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Preface **xiii**

Samuel S. Becker

Nasal, Septal, and Turbinate Anatomy and Embryology **193**

David Neskey, Jean Anderson Eloy, and Roy R. Casiano

This article discusses the development and anatomy of the nasal septum and structures of the lateral nasal wall. Emphasis is placed on anatomic variations associated with surgically correctable nasal obstruction. Common variations, such as deviated nasal septum, inferior turbinate hypertrophy, paradoxical middle turbinate, and concha bullosa, are discussed. Rare developmental causes of nasal obstruction are briefly outlined.

Diagnosis of Nasal Airway Obstruction **207**

Rakesh Kumar Chandra, Monica Oberoi Patadia, and Joey Raviv

Nasal airway obstruction is the source of significant patient discomfort and financial burden; hence, otolaryngologists encounter this symptom on an almost daily basis. This article provides a thorough yet concise summary of common and more specialized techniques that are instrumental in diagnosing nasal obstruction. The article begins with a brief overview of significant nasal anatomy and physiology. Ultimately, the main focus is on exploring the role of nasal endoscopy, radiographic imaging, acoustic rhinomanometry and other diagnostic tests that assist in the diagnosis of nasal airway obstruction.

Endoscopic Sinus Surgery in the Management of Nasal Obstruction **227**

Bruce K. Tan and Andrew P. Lane

Nasal obstruction is the leading symptom observed among patients who have chronic rhinosinusitis (CRS) with or without nasal polyposis. After failure of medical therapy, functional endoscopic sinus surgery (FESS) has emerged as the preferred treatment of CRS. Interestingly, although patient-reported outcomes show unequivocal relief of nasal obstruction after FESS, studies measuring nasal airflow and resistance demonstrate more modest improvements. This article provides an overview of the physiology of nasal airflow sensation, the burden of nasal obstruction in patients who have CRS, and the efficacy of FESS in addressing nasal obstruction in this population. Additionally, advances in airflow modeling that may enable improved preoperative planning for the relief of nasal obstruction after FESS are discussed.

- Surgical Management of the Deviated Septum: Techniques in Septoplasty** 241
Nicholas Fettman, Thomas Sanford, and Raj Sindwani
- This article provides a review of contemporary techniques in nasal septal surgery. Relevant anatomy and physiology of the nose and nasal septum are discussed. The essentials of a complete diagnostic evaluation are outlined. The evolution of surgical approaches to the correction of a deviated septum, including classic submucosal resection, traditional septoplasty, and open techniques, is covered. Complications of septoplasty are reviewed, with an emphasis on prevention and treatment. The recently popularized endoscopic septoplasty, a significant advance in septal surgery, is addressed elsewhere in this issue.
- Endoscopic Septoplasty** 253
Nathan B. Sautter and Timothy L. Smith
- Endoscopic septoplasty has gained popularity since Lanza and colleagues and Stammberger first described the technique. This technique has several advantages over the traditional “headlight” septoplasty. These advantages include superior visualization, accommodation of limited and minimally invasive septoplasty, and usefulness as an effective teaching tool. This article reviews and illustrates the endoscopic septoplasty technique and discusses its limitations and advantages.
- Revision Septoplasty** 261
Michael J. Sillers, Artemus J. Cox III, and Brian Kulbersh
- This article addresses the challenge of persistent nasal airway obstruction following septoplasty, specifically as it relates to revision septoplasty. Emphasis is on the importance of and the steps to be taken in making a complete and correct diagnosis of the problem before any surgery is performed. The authors present two categories of revision surgery: surgery involving the cartilaginous septum and surgery involving the bony septum, because they believe the evaluation and management of these areas are distinct. This article presents a discussion of airflow dynamics, options to objectively assess nasal volume and patency, examination of the septum, and surgical approaches and techniques.
- Postoperative Packing After Septoplasty: Is It Necessary?** 279
Marika R. Dubin and Steven D. Pletcher
- The use of nasal packing following septoplasty has been proposed to serve multiple purposes. One of the most common reasons for use of packing is to prevent postoperative complications such as bleeding and formation of either synechiae or a septal hematoma. Stabilization of the remaining cartilage to prevent postoperative deviation is another reason that packing may be used. Although it appears intuitive that packing may prevent or decrease the incidence of these complications, evidence supporting this assertion is limited at best. Furthermore, certain types of nasal packing have been demonstrated to increase postoperative pain and

have been implicated as a causative factor of catastrophic complications, such as toxic shock. With limited evidence to suggest a beneficial effect and a potential for deleterious side-effects, the routine use of postoperative packing following septoplasty should be questioned.

Pediatric Septoplasty

287

J. Jared Christophel and Charles W. Gross

This article discusses the importance of obtaining the correct anatomic location of a nasal obstruction in the pediatric patient, the relative and absolute indications for septoplasty, and surgical techniques. Because disruption of the developing nasal septum can alter craniofacial growth patterns, the current understanding of the effect of septoplasty on craniofacial growth is also discussed.

Surgery of the Inferior and Middle Turbinates

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Leslie A. Nurse and James A. Duncavage

For over a century, surgical management of the inferior and middle turbinates has been an ongoing topic of discourse and disagreement. Treatment, either medical or surgical, of the inferior turbinate is required in cases of turbinate hypertrophy where the goals of therapy are to maximize the nasal airway, to preserve nasal mucosal function, and to minimize complications. Middle turbinate management, more controversial than inferior turbinate management, still lacks definitive consensus. This article reviews the anatomy, physiology, and pathology involving these two structures. Advantages, disadvantages, complications, and controversies surrounding the surgical management of the turbinates are discussed.

