**EP-1** Decreased expression of type I (IFN-β) and III interferon (IFN-λ) and IFN-stimulated genes in chronic rhinosinusitis with and without nasal polyps

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Background: Little is known about the antiviral responses in the sinonasal mucosa of patients with chronic rhinosinusitis (CRS).

Objective: we investigated the presence of virus, the expression of TLR3 and TLR7, and interferon (IFN) and IFN-stimulated genes (ISGs) in healthy mucosa of control and inflammatory sinus mucosa of CRS patients, and evaluated whether the levels of IFN and ISGs may be affected by CRS-related cytokines and by the treatment with macrolides, dexamethasone, or TLR3 and TLR7 agonists.

Methods: The presence of virus in sinonasal mucosa was evaluated with real time PCR. The expression of IFN and ISGs in sinonasal mucosa and in cultured epithelial cells treated with Th1 and Th2 cytokines, macrolides, dexamethasone, or TLR3 and TLR7 agonists were evaluated with real time PCR and western blot. The expression of TLR3 and TLR7 in sinonasal mucosa were evaluated with immunohistochemistry.

Results: Respiratory viruses was detected in 15 % of samples. IFN and ISGs are expressed in normal mucosa, but their levels were decreased in CRS patients. IFN and ISGs were up-regulated in cells treated with macrolides, dexamethasone, or TLR3 agonist, but a part of them was decreased in cytokine-treated cells. TLR3 and TLR7 levels showed no significant difference between normal and inflammatory sinus mucosa.

Conclusion: These results suggest that decreased levels of IFN and ISGs in CRS may contributes to the impairment of the antiviral innate response in inflammatory sinonasal epithelial cells. Macrolides and glucocorticoids may provide the positive effects on the treatment of CRS by upregulating IFN and ISGs.

**EP-2** PVP-I reduces LPS-induced airway inflammation by blocking TLR4 signaling in airway epithelial cells

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Background: Povidone-iodine (PVP-I) is an antiseptic and a disinfectant with broad-spectrum antimicrobial activity against various pathogens. However, it is unclear whether PVP-I nasal instillation can suppress mucosal inflammation in non-eosinophilic chronic rhinosinusitis mice. Objective: The aim of the study was to explore the anti-inflammatory effects and the underlying molecular mechanism of PVP-I on LPS-stimulated airway epithelial cells and to investigate whether nasal instillation of PVP-I can suppress mucosal inflammation in non-eosinophilic CRS mice.

Methods: Analyses of the inflammation related molecules were measured by ELISA, western blotting, qRT-PCR, immunoprecipitation and histopathology (hematoxylin and eosin, immunohistochemistry, and periodic acid-schiff staining) stain assay in the nasal epithelial cells or non-eosinophilic CRS mice.

Results: PVP-I blocked expressions of the inflammation-related molecules, such as NLRP3, NF-κB-p65, caspase-1, and IL-1β, translocation of the NF-κB to the nucleus, and assembly of NLRP3/ASC complexes in the nasal epithelial cells or non-eosinophilic CRS mice. Notably, PVP-I strongly blocked the receptor interaction of TLR4 and MyD88 in the epithelial cell of nasal mucosa.

Conclusion: We demonstrated that PVP-I significantly attenuated inflammatory molecules and cytokines via blocking the formation of TLR4 and MyD88 complexes in the LPS-induced mucosal inflammation in non-eosinophilic CRS.
EP-3  Two siblings with primary ciliary dyskinesia with the same homozygous variants

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Primary ciliary dyskinesia (PCD) is a rare genetic disorder with impaired function of motile cilia, which causes failure of muco-ciliary clearance. Mutations in PCD genes usually cause ciliary ultrastructural defects. Nevertheless, approximately 30% of PCD cases have normal ciliary ultrastructure. In the current study, we report two sisters in their twenties suspected of PCD with similar symptoms. They were born term and did not have situs inversus. The elder sister had chronic lower respiratory tract infections and bronchiectasis with wet cough when she was referred. She had asthma and allergic rhinitis. Ear endoscopic showed right eardrum with calcified plaque and left eardrum reflex was shortened. Paranasal sinus CT showed opacification of right maxillary sinuses. Chest CT showed bronchiectasis in both lower fields. The younger sister had sinusitis, allergic rhinitis, and asthma with a productive cough and rhinorrhea. Ear endoscopic showed bilateral eardrums were retracted and the light reflex was missing. Chest CT showed similar bronchiectasis with her sister. Electron microscopy of the nasal mucosa from elder sister showed a normal ciliary axoneme structure. The whole-exome sequencing of both siblings revealed a homozygous variant of a PCD-causing gene, and Sanger sequencing confirmed that the parents had heterozygous variants. This is the first report of Japanese siblings with PCD caused by a missense homozygous mutation of this gene.

