surgeries

MDPI

Brief Report

Evaluating the Quality and Safety of In-Office Rhinologic Procedures: A YO-IFOS Pilot Study

David Lobo [1,2], Christian Calvo [3], Juan Maza-Solano [4], Leigh Sowerby [5], Luca Giovanni Locatello [6,*], Alberto Maria Saibene [7], Carlos Chiesa-Estomba [8], Osama Metwaly [9], Karol Zelenik [10], Manuel Tucciarone [11], Alkis Psaltis [12], Raghu Nandhan [13], Jerome R. Lechien [14,15], Antonino Maniaci [16], Jaime Viera-Artiles [1] and Isam Alobid [17,18]

1 Otolaryngology Department, Hospital Universitario Marques de Valdecilla, 39008 Santander, Spain
2 Valdecilla Biomedical Research Institute, 39008 Santander, Spain
3 Otolaryngology, Rhinology and Sleep Apnea Unit, Hospital Complex of Santiago de Compostela, 15700 Santiago de Compostela, Spain; christian.calvo.henriquez@gmail.com
4 Rhinology Unit, Otorhinolaryngology-Head and Neck Surgery Department, University Hospital Virgen Macarena, 41009 Sevilla, Spain
5 Department of Otolaryngology—Head and Neck Surgery, Western University, London, ON N6A 3K7, Canada
6 Department of Otorhinolaryngology, Azienda Sanitaria Universitaria Friuli Centrale, Udine University Hospital, 33100 Udine, Italy
7 AMS Otolaryngology Unit, Santi Paolo e Carlo Hospital, Department of Health Sciences, Università degli Studi di Milano, 20142 Milan, Italy; alberto.saibene@gmail.com
8 Deusto University Faculty of Medicine, Donostia University Hospital, Bidonostia Research Institute, 20014 Donostia-San Sebastián, Spain
9 Otorhinolaryngology-Head and Neck Surgery Department, Kasr Alainy School of Medicine, Cairo University, Cairo 4240310, Egypt; osama_2030@hotmail.com
10 Otorhinolaryngology-Head and Neck Surgery Department, Faculty of Medicine, University of Ostrava, 70103 Ostrava, Czech Republic; karol.zelenik@fno.cz
11 Otorhinolaryngology Department, Jerez University Hospital, 11407 Jerez de la Frontera, Spain
12 Department of Otolaryngology Head and Neck Surgery, University of Adelaide, Adelaide 5005, Australia
13 Department of Otorhinolaryngology, Madras ENT Research Foundation, Raja Annamalai Puram, Chennai 600028, Tamil Nadu, India; raghunandhansampath@gmail.com
14 Young Otolaryngologists-International Federation of Otorhinolaryngological Societies, 91190 Paris, France
15 Department of Head and Neck Surgery, Foch Hospital, Paris Saclay University, 91190 Paris, France
16 Department of Medicine and Surgery, University of Enna Kore, 94100 Enna, Italy; tnmaniaci29@gmail.com
17 Rhinology and Skull Base Unit, Otorhinolaryngology-Head and Neck Surgery Department, Hospital Clinic, IDIBAPS, CIPERES, Barcelona University, 08007 Barcelona, Spain
18 Unidad Alergo Rino, Centro Médico Teknon, 08007 Barcelona, Spain
* Correspondence: locatello.lucagiovanni@gmail.com

Abstract: The primary objective of this pilot study was to identify which aspects of in-office rhinologic procedures (IORPs) warrant further attention and investigation in the future. The secondary objectives were to survey which IORPs are most common and to identify needs for education and training. A cross-sectional study was carried out following the Consensus-Based Checklist for Reporting of Survey Studies (CROSS). The survey collected demographic, organizational, quality, and safety aspects of IORPs and was electronically distributed to YO-IFOS members across five continents. A total of 194 surgeons completed the survey, and 172 respondents (88%) performed IORPs. Ninety-nine responders (51.5%) worked in an academic setting. Common procedures included powered polypectomy (48, 28.4%) and turbinate reduction (93, 54.1%). The main concerns were about patients' tolerance (116, 76.3%) and about the safety of the procedure (102, 67.1%). The most important barriers to the diffusion of IORPs are concerns about the tolerance and safety of these procedures. It would be convenient to establish protocols for this type of procedure to ensure the greatest patient comfort based on evidence.

Keywords: in-office rhinology; in-office procedure; patient safety; balloon sinuplasty; polypectomy

check for updates

Citation: Lobo, D.; Calvo, C.; Maza-Solano, J.; Sowerby, L.; Locatello, L.G.; Saibene, A.M.; Chiesa-Estomba, C.; Metwaly, O.; Zelenik, K.; Tucciarone, M.; et al. Evaluating the Quality and Safety of In-Office Rhinologic Procedures: A YO-IFOS Pilot Study. *Surgeries* **2024**, *5*, 476–485. https://doi.org/10.3390/surgeries5020039

Academic Editor: Kenzo Hiroshima

Received: 17 May 2024
Revised: 11 June 2024
Accepted: 13 June 2024
Published: 18 June 2024

1. Introduction

Rhinological procedures performed in-office are increasingly popular due to their distinct advantages over traditional surgery. When appropriately selected, these procedures can avoid general anesthesia, reduce costs and waiting times, and expedite care while delivering comparable benefits [1]. However, ensuring patient comfort, safety, and optimal outcomes requires careful consideration of technical and logistical aspects [2].

