

Surgical endoscopic management of sinonasal diseases in Kinshasa, Democratic Republic of the Congo

Ntumba, M. A.¹, Mpiana, S. J.^{1,3}, Tshingamb, K. Y.¹, Ngimbi, N. E.¹, Kayembe, K. E.¹, Kalala, K. H.¹, Kambia, T. E.², Mpanzu, K. C.², Tshimbadi, N. A.², Levie, P.², & Nyembue, T. D.^{1,2,3}

¹ENT Department, Kinshasa University Hospital, University of Kinshasa, Democratic Republic of the Congo

²ENT Department, Medical Center of Kinshasa, Democratic Republic of the Congo

³Health Sciences Research Institute, Kinshasa, Democratic Republic of the Congo

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Correspondence to:

Dr. Ntumba Malemba Alain
alainntumba75@gmail.com

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The Gambia, editor@orapuh.org.

ABSTRACT

Introduction

Endoscopic sinus surgery (ESS) is considered the gold standard for the surgical management of sinonasal diseases but remains relatively less well known in our region.

Purpose

The aim of this study was to identify the indications for ESS and examine the sociodemographic, clinical, and satisfaction characteristics of patients undergoing the procedure.

Methods

A descriptive case series study was conducted from 2021 to 2024, enrolling patients who underwent ESS in three hospitals in Kinshasa. Sociodemographic characteristics, surgical indications, procedures, clinical outcomes, and patient satisfaction—measured using a symptom severity visual analogue scale—were evaluated. Allergy prick tests, preoperative endoscopy, and sinus CT scan findings were recorded. The Pearson chi-square (χ^2) test and Student's t-test were used for data comparison, with statistical significance set at $p < 0.05$. Patients were followed up on postoperative days 1, 7, 15, and 30.

Results

A total of 68 patients underwent surgery, with a mean age of 43.6 ± 19.8 years, and 58.8% were male. Nasal obstruction was the most frequently reported symptom (77.9%), followed by rhinorrhea (54.4%) and dysosmia (45.6%). Allergy and asthma were present in 22.0% and 11.8% of patients, respectively. Chronic rhinosinusitis with nasal polyps (CRSwNP) was the most common surgical indication (36.8%), followed by chronic rhinosinusitis without nasal polyps (CRSsNP) and sinonasal tumors, each accounting for 22.1%. Middle meatotomy (MM) was the most frequently performed surgical procedure (50.0%), followed by endonasal polypectomy (45.6%), anterior ethmoidectomy (35.3%), and inferior turbinate cauterization (28.7%). Histological analysis revealed that 63.2% of inflamed polyps were eosinophilic. Approximately one in four patients experienced minor complications, including epistaxis (13.2%), headache (8.8%), and palpebral edema (1.5%). By the 30th postoperative day, all symptoms had significantly improved, except for epistaxis.

Conclusion

This study demonstrated that CRSwNP was the most common indication for ESS, with MM being the most frequently performed surgical procedure. Patient satisfaction was high, suggesting that ESS should be further implemented for the management of sinonasal diseases in our setting.

INTRODUCTION

Endoscopic sinus surgery (ESS) is considered the gold-standard surgical procedure for managing chronic rhinosinusitis (CRS) (Qadeer et al., 2018). ESS is a minimally invasive technique commonly used in well-equipped hospital settings (David et al., 2021).

Initially, ESS was performed for the treatment of inflammatory pathologies of the sinonasal cavities. However, its indications have gradually expanded to include sinonasal tumors, the management of cerebrospinal fluid leaks, profuse epistaxis, foreign body removal, lacrimal functional surgery (dacryocystorhinostomy), and decompression of orbital pathologies (Masson, 2021).

CRS that is refractory to medical treatment affects approximately 31 million Americans annually, leading to around 20 million consultations and over 200,000 ESS procedures per year (Dai et al., 2021). Over the past 30 years, ESS has seen significant growth. In France, approximately 19,000 procedures were performed in 2014, averaging 1,583 surgeries per month (Vicaut et al., 2019).

In Africa, a 10-year case series conducted in Yaoundé by David et al. (2021) enrolled 86 patients who underwent ESS. Several studies have demonstrated that ESS in selected patients is associated with improvements in CRS symptoms, quality of life, sleep, and even cognitive function (Saydy et al., 2021). A systematic review by Khalil et al. (2006) of 47 patients who underwent ESS for CRS found that 87.2% reported significant symptom improvement, while 72.4% experienced an enhanced quality of life (Algahtani et al., 2024). Similarly, Alrajhi et al. (2022) reported significant improvements in nasal obstruction, posterior rhinorrhea, and facial pain among 60 CRS patients who underwent ESS, with a corresponding enhancement in quality of life.