EP-4  Using three-dimensional printed sinus models for assessing the performance of sinus ultrasound in diagnosis of sinusitis

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Background: There is still limited research regarding using A-mode ultrasound (A-US) in the diagnosis of sinusitis. In this study, we designed a three-dimensional (3D) printed sinus model to simulate the clinical condition of using A-US in patients with rhinosinusitis.

Methods: Computed tomography images of three different sizes of normal maxillary sinuses were utilized to fabricate 3D printed sinus models. Water and different concentration of glycerol solutions were used for mimicking various sinus mucus with different viscosity. The depth and amplitude of back wall echo (BWE) in A-US were recorded and analyzed under different experimental parameters, such as fluid volume, the viscosity of the solution, and transducer measuring position.

Results: The amplitude of BWE was positively correlated to the anterior-posterior (AP) dimension of the sinus (p<0.001). The depth of BWE was negatively correlated to the concentrations of glycerol solution (p<0.001).

Conclusion: A 3D printed sinus model is an ideal tool to analyze A-US in various simulated clinical conditions of sinusitis. In our study, we found A-US is a convenient tool to diagnose sinusitis. Moreover, the AP dimension of the maxillary sinus and the viscosity of the sinus fluid were found to be highly related to the amplitude and the depth of BWE respectively.
EP-5  Using image J platform in analysis of sinus X-ray for assisting diagnosis of fungal sinusitis

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Background: Early identification of fungal sinusitis remains a challenge. This study aims to assist diagnosis of fungal maxillary sinusitis using sinus plain film and free software ImageJ platform.

Material and methods: We retrospectively collected patients with unilateral chronic bacterial rhinosinusitis, and fungal rhinosinusitis from Mar, 2015 to Jan, 2019. All the patients should have received endoscopic examination, sinus X-ray, and computed tomography of paranasal sinus. We used ImageJ software to mark bilateral maxillary sinuses to calculate and compared the integrated density.

Result: Forty patients were included. 32, 42, and 6 sides were diagnosed with normal sinus, bacterial sinusitis, and fungal rhinosinusitis, respectively. The integrated density was significantly different between fungal rhinosinusitis group and normal sinus, bacterial sinusitis group, respectively.

Conclusion: Using the integrated density of ImageJ software is a promising tool to assist diagnosis of fungal rhinosinusitis.

EP-6  A novel scoring system of surgical findings at the sinus and olfactory cleft in patients with chronic rhinosinusitis

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Outcome Objective: This study aimed to propose a surgical scoring system at endoscopic sinus surgery (ESS) and to evaluate recurrence in patients with chronic rhinosinusitis (CRS).

Methods: We retrospectively analyzed 496 patients with bilateral CRS who underwent ESS at our hospital between 2009 and 2019. Patients were followed-up for ≥ 3 months after ESS (mean, 23.6 months). Intra-operative endoscopic appearance in all sinuses and olfactory cleft (OC) was scored (OP score, 0-60 points). Mucosal lesions were scored as 0, normal; 1, edema; and 2, polyp. Contents were scored as 0, none; 1, muco-purulent; and 2, viscous. Since the OP score have many items of 30, a simplified OP score (SOP score) reduced to 16 items (0-32 points) was proposed in consideration of the correlation coefficients with the Post-operative endoscopic score (E score, %) and clinical significance. The E score more than 50% was defined as recurrence. According to the results of the E score, the SOP score and pre-operative clinical findings were analyzed using univariate and multivariate analysis.

Result: The E score and all sites of the OP score correlated (P<0.05). On the multivariate analysis, the SOP score was a significant factor of recurrences (P<0.05). In the ROC curve, the area under the phase was 0.759. When the cutoff value of the SOP score was determined to be 22 points, the sensitivity was 0.710 and the specificity was 0.718.

Conclusion: The OP score could be simplified and used easily. Intra-operative findings can be a predictor of post-operative treatment for CRS.
EP-7 Statistical analysis of eosinophilic chronic rhinosinusitis at Fukuyama city hospital

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Introduction: Eosinophilic Chronic Rhinosinusitis (ECRS) often cause the recurrence of the nasal polyps after the operation and to suffer from treatment.

Purpose: We are characteristic in the chronic rhinosinusitis 127 cases with the history of treatment in each group of non-ECRS and ECRS at our hospital or analyze it.

