

Dear Doctor,

Greetings from Micro Labs. We are happy to bring you "Allergy Newsletter" which contains latest and interesting news in the field of Allergy.

This issue contains:

- 1. Risk factors for postoperative relapse in chronic rhinosinusitis with nasal polyps**
- 2. Impact of platelet-rich plasma on recurrence and healing of sinonasal polyps after endoscopic sinus surgery**
- 3. Usefulness of nasal allergen provocation test in individuals allergic to hen's egg white allergens**
- 4. Case series on Endoscopic treatment of different isolated sphenoid sinus diseases**

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Looking forward to your valuable feedback

Best Regards,

Medical Team, Micro Labs Ltd

Risk factors for postoperative relapse in chronic rhinosinusitis with nasal polyps

Introduction

Chronic rhinosinusitis (CRS) is an inflammatory condition of the upper airway that primarily affects the nasal cavity and sinus mucosa. It is classified as CRS with nasal polyps (CRSwNP) and CRS without nasal polyps (CRSsNP) depending on the presence of nasal polyps.¹ It was estimated that between 0.5 and 4.0% of people suffer from CRSwNP worldwide.² Currently, the primary treatment option for CRSwNP is surgery. But there's a



chance of a postoperative recurrence, which makes the therapy more complicated. To mitigate the disease impact and economic burden on CRSwNP patients, healthcare practitioners must investigate postoperative recurrence risk factors and optimize CRSwNP therapy and management procedures. Eosinophilic cationic protein (ECP), a biomarker, and a heme enzyme called myeloperoxidase (MPO) are also used as indicators for the endotype diagnosis of CRS.³ Also, Immunoglobulin E (IgE) plays a crucial role in the pathophysiology of nasal polyposis.⁴ Eosinophil activation and its accumulation at inflammatory areas are mediated by C-C motif chemokine ligand 4 (CCL4).⁵ Despite their potential significance, few studies have looked into whether ECP/MPO, IgE, and CCL4 can predict postoperative relapse of CRSwNP and act as risk factors for recurrence. This study attempts to address this gap by examining biomarkers that can help avoid postoperative CRSwNP recurrence.³

Methods

This retrospective study was carried out among 270 CRSwNP patients who received surgical treatment where 230 patients were allocated to the non-relapse group and 40 instances to the relapse group. Individuals who met the CRSwNP and Davos scoring criteria and were at least 18 years old underwent endoscopic sinus surgery, had intact clinical data and case records, and had not taken any drugs for four weeks previous to the procedure were included. Patients with fungal sinusitis, polyps in the nose of the posterior maxillary sinus, a history of endoscopic sinus surgery, compromised heart, lung, or kidney function, infectious illnesses, or immune system disorders were excluded. Serum samples were taken from both groups prior to surgery to assess ECP/MPO, IgE, and CCL4. Receiver operating characteristic (ROC) curves were utilized to assess these markers' predictive potential for postoperative relapse in CRSwNP patients. The association between these variables and postoperative relapse was examined using Spearman's correlation coefficients. Univariate and multivariate analyses were used to determine factors affecting postoperative relapse of CRSwNP.

Results

ECP/MPO, IgE, and CCL4 were significantly greater in the relapse group than in the non-relapse group. The area under the curve (AUC) for predicting postoperative recurrence of CRSwNP by each indicator was about 0.800, while the combined detection's AUC was more than 0.900. There was a substantial positive connection between postoperative recurrence of CRSwNP and ECP/MPO, IgE, and CCL4. Upon univariate analysis, the Davos score of nasal polyps, smoking history, postoperative infection, ECP/MPO, IgE, and CCL4 were all substantially associated with the postoperative relapse of CRSwNP. By multivariate analysis, ECP/MPO, IgE, and CCL4 were found to be independent risk factors for postoperative recurrence of CRSwNP. Furthermore, a nomogram for predicting the postoperative relapse risk of CRSwNP was formulated based on the binary Logistic regression analysis. The total score ranged from 0 to 550 points, allowing prediction of the postoperative recurrence risk of CRSwNP within a range of 10%-90%. (Figure 1).