In developing countries, ESS has faced challenges such as a lack of adequate equipment, difficulties in identifying surgical indications, high costs of surgical training, and limited access to health insurance. In the Democratic Republic of the Congo (DRC), ESS was first introduced in 2003 during a foreign medical mission. However, after a latency period, ESS was reintroduced around 2020 through collaborations with visiting surgeons who trained

local ENT specialists. The delay was primarily due to a lack of locally trained ENT surgeons in ESS techniques. Although ESS has been performed in the DRC since 2020, no data are currently available on its impact on sinonasal disease management. Therefore, this study, as the first of its kind in the region, aimed to evaluate the indications, surgical procedures, complications, and patient satisfaction following ESS. These findings will help assess the benefits of this procedure, particularly in our setting.

METHODS

A descriptive case series study was conducted from June 2021 to June 2024 (three years) in the ENT departments of the University Hospital of Kinshasa, the Medical Center of Kinshasa, and Mongala Medical Center. Patients who underwent ESS during the study period, regardless of age, and who provided informed consent by signing a consent form were included in the study.

Sociodemographic and clinical characteristics of patients were recorded using a survey sheet. Patient satisfaction, based on the severity of pre- and postoperative symptoms, was assessed using a visual analogue scale (VAS) ranging from 0 (no symptoms) to 10 (severe symptoms).

Endoscopic findings, prick tests, and sinus CT scans were performed for all patients. The positive threshold for the prick test was 3 mm. All surgical procedures were performed under general anesthesia.

RESULTS

Sixty-eight patients were enrolled, with 21 (30.9%) employed in the formal sector, 21 (30.9%) unemployed, 18 (26.5%) pupils/students, and 8 (11.8%) employed in the informal sector. Among the 29 patients who underwent the prick test, 15 (48.3%) tested positive.

Sociodemographic Characteristics

Table 1 shows that 40 (58.8%) patients were male and 28 (41.2%) were female, resulting in a sex ratio of 1.4. The average age was 43.6 ± 19.8 years, ranging from 5 to 79 years. The most common age group was 40–59 years (38.2%).

Table 1:
Age Group and Gender

Age group	Sex		Total
	Male	Female	
<20	6 (15,0)	7 (25,0)	13 (19,1)
20 - 39	6 (15,0)	6 (21,4)	12 (17,6)
40 - 59	17 (42,5)	9 (32,1)	26 (38,2)
≥60	11 (27,5)	6 (21,4)	17 (25,0)
Total	40 (100,0)	28 (100,0)	68 (100,0)

Clinical Data

Symptoms

Nasal obstruction was the most frequently reported complaint prompting ENT consultation (77.9%), followed by rhinorrhea (54.4%) and dysosmia (45.6%), as shown in **Table 2**. The duration between the onset of the first symptoms and the initial ENT consultation ranged from 1 to 5 years, with a median of 2 years. Epistaxis was associated with the reason for consultation in 25.0% of cases.

Table 2:
Symptoms

Symptoms	Frequency (n=68)	%
Nasal obstruction	53	77,9
Rhinorrhea	37	54,4
Dysosmia	31	45,6
Epistaxis	17	25,0
Sneezing	13	19,1
Closed rhinolalia	5	7,4
Nasal hyperreactivity to strong odors	3	4,4

Surgical Indications

As shown in **Table 3**, chronic rhinosinusitis (CRS) with nasal polyps was the most frequently encountered indication (36.8%), with lesions commonly located in the maxilla (66.2%). CRS without nasal polyps accounted for 20.6% of cases, followed by sinonasal tumors (22.1%). One patient presented with pansinusitis complicated by Pott’s puffy tumour and cerebral abscess (1.4%). The majority of patients with CRSwNP were older than 40 years.

