Advancing the field of Rhinology and Allergy

The May/June issue of the *American Journal of Rhinology & Allergy* contains several articles that advance the field of rhinology and allergy. This editorial will provide a high level summary of the articles contained in this issue—be sure to examine the articles in more depth on the following pages.

Several studies in this issue focus on the pathophysiology of airway inflammation. Wang et al¹ studied the regulation of aquaporin-5, a channel protein important for fluid secretion in allergic inflammation. They tested the 4 concentrations of histamine on the expression of aquaporin-5 in human nasal epithelial cells, findings a dose dependent decrease in expression. They further discovered that the downregulation of aquaporin by histamine occurs via inhibition of the cyclic adenosine monophosphate-responsive element binding protein. Choi et al² found that Asian sand dust, generated from the deserts in China, are capable of inducing MUC8 and MUC5b expression via TLR-4 dependent signaling pathways. These findings were derived from experiments using human nasal epithelial cells. Asian sand dust may be an important environmental trigger for TLR-4 pathway expression and subsequent promotion of airway inflammation. Lam et al³ used sinus mucosal samples to demonstrate increased IL-25 and IL-33 expression, but not TSLP expression, in patients with chronic rhinosinusitis, nasal polyps, and >10 eosinophils/high power field, in a comparison study with normal control tissue. Linke et al,⁴ in another study using human samples, this time nasal polyps and inferior turbinate tissue, found that STAT5b, but not STAT5a, is activated compared to controls in patients with chronic rhinosinusitis and nasal polyps. Finally, Esmaeilzadeh et al⁵ identified genetic variabilities of major histocompatibility complex class II for patients with aspirin exacerbated respiratory disease, suggesting a role for T cell activation in the pathophysiology of this disease process.

One study focused on sinonasal tumor pathophysiology. Jung et al⁶ studied expression of the Wnt signaling pathway to better understand the mechanism involved in the malignant transformation of sinonasal inverted papillomas. Their findings suggest several Wnt pathway signaling proteins, including β -catenin, cyclin D1, and Dvl-1, are associated with malignant transformation.

Two studies analyzed imaging results as a means to better understand challenging diagnostic and management issues in rhinology. Craig and Goyal⁷ analyzed images of patients who sustained sphenoid fractures and found that CSF leaks occurred in 9% and blunt carotid injury occurred in just 2% of sphenoid fractures. They also found a significant association between sphenoid roof fractures and CSF leak and that penetrating issues were strongly associated with CSF leak. Lin et al⁸ describe the use of volumetric analysis for assessment of orbital volume in patients with chronic maxillary atelectasis, also called silent sinus syndrome. They concluded that expansion of maxillary sinus and decrease in orbit volume can occur following endoscopic sinus surgery.

Two studies focus on granulomatosis with polyangiitis (GPA, also known as Wegener's Granulomatosis), the first on diagnosis and the second on prognosis. Trimarchi et al⁹ found that the use of narrow band imaging nasal endoscopy allowed for identification of vascular patterns clearly different from healthy mucosal patterns in 53% of those with biopsy-proven GPA. These findings suggest a potential role for narrow band imaging in GPA diagnosis. Janisiewicz et al¹⁰ report that sinonasal GPA patients who present with C-ANCA titers $\geq 1:80$ had more frequent health care use; however, there was no difference in Lund-Mackay scores when comparing the GPA patients based on high or low C-ANCA titers.

Matthew A. Rank, M.D.

Three studies considered the potential role of other chronic conditions in patients with chronic rhinosinusitis. Chien et al,¹¹ using a case control design adjusting for many key confounding diagnoses, report that COPD is an independent risk factor for the development of chronic rhinosinusitis without nasal polyposis. Bohnhorst et al,¹² using a case control design but not adjusting for confounding diagnoses, found that patients who have GERD are more likely than those who do not have GERD to have a diagnosis of chronic rhinosinusitis and to have a higher SNOT-22 score

(have a higher symptom burden). Rix et al¹³ performed a systematic review of management of chronic rhinosinusitis with co-existing asthma, a very common population of patients. They identified only 7 trials and concluded that only low grade evidence was available for interventions among patients with coexisting chronic rhinosinusitis and asthma.

One study considered a potential remedy for allergic rhinitis is a series of experiments using human mast cell lines and the ovalbumin-sensitized mouse model. Kim et al¹⁴ reports that *Allium hookeri* has anti-inflammatory effects in these experimental models.

Two studies in this issue focus on surgical management of pituitary lesions. Chung et al¹⁵ reports that CT-assisted surgery is associated with lower CSF leak rates compared to no image guidance or MR-assisted procedures; the authors recognize the limitation of this report was the inability to control for the severity or extent of the disease. Hong et al¹⁶ studied olfactory function and quality of life in patients undergoing endoscopic binostril or transnasal transseptal microscopic pituitary surgery. They report that transnasal transseptal surgery is associated with better postoperative quality of life and similar olfactory function when compared with the endoscopic approach. Specifically there was less nasal crusting and urge to blow the nose following the transnasal transseptal approach.