In-office rhinologic procedures (IORPs), which do not require general anesthesia, are common in rhinology clinics in the USA and Canada [2–4]. A 2019 American Rhinologic Society survey showed that sinonasal debridements (99%), polypectomy (77%), and balloon sinus ostial dilation (56%) were the most performed IORPs [1]. Additionally, more extensive procedures such as ethmoidectomies (35%), middle meatal antrostomies (31%), sphenoidotomies (24%), and frontal sinusotomies (21%) were reported. The volume of IORPs has increased over the last five years, but practice patterns and training implementation outside North America are less known [5,6].

The scope of office-based rhinologic practices has expanded to include procedures like inferior turbinoplasty, endoscopic sinus surgery techniques, septoplasty, and various types of rhinoplasty and septorhinoplasty [7]. IORPs are generally considered safe, with a reported complication rate of 2.5% in a series of 315 procedures [3]. The COVID-19 pandemic has further increased the demand for office-based surgeries due to longer surgical wait times [8]. This pilot study sought to identify which aspects of IORPs deserve more attention, to gather information on IORP quality and safety concerns, and to address educational and training needs.

2. Materials and Methods

The study protocol was reviewed and approved by the hospital's ethics committee (Ethical Committee, Hospital Universitario Marques de Valdecilla, Santander, Spain) and by the institutional review board (Code 2021.376). This survey was designed by collaborators of the Rhinology section of the Young Otolaryngologists of International Federation of Oto-rhino-laryngological Societies (YO-IFOS) group.

2.1. Target Population and Method

A cross-sectional study was carried out following the most recent guidelines for reporting of surveys (Consensus-Based Checklist for Reporting of Survey Studies, CROSS) [9]. The eligibility criteria were board-certified otolaryngologists, whether or not they perform IORPs. An English survey adapted from Lee et al. [1] was electronically distributed through the YO-IFOS mailing list. The anonymous questionnaire was generated using the free software Google Forms (Google Inc., Mountain View, CA, USA). A single-use link that permitted access and the compilation of the survey was sent via e-mail and was open from March to May 2022 for a total of twelve weeks.

2.2. Survey Structure

This questionnaire included the following sections: (1) demographic information, (2) aspects related to the location and scope of work, (3) type of rhinological procedures performed in the office, (4) aspects related to training for these procedures and aspects related to personnel and their emergency training, (5) quality and safety aspects related to patient screening, selection, and monitoring, and (6) rationale for choosing to perform these procedures in the office setting versus the operating room (OR).

Some questions included multiple choice answers; other questions included "select all that apply" options; and others allowed free-text answers to open-ended questions.

The main variables examined were years of experience, fellowship training, work setting and involvement of the resident or trainee in these procedures, and rationale for choosing to perform these procedures in the office versus the operating room.

The full questionnaire is available in Supplementary Materials.

2.3. Statistical Analysis

A formal descriptive analysis was performed. Calculation of the mean, median, or mode for continuous variables and percentages for categorical variables was performed. Categorical variables are presented as the means of absolute and relative frequencies, and numerical variables are presented as the mean (standard deviation) or median (25th and 75th percentiles). Categorical variables were analyzed with the chi-square test, and the numerical variables were analyzed with the Mann–Whitney U test or the Kruskall–Wallis test. Analysis of variance and Fisher's exact test were used where appropriate. A *p*-value of less than 0.05 was considered statistically significant. The analysis was performed with StataCorp. 2021. (Stata Statistical Software: Release 17. College Station, TX, USA: StataCorp LLC).

3. Results

A total of 194 otolaryngologists from 26 countries across five continents responded to the survey (see Figure 1). The mean age of respondents was 46 years (SD 11.9). Among them, 83 (42.8%) were rhinologists, while 111 (57.2%) practiced general ENT or other subspecialties. Additionally, 40.2% had completed fellowship training in rhinology and skull base surgery. Table 1 summarizes the demographic information.

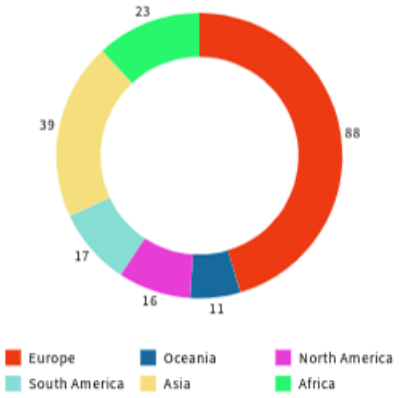

Figure 1. Distribution of survey respondents by continent. Countries represented with at least five respondents included Australia, France, Spain, Canada, India, Czech Republic, Italy, Egypt, Mexico, Argentina, Belgium, Brazil, Chile, Colombia, Dominican Republic, Germany, Israel, Maldives, Morocco, New Zealand, Panama, Peru, Portugal, Saudi Arabia, USA, and Yemen.

