Sex Specific Quality of Life Differences in Chronic Rhinosinusitis

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**Background**
- The use of subdomains in the Sinus Nasal Outcome Test (SNOT-22) has been validated to describe Chronic Rhinosinusitis (CRS) symptoms.
- Sex discrepancies have been reported in total SNOT-22 scores and individual traits, but limited data exist and subdomains have not been reported.
- Tissue biomarkers of CRS in regards to sex have not been assessed.

**Hypothesis**
- Women preferentially suffer from different CRS-related symptoms and comorbidity conditions such as migraine disorder.
- Neuropeptides such as Substance P will be locally elevated in women with CRS.

**Methods**
- CRS patients presenting to a tertiary care rhinology facility for surgical intervention were recruited into an IRB-approved biobank (Univ of Colorado), where SNOT-22 and middle meatal mucus swabs were obtained.
- Patient demographics and characteristics were summarized by mean (sd) or frequency (%) for the overall cohort and by sex.
- Gender differences in SNOT-22 subdomains were assessed using linear regression and adjusted for age, CRS diagnoses, smoking status, and use of topical nasal saline or corticosteroid medications.
- A random forest (RF) model was applied to assess importance of variables in predicting total SNOT-22 score.
- Significance assessed using two-sample t-tests for continuous variables and chi-square tests of independence or Fisher's exact tests for categorical variables.
- Mucous Substance P was measured by ELISA in a subset of men and women matched for age and disease type to explore sex differences and relationship to SNOT-22 quality of life (QOL).

**Patient Demographics**

**Sex Differences in SNOT-22**
- Higher values across the mean decrease in Gini index determine which variables are likely to predict higher SNOT-22 scores.
- Mean concentration of Substance P of 0.23 and surprisingly high and warrants further attention.

**Results**
- Significant age difference in male vs female groups with questionable biological importance.
- Sex differences in proportion of CRS subject with and without NP

**Sex Differences in SNOT-22**
- Females suffered a higher QOL burden by total SNOT-22 score, despite similar disease on endoscopy and lesser disease on CT.
- Females exhibited worse QOL in SNOT-22 subdomains of Ear/Facial, Psych, and Sleep.

**Random Forest Model for Total SNOT-22 Score**
- Top predictors for Total SNOT-22 were age, objective disease measures (CT and endoscopy scores), and then sex, above other variables such as smoking, presence of comorbid allergy or asthma, and presence of poly or AED.

**Substance P by Sex and SNOT-22 Total**
- Mucus Substance P was not statistically associated with Total SNOT-22 score, but exhibits a trend towards a weak association in the female group.

**Conclusion**
- Sex differences in patients with CRS exist between age at presentation for surgery, total SNOT-22 score, and SNOT-22 subdomain scores.
- Among the many predictor variables for total SNOT-22 score, sex is surprisingly high and warrants further attention.
- Substance P may weakly associate with total SNOT-22 score.

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**Figure 1:** Random Forest Model for Total SNOT-22 Predictors

**Figure 2:** Total SNOT-22 vs Concentration of Substance P by Sex

**Table:** Disease Characteristics

**Table:** Sex Differences in SNOT-22 Subdomains

**Table:** Sex Differences in SNOT-22 Predictors