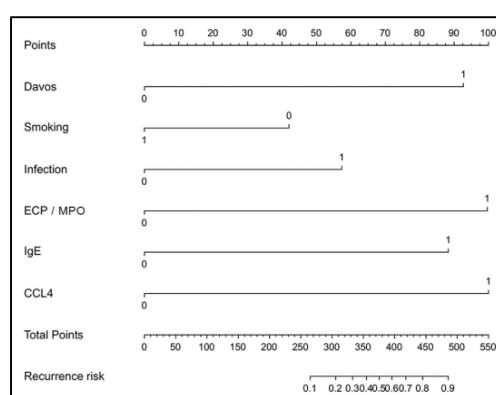


Figure 1. Nomogram for postoperative relapse risk of CRSwNP

Discussion

The serum levels of IgE, CCL4, and ECP/MPO in relapse group were abnormally higher than those of the non-relapse group. This suggests that these markers may be involved in the pathological course of CRSwNP and contribute to its postoperative recurrence. The greatest predictive performance was shown by IgE, which was followed by CCL4 and ECP/MPO.³ Similar to the results of this study, Zheng M et al. revealed that the relapse group had significantly higher levels of ECP/MPO, IgE, and CCL4 than the non-relapse group; additionally, IgE showed the highest sensitivity (82.4%) in predicting CRSwNP recurrence, and ECP/MPO presented the highest specificity (83.7%).⁶

Conclusion

ECP/MPO, IgE, and CCL4 are all reliable indicators of postoperative relapse in CRSwNP patients and combining them can improve prediction accuracy even further. These indicators have a strong and positive correlation with postoperative relapse and serve as risk factors for recurrence.

Early detection of ECP/MPO, IgE and CCL4 could predict and prevent the recurrence of CRS with nasal polyps after surgery.

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Impact of platelet-rich plasma on recurrence and healing of sinonasal polyps after endoscopic sinus surgery

Introduction

Chronic rhinosinusitis with nasal polyps (CRSwNP) is a condition characterized by thickening of the paranasal sinus and nose mucous membranes that persists for more than three months. Individuals with CRSwNP have a greater burden of chronic rhinosinusitis (CRS) symptoms and a higher chance of recurrence following either medication or surgery, according to empirical study.¹ Nasal polyps does not react to standard treatments, where surgery is the main and most successful treatment option. Endoscopic sinus surgery (ESS) is a procedure that restores normal nasal and sinus function by enhancing mucus circulation and allowing anti-inflammatory medications to be administered directly to the operative site. Despite the high level of satisfaction and overall improvement in symptoms with ESS, a considerable proportion of patients (23–87%) require revision surgery due to the reappearance of polyps.² Platelets are employed in a variety of pain-relieving treatments and aid in haemostasis, wound healing, and scar reduction. Platelet Rich Plasma (PRP) has lately been investigated by otolaryngologists in relation to ESS, cerebrospinal fluid rhinorrhea repair turbineoplasty, and tympanoplasty.³ This study evaluated the effect of PRP on the healing and recurrence of sinonasal polyposis after functional endoscopic sinus surgery (FESS).⁴

Methods

This was a prospective randomised controlled clinical study carried out among 40 patients with CRS, either with or without polyps, who had headaches, face discomfort, nasal blockage, and discharge for a minimum of 12 weeks. The diagnosis was confirmed by a computed tomographic (CT) scan of the nose and paranasal sinuses, as well as a nasal endoscopy. Patients who were above the age of 18 but under 60 years, had CRS symptoms for more than three months, and had endoscopic evidence of polyps and/or mucosal abnormalities on a CT scan were included. Those with history of asthma, aspirin sensitivity, cystic fibrosis, congenital mucociliary issues, systemic vasculitis, immune deficiency, allergic fungal rhino-sinusitis,

patients with uncontrolled systemic diseases or coagulopathy, and patients who had previously had sinus surgery were excluded. The patients were divided into two equal groups. The first group consisted of 20 CRSwNP patients who received functional ESS and a PRP injection in the lateral nasal wall. The second group consisted of 20 CRSwNP patients who received just functional ESS. The Sino-Nasal Outcome Test (SNOT-22) was used to assess patients' symptoms and quality of life, followed by Lund-Kennedy ratings at four, three, and six months postoperatively. Endoscopic examination evaluated polyp recurrence.