Table 1. Demographic information. Range and standard deviation are shown where applicable.

Total Number of Respondents	**194**
Age, median (range)	46 (26–75)
Gender (male)	72%
Countries (number)	26
Years in practice, mean (standard deviation)	17.4 (12.1)
Academic setting	51.5%
Location of the clinic within a hospital	82%
Rhinology practice *	42.3%
Fellowship training (rhinology and skull base surgery fellowship)	40.2%

* Rhinology practice vs. another subspecialty or general ENT.

3.1. In-Office Rhinology Procedures (IORPs)

A total of 172 respondents (88.6%) performed IORPs. Common procedures under topical/local anesthesia outside the OR included turbinate reduction (54.1%) and polypectomy (55.2%) (see Table 2). On average, nine in-office polypectomies were performed annually, with a mode of five.

Table 2. Which of these rhinologic procedures do you perform in-office under topical/local anesthesia with or without sedation?

Minor Procedures	**171 (99.4%)**
Polypectomy	95 (55.2%)
Turbinate reduction/Turbinoplasty	93 (54.1%)
Maxillary antrostomy	24 (14%)
Drainage of mucocele	24 (14%)
Sphenopalatine ganglion (block)	19 (11.6%)
Septoplasty, septal spur	16 (9.3%)
Balloon sinuplasty	13 (7.6%)
Ethmoidectomy	12 (7%)
Nasal valve repair/functional rhinoplasty-type techniques	10 (5.8%)
Eustachian tuboplasty	7 (4.1%)
Septoplasty, caudal deviation	7(4.1%)
Sphenoidotomy	6 (3.5%)
Frontal sinus surgery	4 (2.3%)

IORPs were more commonly performed in academic settings than in private practice (92.1% vs. 64.7%, $p < 0.001$). Within private practice, these procedures were more often performed in a hospital setting, although this difference was not statistically significant ($p = 0.10$). Vitals were monitored by 57.5% of respondents during and after the procedures. A total of 60.2% never used sedation or pre-medication, while 31.6% used it for anxious patients, and 8.2% used it routinely.

3.2. Human Resources, Facilities, and Education

Human resources included an assistant or nursing staff in 79.9% of cases. Otolaryngology trainees were present in 63.4% of procedures. The main practice setting was academic (51.5%), with procedures typically performed in a clinic within the hospital (82%). Non-academic groups accounted for 34.3%, and solo practices 13%.

3.3. Patient Screening/Monitoring

Exclusion criteria included intolerance to nasal endoscopy, significant anxiety, and bleeding disorders. Other criteria were unfavorable anatomy, lesions too bulky for in-office procedures, uncontrolled hypertension, and lidocaine allergy. Eighty-two percent of respondents advised patients to discontinue anticoagulation medication before IORPs after consulting the prescribing physician.

3.4. Procedure and Emergency Equipment

In 71.6% of cases, staff had training for emergencies like CPR or ACLS. There were no significant differences in emergency equipment availability between rhinologists and other subspecialties, or between those who performed IORPs and those who did not (see Tables 3 and 4).

Table 3. Surgical and emergency equipment.

Access to a Crash Cart and Defibrillator	170 (87.6%) *
Access to material to treat an allergic reaction	172 (88.6%) £
Access to material to treat a severe complication	157 (80.9%)

*, 4 depending on procedure, 1 only if pre-medicated patient, and 13 depending on in-office setting; £, 3 depending on procedure and 6 depending on in-office setting.

Table 4. In-office rhinology procedures. Rhinologists vs. other subspecialists.

	Rhinologist (*N* = 84)	Others (*N* = 110)	Statistics and *p*-Values
IORPs	76 (90.48)	93 (84.55)	$\chi^2 = 1.49$; $p = 0.22$
Minor procedures (biopsies, synechiolysis)	76 (100.00)	91 (98.91)	$\chi^2 = 0.83$; $p = 0.36$
Polypectomy	47 (61.84)	48 (52.17)	$\chi^2 = 1.58$; $p = 0.20$
If yes, is it powered polypectomy?	27 (36.49)	19 (20.88)	$\chi^2 = 4.94$; $p = 0.026$ *
Turbinate surgery	43 (56.58)	48 (52.17)	$\chi^2 = 0.32$; $p = 0.56$
Maxillary antrostomy	17 (22.37)	6 (6.52)	$\chi^2 = 8.84$; $p = 0.003$ *
Mucocele drainage	15 (19.74)	9 (9.78)	$\chi^2 = 3.36$; $p = 0.06$
Septal surgery	11 (14.47)	7 (7.61)	$\chi^2 = 2.05$; $p = 0.15$
Balloon sinuplasty	11 (14.47)	2 (2.17)	$\chi^2 = 8.81$; $p = 0.003$ *
Sphenoid block	11 (14.47)	7 (7.61)	$\chi^2 = 2.05$; $p = 0.15$
Ethmoidectomy	9 (11.84)	3 (3.26)	$\chi^2 = 4.62$; $p = 0.032$ *
Sphenoidotomy	5 (6.58)	1 (1.09)	$\chi^2 = 3.64$; $p = 0.05$
Functional rhinoplasty	5 (6.58)	5 (5.43)	$\chi^2 = 0.09$; $p = 0.75$
Eustachian tuboplasty	5 (6.58)	2 (2.17)	$\chi^2 = 2.02$; $p = 0.15$
Frontal drainage	4 (5.26)	0 (0.0)	$\chi^2 = 4.96$; $p = 0.026$ *

*, 4 depending on procedure, 1 only if pre-medicated patient, and 13 depending on in-office setting.