Result: Non-ECRS were 37 cases among 127 CRS, There are ECRS 90 cases, of which 7 were mild ECRS, 32 were moderate ECRS, 51 were severe ECRS in 127 CRS cases. In addition, there was significant difference between serum eosinophils level and, the total IgE level in each group. But there was not significant difference to the number of eosinophil in nasal polyp tissue in each group. Dupilumab uses 1 case non-ECRS and 5 cases severe ECRS. Among them, 5 severe ECRS cases were treated effectively.

Conclusion: This time, there was a significant difference in serum eosinophil level and the total IgE levels in each group. In addition, the control was also good in cases using the biological preparation. In the future, we would like to continue to analyze appropriate treatment including biological preparation and want to accumulate more cases.

EP-8 Therapeutic effects of sinonasal topical steroid treatment on postoperative eosinophilic chronic rhinosinusitis patients.

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Objective. Postoperative treatment is required for eosinophilic chronic rhinosinusitis (ECRS) to maintain the respiratory and olfactory function. Although available biotics have been recently reported to have therapeutically effects on the refractory ECRS and/or asthma, corticosteroids (steroids) still play an important role in the postoperative recurrence of nasal polyposis. The purpose of this study was to clarify the indications for sinonasal topical steroid treatments, and to evaluate its therapeutic effects in postoperative ECRS patients.

Method. Between January 2016 and February 2020, 30 adult patients (22 men and 8 women; median age: 48 years, age range 28-75 years) with ECRS who underwent bilateral primary functional endoscopic sinus surgery (FESS) were retrospectively enrolled in this study. We investigated postoperative courses in two groups: group A, patients who underwent sinonasal topical steroid treatment; and group B, control patients who did not.

Results. Group A was significantly younger than group B ($p < 0.01$), and the preoperative CT score was significantly higher in group A than in group B ($p < 0.05$). In the postoperative stage, the nasal symptoms questionnaire component of olfactory loss and the postoperative endoscopic appearance score were significantly worse in group A than in group B ($p < 0.01$).

Conclusion. These data suggest that younger adult, more severe rhinosinusitis in the pretreatment stage, and postoperative olfactory loss led to the need for sinonasal topical steroid treatment to prevent relapsing inflammation after FESS in ECRS patients.
EP-9  Mepolizumab therapy on eosinophilic chronic rhinosinusitis associated with asthma

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Background: Eosinophilic chronic rhinosinusitis (ECRS), which is characterized by the accumulation of eosinophils in nasal polyps, is a refractory rhinosinusitis that is often associated with asthma. Although appropriate operation and post-operative management are necessary, there are currently no well-established treatments for this condition. The optimized asthma treatment is critical for management of ECRS. In Japan, an anti-IL-5 monoclonal antibody, mepolizumab, was approved for the treatment of severe asthma in 2016, and there are increasing numbers of evidence about its efficacy on eosinophilic asthma. However, there are only a few previous reports that show the efficacy of mepolizumab on ECRS associated with severe asthma.

Method: 12 patients with ECRS associated with severe asthma received mepolizumab therapy for at least 16 weeks. They were evaluated by nasal symptom VAS scale, nasal polyp score (NPS), Lund-Mackay system score (LMS), and number of peripheral blood eosinophils before and after receiving mepolizumab.

Results: NPS, LMS and the number of peripheral blood eosinophils were significantly improved after the initiation of mepolizumab. Some cases showed the dramatic improvement of nasal symptom VAS scale, but significant improvement was not recognized in all cases.

Conclusions: Anti-IL-5 therapy might be an additional treatment choice for ECRS associated with severe asthma.

EP-10  Combination flap technique for choanal atresia

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Choanal atresia is a congenital malformation showing obliteration or narrowing of nasal choanae. Recommended therapeutic options are suggested to perform surgical treatments using endoscopic technique: transnasal puncture or endoscopic resection with flap technique, but there is no clear consensus in the choice of above two surgical methods, as long-term outcomes including complication rate of restenosis should be affected by growth of patients. On the contrary, restenosis of created hole in sinus surgery is also suggested to be induced by scarring and/or synechia formation in surgical area, especially in exposed bone. Therefore, covering flap technique for exposed bone is well-recommended to reduce scarring and/or synechia formation in sinus surgery such as modified Lothrop procedure and nasoantral window formation etc. In the endoscopic resection of choanal atresia, there are mainly two flap techniques: 1) cross-over flap technique, which covers exposed septal bone surface located in vertical area, 2) single side-hinged flap technique, which covers horizontal surface of punctured choanal mucosa. We performed endoscopic resection with novel combination flap technique modifying above two techniques to cover exposed bone and mucosa in two choanal atresia cases, and experienced long-term good results. The combination flap technique would pave the way for good patency of atresia as reducing scarring and/or synechia formation.
EP-11 A study of the efficacy on surgical treatment for allergic rhinitis

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Objective: Allergic rhinitis (AR) is an endemic disease affecting a large proportion of Japan’s population. According to the Japanese Guidelines for AR, surgical treatment is recommended for severe AR with nasal obstruction. The aim of this study was to evaluate the indications for surgical treatment in AR patients.