Table 3:
Surgical Indications

Surgical indications	Age group (years)			p
	<40 (n=25)	≥40 (n=43)	Ensemble (n=68)	
Chronic rhinosinusitis with nasal polyps	10 (14.7)	15 (22.1)	25 (36.8)	0.673
Chronic rhinosinusitis without nasal polyps	6 (8.8)	8 (11,8)	14 (20.6)	0.596
Sinonasal tumors	4 (5.9)	11 (16.2)	15 (22.1)	0.358
Fungal rhinosinusitis	1 (1.5)	5 (7.4)	6 (8.8)	0.285
Antrochoanal polyps	2 (2.9)	1 (1.5)	3 (4.4)	0.272
Epistaxis	1 (1.5)	2 (2.9)	3 (4.4)	0.245
Pansinusitis complicated with Pott’s puffy tumor	1 (1.5)	1 (1.5)	2 (2.9)	0.694
Septal deviation	0 (0.0)	2 (2.9)	2 (2.9)	0.274
Rhinite hypertrophique	0 (0.0)	1 (1.5)	1 (1.5)	0.442

Surgical Procedures Performed and Age Group

Table 4 shows that middle meatotomy was the most common surgical procedure performed (67.6%), followed by anterior ethmoidectomy (50.0%) and endonasal polypectomy (45.6%). and (**Figure 1**).

Table 4:
Surgical Procedures Performed and Age Group

Surgical procedure	Age group (years)			p
	<40 (n=25)	≥40 (n=43)	All (n=68)	
Middle meatotomy	18 (26.5)	28 (41.2)	46 (67.6)	0.559
Anterior ethmoidectomy	12 (17.6)	22 (32.4)	34 (50.0)	0.801
Endonasal polypectomy	9 (13,2)	22 (32.4)	31 (45.6)	0.226
Cauterization of inferior turbinate	14 (20.6)	15 (22.1)	29 (42.6)	0.090
Maxillary sinus polypectomy	7 (10.3)	16 (23.5)	23 (19.1)	0.439
Posterior ethmoidectomy	5 (7.4)	15 (22.1)	20 (29.4)	0.194
Frontotomy	7 (10.3)	9 (13.2)	16 (23.5)	0.508
Endonasal mass removal	2 (2.9)	5 (7.4)	7 (10.3)	0.635
Inferior meatotomy	3 (4.4)	3 (4.4)	6 (8.8)	0.481
Septoplasty	2 (2.9)	4 (5.9)	6 (8.8)	0.855
Middle turbinate turbinectomy	3 (4,4)	3 (4,4)	6 (8,8)	0.481
Sphenoidotomy	2 (2.9)	2 (2.9)	4 (5.9)	0.571
Cauterization of Kiesselbach region	1 (1,5)	2 (2,9)	3 (4,4)	0,900

Surgical Procedures Performed and Gender

Table 5 shows that middle meatotomy, posterior ethmoidectomy, and middle turbinate turbinectomy were statistically significantly associated with gender. Middle

meatotomy was equally distributed between both genders (33.8%), whereas posterior ethmoidectomy was more common in males (23.5%) and middle turbinate turbinectomy was more common in females (7.4%).

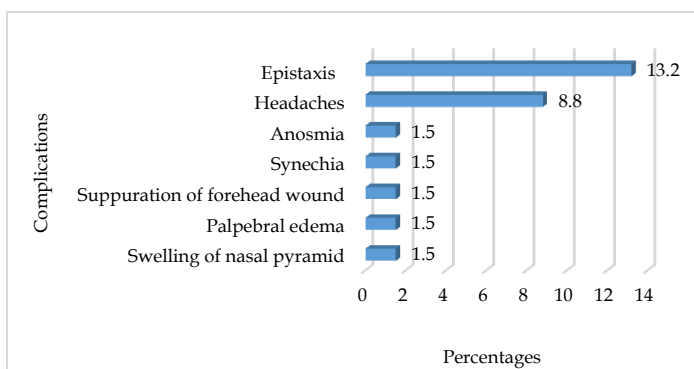
Table 5:
Surgical Procedures Performed and Gender

Surgical procedure	Gender			p
	Male (n=40)	Female (n=28)	All (n=68)	
Middle meatotomy	23 (33.8)	23 (33.8)	46 (67.6)	0.033
Anterior ethmoidectomy	21 (30.9)	13 (19.5)	34 (50.0)	0.622
Endonasal polypectomy	19 (27.9)	12 (17.2)	31 (45.6)	0.705
Cauterization of inferior turbinate	15 (22.1)	14 (20.6)	29 (42.6)	0.305
Maxillary sinus polypectomy	13 (19.1)	10 (14.7)	23 (33.8)	0.783
Posterior ethmoidectomy	16 (23.5)	4 (5.9)	20 (29.4)	0.022
Frontotomy	10 (14.7)	6 (8.8)	16 (23.5)	0.733
Endonasal mass removal	5 (7.4)	2 (2.9)	7 (10.3)	0.474
Inferior meatotomy	3 (4.4)	3 (4.4)	6 (8.8)	0.646
Septoplasty	4 (5.9)	2 (2.9)	6 (8.8)	0.683
Middle turbinate turbinectomy	1 (1.5)	5 (7.4)	6 (8.8)	0.028
Sphenoidotomy	3 (4.4)	1 (1.5)	4 (5.9)	0.498
Cauterization of Kiesselbach region	2 (2.9)	1 (1.5)	3 (4.4)	0.778

Complications

As shown in **Figure 1**, postoperative complications occurred in 29.4% of patients, almost all of which were minor. Less severe epistaxis and headaches were the most common, occurring in 13.2% and 8.8% of cases, respectively.