The main concerns in performing IORPs were patient tolerance and safety. The primary advantages were avoiding general anesthesia risks and reducing surgical wait times (see Figures 2 and 3).

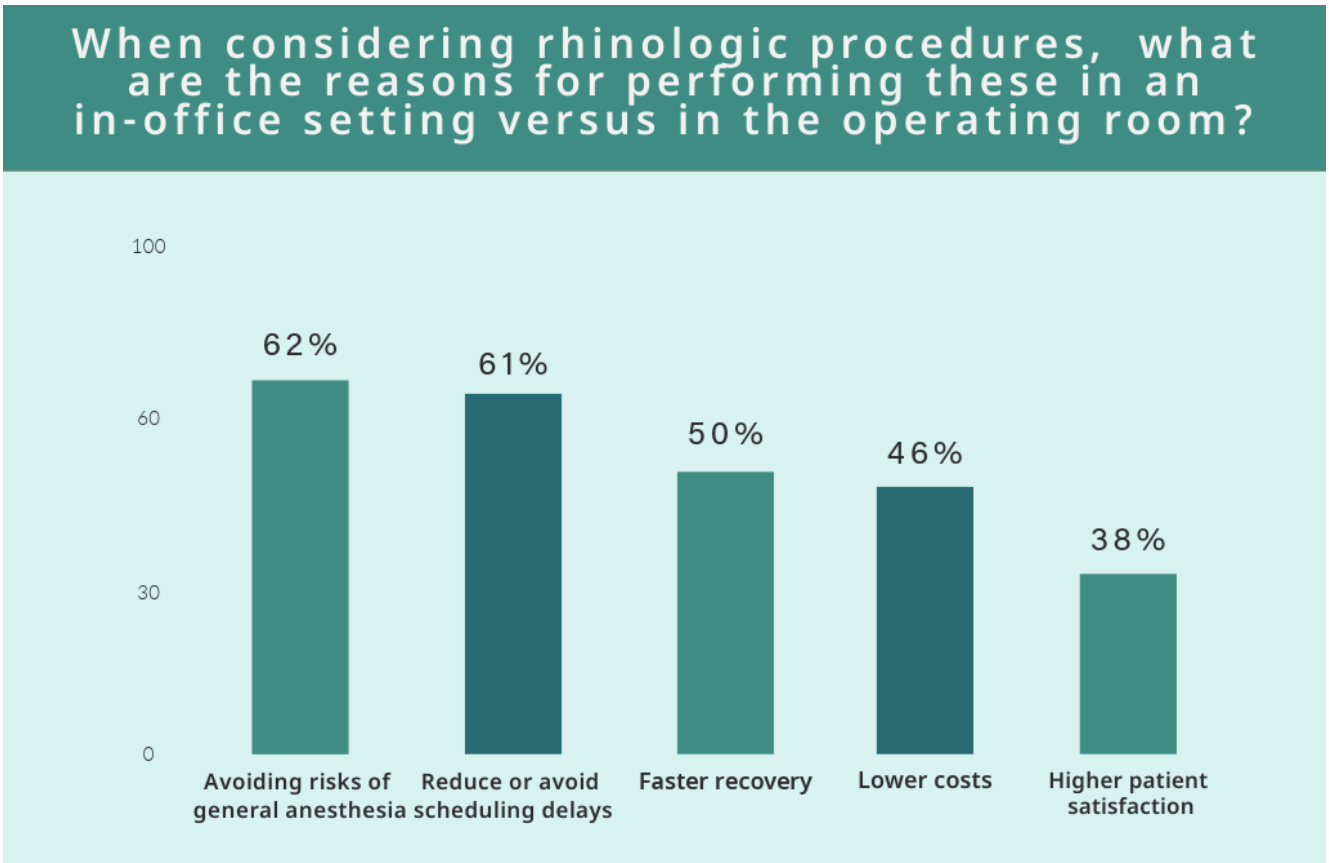

Figure 2. Reasons for performing rhinologic procedures in an in-office setting.

