

# **GEORGIAN MEDICAL NEWS**

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ISSN 1512-0112

NO 5 (374) Май 2026

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ТБИЛИСИ - NEW YORK



**ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ**

Медицинские новости Грузии  
საქართველოს სამედიცინო სიახლენი

## GEORGIAN MEDICAL NEWS

Monthly Georgia-US joint scientific journal published both in electronic and paper formats of the Agency of Medical Information of the Georgian Association of Business Press.  
Published since 1994. Distributed in NIS, EU and USA.

**GMN: Georgian Medical News** is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

**GMN: Медицинские новости Грузии** - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

**GMN: Georgian Medical News** – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებშიდან.

### WEBSITE

[www.geomednews.com](http://www.geomednews.com)

## К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman (Кириллица)**, для текста на грузинском языке следует использовать **AcadNusx**. Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - <http://www.spinesurgery.ru/files/publish.pdf> и [http://www.nlm.nih.gov/bsd/uniform\\_requirements.html](http://www.nlm.nih.gov/bsd/uniform_requirements.html) В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректур авторам не высылаются, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

**При нарушении указанных правил статьи не рассматриваются.**

## REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or computer-printed on a single side of standard typing paper, with the left margin of 3 centimeters width, and 1.5 spacing between the lines, typeface - **Times New Roman (Cyrillic)**, print size - 12 (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: [http://www.nlm.nih.gov/bsd/uniform\\_requirements.html](http://www.nlm.nih.gov/bsd/uniform_requirements.html)  
[http://www.icmje.org/urm\\_full.pdf](http://www.icmje.org/urm_full.pdf)

In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

**Articles that Fail to Meet the Aforementioned  
Requirements are not Assigned to be Reviewed.**

## ავტორთა საქურაღებოლ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დაიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx**. შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შედეგის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფხიხლებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

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## ENDOSCOPIC ENDONASAL TREATMENT OF PRIMARY INVERTED PAPILOMA OF THE SPHENOID SINUS: A CLINICAL CASE

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### Abstract.

**Aims:** To describe a case of primary inverted papilloma of the sphenoid sinus and to illustrate the technical aspects of the endoscopic endonasal procedure with posterior septectomy, combining clinical and radiological findings.

**Study Design:** Clinical case report.

**Place and Duration of Study:** City Clinical Hospital No. 5, Dostyk Street 220, Almaty, Kazakhstan. From initial presentation to 6-months post-operative follow-up.

**Sample:** A 30-year-old male patient with 7 years of progressive sinonasal symptoms.

**Methodology:** The patient had nasal endoscopy, CT and MR imaging. The tumor was removed via endoscopic endonasal approach with posterior septectomy. The diagnosis was confirmed by histopathology.

**Results:** Endoscopic resection was performed without complications. Total operative duration was 95 minutes. Patient's intraoperative blood loss was 80 mL. There were no intraoperative or postoperative complications, no need for nasal packing beyond routine care, and no postoperative bleeding or infection. Headache decreased from VAS 7 to 0 within one week. Nasal obstruction decreased from VAS 8 to 0 by week two. Olfactory function recovered by week six. Six-month CT showed no evidence of recurrence.

**Conclusion:** Endoscopic surgery with a posterior septectomy demonstrates feasibility in the treatment of primary sphenoid sinus inverted papilloma in this case. Complete macroscopic resection was achieved without perioperative complications, need for transfusion, cerebrospinal fluid leak, visual disturbance, septal perforation, or prolonged hospitalization, and with no evidence of recurrence at six months, indicating short-term disease control.

**Key words.** Inverted papilloma, sphenoid sinus, endoscopic surgery, endoscopic surgical approach, posterior septal resection.