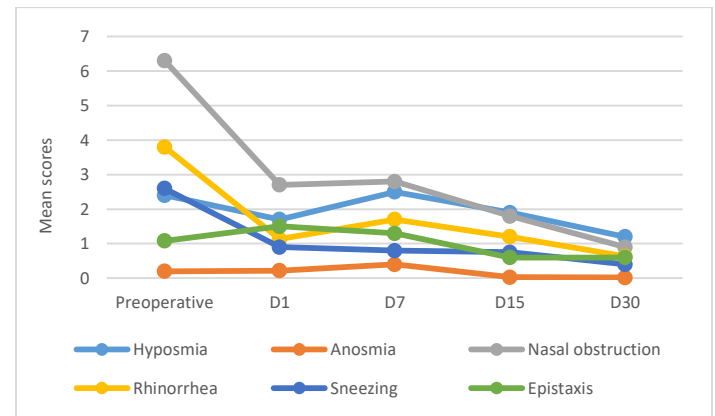
Figure 1:
Postoperative Complications



Comparative Evolution of Pre- and Postoperative Nasal Symptoms (VAS Symptom Score Comparison)

Figure 2 shows that, with the exception of epistaxis (p=0.081), all other symptoms showed a significant decrease in Visual Analogue Scale (VAS) scores on postoperative Day 30 (all p<0.05).

Figure 2:
Comparative curve of symptom means scores before and after surgery



DISCUSSION

Socio-demographic Data

In our study, the mean age of patients was 43.6 years, with extremes ranging from 5 to 79 years. The predominant age group was 40–59 years. The sex ratio was 1.4, with a male predominance. These results are similar to those found by **Hemmi et al. (2023)** in Japan, where the mean age was 48.7 years, with a predominantly male sex ratio. However, these findings differ from those of **David et al. (2021)** in Yaoundé, where the mean age was 36.3 years, with a predominantly female sex ratio of 0.9. Similarly, **Gohar et al. (2017)** reported a mean age of 39.1 years in their study. The smaller sample size in our study compared to those of **David et al. (2021)** and **Gohar et al. (2017)**, as well as differences in patient selection methods, may account for these variations.

The majority of our patients (30.9%) were employed in the formal sector. These results align with those of **David et al. (2021)** in Yaoundé, where government employees predominated. This may be explained by the fact that individuals working in government institutions often benefit from health insurance, which facilitates easier access to surgery when needed.

Medical History

Asthma was the most common comorbidity in our study, accounting for 11.8% of cases, followed by high blood pressure (10.3%). Qadeer et al. (2018), in a study conducted in Kenya on the quality of life of patients with chronic rhinosinusitis after endoscopic sinus surgery, found that asthma was present in 22.2% of cases.

Our findings differ from those of David et al. (2021) in Yaoundé, where sinonasal allergy was the most frequently reported condition, accounting for 40.6% of cases. Asthma is frequently associated with nasal polyps, which may explain why it was the predominant medical history reported in our study. The prevalence of asthma in patients with chronic rhinosinusitis with nasal polyps has been reported to range from 26% to 48% (Bartier et al., 2021). Regarding the high prevalence of allergy in the study by David et al. (2021), the discrepancy may be due to the fact that some patients in our study did not undergo allergy testing, as they failed to present for the test.

Clinical Data

Nasal obstruction was the most frequently encountered complaint in our study, reported in 77.9% of cases, followed by rhinorrhea (54.4%) and dysosmia (47.1%). These results are comparable to those found by David et al. (2021) in Yaoundé, where nasal obstruction was reported in 83.7% of cases, rhinorrhea in 60.5%, and dysosmia in only 8.1%. Similarly, Gohar et al. (2017) in a study at Multan Hospital, Pakistan, found that nearly all patients experienced varying degrees of nasal obstruction.

Nasal obstruction is a common symptom in sinonasal pathologies. When caused by polyps, tumors, or anatomical variations, it significantly affects the patient's quality of life. However, endoscopic sinus surgery (ESS) has been shown to provide substantial improvement in such cases.