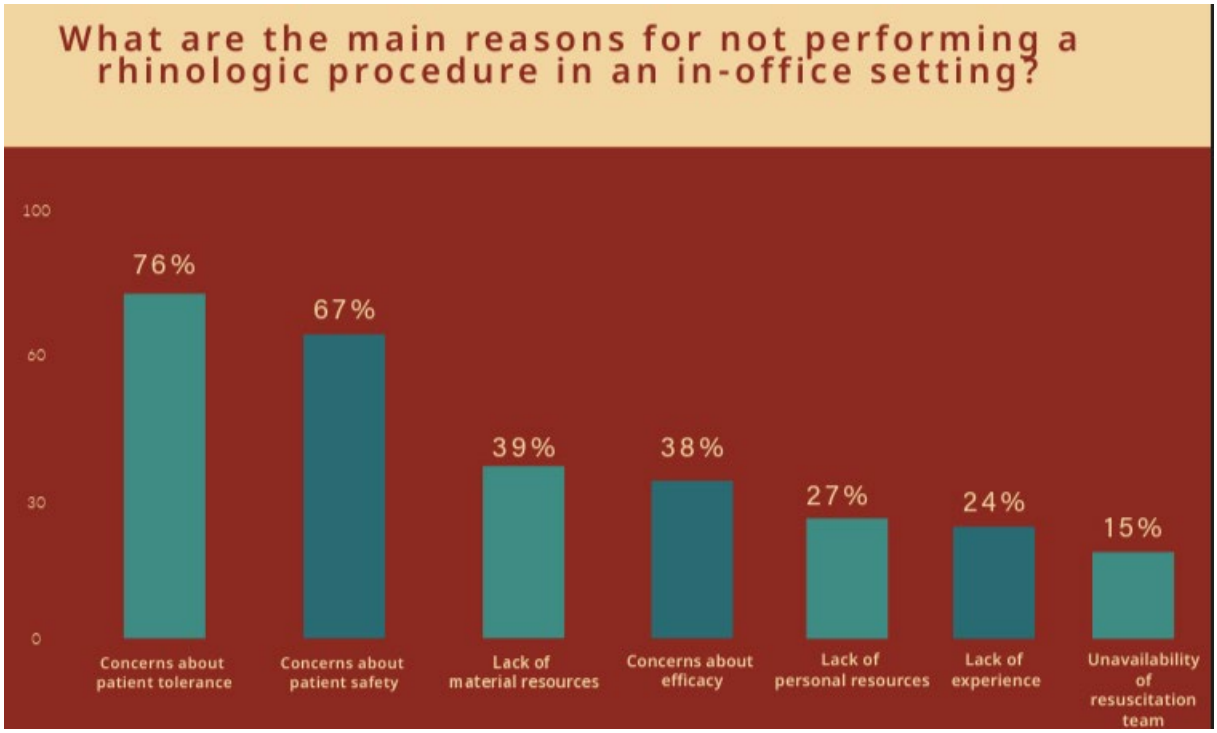

Figure 3. Reasons for not performing rhinologic procedures in an in-office setting.

4. Discussion

Office-based rhinology is gaining traction among American Rhinologic Society (ARS) members, with increased adoption across various practice settings [1]. This trend, however, is not fully understood in other parts of the world [5,6].

Recent research explores the use of office-based rhinology for managing chronic rhinosinusitis with nasal polyposis, simple polypectomy [5], steroid-eluting stents [10], and inferior turbinate reduction [11]. Despite small patient numbers, these studies report favorable outcomes for IORPs. Other applications include the drainage of mucoceles [12], balloon dilation of the frontal sinus ostium [13,14], and the reopening of failed dacryocystorhinostomies using powered instruments like microdebriders and lasers [15,16]. Additionally, posterior nasal nerve (PNN) ablation for chronic rhinitis has shown promise as a minimally invasive option [17]. Generally, patients tolerate IORPs well, reporting low pain and anxiety levels [18].

In-office rhinological procedures (IORPs) are becoming more prevalent due to advancements in medical technology and the benefits they offer in terms of patient convenience, cost effectiveness, and resource utilization. However, they present several challenges that need to be carefully managed to ensure patient safety and procedural success.

Participants in this study had varied experience levels and practice settings [1,19,20], commonly performing nasal polypectomy and turbinate reduction/turbinoplasty. Many had residents or trainees involved in these procedures. Key concerns for IORPs were patient tolerance and procedure safety. Benefits include avoiding general anesthesia, reducing surgical wait times, lowering costs, and speeding up recovery [21–24]. Ensuring respectful staff communication is crucial for minimizing patient anxiety.

Selecting appropriate patients for IORPs is crucial. Not all patients are suitable candidates for these procedures due to various factors such as the severity of their condition, anatomical considerations, and overall health status. Proper patient evaluation and selection are essential to minimize risks and ensure the best outcomes.

Effective anesthesia management is a significant challenge of IORPs. Unlike in traditional operating rooms where general anesthesia is commonly used, in-office procedures

often rely on local anesthesia. This requires precise administration to ensure adequate pain control while minimizing risks.

Establishing evidence-based protocols or guidelines for IORPs is advisable to ensure patient comfort and safety. Future research should focus on assessing the effectiveness of various protocols and anesthetic regimens, especially as advanced procedures like hybrid balloon sinus dilation become more common in office settings. For instance, incorporating the maxillary nerve block has shown to enhance anesthesia coverage and reduce complications. Various anesthetic regimens involving oral sedation, topical tetracaine gel, and intranasal local infiltrative anesthesia have shown variable effectiveness [25].

