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Conservative Phytotherapeutic Management of Chronic Rhinosinusitis Post-FESS in Type II Diabetes Mellitus Patients

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Abstract: Chronic rhinosinusitis (CRS) in patients with type 2 diabetes mellitus (T2DM) poses a therapeutic challenge, especially in the postoperative period after functional endoscopic sinus surgery (FESS). Conventional therapy (corticosteroids, antibiotics, saline) often has limited efficacy and carries risks (e.g. steroid-induced hyperglycemia and antibiotic resistance). In this context, phytotherapy – the use of herbal medicinal agents – offers multimodal benefits (anti-inflammatory, antimicrobial, mucosal healing) with good tolerability. For example, Chinese herbal formulas (e.g. Biyuan Tongqiao granules) have been shown in meta-analyses to significantly improve symptoms and quality-of-life scores (SNOT-20, VAS) in CRS. Likewise, agents such as bromelain (a pineapple enzyme) and propolis (bee resin) have demonstrated enhanced mucosal healing and symptom relief in small trials. Here we review and propose a structured herbal regimen as an adjunctive conservative treatment after FESS in T2DM patients, summarizing evidence from clinical studies and discussing potential mechanisms. This approach aims to reduce inflammation, control infection, and promote mucosal regeneration without exacerbating glycemic control.

Keywords: phytotherapy; chronic rhinosinusitis; functional endoscopic sinus surgery (FESS); diabetes mellitus type 2; herbal medicine; mucosal healing

Introduction

Chronic rhinosinusitis (CRS) – defined by ≥12 weeks of nasal obstruction, discharge, facial pain, or olfactory loss – affects about 5–12% of the population. It imposes a severe quality-of-life and economic burden (in the U.S. an estimated direct costs of $10–13 billion annually). Standard first-line therapies include topical corticosteroids and saline irrigation; refractory cases may require systemic steroids, antibiotics, or surgery. However, these treatments have limitations. For example, systemic corticosteroids can worsen glycemic control in diabetics, while long-term antibiotics risk resistance and side effects. In many patients (especially those with comorbidities), symptom relief remains incomplete.

Patients with T2DM face additional challenges: chronic hyperglycemia impairs immune function and wound healing, increasing the risk of postoperative infection and delayed mucosal recovery. Functional endoscopic sinus surgery (FESS) can improve symptoms in diabetic and non-diabetic CRS patients alike, but even after surgery, optimal mucosal healing and infection control are essential. Diabetic CRS patients may not tolerate prolonged steroids or broad antibiotics, and they could benefit from safe adjunctive therapies.

For these reasons, **phytotherapy** has attracted interest as a postoperative adjunct. Herbal agents can exert anti-inflammatory, antimicrobial, mucolytic, and tissue-regenerative effects, often with fewer systemic side effects. In vitro and in vivo studies indicate many plants have beneficial effects on sinus mucosa (e.g. reducing edema, enhancing secretion clearance). Clinical studies in CRS (mostly non-diabetic patients) have reported symptomatic improvements with herbal formulas. A systematic review found that combined herbal–conventional therapy significantly improved endoscopic and CT scores

and mucociliary function compared to conventional therapy alone. These findings suggest that multi-component herbal medicines can effectively target the complex pathophysiology of CRS.

The aim of this work is to outline a conservative phytotherapeutic strategy for T2DM patients after FESS, integrating evidence-based herbal agents. We focus on botanicals with anti-inflammatory, antimicrobial, and mucosal-reparative properties beyond the well-known walnut bark, citing clinical studies where available.

Purpose of the Study

To evaluate the role and efficacy of combined herbal (phytotherapeutic) treatment in the conservative postoperative management of chronic rhinosinusitis in patients with type 2 diabetes mellitus after FESS.

Research Objectives

1. **Assess symptom improvement**: Determine the effect of herbal adjuvant therapy on sinonasal symptoms (measured by validated scores such as SNOT-20 and VAS) in post-FESS T2DM patients.
2. **Evaluate mucosal healing**: Examine whether herbal treatment accelerates nasal mucosal regeneration and reduces inflammation, using endoscopic scores (Lund–Kennedy), CT imaging (Lund–Mackay), and biomarkers.
3. **Monitor glycemic impact**: Ensure the herbal regimen does not adversely affect blood glucose levels or diabetic control.
4. **Compare safety and outcomes**: Compare the herbal-adjunct group to standard postoperative care (saline +/- antibiotics) in terms of complications (infection, adhesions) and patient quality of life.

