representative image of a large unilateral saccular cyst (black arrow).

4. Results

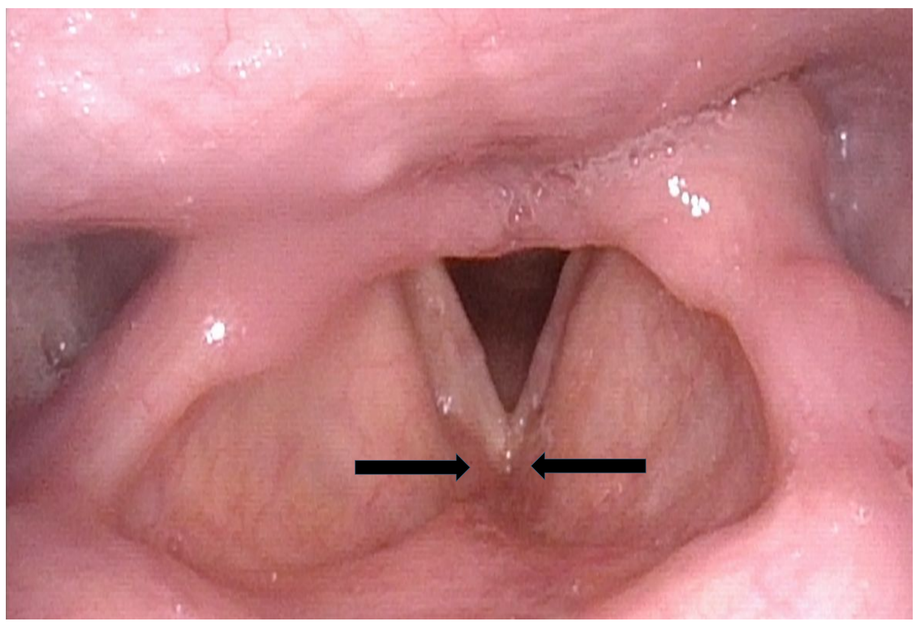


Figure 2: A representative image of bilateral small saccular cysts (black arrows).

	Total (n=68)	*Unilateral (n=47)*	*Bilateral (n=21)*
- Age Mean (Standard Deviation)	52.59 (16.0)	50.87 (14.9)	50.7 (14.4)
- Female, n (%)	44 (64.70)	32 (47.05)	12 (17.65)
- Male, n (%)	24 (35.3)	16 (23.53)	8 (11.76)
- BMI Mean (Standard Deviation)	31.95 (8.64)	29.92 (9.10)	36.41 (7.21)
- Never Smoker, n (%)	35 (51.50)	25 (36.76)	10 (14.71)
- Current Smoker, n (%)	15 (22.06)	11 (16.18)	4 (5.88)
- Former Smoker, n (%)	18 (26.47)	12 (17.65)	6 (8.82)
- Symptomatic at Initial Visit	47 (68.12)	32 (47.06)	15 (22.06)
- Complaint of Dysphonia	47 (68.12)	35 (51.47)	12 (17.64)
- History of Viral Infection	7 (10.29)	4 (5.88)	3 (4.41)
- History of Intubation	20 (29.41)	14 (20.59)	6 (8.82)
- History of OSA	18 (26.47)	14 (20.59)	4 (5.88)

Table 1: Summary Table of Demographic Information by Cyst Laterality.

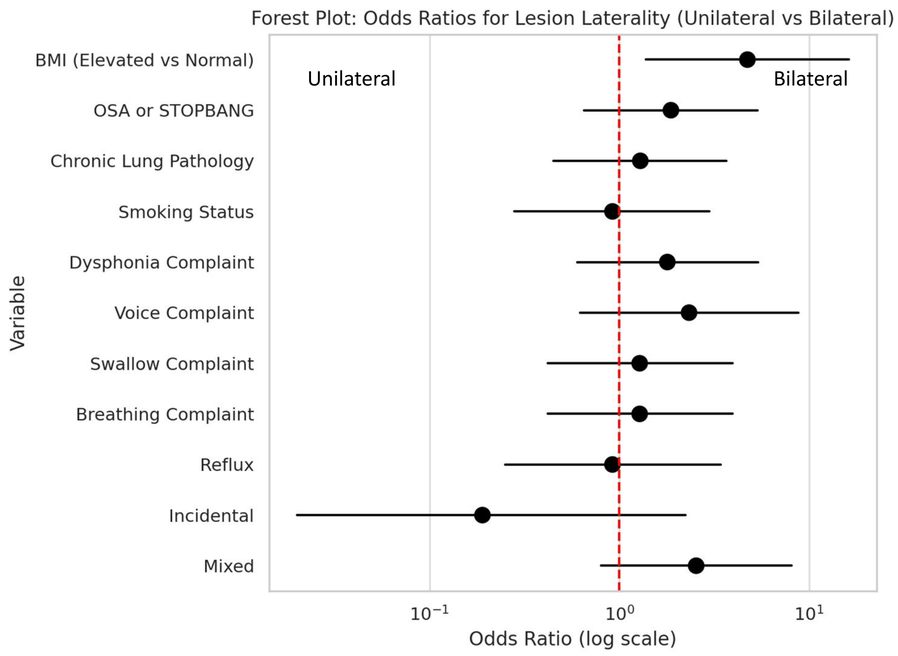


Figure 3: Forest plot showing the odds ratios (OR) and 95% confidence intervals (CI) for the association between clinical variables and lesion laterality (bilateral vs unilateral) in patients with saccular cysts. *An OR greater than 1 favors bilateral lesions; an OR less than 1 favors unilateral lesions. The dashed red line indicates an odds ratio of 1.0 (no effect).*

5. Discussion

- In this study, we evaluated whether clinical or demographic factors predicted lesion laterality in patients with saccular cysts.
  - **Elevated BMI at presentation was found to be significantly associated in patients with bilateral disease (OR = 4.73, 95% CI 1.38-16.24) versus unilateral disease.**
  - We found no significant associations between laterality and gender, history of bearing down (OSA/STOPBANG ≥3), chronic lung disease, or smoking status.
  - We found no significant associations between voice complaints and laterality.
- There were trends suggesting that patients with voice complaints (OR = 2.33) and those with mixed symptomatology (OR = 2.54) were more likely to have bilateral lesions. However, confidence intervals were wide and included 1, limiting definitive conclusions. Effect sizes across variables were small (Cramer's V <0.20), consistent with weak or absent associations.
- A power analysis showed that this study was underpowered and would benefit from a multi-site study in the future to determine the significance of these factors.

6. Conclusion

- Our results suggest that demographic characteristics and presenting symptoms are not strongly predictive of whether a saccular cyst will be unilateral or bilateral.
- **Elevated BMI above 30 may be an important factor to note** when assessing for unilateral vs bilateral cyst presentation. This can inform patient counseling and reassurance.
- Further studies with larger sample sizes may be helpful to explore relationships between lesion laterality and other clinical conditions that may alter intralaryngeal pressure

7. References

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