Most participants advised discontinuing anticoagulation medication before IORPs, though NSAIDs were generally not a contraindication. Perioperative bridging with heparin should only be dictated by the patient's condition, not by the procedure itself [26]. In a recent study, thirty-five patients underwent in-office balloon sinus ostial dilation while on antiplatelet and/or anticoagulant therapy. None of the patients experienced significant bleeding events postoperatively and only two patients needed absorbable nasal packing for persistent bleeding immediately post procedure [27].

Even minor in-office procedures can encounter complications. Ensuring that emergency equipment and trained staff are available to handle issues such as allergic reactions, excessive bleeding, or cardio-respiratory arrest is vital. Minimally invasive procedures can still lead to complications such as the trigemino-cardiac reflex (TCR), necessitating quick and effective response protocols [3,6].

A comparison with previous surveys revealed a lower percentage of participants performing polypectomies and balloon sinuplasty, potentially due to evolving practices and the availability of new treatments [1,28,29]. While IORPs offer cost savings by avoiding operating room expenses and reducing surgical wait times, there are economic and logistical challenges. These include securing appropriate reimbursement, investing in necessary equipment, and managing the logistics of performing surgical procedures in an office setting. In some regions, lack of reimbursement for certain in-office procedures like balloon sinuplasty can hinder their adoption.

There is a need for standardized protocols to guide IORPs. This includes guidelines on patient preparation, anesthesia administration, procedural steps, and post-procedural care. Standardized protocols help ensure consistency in patient care, enhance safety, and improve outcomes across different practice settings.

The skill and experience of the medical practitioners performing IORPs are crucial. As these procedures are integrated into practice, ensuring that otolaryngologists receive adequate training is essential. This includes understanding the nuances of in-office procedures, managing complications, and using specialized equipment effectively.

The shift towards office-based procedures in otorhinolaryngology reflects advancements in technology and procedural techniques, offering patient convenience, cost effectiveness, and reduced healthcare resource utilization [30]. It aligns with the broader trend towards patient-centered care, emphasizing personalized treatment plans and enhanced patient engagement. However, it also presents challenges in patient selection, procedural safety, and perioperative management. Ongoing research and quality improvement initiatives are essential to evaluate the safety, efficacy, and long-term outcomes of office-based procedures. In order to strengthen the level of evidence for these procedures, we simply need more studies to be added to the currently scant body of literature. For example, a 2024 paper from Canada presented an impressive report of 1208 patients who underwent IORPs, namely turbinoplasties (35%), FESS (26%), septoplasties (15%), nasal fracture reductions (7%), and other procedures. The authors reported that 1.1% of the procedures were aborted prior to completion, and the post-operative complication rate was 3.2% [31]. Hopefully, new studies from other institutions will appear in the next few years, which would make a summary or meta-analysis of the outcomes of IORPs more feasible.

This study has several limitations, including a small and potentially biased sample, and the lack of a detailed assessment of procedure volume and practice patterns. Despite

these limitations, it provides a preliminary understanding of IORP practices and highlights the need for standardization and further research to address safety and tolerability concerns. Future studies should explore detailed monitoring protocols and best practices to facilitate wider adoption of IORPs.

5. Conclusions

This study highlights the preliminary findings on office-based rhinology practices. The small and unrepresentative sample limits the generalizability of the results. However, it provides a first step in understanding the quality and safety concerns of IORPs and identifying areas for future research. Standardizing best practices and conducting further studies on patient outcomes and procedural safety will help broaden the adoption of IORPs and address current barriers.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/surgeries5020039/s1.

Author Contributions: D.L., C.C., L.S. and J.M.-S. contributed to the conception and design of the study. Material preparation and data collection and analysis were performed by D.L., C.C. and J.M.-S. All authors contributed to the circulation of the survey used in the study. The first draft of the manuscript was written by D.L. and all authors commented on subsequent versions of the manuscript. L.G.L. supervised the writing of the revised version of the paper. All authors have read and agreed to the published version of the manuscript.

Funding: No funding was received to assist with the preparation of this manuscript.

Institutional Review Board Statement: This study was approved by the Institutional Ethics Committee of Hospital Universitario Marques de Valdecilla (26 November 2021/No. 2021.376). This study was performed in line with the principles of the Declaration of Helsinki. This research was conducted ethically, with all study procedures performed in accordance with the requirements of the World Medical Association's Declaration of Helsinki.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Acknowledgments: The authors were assisted by the following scientific societies in distributing the survey: Sociedad Española de Otorrinolaringología y Cirugía de Cabeza y Cuello (SEORL-CCC), Societa' Italiana di Otorinolaringoiatria e Chirurgia Cervico Facciale (SIOeChCF), Indian Academy of ORLHNS (IAOHNS), Egyptian Society of Otorhinolaryngology–Head and Neck Surgery, and the Canadian Society of Otolaryngology Rhinology Group.