Our study revealed a consultation delay of 1 to 5 years, with a median of 2 years. These findings are nearly identical to those of David et al. (2021) in Yaoundé, where the average consultation time was 2 years and 6 months. This delay may be attributed to the lack of health insurance coverage for many patients in Africa, as well as cultural beliefs that lead patients to seek traditional

treatments before resorting to modern medical care when their condition worsens.

Indications and Surgery

In our study, chronic rhinosinusitis with nasal polyps was the most frequent indication for sinonasal endoscopic surgery, accounting for 36.8% of cases, followed by chronic rhinosinusitis without nasal polyps (20.6%) and sinonasal tumors (22.1%). Our findings are similar to those of Qadeer et al. (2018) at Aga Khan Hospital in Kenya, where chronic rhinosinusitis with nasal polyps was also the most common indication, accounting for 44.4% of cases. The slightly higher frequency reported by Qadeer et al. (2018) may be due to the fact that their study focused exclusively on chronic rhinosinusitis, whereas ours considered a broader range of sinonasal pathologies. Chronic rhinosinusitis with nasal polyps (CRSwNP) is particularly responsive to ESS, which enhances the effectiveness of intranasal corticosteroids in the ethmoid cells and mucosa.

Our results differ from those of David et al. (2021) in Yaoundé, where chronic rhinosinusitis without nasal polyps was the most frequent indication (47.7%), followed by chronic rhinosinusitis with sinonasal polyps (32.6%). Benign tumors accounted for 14% of cases in their study. The observed differences may be due to sample size variations and the fact that our study considered both benign and malignant tumors.

Middle meatal antrostomy was the most frequently performed surgical procedure in our study, accounting for 67.6% of cases, followed by anterior ethmoidectomy (50.0%) and endonasal polypectomy (45.6%). Cauterization of the inferior turbinates was performed in 42.6% of cases. These results align with those of David et al. (2021) in Yaoundé, where middle meatal antrostomy was performed in 37.3% of cases. However, polypectomy and ethmoidectomy were less frequent in their study, occurring in 18% and 9% of cases, respectively. This similarity may be attributed to the predominance of maxillary sinus involvement in both studies, with middle meatal antrostomy being the procedure that provides access to the maxillary sinus.

Complications and Postoperative Course

Postoperative complications were recorded in 29.4% of patients. This rate is significantly higher than that reported by David et al. (2021) in Yaoundé, where complications occurred in only 5.8% of patients. Our study recorded minor complications in 28% of cases, with no major complications observed. These findings differ from those reported in the literature, where minor complications occur in 0.5% to 5% of cases, and major complications in approximately 0.1% (David et al., 2021). One case (1.5%) of endonasal synechia was found in our study, which is consistent with the findings of David et al. (2021).

Postoperative epistaxis was reported in nine patients. Our results are similar to those found by Hemmi et al. (2023) in Japan. Epistaxis is one of the most common complications of ESS due to mucosal injury during dissection. It is more likely to occur when extensive polyp removal is required or when visibility is poor, leading to unintentional mucosal trauma. We believe that improving endoscopic tower quality and implementing image-guided surgery in our setting could help reduce the incidence of epistaxis as a complication of ESS.

CONCLUSION

This study highlights that endoscopic sinus surgery remains the cornerstone of surgical management for sinonasal pathologies in our setting. Chronic rhinosinusitis with nasal polyps was the most frequent surgical indication. Most symptoms showed significant improvement by day 30, except for epistaxis. Therefore, fostering the availability of adequate equipment and providing local training should be prioritised to enable more patients to benefit from this procedure.

Ethical Approval: This research received ethical approval from the National Health Ethics Committee (Approval No. 621/CNES/BN/PMMF/2021).

Conflicts of Interest: None declared.

ORCID iDs:

Ntumba, M. A.¹: <https://orcid.org/0009-0005-3772-1324>
 Mpiana, S. J.^{1,3}: <https://orcid.org/0009-0003-0870-0159>
 Tshingamb, K. Y.¹: <https://orcid.org/0009-0005-9285-3178>
 Ngimbi, N. E.¹: Nil identified
 Kayembe, K. E.¹: Nil identified
 Kalala, K. H.¹: Nil identified
 Kembia, T. E.²: Nil identified
 Mpanzu, K. C.²: Nil identified

Tshimbadi, N. A.²: Nil identified
 Levie, P.²: Nil identified
 Nyembue, T. D.^{1,2}: <https://orcid.org/0009-0007-6606-8699>

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