Results

After surgery, both groups' SNOT-22 and Lund-Kennedy scores improved. But Group 1 showed noticeably more progress than Group 2 after three months (median Lund-Kennedy score: 4.0 vs. 6.0, $p < 0.001$) and six months (median Lund-Kennedy score: 4.5 vs. 6.0, $p < 0.001$). Furthermore, Group 1 observed a much greater percentage change in Lund-Kennedy scores (median 40.18% vs. 14.29%, $p < 0.001$). In addition, Group 1 showed a greater median percent improvement (90.91% vs. 43.65%, $p < 0.001$) and a significant decrease in SNOT-22 scores at 6 months (median score: 7.0 vs. 45.0, $p < 0.001$). Relapse rates at six months were significantly lower in Group 1 (15.0%) than in Group 2 (50.0%) ($p = 0.018$) (Figure 1).

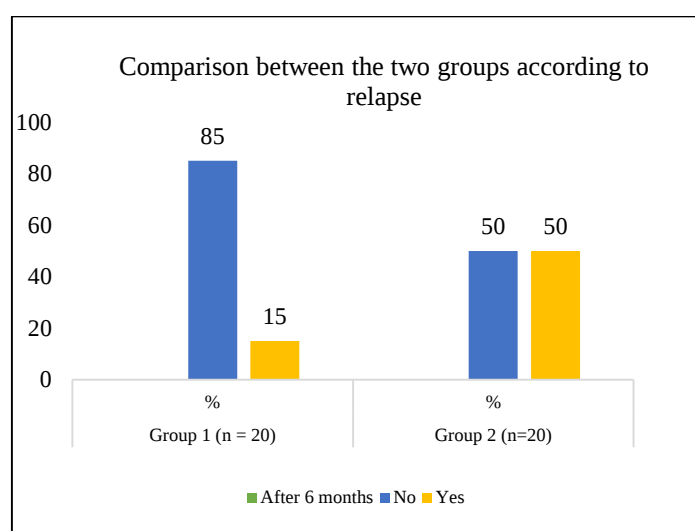


Figure 1. Comparison between the two studied groups according to relapse.

Discussion

Due of its autologous nature, PRP is a unique product that is increasingly being utilised almost without any problems or negative effects. At six months, PRP therapy was still reducing nasal polyps and improving the patients' clinical results. Over a six-month period, the PRP continued to reduce oedema, discharge, and general endoscopic discomfort.⁴ These results are in line with recent studies assessing PRP in CRSwNP and demonstrated comparable pre-operative features and a significant reduction in symptoms six months following PRP treatment.⁵

Conclusion

For individuals with CRSwNP, PRP injection during FESS significantly improves clinical outcomes and decreases the recurrence of sino nasal polyps. According to these findings, PRP shows as a potential adjuvant therapy to improve surgical results and lessen medical expenses related to recurrent sinonasal polyposis.

PRP promotes tissue healing and reduces inflammation thereby prevent the recurrence of Sinonasal polyps after surgery.

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Usefulness of nasal allergen provocation test in individuals allergic to hen's egg white allergens

Introduction

Food allergy (FA) is a major clinical issue because of its rising frequency and pathomechanism, which involves a complex interplay of genetic, epigenetic, and environmental variables.¹ On average, 13% of adults and 12% of children report having FA symptoms. Sensitisation to peanut allergens is reported by 0.6% of patients, 3% for milk, 1% by hen's egg, 0.6% for fish, and sensitisation to shellfish by 1.2% of patients.² The problem of hen's egg white allergy primarily affects children in infancy and early childhood, where the incidence of sensitization to this allergen is estimated at 16.5%, with diagnosis confirmed by an oral food challenge including the allergen in 8.9%. Nearly 3% of the general population has been diagnosed with hen's egg white allergy, which is associated with symptoms of FA as determined by skin prick tests or sIgE expression assays.³ Nasal allergen provocation test, an essential component for the diagnosis of allergies which got triggered by environmental factors. The possibility of using this technique to diagnose food allergies has received more attention lately. This study aimed to determine the beneficial role of NAC for the patients who were allergic to hen's egg white allergens.⁴