Conflicts of Interest: I. Alobid has received honoraria for consultancy and conferences from Viatris, Roche, Sanofi, GSK, MSD, Menarini, Salvat, and Novartis. L. Sowerby is a consultant for Stryker, Darvis, Paladin, Olympus, and Freudenberg Medical and received honoraria and research support from Medtronic, GSK, Sanofi, AstraZeneca, Optinose, and Neilmed. A. Psaltis is a shareholder in Chitogel and a consultant for Medtronic. He previously consulted for Fusetec, ENT technologies, and Aerin Medical and received honoraria from Lyra Speakers, Sanofi, Storz, and Sequiris. J. Viera received honoraria for consultancies and conferences and research support from Medtronic. The other authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

References

1. Lee, J.T.; DelGaudio, J.; Orlandi, R.R. Practice Patterns In-office-Based Rhinology: Survey of the American Rhinologic Society. *Am. J. Rhinol. Allergy* **2019**, *33*, 26–35. [CrossRef]
2. Unsal, A.A.; Gregory, N.; Rosenstein, K. Current opinions in office-based rhinology. *Curr. Opin. Otolaryngol. Head. Neck Surg.* **2018**, *26*, 8–12. [CrossRef] [PubMed]
3. Scott, J.R.; Sowerby, L.J.; Rotenberg, B.W. Office-based rhinologic surgery: A modern experience with operative techniques under local anesthetic. *Am. J. Rhinol. Allergy* **2017**, *31*, 135–138. [CrossRef] [PubMed]