Object and Subject of Research

The **object of study** is adult patients with chronic rhinosinusitis who have undergone FESS. Specifically, we focus on those with comorbid type II diabetes mellitus. These patients require careful postoperative management due to their predisposition to infections and delayed healing. The **subject of research** is the phytotherapeutic regimen applied in the postoperative period. This includes specific oral and topical herbal agents known for anti-inflammatory, antimicrobial, and wound-healing effects (e.g., standardized herbal extracts, compounds, or capsules), in conjunction with routine saline irrigation.

Materials and Methods

This structured approach draws on a combination of clinical trial design and evidence synthesis. In a hypothetical or review context, we consider:

- **Study design**: Prospective cohort or randomized controlled trial of diabetic CRS patients post-FESS. For illustration, we might enroll 50–100 adult patients (18–75 years) with controlled T2DM and confirmed CRS, who undergo standard FESS. Inclusion criteria include documented T2DM (on diet, oral agents or insulin) and CRS (with or without polyps) necessitating surgery. Exclusion criteria include immunodeficiency, aspirin-exacerbated respiratory disease, or poorly controlled diabetes (e.g. HbA1c >10%).
- **Interventions**: All patients receive standard postoperative care (nasal saline irrigations, analgesics). The **phytotherapy group** also receives a combination of herbal preparations: for example,

✓ *Oral Sinupret® or BNO 1016* (a dry extract combination of gentian root, primrose, sorrel, elderflower and verbena) twice daily. Sinupret has mucolytic and anti-inflammatory effects and was shown safe in CRS patients.

- ✓ *Bromelain tablets* (500 FIP units daily, as in Büttner et al.) for 3 months. Bromelain (pineapple stem extract) is known for anti-inflammatory and anti-edematous activity, providing a glucocorticoid-sparing effect. In a pilot study of post-surgery CRS patients, bromelain markedly improved symptom (TSS) and endoscopy (TRS) scores with excellent tolerability.
- ✓ *Propolis capsules* (e.g. 500 mg three times daily). Propolis (bee resin) contains flavonoids with potent anti-inflammatory, antioxidant and antibacterial properties. An animal study showed that systemic propolis significantly reduced nasal mucosal inflammation and enhanced healing of iatrogenic mucosal wounds.
- ✓ *Juglans regia (walnut) bark powder* nasal irrigations (0.5–1%), used twice daily. Walnut bark is rich in tannins with broad antimicrobial effects against bacteria and fungi. It also provides astringent and anti-inflammatory action on mucosa.
- ✓ *Topical herbal rinses* (e.g., chamomile tea or calendula decoction) used as adjunctive nasal washes for their soothing and anti-inflammatory effects.

Dosages and durations should follow manufacturer or traditional guidelines. Treatments are administered for 8–12 weeks postoperatively, based on prior study durations.

- ➢ **Outcome measures**: Patients are evaluated at baseline (pre-treatment), 2 months, and 6 months post-intervention. Key measures include:
- ✓ **Symptom scores**: Sino-Nasal Outcome Test (SNOT-20 or SNOT-22) and Visual Analogue Scale (VAS) for congestion, discharge, pain.
- ✓ **Endoscopic examination**: Lund–Kennedy scoring for edema, polyps, discharge at 2 and 6 months.
- ✓ **Imaging**: Sinus CT with Lund–Mackay scoring pre- and post-treatment (e.g. at 6 months).
- ✓ **Mucociliary function**: Saccharin transit test or rhinoscintigraphy.
- ✓ **Laboratory markers**: Blood tests for inflammatory markers (CRP, ESR, cytokines) and glycemic control (fasting glucose, HbA1c).
- ✓ **Microbiology**: Nasal swabs/cultures to detect residual or emergent infection.
- ✓ **Histology (if available)**: In research settings, turbinate or sinus biopsy samples can assess epithelial regeneration and neutrophil infiltration.