Methods

A total of 57 participants were included in the study, comprising 32 patients who were allergic to hen's egg white allergens and 25 healthy controls, who were free of allergies and had not become sensitised to any allergens. Patients with positive skin prick tests for hen's egg allergies were included. Those with a history of anaphylactic shock, external nasal deformities and nasal cavity structural abnormalities, atrophic rhinitis, recent vaccinations, surgeries performed within the last eight weeks, acute upper respiratory tract infections that were active or had occurred within the 4 weeks prior to the study, uncontrolled asthma, severe systemic conditions, and systemic immunotherapy were excluded. Hen's egg white allergen is used in the nasal allergen provocation test, which is evaluated by measuring the levels of tryptase and sIgE in nasal lavage fluid, as well as by utilising the visual analog scale (VAS) and optical rhinometry (OR).

Results

The severity of nasal symptoms and flow rates measured by OR significantly increased with increasing doses of the hen's egg white allergen used in the Nasal Food Challenge (NFC). Nasal obstruction was the most common symptom measured by the VAS, and it was most noticeable in the individuals who were allergic to hen's egg protein (mean 5 cm, range: 2–7 cm on the VAS) when 100 µg vs. control group. Prior to the subjective complaints as assessed by the VAS scale being reported (i.e., beginning 30 minutes into the study), there were significant differences in nasal patency as determined by OR compared to the control group. Variability in blood flow inside the blood vessels was found to differ between the study group and the control group, with values of 0.03, 0.04, 0.06, 0.20, 0.31, and 0.34 OD and –0.01, 0.01, 0.01, 0.01, 0.05, and 0.04 OD, respectively (Figure 1). In the analysis of symptoms as measured using the VAS scale, the study groups differed in terms of nasal itching at 30 min (AUC=0.4752), 45 min (AUC=0.7616), 60 min (AUC=0.9808), and 75 min (AUC=0.9984); for nasal discharge, the AUC values were 0.224 at 30 min, 0.712 at 45 min, 0.976 at 60 min, and 0.9952 at 75 minutes into the study. The highest difference between the study groups in terms of nasal blockage was noted 75 minutes into the investigation (AUC = 1).

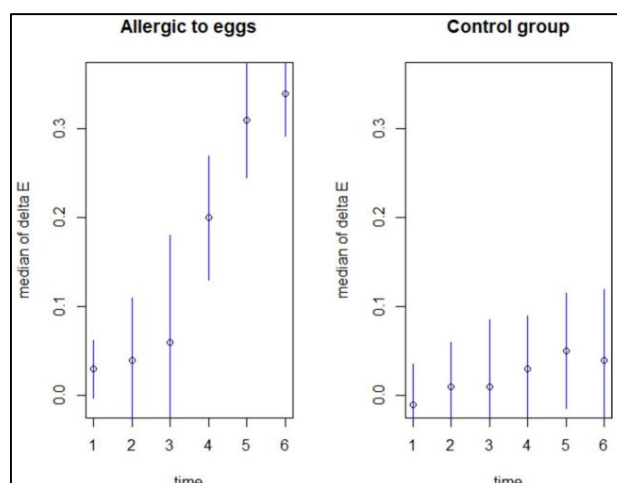


Figure 1. Objective assessment of changes in nasal patency as measured by optical rhinometry.