### Introduction.

An inverted papilloma (IP) is a tumor located in the sinonasal tract. More specifically, it is a benign tumor, although it can behave quite locally aggressively, has a significant chance of recurrence, and may undergo malignant transformation. Foundational works on IP surgery and its pathogenesis in the early twentieth century established the basis for current

endoscopic treatment and biological knowledge. The most important historical sources defined IP as a harmless but invasive and potentially malignant tumor; a paradigm shift from open to minimally invasive methods was subsequently introduced [1]. The inverted growth pattern was first described by Ringertz (1938). Pathogenesis has been associated with HPV dysregulation through subtypes 6/11 and 16/18, and p53/p21 [2].

Among all cases, about 5–15% experience malignant transformation, and the majority of cases have lesions with high-grade dysplasia or within the carcinoma in situ spectrum [3,4]. Recurrence rates vary depending on the surgical technique used. The recurrence rate of endoscopic resection is 12.8% on average, while external and combined approaches are associated with rates of 16.6% and 12.6%, respectively. This implies that the choice of surgical method is critical in tumor management [5]. Approximately 0.5–4% of all rhinosinusal tumors are due to IP, with an incidence of 0.2–1.5/100,000. Additionally, isolated sphenoid sinus involvement is reported in only 3–7% of all cases [6,7]. The most common origin of IP is the lateral nasal wall, whereas the maxillary and ethmoid sinuses are also common.

Similarly, epidemiological research in other disease domains also illustrate how incidence patterns and risk stratification inform clinical management; a population-based study in Kazakhstan showed an increasing incidence of gastric cancer (19.2–29.3 per 100,000) with low five-year survival (28.4%), further highlighting the need to identify areas for earlier diagnosis and selective treatment strategies with malignant potential [8].

However, IP is rarely attached to the nasal septum and is only seldom found in the frontal and sphenoid sinuses [9]. Traditional open approaches, such as medial maxillectomy, reduced recurrence rates from 80% (with intranasal approaches) to 30%; however, they were associated with considerable morbidity [10]. Diagnosing tumors of the sphenoid sinus remains challenging, as the presenting symptoms, including headache, nasal congestion, and nasal obstruction, are nonspecific and frequently mimic other conditions, resulting in delayed diagnosis.

Comparable challenges of delayed detection and nonspecific presentation are also observed in infectious disease settings, where large-scale studies have shown persistent disease burden due to environmental and management factors, such as high reinfection rates observed in parasitic diseases [11].

In a study examining the average time to diagnosis of sphenoid sinus disease, the average time was over 6 months [12,13]. Imaging is important to aid in the development of treatment plans. In most preoperative CT scans, there is bone hyperostosis at the site of tumor attachment which correlates with the intraoperative pedicle site 60 to 80% of the time, increasing to 80% in sphenoid sinus tumors [14]. On sphenoid sinus lesions, MRI may show a range of imaging signals which may include a modified “cerebriform” pattern on T2-weighted images and signals may range from low to high T1 and to high T2 [15].

Endoscopic resection was pioneered, with Wigand and Draf advancing it in Europe for limited disease. Modern prelacrimal approaches now improve maxillary access with relapse rates <10% [16]. Initially, open surgery was the approach used to address the removal of such tumors, but with the developments in functional endoscopic sinus surgery (FESS), endoscopic approaches have become favored due to advances in techniques. Compared to external approaches, endoscopic surgeries have lower rates of morbidity, and at times comparable, if not lower recurrence rates to external approaches, as well as shorter hospital stays [17,18]. A recent review in the literature for IP of the frontal sinus states that for endoscopic surgery, the recurrence rate is 14.7% compared to open and combination surgery which resulted in a 16.5% recurrence rate, thus reinforcing the trend for endoscopic surgery but underlining the importance of individualized surgery [19]. The surgery used in this scenario involved a posterior septal resection (posterior septectomy) to allow better access to the sphenoid sinus and provide a binostril, four-hand procedure. This enabled direct visualization of the lesion's attachment site and allowed complete resection with minimal trauma to the surrounding structures [20]. Endoscopic endonasal procedures are safe and reliable methods of accessing the sphenoid sinus to obtain biopsies or surgically