4. Saini, A.T.; Citardi, M.J.; Yao, W.C.; Luong, A.U. Office-Based Sinus Surgery. *Otolaryngol. Clin. N. Am.* **2019**, *52*, 473–483. [CrossRef] [PubMed]
5. Coates, M.L.; Mayer, A.; Carrie, S. Developing an innovative office-based UK rhinology service-Experience and outcomes in 22 patients undergoing office-based local anaesthetic nasal polypectomy. *Clin. Otolaryngol.* **2020**, *45*, 268–273. [CrossRef]
6. Viera-Artiles, J.; Corriols-Noval, P.; López-Simón, E.; González-Aguado, R.; Lobo, D.; Megía, R. In-office endoscopic nasal polypectomy: Prospective analysis of patient tolerability and efficacy. *Eur. Arch. Otorhinolaryngol.* **2020**, *277*, 3341–3348. [CrossRef] [PubMed]
7. Kao, R.; Rabbani, C.C.; Ting, J.Y.; Shipchandler, T.Z. In-office Functional Nasal Surgery. *Otolaryngol. Clin. N. Am.* **2019**, *52*, 485–495. [CrossRef] [PubMed]
8. Setzen, M.; Svider, P.F.; Pollock, K. COVID-19 and rhinology: A look at the future. *Am. J. Otolaryngol.* **2020**, *41*, 102491. [CrossRef] [PubMed] [PubMed Central]
9. Sharma, A.; Minh Duc, N.T.; Luu Lam Thang, T.; Nam, N.H.; Ng, S.J.; Abbas, K.S.; Huy, N.T.; Marušić, A.; Paul, C.L.; Kwok, J.; et al. A Consensus-Based Checklist for Reporting of Survey Studies (CROSS). *J. Gen. Intern. Med.* **2021**, *36*, 3179–3187. [CrossRef]
10. Stolovitzky, J.P.; Kern, R.C.; Han, J.K.; Forwith, K.D.; Ow, R.A.; Wright, S.K.; Gould, A.; Matheny, K.E.; Karanfilov, B.; Huang, S.; et al. In-office Placement of Mometasone Furoate Sinus Implants for Recurrent Nasal Polyps: A Pooled Analysis. *Am. J. Rhinol. Allergy* **2019**, *33*, 545–558. [CrossRef] [PubMed] [PubMed Central]
11. White, M.; Rebeiz, E. Office-based inferior turbinate reduction using bipolar cautery: Technique and results. *Am. J. Otolaryngol.* **2020**, *41*, 102449. [CrossRef] [PubMed]
12. Barrow, E.M.; DelGaudio, J.M. In-office drainage of sinus Mucoceles: An alternative to operating-room drainage. *Laryngoscope* **2015**, *125*, 1043–1047. [CrossRef] [PubMed]
13. Luong, A.; Batra, P.S.; Fakhri, S.; Citardi, M.J. Balloon catheter dilatation for frontal sinus ostium stenosis in the office setting. *Am. J. Rhinol.* **2008**, *22*, 621–624. [CrossRef] [PubMed]
14. Eloy, J.A.; Shukla, P.A.; Choudhry, O.J.; Eloy, J.D.; Langer, P.D. In-office balloon dilation and drainage of frontal sinus mucocele. *Allergy Rhinol.* **2013**, *4*, e36–e40. [CrossRef] [PubMed] [PubMed Central]
15. Park, J.; Kim, H. Office-based endoscopic revision using a microdebrider for failed endoscopic dacryocystorhinostomy. *Eur. Arch. Oto-Rhino-Laryngol.* **2016**, *273*, 4329–4334. [CrossRef] [PubMed]
16. Wu, V.; Kell, E.; Faughnan, M.E.; Lee, J.M. In-Office KTP Laser for Treating Hereditary Hemorrhagic Telangiectasia-Associated Epistaxis. *Laryngoscope* **2021**, *131*, E689–E693. [CrossRef] [PubMed]
17. Gorelik, D.; Dhanda, A.K.; Choi, A.; Takashima, M.; Khan, N.S.; Rowan, N.R.; Jafari, A.; Syed, T.; Ahmed, O.G. Modified technique improves efficacy for in-office posterior nasal nerve ablation. *Laryngoscope Investig. Otolaryngol.* **2024**, *9*, e1238. [CrossRef] [PubMed] [PubMed Central]
18. Chang, M.T.; Jitaroon, K.; Nguyen, T.; Yan, C.H.; Overdevest, J.B.; Nayak, J.V.; Hwang, P.H.; Patel, Z.M. Hemodynamic changes in patients undergoing office-based sinus procedures under local anesthesia. *Int. Forum Allergy Rhinol.* **2020**, *10*, 114–120. [CrossRef] [PubMed]
19. Rimmer, J.; Amin, M.; Fokkens, W.J.; Lund, V.J. Endoscopic sinus surgery and musculoskeletal symptoms. *Rhinology* **2016**, *54*, 105–110. [CrossRef] [PubMed]
20. Lobo, D.; Gandarillas, M.A.; Sánchez-Gómez, S.; Megía, R. Work-related musculoskeletal symptoms in otorhinolaryngology and their relationship with physical activity. A nationwide survey. *J. Laryngol. Otol.* **2019**, *133*, 713–718. [CrossRef] [PubMed]
21. Varshney, R.; Lee, J.T. New innovations in office-based rhinology. *Curr. Opin. Otolaryngol. Head. Neck Surg.* **2016**, *24*, 3–9. [CrossRef] [PubMed]
22. Prickett, K.K.; Wise, S.K.; DelGaudio, J.M. Cost analysis of office-based and operating room procedures in rhinology. *Int. Forum Allergy Rhinol.* **2012**, *2*, 207–211. [CrossRef] [PubMed]
23. Rudmik, L.; Smith, K.A.; Kilty, S. Endoscopic polypectomy in the clinic: A pilot cost-effectiveness analysis. *Clin. Otolaryngol.* **2016**, *41*, 110–117. [CrossRef] [PubMed]
24. Papagiannopoulos, P.; Ganti, A.; Kim, Y.J.; Raad, R.A.; Kuan, E.C.; Losavio, P.; Tajudeen, B.A.; Batra, P.S. Impact of COVID-19 Pandemic on Ambulatory Operating Room Rhinology Practice in the, U.S. *Am. J. Rhinol. Allergy* **2021**, *35*, 441–448. [CrossRef] [PubMed]
25. Nishioka, G.J. The maxillary nerve block for in-office hybrid balloon sinus dilation procedures: A preliminary study. *Ear Nose Throat J.* **2017**, *96*, E31–E35. [CrossRef]
26. Sargi, Z.; Casiano, R. Endoscopic sinus surgery in patients receiving anticoagulant or antiplatelet therapy. *Am. J. Rhinol.* **2007**, *21*, 335–338. [CrossRef] [PubMed]
27. Higgins, T.S., Jr.; Öcal, B.; Adams, R.; Wu, A.W. In-office Balloon Sinus Ostial Dilation with Concurrent Antiplatelet and Anticoagulant Therapy for Chronic Rhinosinusitis without Nasal Polyps. *Ann. Otol. Rhinol. Laryngol.* **2020**, *129*, 280–286. [CrossRef]
28. Fokkens, W.J.; Lund, V.J.; Hopkins, C.; Hellings, P.W.; Kern, R.; Reitsma, S.; Toppila-Salmi, S.; Bernal-Sprekelsen, M.; Mullol, J. Executive summary of EPOS 2020 including integrated care pathways. *Rhinology* **2020**, *58*, 82–111. [CrossRef]
29. Orlandi, R.R.; Kingdom, T.T.; Smith, T.L.; Bleier, B.; DeConde, A.; Luong, A.U.; Poetker, D.M.; Soler, Z.; Welch, K.C.; Wise, S.K.; et al. International consensus statement on allergy and rhinology: Rhinosinusitis 2021. *Int. Forum Allergy Rhinol.* **2021**, *11*, 213–739. [CrossRef] [PubMed]

30. Matheny, K.E.; Carter, K.B., Jr.; Tseng, E.Y.; Fong, K.J. Safety, feasibility, and efficacy of placement of steroid-eluting bioabsorbable sinus implants in the office setting: A prospective case series. *Int. Forum Allergy Rhinol.* **2014**, *4*, 808–815. [CrossRef]
31. Kokavec, A.; Zahabi, S.; Rocha, T.; Rotenberg, B.W.; Sowerby, L.J. Assessing the safety and tolerability of rhinologic surgery under local anesthetic: An 8-year retrospective analysis. *Eur. Arch. Otorhinolaryngol.* **2024**, *Epub ahead of print*. [CrossRef] [PubMed]