Methods: This retrospective cohort study involved 43 patients who underwent submucosal inferior turbinectomy combined with selective posterior nasal neurectomy and nasal septoplasty between 2013 and 2018. We evaluated the patients’ nasal/eye symptoms, quality of life (according to guidelines), and nasal cavity volume by acoustic rhinometry and fractional exhaled nitric oxide as indications of eosinophilic airway inflammation. We compared the data before and after surgery. In addition, during the Japanese Cedar Pollen (JCP) dispersal season of 2019, in which large amounts of pollen were dispersed, the postoperative group was compared with a control group who received preseasonal prophylactic treatment, a group treated with sublingual immunotherapy (SLIT) with JCP for 1 year (SLIT1), and a group treated with SLIT for 5 years (SLIT5).

Results: Nasal symptoms and quality of life were improved significantly after surgery. In the JCP dispersal season of 2019, symptoms in the postoperative group were significantly decreased compared with those in the initial therapy group and SLIT1 group; however, they were equivalent to those in the SLIT5 group.

Conclusion: This study suggested that surgical treatment is suitable for patients with severe allergic rhinitis who have perennial nasal obstruction and need to improve symptoms early.

EP-12 Study of allergic rhinitis in atopic individuals and diagnostic significance of nasal eosinophilic count

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Background: Recently, increasing prevalence of allergic rhinitis in children has been the major health concern in Japan. Present study mainly emphasizes the changing sensitization in atopic paediatric group and their subsequent development of allergic rhinitis. This study also analyses the significance of nasal eosinophil count as a routine diagnostic tool for allergic rhinitis.

Methods: This study was conducted for a group of 264 atopic paediatric individuals whose parents had some allergic diseases. All of them were examined by an otolaryngologist and a paediatrician in Chiba University. Serum concentrations of specific-IgE were analysed at the ages of 1, 2, 5 and 7 years and their sensitization patterns were evaluated. Nasal eosinophil counts of all the above ages were analysed for their sensitivity and specificity in diagnosis of allergic rhinitis.

Results: It was observed that mites s-IgE was increasing from 7% to 57% at 1 and 7 years, respectively. The development rate of allergic rhinitis induced by mites has also shown increase from 2% (1yr) to 36% (7yr). Sensitivity and specificity of nasal eosinophil counts for diagnosing allergic rhinitis were 96% and 17% respectively at 1 and 2 years. Accuracy of these eosinophil counts as a predictive for diagnosis of allergic rhinitis was almost same in 7 years.

Conclusion: Sensitisation to mites and development rate of allergic rhinitis were significantly increasing with age. Nasal eosinophilic counts certainly had a significant role in diagnosing allergic rhinitis, however, the specificity was low.
EP-13  Perspicuous treatment algorithm for pediatric blowout orbital fractures

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Aim: Pediatric blowout orbital fractures occasionally include cases that require urgent treatment to prevent serious sequelae. Sometimes physicians cannot confirm findings because pediatric patients may not be cooperative with examinations. Hence, we advocate for a simple, practical treatment algorithm for pediatric blowout orbital fractures. The oculocardiac reflex and missing rectus sign are especially emphasized as signs of an emergency. According to the algorithm, patients with these signs should undergo urgent release, even without a Hess screen test.

Methods: This retrospective cohort study included patients with pediatric blowout orbital fractures treated at Japanese Red Cross Asahikawa Hospital from April 2000 to August 2020 based on the algorithm. At follow-up, ocular movements were evaluated based on percentage of Hess area ratio (HAR%) and subjective diplopia. Patients were divided into two age groups: 0–12 years and 13–18 years. Differences in the frequency of urgent cases and HAR% were compared across groups.

Results: There were 9 patients who underwent urgent release, 16 who underwent repair, and 36 who underwent conservative treatment. Mean age was 13.10 ± 3.72 years. HAR% on follow-up was 98.0% ± 4.7% (range, 77.6%–100%). Postoperative diplopia was observed in 4% of patients. More patients aged 0–12 years had urgent needs than those aged 13–18 years (p=0.0051). There were no differences in HAR% between the groups.