treat lesions; some studies have reported a reduction of up to 32% in tumor size after intervention [21]. This case is among the few reported cases of complete endoscopic resection of primary sphenoid sinus inverted papilloma with posterior septal resection, including a full operative technical description with improved visualization, bimanual dissection, and contralateral access. In addition to this, the case demonstrates unusual clinical characteristics such as a relatively long duration of symptoms, isolated sphenoid localization confirmed intraoperatively, and a rapid course of functional recovery. This report presents an atypical case of primary sphenoid sinus IP which was treated with endoscopic endonasal resection with posterior septal resection achieving complete excision with an excellent functional outcome and no recurrence at six months.

### Clinical Case Presentation.

A 30-year-old man was admitted to the otolaryngology department of City Clinical Hospital No. 5, 220 Dostyk Street, Almaty, Kazakhstan, presenting with bilateral nasal obstruction for many months, progressively decreased sense of smell and history of frequent rhinosinusitis (3-4 episodes of rhinosinusitis per year, requiring antibiotic therapy.) The patient also experienced occipital headaches multiple times per week, with an episode of 7/10 VAS lasting for several hours. Over the preceding seven years, symptoms had progressively worsened despite conservative management, including multiple courses of antibiotics, intranasal corticosteroids, and antihistamines. The patient has no significant comorbidities.

While the patient had reported a history of chronic bilateral nasal obstruction, endoscopic examination revealed additional anatomical contributors to nasal obstruction and mucosal hypertrophy in the posterior nasal cavity. The lesion in the sphenoid sinus extended to the posterior choanal region and

**Table 1.** Clinical and Diagnostic Summary of the Patient.

Category	Findings
Patient demographics	30-year-old male
Symptom duration	7 years
Chief clinical findings	Progressive bilateral nasal obstruction symptoms, progressive hyposmia, recurrent rhinosinusitis, occipital headaches
Endoscopic findings	Polypoid mass visualized in the sphenothmoidal recess protruding into the posterior nasal cavity; smooth surface, firm consistency
CT findings	Soft tissue mass (32 × 24 × 28 mm) within sphenoid sinus; medial wall displacement without bone destruction; focal hyperostosis at presumed attachment site
MRI findings	Mucosa-derived lesion with isointense T1 signal and heterogeneous T2 cerebriform (convoluted) pattern; moderate contrast enhancement; no orbital or intracranial extension
Preoperative diagnosis	Primary inverted papilloma of the sphenoid sinus
Surgical approach	Endoscopic endonasal excision with extended binostril endoscopic approach
Operative details	Complete tumor removal; operative time 95 minutes; estimated blood loss 80 mL
Attachment site management	Targeted bipolar coagulation of hyperostotic area to the depth of 2–3 mm beyond the visible margins
Histopathology	Inverted papilloma with multilayered inverted squamous epithelium, intact basement membrane, absence of dysplasia or malignancy, negative resection margins, mild chronic inflammatory stromal infiltrate
Postoperative recovery	Uneventful; hospital stay 2 days
Symptom resolution	Headaches resolved in 1 week; nasal breathing restored in 2 weeks; olfactory function fully recovered in 6 weeks
Follow-up imaging (6 months)	CT: clear sphenoid sinus, no residual or recurrent lesion
Endoscopic follow-up (6 months)	Healthy mucosa, patent sinus cavity, no pathological formations
Recurrence status	No recurrence detected at 6-month follow-up

would likely cause partial bilateral airflow compromise via mass effect and altered posterior nasal airflow dynamics, rather than complete mechanical obstruction.