Discussion

The study highlighted that the nasal food challenge test is an effective diagnostic tool for detecting the allergy, thereby providing an alternative tool for oral food challenge methods. The result also showed a moderate nasal response ($\Delta E=0.34$ OD) in optical rhinometry, proving that reactivity can be measured in allergic individuals while maintaining a strong safety profile with no severe reactions.⁴ In another study, a nasal allergen provocation test was carried out against shellfish allergy and found similar specificity and sensitivity to NFC, thereby promoting it as a diagnostic method for detecting food allergies.⁵

Conclusion

For patients with food allergies, a nasal food challenge using the hen's egg white allergen is a useful diagnostic alternative. More attempts at standardizing the procedure are necessary because there haven't been enough studies conducted thus far.

Nasal food challenge provides a valuable diagnostic insight with minimal risk, thereby improving the testing methods for allergens.

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Case series on Endoscopic treatment of different isolated sphenoid sinus diseases

Introduction

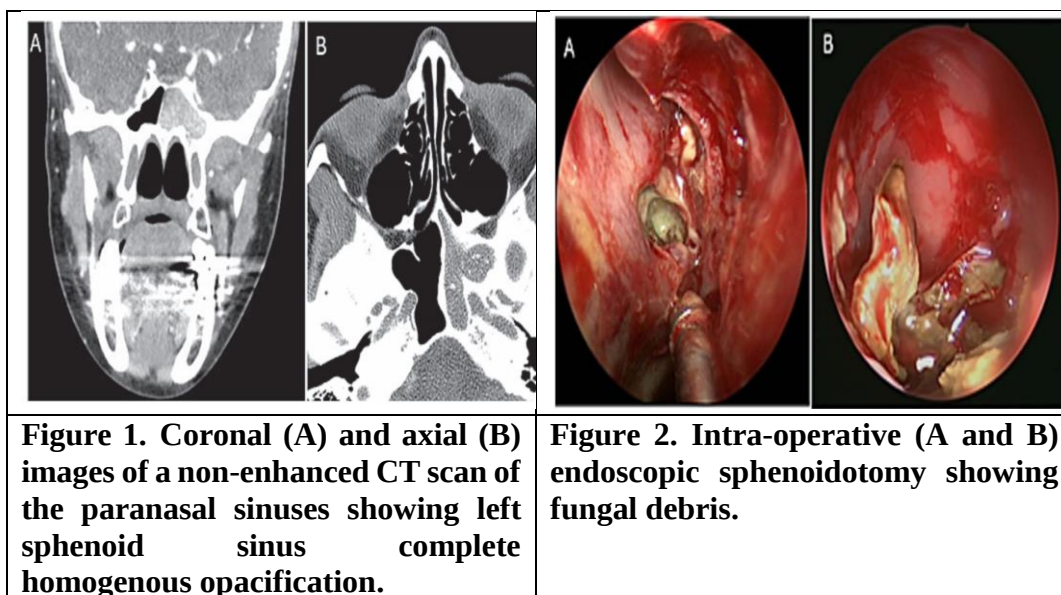
Isolated sphenoid sinus disease (ISSD) is a rare condition that accounts for around 3% of all occurrences of sinusitis. Headache is a prevalent first symptom that accounts for 65.8% to 69% of individuals.¹ Invasive and non-invasive disease, such as acute fulminant invasive fungal sinusitis, fungal ball, and allergic fungal sinusitis (AFS), are included in the histopathological categorization. Because of the anatomical location of the sphenoid and its proximity to important structures like the cavernous sinus, internal carotid arteries, cranial nerves II, III, IV, V1, V2, VI, pituitary gland, and dura mater, the sphenoid disease can result in serious

complications like blindness, diplopia, or potentially fatal infection if treatment not received.² The diagnosis is made using imaging tests such as computed tomography (CT) and magnetic resonance imaging (MRI), clinical suspicion, and nasal endoscopy. Choices for therapy anatomical structure of the sphenoid sinus, the extent of the operation, and the location of the sickness are all determined via endoscopic surgery.³ Endoscopic transnasal sphenoethmoidectomy reduces blood loss and surgery time by effectively treating a variety of sphenoid sinus disorders. So, the case series demonstrated how various isolated sphenoid fungal diseases can be managed endonasally.⁴

Case Presentation

Case 1:

A 36-year-old male who had no prior medical history arrived at the otolaryngology clinic complaining of a headache that was accompanied by pressure, primarily in the occipital region. A post-nasal drip was also noted by him. A single sphenoid sinus homogeneous opacification, most likely a sphenoid fungal ball, was seen on the patient's non-contrast paranasal sinus CT scan (Figure 1). In order to clean and remove the material, endoscopic sphenoidotomy was used, confirming the diagnosis of a sphenoid sinus fungal ball (Figure 2).