The Diagnosis and Management of Empty Nose Syndrome

311

Nipun Chhabra and Steven M. Houser

Empty nose syndrome (ENS) is a poorly understood and rare iatrogenic disorder resulting from the destruction of normal nasal tissue. In severe forms, it can be debilitating. In this article, the authors elucidate the distinction between ENS and atrophic rhinitis, and provide a systematic approach to the diagnosis and management of ENS. They urge a judicious and cautious approach to turbinate resection, to help better prevent this sequela of nasal surgery. They state that patients with ENS can be rehabilitated and their quality of life substantially improved with nasal augmentation as a means to help restore nasal anatomy toward the pre-morbid state.

Empty Nose Syndrome: What are We Really Talking About

331

Spencer C. Payne

The problem with empty nose syndrome is probably not that it does not exist, it is that we cannot adequately explain its existence by what we currently understand about the nose. The result of empty nose syndrome or iatrogenic atrophic rhinitis as a consequence of turbinectomy remains a controversial topic that deserves further scrutiny. It is clear from the

literature, that not everyone undergoing a turbinectomy procedure suffers from the debilitating symptoms of either atrophic rhinitis or empty nose syndrome. Thus, it behooves us to evaluate this latter entity with a more critical eye, so that we can avoid creating future sufferers and provide relief to those who have already been afflicted.

Choanal Atresia and Choanal Stenosis

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James D. Ramsden, Paolo Campisi, and Vito Forte

Congenital narrowing of the nasal airway at the posterior choanae, which can be uni- or bilateral, is an uncommon condition in pediatric patients. The surgical management of choanal atresia varies widely in different centers. This article discusses the different surgical strategies including: dilation and stenting; trans-palatal repair; and transnasal resection utilizing endoscopic sinus surgery (ESS) techniques. The merits of stents, lasers, CT-guided surgery, and the use of additional agents including mitomycin C are reviewed, as well as the particular problems associated with managing bilateral choanal atresia in neonates.

Surgical Management of Benign Sinonasal Masses

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Richard J. Harvey, Patrick O. Sheahan, and Rodney J. Schlosser

A diverse group of pathologic findings requires surgical excision from the sinonasal tract. Symptoms directly related to pathologic findings, pending complications and the possibility or suspicion of malignancy, should be the cornerstones of surgical decision making. The management of benign sinonasal masses should follow a balanced algorithm to weigh the need for resection against the adverse effects of surgical removal. Endoscopic approaches have become the primary modality by which most benign masses of the nasal cavity and sinuses are managed. This article describes an aggressive surgical approach to these lesions while maintaining respect for their benign nature and the importance of preserving natural barriers to growth (spread), such as the dura and periorbita.

Surgical Management of Polyps in the Treatment of Nasal Airway Obstruction

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Samuel S. Becker

In addition to their role in chronic rhinosinusitis and nasal congestion, sinonasal polyps are associated with significant nasal obstruction. Effective long-term treatments remain difficult to pinpoint. Management of these polyps is a difficult challenge for the contemporary otolaryngologist. Medical options vary and include topical and oral steroids; macrolide antibiotics; diuretic nasal washes; and intrapolyp steroid injection. Surgical options include polypectomy and functional endoscopic sinus surgery (FESS). In addition, novel treatments for polyps are introduced with some frequency. This article presents an overview of management options for sinonasal polyps, focusing on the indications, efficacy, and complications of the more common interventions.

Case Studies in the Surgical Management of Pediatric Nasal Airway Obstruction 387

Larry H. Kalish, Joao F. Nogueira, and Aldo C. Stamm

The authors present two case studies on pediatric nasal obstruction that highlight the consequences of a delayed diagnosis and the complexities of managing obstructed lesions in children.

Case Studies in the Surgical Management of Nasal Airway Obstruction 399

Adam M. Becker and Stilianos E. Kountakis

Nasal obstruction is one of the most common complaints evaluated by the otolaryngologist. The differential diagnosis is broad, ranging from benign reversible causes to life-threatening diseases. In addition, patients may suffer from a combination of etiologies, further confusing the diagnosis. Surgical management is directed at the underlying origin of obstruction. The clinician therefore must use a careful history and physical examination as well as appropriate sinonasal imaging in accurately identifying the causes of nasal obstruction. To further illustrate these principles, we present two interesting cases of patients presenting with nasal obstruction.

Case Studies in the Surgical Management of Nasal Airway Obstruction 405

Kristin A. Seiberling and Peter-John Wormwald

This article focuses on the workup and treatment of two distinct cases of nasal obstruction. The first case has to do with a 24-year old male who presented with a brief seizure. Review of systems was positive only for long-standing right nasal obstruction. Imaging studies were consistent with a meningoencephalocele. The patient was taken to surgery for excision of the nasal mass and repair of the skull-base defect. Case two involves the treatment of a male with chronic nasal obstruction due to an S-shaped septal deviation and turbinate hypertrophy. The case illustrates the role of endoscopic septoplasty and shows how the endoscopic septoplasty technique is applied. The article also discusses the management of the enlarged turbinates.

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