The patient was selected for this report based on the rarity of isolated sphenoid sinus IP and the use of an endoscopic endonasal approach an extended binostril surgical corridor. Table 1 outlines the patient's clinical details and diagnostic results. The patient provided written informed consent for publication of this case report and accompanying images. Ethical approval for this study was obtained from the Administration of the Municipal State Enterprise on the Right of Economic Management "City Clinical Hospital No. 5", Public Health Department of Almaty, Almaty, Kazakhstan (administrative approval reference No. 314, April 6, 2026). The institution does not have a Local Ethics Committee; the clinical material was reviewed and approved at the administrative level in accordance with the principles of the Declaration of Helsinki of the World Medical Association.

During nasal endoscopy, a large, pale-pink, polypoid mass was identified in the sphenothmoidal recess, extending anteriorly into the posterior nasal cavity and causing partial bilateral airflow compromise, without involvement of the maxillary sinus ostium. Its surface was smooth, non-ulcerated, and of firm consistency. Figures 1 and 2 present preoperative CT imaging demonstrating the lesion and its sphenoid sinus origin.

A soft-tissue mass measuring  $32 \times 24 \times 28$  mm was located in the sphenoid sinus cavity on CT imaging, corresponding to a calculated tumor volume of approximately  $11.3 \text{ cm}^3$ . The sinus wall had medial displacement by 3 mm, without any bone destruction. Along the posterior wall of the sphenoid sinus, focal hyperostosis was noted, in line with the presumed attachment of the tumor. MRI revealed a well-defined mucosa-derived lesion that was isointense on T1-weighted images and demonstrated a heterogeneous cerebriform pattern on T2-weighted images with moderate contrast enhancement. There was no involvement of the orbit, the brain, or the cavernous sinus. A presumptive preoperative diagnosis of inverted papilloma of the sphenoid sinus was established on the basis of endoscopic and imaging findings. The preoperative workup included nasal endoscopy, CT, MRI, assessment of nasal obstruction severity using the NOSE scale, and olfactory evaluation using the Sniffin' Sticks test. Headache intensity was assessed using the Visual Analog Scale (VAS). Quality of life was measured with the Sino-Nasal Outcome Test (SNOT-22).

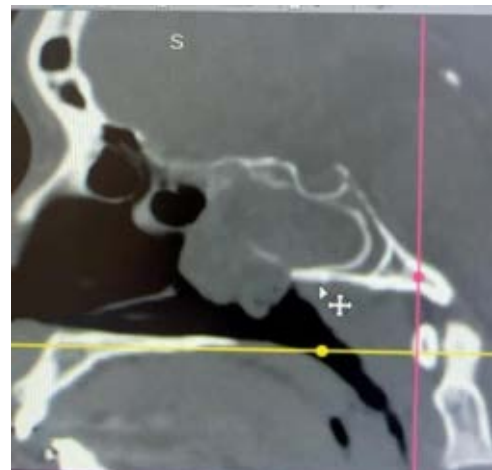
All procedures were conducted while the participant was under the same type of anesthesia, and the patient was positioned supine with their head elevated by  $20^\circ$ . The nasal cavity was prepped with topical vasoconstriction using 1:1000 adrenaline. A rigid Karl Storz endoscope (4 mm diameter) with  $0^\circ$ ,  $30^\circ$ , and  $70^\circ$  optics was utilized to visualize the sphenoid sinus roof, lateral recesses, and posterior wall. An extended posterior septal resection measuring approximately 20 mm (anteroposterior)  $\times$  15 mm (craniocaudal) was performed to create a common binostril working corridor, facilitating a two-handed, four-instrument technique.

The microdebrider and fiber optic shears were used to remove the tumor in sections. All of the sphenoid sinus walls were examined. The location of the tumor attachment, as pointed out the hyperostosis area on the CT scan, was located on the

posterior wall. This area was treated with bipolar cautery to a depth of 2 to 3 mm past the visible margins. The procedure took 95 minutes and there was 80 mL of blood loss. The intraoperative investigation of disease in the maxillary, ethmoid and frontal sinuses confirmed involvement of the sphenoid sinus as primary and isolated.