Laboratory and Instrumental Studies

Laboratory assays would track systemic inflammation and immune parameters. For example, ELISA assays for serum IL-6, TNF-α, or immunoglobulin levels could quantify anti-inflammatory effects of treatment. Nasal nitric oxide or cytokine levels in lavage fluid might also be measured. Instrumental studies include objective airflow (rhinomanometry), acoustic rhinometry for cross-sectional area, and measurement of nasal resistance.

Endoscopy and imaging are crucial: Lund–Kennedy endoscopy scores (grading edema, discharge, scarring) and Lund–Mackay CT scores (extent of opacification in sinus compartments) provide objective evidence of healing. In prior herbal vs control studies, these scores were significantly better in the herbal groups. For instance, the bromelain pilot showed improved Total Rhinoscopy Scores (TRS) after 3 months. Likewise, addition of Biyuan Tongqiao was associated with a significant reduction in endoscopic mucosal pathology on follow-up.

Scientific Novelty

This work addresses a niche yet clinically relevant scenario: **post-FESS conservative management in diabetic CRS patients**, an area with limited prior focus. While FESS outcomes in diabetics have been studied for symptom relief, and herbal treatments in general CRS have been reviewed, integrating these two aspects is novel. We propose combining several evidence-backed botanicals to target the specific needs of diabetic patients. By emphasizing mucosal regeneration and antimicrobial defense,

we aim to reduce reliance on steroids/antibiotics and exploit herbs' complementary mechanisms (e.g. tannins sealing tissue, proteases like bromelain reducing edema, flavonoids modulating immunity). The concept of a tailored "postoperative phytotherapy cocktail" for T2DM has not been previously formalized.

Scientific and Practical Significance

Implementing safe phytotherapy could significantly impact patient care. Diabetic CRS patients often have persistent symptoms and higher recurrence risk due to impaired healing. A multi-agent herbal regimen could accelerate recovery of the sinus mucosa, decrease residual inflammation, and lower the chance of synechiae and infection. Clinically, this might translate to fewer postoperative visits, reduced need for systemic medications, and better long-term control of CRS. The proposed approach also encourages holistic healing: for example, some herbs (cinnamon, fenugreek) modestly improve glucose metabolism, indirectly aiding diabetic control. Reduced steroid use would mitigate hyperglycemia. Additionally, confirming the efficacy of such regimens could broaden acceptance of integrative medicine in ENT practice. Given the large population with CRS and diabetes, positive results would have broad relevance.

Implementation into Clinical Practice

To apply these findings, otolaryngologists and primary care physicians should consider phytotherapeutic adjuncts as part of postoperative protocols for at-risk CRS patients. Practical steps include: obtaining high-quality standardized herbal preparations, educating patients on proper use (e.g. timing of doses, handling of nasal herbal rinses), and monitoring for interactions (though most herbs proposed have favorable safety profiles). Clinics could collaborate with integrative medicine specialists to formulate prescriptions. Training ENT practitioners on herbal medicine evidence can facilitate informed patient counseling. Adoption of this regimen would involve protocol changes: for instance, prescribing an herbal formula and bromelain along with routine care for diabetic patients after FESS. Outcomes should be tracked (e.g. symptom logs, repeat endoscopy) to ensure benefit. Over time, accumulating real-world data will refine which combinations work best for specific patient subgroups (with polyps vs without, varying diabetes control).

Conclusion

Conservative phytotherapy represents a promising adjunct in managing chronic rhinosinusitis following FESS, especially in patients with type II diabetes mellitus. Multiple botanicals – including herbal formulas (Sinupret, Biyuan Tongqiao), bromelain, propolis, walnut bark, and others – offer synergistic anti-inflammatory, antimicrobial, mucolytic, and regenerative effects. Clinical evidence, though limited, indicates improved symptom scores and mucosal healing without significant adverse effects. In diabetic patients, this approach may help overcome the limitations of steroids and antibiotics, reduce glycemic impact, and enhance tissue repair. Future prospective studies are needed to validate these protocols and optimize dosing; however, current data provide a rational basis for integrating phytotherapy into postoperative CRS care. By leveraging the therapeutic diversity of plants, clinicians can provide more comprehensive, personalized treatment that addresses both rhinosinusitis and the challenges of diabetes.

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