Conclusion: The algorithm is suitable for pediatric blowout orbital fractures.

EP-14  Pathophysiology of current odontogenic maxillary sinusitis and endoscopic sinus surgery preceding dental treatment

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Objective: The purpose of this study is to retrospectively investigate the pathophysiology of current intractable odontogenic maxillary sinusitis (OMS) and the role ESS, especially ESS preceding dental treatment, plays in its pathophysiology.

Methods: Ninety-seven adults who underwent ESS for intractable OMS were retrospectively examined.

Results: In 85 cases (87.6%), causative teeth were periapical lesions after root canal treatment (endodontics). The root canal procedures were not sufficient; hence, the root-canal-treated teeth had periapical lesions causing OMS. The ciliated columnar epithelium with intractable OMS was not severely damaged and not irreversibly injured. In postoperative nasal endoscopy and CT scans for all patients, the natural ostiums and the membranous portions of the maxillary sinuses were enlarged and the ostiomeatal complexes remained widely open. Temporary acute sinusitis recurrence after primary ESS was observed in 10 cases (11.8%). However, since the ostiums were enlarged and the ostiomeatal complexes remained widely open, antibiotic administration alone without dental treatment cured the acute sinusitis. Regarding the causative endodontic treated teeth, 97.6% of them were able to be preserved with only antibiotic treatment and without dental retreatment. In two cases, extraction of the teeth was necessary because the teeth became mobile.

Conclusion: ESS is highly indicated for OMS requiring surgery. The treatment results are exceptionally good once the ventilation and drainage of the maxillary sinus is successfully restored after surgery. Consequently, ESS can be considered the first-line therapy for intractable OMS caused by root canal treatment (endodontics), followed by close dental follow-up and dental treatment when necessary.
EP-15  Analysis of symptomatic frontal sinusitis after endoscopic sinus surgery

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(background) The frontal recess is made up of ethmoid cells and has a very narrow and complicated drainage route. Occasionally, patients experience symptomatic frontal sinusitis after endoscopic sinus surgery (ESS) because of the obstruction of its drainage route. In this study, we addressed the cause of frontal sinusitis.

(methods) We retrospectively evaluated patients who underwent ESS between May 2020 and April 2021. Five patients presented with symptomatic frontal sinusitis after ESS. We compared the preoperative and postoperative computed tomography (CT) images.

(results) A total of seven sides showed evidence of frontal sinusitis in five patients. Two patients had bilateral frontal sinusitis. In postoperative CT images, an anterior wall of supra bulla cells remained of 2 sides, of supra bulla frontal cells did in 3 sides, and of supra agger frontal cells (T3) did in 1 case. One patient developed frontal sinusitis because of middle turbinate lateralization.

(conclusion) Incomplete resection of the anterior walls of supra bulla cells or supra bulla frontal cells caused frontal sinusitis after surgery. Hence, the size and localization of these cells should be determined before the operation.

EP-16  Modified endoscopic medial maxillectomy to overcome absent or limited prelacrimal recess

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Background: Endoscopic prelacrimal recess approach can be widely used in maxillary sinus lesion, orbit, and infratemporal fossa because it provides adequate access to the maxillary sinus. However, it is reported not feasible in cases with type I (<3mm) and absent prelacrimal recess (PLR). To overcome the limit, we proposed a modified endoscopic medial maxillectomy (MEMM) for these cases by preserving the function of inferior turbinate (IT) and nasolacrimal duct (NLD)

Material and Methods: Six consecutive patients (9 lesions) undergoing MEMMs were recruited. Categorization of PLR is based on the methodology proposed by Simmen. Pre- and post-surgical SNOT-22 and 10-point visual analog scales (VAS) were collected to assess the impact of MEMM on quality-of-life.

Results: Three out of 6 patients (4 males; mean age: 51.3 ± 9.4 year) had absent PLR, and the averaged AP diameter for the three type I PLR was 2.1 ± 0.7mm. We had nine lesions (7 MEMMs) because two patients had concurrent 2 pathologies and one had bilateral sinusitis. Three lesions (33.3%) were recurrent sinusitis, two lesions were inverted papilloma, and four lesions were mycetoma, cholesterol granuloma, fibrous dysplasia, and orbital tumor, respectively. After MEMMs, we found significant improvements in VAS ratings (from 6±4.69 to 0.4±0.55), nasal domain of SNOT-22 (18.4±14.77 to 1.80±1.92), and total SNOT-22 scores (from 33.2±23.38 to 10±15.49). There were no neurologic deficits and alar collapse.