Recovery was uneventful and the patient was discharged on the second day post-operation. Analgesia consisted of non-opioid medications and saline nasal irrigations were prescribed. Postoperative saline irrigation protocol consisted of 200 mL isotonic saline twice daily for 4 weeks. Topical nasal steroid spray (mometasone 200 mcg once daily) was started at 2 weeks postoperatively and continued for 8 weeks. Antibiotics were prescribed for 5 days (amoxicillin-clavulanate 1 g twice daily). Headaches are completely resolved within one week. Nasal breathing was restored and olfactory function progressively improved, reaching complete recovery by 6 weeks.

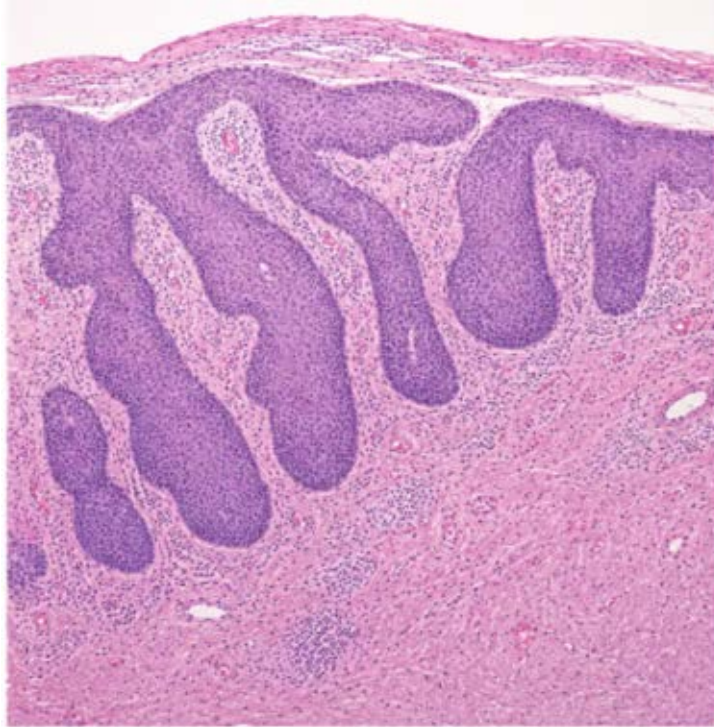
Histopathological examination demonstrated multilayered inverted squamous epithelium with endophytic growth composed of well-differentiated non-keratinizing epithelium with preserved epithelial polarity, intact basement membrane, absence of cytological atypia, increased mitotic activity, dysplasia, carcinoma in situ, or invasive malignancy. Surgical



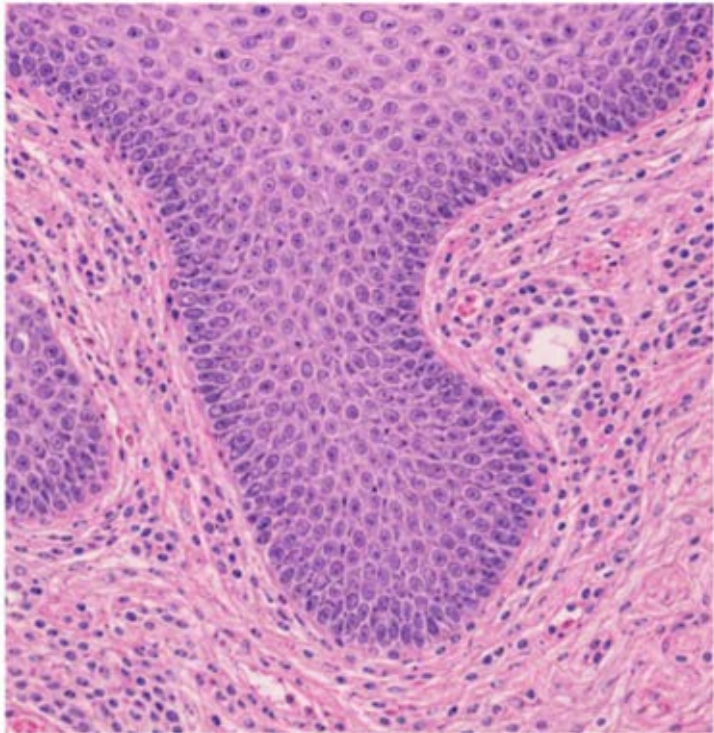
**Figure 1.** Preoperative CT scan showing soft-tissue mass occupying the sphenoid sinus with focal hyperostosis.