Finally, 2 articles report on surgical techniques. Lemonnier et al¹⁷ report 7 out of 9 patients with CSF leaks were successfully managed with endoscopic endonasal eustachian tube closure. Rotenberg et al,¹⁸ in the "How I Do It" feature, describe radio frequency ablation for treatment of hereditary hemorrhagic telangiectasia.

Primary care clinicians, surgeons, allergists, pulmonologists, endocrinologists, oncologists, rheumatologists, gastroenterologists and researchers at all levels of translation are encouraged to review the following pages for ways to improve your practice and advance your research.

Matthew A Rank, M.D.

REFERENCES

1. Wang W, Wang X, Ma L, and Zhang R. Histamine downregulates aquaporin 5 in human nasal epithelial cells. *Am J Rhinol Allergy* 29, 188–192, 2015.
2. Choi YS, Bae CH, Song S-Y, and Kim Y-D. Asian sand dust increases MUC8 and MUC5B expressions via TLR4-dependent ERK2 and p38 MAPK in human airway epithelial cells. *Am J Rhinol Allergy* 29, 161–165, 2015.
3. Lam M, Hull L, Imrie A, et al. Interleukin-25 and interleukin-33 as mediators of eosinophilic inflammation in chronic rhinosinusitis. *Am J Rhinol Allergy* 29, 175–181, 2015.
4. Linke R, Pries R, Könnecke M, et al. Increased phosphorylation of STAT5b, but not STAT5a, in nasal polyps. *Am J Rhinol Allergy* 29, 182–187, 2015.
5. Esmaeilzadeh H, Nabavi M, Amirzargar AA, et al. HLA-DRB and HLA-DQ genetic variability in patients with aspirin-exacerbated respiratory disease. *Am J Rhinol Allergy* 29, e63–e69, 2015.
6. Jung YG, Lee HW, Kim M-G, et al. Role of Wnt signaling pathway in progression of sinonasal inverted papilloma to squamous cell carcinoma. *Am J Rhinol Allergy* 29, e81–e86, 2015.

7. Craig J, and Goyal P. Patterns and sequelae of sphenoid sinus fractures. *Am J Rhinol Allergy* 29, 211–214, 2015.
8. Lin GC, Sedaghat AR, Bleier BS, et al. Volumetric analysis of chronic maxillary atelectasis. *Am J Rhinol Allergy* 29, 166–169, 2015.
9. Trimarchi M, Bozzolo E, Pilolli F, et al. Nasal mucosa narrow band imaging in granulomatosis with polyangiitis (Wegener granulomatosis): A preliminary study. *Am J Rhinol Allergy* 29, 170–174, 2015.
10. Janisiewicz AM, Klau MH, Keschner DB, et al. Higher antineutrophil cytoplasmic antibody (C-ANCA) titers are associated with increased overall healthcare use in patients with sinonasal manifestations of granulomatosis with polyangiitis (GPA). *Am J Rhinol Allergy* 29, 202–206, 2015.
11. Chien C-Y, Tai S-Y, Wang L-F, and Lee CT-C. Chronic obstructive pulmonary disease predicts chronic rhinosinusitis without nasal polyps: A population-based study. *Am J Rhinol Allergy* 29, e75–e80, 2015.
12. Bohnhorst I, Jawad S, Lange B, et al. Prevalence of chronic rhinosinusitis in a population of patients with gastroesophageal reflux disease. *Am J Rhinol Allergy* 29, e70–e74, 2015.
13. Rix I, Håkansson K, Grønhoj Larsen C, et al. Management of chronic rhinosinusitis with nasal polyps and coexisting asthma: A systematic review. *Am J Rhinol Allergy* 29, 193–201, 2015.
14. Kim H-Y, Nam S-Y, Hong S-W, et al. Protective effects of rutin through regulation of vascular endothelial growth factor in allergic rhinitis. *Am J Rhinol Allergy* 29, e87–e94, 2015.
15. Chung TK, Riley KO, and Woodworth BA. The use of image-guidance during transsphenoidal pituitary surgery in the United States. *Am J Rhinol Allergy* 29, 215–220, 2015.
16. Hong SD, Nam D-H, Seol HJ, et al. Endoscopic binostril versus transnasal transseptal microscopic pituitary surgery: Sinonasal quality of life and olfactory function. *Am J Rhinol Allergy* 29, 221–225, 2015.
17. Lemonnier LA, Tessema B, Kuperan AB, et al. Managing cerebrospinal fluid rhinorrhea after lateral skull base surgery via endoscopic endonasal Eustachian tube closure. *Am J Rhinol Allergy* 29, 207–210, 2015.
18. Rotenberg B, Noyek S, and Chin CJ. Radiofrequency ablation for treatment of hereditary hemorrhagic telangiectasia lesions: “How I do it”. *Am J Rhinol Allergy* 29, 226–227, 2015. □