Conclusion: We concluded that MEMM is an effective method in cases with limited or absent PLR. When short-term life-quality improvements were promising, future large-scale studies with longer follow-up periods are warranted to strengthen our findings.

Keywords: Prelacrimal recess, Endoscopy, Modified medial maxillectomy, VAS, SNOT-22
EP-17 Endonasal endoscopic closure for oroantral fistula- report of 2 cases
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Oroantral fistula (OAF) is not uncommonly seen after extraction of upper molar tooth. Though several promising techniques were proposed, combined procedures are usually necessary to close fistula as well as to treat sinusitis. However, when most of them mainly focus on transoral approaches with OAF repair, very few studies address single endonasal endoscopic surgery (ESS). In this investigation, we report our successful experience using ESS for two OAF cases who had uncontrolled sinusitis and persistent fistula after transoral repairs. The average size of OAF is 7.1mm (7.5mm and 6.7mm, respectively). We address the defects through modified endoscopic medial maxillectomy (MEMM) by preserving naso-lacrimal duct and inferior turbinate. After removing the diseased maxillary sinus mucosa, the fistulas were repaired by a free bone graft and a mucoso-osteal graft harvested from medial maxillary wall. Successful closures after a single procedure were achieved in both cases. No complication or recurrence was observed after 4-month follow-up. To conclude, we found single ESS through MEMM is feasible to salvage patients who have small-to-median sized OAF failed prior trans-oral repairs. Keywords: Oro-antral fistula, dental extraction, endoscope, modified medial maxillectomy, graft

EP-18 Olfactory dysfunction in an IgG4-related disease mice model
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IgG4-related disease is a systemic illness that is characterized by extensive infiltration of lymphocytes and IgG4-positive plasma cells, with fibrosis of various affected organs and elevated serum IgG4 concentrations. Our previous study revealed patients with IgG4-related disease experience olfactory dysfunction. LATY136F knock-in mice have been established as an IgG4-related disease model for pancreatic, kidney, and salivary gland lesions. This study examined whether LATY136F knock-in mice is an applicable IgG4-related model for the olfactory system. Behavioral tests to evaluate olfactory function showed that the LATY136F knock-in mice had a statistically significant level of olfactory dysfunction. Histological analysis showed that the thickness of the olfactory epithelium in these mice was thinner than that in the age-matched wild-type mice. Olfactory marker protein and growth-associated protein 43 expressions in the olfactory epithelium of the LATY136F knock-in mice were markedly lesser than those in the wild-type mice. In the olfactory epithelium of the LATY136F knock-in mice, the function of both newly differentiated and mature olfactory nerve cells were impaired.
EP-19  Efficacy of combination therapy using olfactory training and medication for post-traumatic olfactory dysfunction

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Post-traumatic olfactory dysfunction is a refractory disease and efficacious treatment is limited. Recently, olfactory training has been reported to be efficacious for sensorineural olfactory dysfunction. We previously reported that combination of olfactory training and medication using Tokishakuyakusan, zinc preparation and vitamin B12 had improved post-infectious olfactory dysfunction better than the medication alone. The present study was designed to investigate if the combination therapy is efficacious for post-traumatic olfactory dysfunction. A total of 47 patients with post-traumatic olfactory dysfunction were treated with either the combination therapy or medication alone. Olfactory function was assessed by Japanese standard olfactory function test using T&T olfactometry before and after the treatments. Curative ratio was 43% (6 of 14 patients) in the combination therapy group and 21% (7 of 33) in medication group although there is no significant difference between these two groups in all generations (p = 0.12). In young generation 35 years old and under, however, the combination therapy cured all patients’ olfactory dysfunction (100%, 4 of 4), which is significantly better than the medication group (26%, 5 of 19, p = 0.01). These results indicate that olfactory training can potentiate therapeutic efficacy of medication for post-traumatic olfactory dysfunction at least in young patients.

EP-20  Treatment with nasally administered adipose-derived stem cells from GFP transgenic mice in olfactory impaired mice

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Adipose-derived stem cells (ADSCs) express neurotrophic factors. In this study, we determined whether nasal administration of ADSCs from GFP transgenic mice increases recovery of odor aversion behavior and olfactory epithelium regeneration with increased neurotrophic signaling in olfactory impaired mice treated with methimazole, a toxic agent for olfactory epithelium.

The intrinsic odor aversion behavior to butyric acid was assessed before and after the methimazole intraperitoneal injection in C57BL/6J mice (male, 8W). The ADSCs or vehicle control (phosphate-buffered saline) were nasally administrated to the left nostril of mice 7d after the methimazole injection. Markers for olfactory neural cells and GFP were assessed by immunohistochemical staining in the epithelium of nasal septum.