**Figure 2.** Preoperative CT scan demonstrating tumor extent and sphenoid sinus wall displacement.



**Figure 3.** Histopathological Appearance of Primary Sphenoid Sinus Inverted Papilloma (Low Magnification,  $\times 10$ , H&E Stain).



**Figure 4.** High-Power Histopathological View of Inverted Papilloma (High Magnification,  $\times 40$ , H&E Stain).



**Figure 5.** Postoperative endoscopic view at 6 months showing healed mucosa and no evidence of recurrence.



**Figure 6.** Postoperative endoscopic view confirming patent sinus cavity and satisfactory surgical outcome.

margins were negative. The underlying stroma showed mild chronic inflammatory infiltrate without necrosis, vascular invasion, or stromal atypia, confirming the diagnosis of inverted papilloma.

Figure 3 demonstrates inverted (endophytic) growth of non-keratinizing stratified squamous epithelium extending downward into the underlying stroma. Broad epithelial invaginations forming irregular nests and ribbons are observed within the connective tissue. The surface epithelium remains intact without ulceration. No destructive stromal invasion or infiltrative growth pattern is identified. Mild chronic inflammatory cell infiltrate is present within the underlying stroma.

Figure 4 shows non-keratinizing stratified squamous epithelium with maintained architecture and polarity. Nuclei of the epithelial cells are relatively uniform with no significant pleomorphism. The basement membrane remains intact. Increased mitotic activity, dysplasia, carcinoma in situ or

invasive malignancy is not identified. The stroma around shows mild chronic inflammatory infiltrate without necrosis, vascular invasion or stroma atypia.

Nasal endoscopy follow-ups were conducted in one week, one month, three months, and six months post-surgery. Six-month postoperative CT imaging demonstrated a well-aerated sphenoid sinus with no residual or recurrent lesion. Surgical outcomes were confirmed and are illustrated in Figures 5 and 6.

At 6 months after surgery, the posterior septal defect created at surgery was stable and asymptomatic. There was no crusting, epistaxis, nasal dryness, whistling or airflow disturbance. The patient noted adequate nasal breathing, implying no clinically significant functional impairment associated with the posterior septectomy.

### Discussion.

This clinical case of a primary inverted papilloma entirely confined to the sphenoid sinus contributes to the small existing number of publications regarding this rare clinical presentation. IP is a primary sinonasal neoplasm with a male predominance and is most commonly treated with endoscopic approaches because of improved visualization and reduced morbidity. The vast majority have a benign histology and an intermediate risk of recurrence.

Similarly, the concept of prognostic variability reflecting biological characteristics as suggested in this manuscript is supported by oncological literature; an example are the features of the tumor microenvironment in colorectal cancer in which higher presence of keloid-like collagen has been demonstrated to significantly worsen recurrence-free survival and to represent an independent prognostic marker [22].

By contrast, isolated involvement of the sphenoid sinuses, as seen in this patient, is rare and typically occurs with non-specific symptoms, e.g. headaches and delayed diagnoses, as opposed to the more pronounced anterior nasal symptoms associated with other, more common sites.