Case 2:

A 42-year-old asthmatic patient who had no discernible improvement from prior medical treatment for allergic rhinitis. On a follow-up CT scan, isolated sphenoid sinus illness was seen (Figure 3). Endoscopic results during surgery showed fungal muck and mucus (Figure 4A and B), but post-operative endoscopic findings showed a clean, widely open sphenoid sinus. The specimen's subsequent histological analysis confirmed the diagnosis of eosinophilic AFS.



Figure 3. Coronal CT scan image showing complete sphenoid sinus heterogeneous opacification.

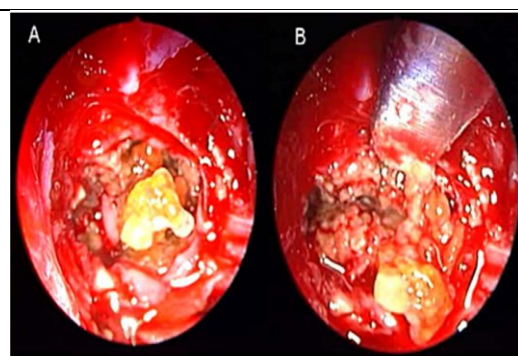


Figure 4. Intra-operative (a and b) endoscopic sphenoidotomy showing mud and mucin.

Case 3:

A 69-year-old woman with diabetes was referred to neurology because she was experiencing retro-orbital pressure, diplopia, and a severe headache that started suddenly. An initial CT scan and a follow-up MRI scan revealed infiltrative sphenoid pathology affecting the cavernous sinus and skull base, with a provisional diagnosis of acute invasive fungal sinusitis (Figure 5). The endoscopic debridement and histopathological analysis were done on sphenoid sinuses to diagnose and confirm the Invasive sphenoid sinus mucormycosis.



Figure 5. (A) Coronal CT; (B) MRI and CT image guided intra-operative; (C) images of the paranasal sinuses showing aggressive sphenoid sinus disease extending to the skull base and cavernous sinus.

Discussion

The isolated sphenoid sinus may host a wide range of fungal infections, both invasive and non-invasive. Understanding the differences among these conditions is critical for accurate diagnosis and therapy. Typically, the diagnosis of SSFB is made by CT, which reveals distinguishing characteristics such as opacity, central microcalcification, and possible bone wall changes. Histological investigation confirms the presence of fungal components without evidence of tissue invasion.⁴ A similar study also showed that Endoscopic sphenoidotomy, the conventional surgical procedure for SSFB, includes eliminating all fungal material and has been demonstrated to be curative. There is a minimal chance of recurrence and a good overall

prognosis following surgery.⁵ In the second case, the pathophysiology of AFS is a complex interaction between elevated IgE levels, type I hypersensitivity, and maybe *Staphylococcus aureus* superantigens. Post-operative oral corticosteroids are often used following the surgical excision of allergic mucus and sick tissue. While allergen immunotherapy may help prevent relapses, systemic antifungals are not recommended in AFS. In the third case, the abrupt invasion might cause major issues such as cavernous sinus thrombosis, blindness, and even death if treatment is not received. So, it requires therapy consisting of antifungal medication and thorough surgical debridement.⁴

Conclusion

Surgery is the primary treatment for non-invasive types of isolated sphenoid sinus fungal illnesses such as fungal ball and AFS; however, because the latter is chronic, continuous medical care is required. Conversely, invasive types, such as acute fulminant fungal sinusitis, need prompt medical and surgical treatment.

Depending on the illness type, different isolated sphenoid fungal diseases require different approaches to management, including early detection and appropriate treatment.

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