The treatment with nasal administration of ADSCs significantly increased a recovery of odor aversion behavior to butyric acid in compared with the treatment of vehicle control at 7d and at 14d after the nasal administration of ADSCs or vehicle control. The OMP expressions in nasal epithelium were significantly increased in the mice treated with ADSCs than the control mice 14d after the nasal administration. The expressions of K1-67, MASH-1 or P-TrkA Tyr490 were significantly increased in nasal epithelium of mice treated with ADSCs, as compared to controls 24h after the nasal administration. GFP positive cells were shown in the treated-side nasal cavity of the mice 24h after nasal administration of ADSCs.

Nasal administration of ADSCs increases recovery of odor aversion behavior and olfactory epithelium regeneration with activation of TrkA signaling and increased globose basal cells in the olfactory impaired mice.
EP-21  Comparison of magnetic resonance imaging and computed tomography in the evaluation of the olfactory cleft and ethmoidal cell

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No study has examined whether magnetic resonance imaging (MRI) alone can be used for evaluating olfactory cleft and ethmoidal sinus in patients with olfactory disorders. Therefore, we analyzed the discrepancies between computed tomography (CT) and MRI in the imaging of the olfactory cleft and ethmoidal sinus. Patients who underwent CT and MRI within 30 days were evaluated. Age, sex, diagnosis, presence of bronchial asthma (BA), peripheral blood eosinophil percentage, and CT and MRI findings were retrospectively reviewed, and the sinuses were assessed on a scale of 0-3. Overall, 146 patients with 292 sinuses were enrolled. The ethmoid sinus score and the olfactory cleft score had 77.1% and 72.6% image similarity in CT and MRI. Sex and BA status were not associated with olfactory cleft score discrepancies (sex: p=0.52, BA: p=0.41). MRI scores tended to be rated higher than the CT scores as age increased, although this difference was not statistically significant (p = 0.09). The higher the peripheral blood eosinophil percentage, the more the magnitude by which the CT score tended to exceed the MRI score; however, this finding was also not statistically significant (p = 0.11). MRI scans should be limited to the evaluation of intracranial regions. Scans of olfactory cleft and ethmoid cells are not accurate for the assessment of olfactory dysfunction.

EP-22  Preoperative endovascular embolization in an easily bleeding respiratory epithelial adenomatoid hamartoma (REAH) of the olfactory cleft

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Respiratory epithelial adenomatoid hamartoma (REAH) was first described in 1995 by Wenig and Heffner and is a relatively recently established disease. REAHs are uncommon tumors occurring in the nasal cavity and sinuses, and their etiology is still unknown. The endoscopic diagnosis of REAH is difficult because of the frequent coexistence of common inflammatory polyps, and REAH is often misdiagnosed as nasal polyposis or other tumors. Preoperative endovascular embolization for sinonasal tumors is now widely recognized as an effective method to decrease blood loss, soften the tumor, and facilitate surgical procedures. However, to the best of our knowledge, there are no clinical reports of the requirement for preoperative endovascular embolization in the treatment of REAH. Here, we report a 70-year-old male with an easily bleeding REAH of the olfactory cleft, vascularized by branches of the bilateral internal and external carotid arteries. We removed the tumor endoscopically after preoperative endovascular embolization of the bilateral sphenopalatine arteries. Histological investigation showed an intratumoral hemorrhage accompanying the REAH, with no evidence of a residual or recurrent tumor during the last follow-up at 6 months. In conclusion, some REAHs may receive an abundant blood flow. Correct preoperative diagnosis and proper preoperative interventions such as endovascular embolization are needed for safe and sufficient treatment of REAHs with an abundant blood flow.
EP-23 Clinical study of tumors in the nasal septum

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Nasal septal tumors are rare diseases. We have experienced 56 cases of septal tumors in the last 10 years. The breakdown was 41 (73%) benign tumors and 15 (27%) malignant tumors, with many benign diseases. Pathological diagnosis was benign tumor (cavernous hemangioma 18 cases, papillary type 9 cases, polyp 5 cases, fibrous type 4 cases, polymorphic adenocarcinoma 2 cases, schwannoma 2 cases, inflammatory granuloma 1 case), malignant tumor (squamous epithelial cancer 7 cases, malignant melanoma 3 cases, hemangiopericytoma 2 cases, adenocarcinoma 1 case, adenoid cystic carcinoma 1 case, rhabdomyosarcoma 1 case). The chief complaint was epistaxis in 33 cases. Thirty-nine benign tumors were resected by endoscopic surgery. For squamous cell carcinoma, combined chemoradiation therapy was performed in 3 cases, resection by external incision was performed in 2 cases, and endoscopic resection was performed in 2 cases. Two cases of malignant melanoma underwent heavy ion radiotherapy. Endoscopic resection was performed in 1 case of adenocarcinoma, 1 case of adenoid cystic carcinoma, and 2 cases of hemangiopericytoma.