The differential diagnosis of an isolated sphenoid sinus mass includes inflammatory nasal polyps, fungal sinusitis (particularly allergic fungal rhinosinusitis), mucocele, chordoma, pituitary adenoma with inferior extension, meningioma, plasmacytoma, and primary sinonasal malignancies such as squamous cell carcinoma and adenocarcinoma. Inflammatory polyps typically lack focal hyperostosis and the cerebriform appearance on MRI, whereas fungal sinus disease tends to show hypointense signals on T2-weighted imaging. Mucoceles are expansile with remodeled margins, as opposed to the focal attachment characteristic of inverted papilloma. Bone destruction and infiltrative margins are more prevalent in malignant tumors. The absence of focal hyperostosis on CT, the cerebriform pattern on T2-weighted MRI, endoscopic findings, and unambiguous histopathology in this case allowed exclusion of these entities and supported a definitive diagnosis of primary sphenoid sinus inverted papilloma.

At the six-month follow-up, the patient reported complete resolution of symptoms with no evidence of recurrence at short-term follow-up. Limited intraoperative blood loss, an uneventful perioperative course, preserved olfactory function, short hospitalization, and rapid postoperative recovery all

indicated minimal morbidity with no neurological, vascular, or orbital sequelae. Although posterior septectomy creates an iatrogenic posterior septal defect, current evidence and our clinical observation suggest that small posterior perforations are generally well tolerated. In the present case, no adverse functional outcomes such as crusting, bleeding, or airflow disturbance were observed at 6 months. However, longer follow-up is required to assess long-term mucosal adaptation and nasal physiology

Similar observations regarding the impact of comorbid conditions on disease severity and recovery have been reported in clinical studies, where patients with type 2 diabetes exhibited significantly worse outcomes and prolonged recovery in infectious diseases such as COVID-19, highlighting the importance of patient-specific risk factors in clinical prognosis [23].

The outcome of this case is consistent with current evidence supporting endoscopic endonasal resection as the preferred treatment for sinonasal inverted papilloma. A single case cannot set or validate standards of treatment. In comparison, the absence of recurrence at six months in our patient should be interpreted as a short-term outcome reflecting early local disease control rather than definitive long-term cure, requiring continued surveillance. Multiple endoscopic cohort studies have reported positive control rates with low recurrence. Endoscopic removal and malignant change are both effective and ontologically benign. In the cohort of 139 patients with inverted papilloma, Islam et al. recorded a recurrence of 5.75% and malignant transformation of 6.5% [24]. Yu et al. noted that following endoscopic sinus surgery, there was a 15.3% recurrence rate, and the median time for recurrence was 22 months, emphasizing the importance of long-term monitoring, even in surgically successful patients [25]. In comparison, the absence of recurrence at six months in our patient should be interpreted as a short-term outcome requiring continued surveillance.

Recent diagnostic studies have investigated the radiological predictors of attachment and recurrence. Several studies show that focal hyperostosis on CT scans reliably corresponds to, and assists in, intraoperative complete removal of an attachment site for inverted papilloma.

Similarly, advances in genetic and molecular diagnostics across medical fields have improved disease characterization; for instance, genetic confirmation of SLC26A2 mutations in rare skeletal disorders has enhanced diagnostic accuracy and genotype–phenotype understanding [26].

In this case, focal hyperostosis detected preoperatively matched the intraoperative attachment region on the posterior sphenoid wall, thereby aiding in a targeted coagulation as previously described [25,27]. In contrast, several studies have reported that hyperostosis can correlate to some extent with attachment points, but that its presence/absence cannot predict recurrence over time. Thus, meticulous surgical technique and complete excision remain the critical determinants, rather than radiological findings alone [28].

Among the various analyses of surgical approaches, recurrence risk validates the endoscopic endonasal approach as preferable to external approaches. A systematic review and meta-analysis indicate that recurrence rates following endoscopic surgery

(approximately 12.8%) are lower than those associated with external methods (16.6%), consolidating endoscopic resection as the standard of care for the majority of inverted papilloma cases [5]. Our results are consistent with these published data, although the single-case design does not permit statistical comparison or independent validation of superiority. The favorable postoperative recovery observed in our patient is consistent with reports demonstrating fewer complications and better outcomes following endoscopic procedures [19].

Case series of sphenoid sinus inverted papilloma remain limited; however, the available evidence suggests that surgical access and completeness of resection are the most critical determinants of outcome. Small case series and reports indicate variable rates of local control depending on the surgical approach and tumor configuration. Endoscopic surgery is associated with control rates of around 66.7% in small sample sizes when ample access is obtained (i.e. wide sphenoidotomy) [29]. The surgical approach in our patient was selected based on isolated sphenoid involvement and aimed to optimize visualization and access to the attachment site. This indicates the complexity of the anatomy of the sphenoid sinus, although the more acceptable control disease may be achieved by developing endoscopic tailored techniques. Similar cyclical effects are evident from broader public health research where disease burden trends showing increasing disability-adjusted life years from maternal disorders specifically prevalent disease processes such as pre-eclampsia and eclampsia emphasize the importance of early intervention and prepared healthcare systems in improving outcomes [30].

Outcomes comparison on parameters other than recurrence rates also shows similar quality-of-life benefits following endoscopic resection. A longitudinal multi-institutional cohort study of 373 endoscopic resection patients reported change over time in self-reported disease specific symptomatology and quality of life measures showing functional gains in addition to disease elimination [31]. While similar functional recovery was observed in our patient, this observation remains descriptive and limited to a single case. Conversely, older and more extensive open approaches carry increased morbidity with no definitive oncologic advantage in well-selected inverted papilloma cases.

Even though the outcomes of endoscopic procedures are generally reported to be positive, also risk factors resulting in difficult surgical planning and relapse have been described. Advanced tumor stage, intracranial extension, and certain high-risk attachment sites have also been shown to be predicting factors for recurrence in larger cohort studies and should be included in preoperative evaluation and postoperative surveillance protocols [32,33]. Multifocality, tobacco use, and certain tumor biological features (like HPV involvement) may promote recurrence and malignant transformation also, lending further support for an extensive diagnostic workup and an aggressive operative approach [34]. These considerations highlight the significance of tailored surgical strategy and longitudinal monitoring, a need further supported by the relatively short follow-up duration for the current case.

In general, the results of this case are in agreement with current literature recommending endoscopic endonasal excision for inverted papilloma when feasible, with complete symptom resolution and no evidence of recurrence at short-term follow-

up. However, given that reported recurrences often occur beyond one year, long-term endoscopic and radiological surveillance is essential.

### Limitations.

This report discusses a singular clinical case which has a follow up period of 6 months. This period is shorter than most cited literature regarding time to recurrence. Due to the absence of a comparison group, statistical evaluation and direct comparison with other surgical methods is not possible. Some functional outcomes are partly based on the measures reported by the patients and thus may include some degree of subjectivity, even with the use of validated assessment tools. Therefore, findings are constrained to the short-term and to feasibility outcomes and should not be extended beyond this single case.

### Conclusion.

This report outlines a successful case of an endoscopic endonasal surgical technique with a posterior septal resection in a patient with primary inverted papilloma of the sphenoid sinus.

Complete macroscopic tumor removal was achieved, with limited intraoperative blood loss, no perioperative complications, and preservation of surrounding sinonasal structures. At 6-month follow-up, both clinically, endoscopically and radiologically there is no evidence of recurrence, but this should be regarded as short-term disease control and not indicative of long-term cure.

Postoperative improvement was rapid with regard to headache, nasal obstruction, and olfactory function. Nevertheless, because of the limited follow-up and the median time to recurrence in the literature, this is more a demonstration of early disease control than established long-term recurrence-free survival. As late recurrence of inverted papilloma has been reported, long-term endoscopic and radiological surveillance should be performed. Generalizability regarding the efficacy or superiority of the technique is not allowed from this single case and longer endoscopic and radiological follow-up is necessary.

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