Endoscopic surgery was effective for benign tumors, and it was considered that there was no recurrence because the tumor could be resected with a secure margin.

SCC was found in some cases with a significantly advanced primary lesion, but the response to treatment was good. However, in some cases, diseases such as rhabdomyosarcoma and malignant melanoma died due to distant metastasis even if the primary lesion could be controlled.

EP-24 Impact of prior cancer history on the overall survival of patients with nasopharyngeal carcinoma

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Objective: Nasopharyngeal carcinoma (NPC) is a common cancer and the mainstay treatment is radiotherapy and chemotherapy. If a prior cancer history can affect the survival of NPC patients is still unclear.

Methods: We retrospectively collected 666 patients with NPC from 2006 to 2018. Patients in this study were divided into two groups: those patients with a prior cancer history and those without a prior cancer history. We then analyzed the demographic data and survival of these two groups.

Results: We identified 25 NPC patients with a prior cancer history in our case series. In univariate analysis, NPC patients with a prior cancer history had older age \(P < 0.05\), compared with those without a prior cancer history. In patients with stage III NPC, having a prior cancer history leads to a poor prognosis. In cox regression analysis, old age and a prior cancer history were independent predictors of poor prognosis.

Conclusion: We found that prior cancer history could lead to poor prognosis in stage III NPC.
EP-25  Accuracy of intraoperative frozen section diagnosis of laser assisted endoscopic nasopharyngectomy in recurrent nasopharyngeal carcinoma

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Background: The treatment options of locally recurrent nasopharyngeal carcinoma (rNPC) include re-radiation and salvage nasopharyngectomy. Intraoperative consultation with frozen section is important in evaluation of adequate surgical margins of H&N tumor excision. Nevertheless, it is believed that frozen section analysis is less accurate in recurrent NPC compared to other H&N tumors. In addition, laser and electrocoagulation assisted resection increases the difficulty of accurate intraoperative diagnosis.

Methods: Patients with rNPC who had underwent endoscopic laser assistant nasopharyngectomy were enrolled from year 2010 to 2021. Results of intraoperative consultation of resection margins were reviewed and analyzed.

Results: A total of 32 NPC patients were enrolled for this study. Four patients were excluded from this study due to no intraoperative consultation. A total of 151 comparative sets of frozen section and permanent results were used for analyses. The accuracy of intraoperative consultation was 94.03%. The sensitivity, specificity, positive predictive value, and negative predictive value were 36.36%, 99.19%, 80%, and 94.57%, respectively.

Discussions: Only one study from Hong Kong investigated the efficacy of frozen section analysis for nasopharyngectomy of rNPC. Current study demonstrates a comparable accuracy with a high negative predictive value of intraoperative consultation. Challenges of intraoperative consultation of nasopharyngectomy are radiation effects, crush and coagulation artifacts, and lymphoid infiltration of current tumor entity.

Conclusion: Our study provided evidence of value in frozen section consultation for nasopharyngectomy. The high negative predictive value of frozen section provides surgeons helpful information in determining adequate margins intraoperatively.

EP-26  Extracranial trigeminal schwannoma in the pterygopalatine fossa successfully resected by endoscopic modified medial maxillectomy approach

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Tumors in the pterygopalatine fossa (PPF) are rare, and the most common cases are benign neurogenic tumors such as schwannoma. We report a rare case of schwannoma arising from the extracranial trigeminal nerve (the greater palatine nerve) in the left PPF. Endoscopic medial maxillectomy (EMM) had been used as endoscopic surgical approach for the tumor in the maxillary sinus. However, this procedure sacrifices the inferior turbinate and the nasolacrimal duct. Recently, endoscopic modified medial maxillectomy (EMMM) was newly developed to preserve inferior turbinate and nasolacrimal duct. We applied EMMM approach for the resection of PPF schwannoma. Preoperative transcatheter embolization of the left sphenopalatine artery and intraoperative CT-guided navigation system were useful for the safe and complete resection. Postoperative hypoesthesia was found around his left hard palate, but no other complications were observed. No local recurrence has been observed in 3 years follow-up period. EMMM approach with a CT-guided navigation system is useful for the surgical resection of benign PPF tumors.