Pan Arab Rhinology Society
PARS Reader's Digest

Reader Digest

Digested by Dr. Tarek Kandil, MD. Consultant, students Hospital, Cairo University

Introduction

This newsletter is intended to provide information that is useful to the student and specialist in the field of rhinology and allergic disorders.

The selected recent material represents important fundamental knowledge, current trends or recent developments in this field.

We hope that this newsletter will help the reader have a greater understanding of rhinology and allergic disorders.

1. The Maxillary Sinus: Physiology, Development and Imaging Anatomy

Andrew Whyte 1 2 3, Rudolf Boeddinghaus 4 5

Abstract

Objectives: The maxillary sinus is of paramount importance for otolaryngologists, rhinologists, oral and maxillofacial surgeons, head and neck and dental and maxillofacial radiologists. A comprehensive review article concerning the physiology, development and imaging anatomy was undertaken.

Methods: Relevant literature pertaining to the physiology of the sinonasal cavity, development of the paranasal sinuses and imaging anatomy of the maxilla and maxillary sinus from 2000 to 2019 was reviewed. Emphasis was placed on literature from the last 5 years.

Results: Extensive recent research using imaging has provided new insights into the development of the maxillary sinus, the other paranasal sinuses and the midface. The fundamental physiological concept of mucociliary clearance and its role in sinus health is emphasized. The paranasal sinuses are an integral part of a common mucosal organ formed by the upper and lower airway.An in-depth understanding of the soft-tissue and neurovascular relationships of the maxillary sinus to the deep fascial spaces and branches of the trigeminal nerve and external carotid artery respectively is required to evaluate and report imaging involving the maxillary sinus.Sinusitis of rhinogenic, rather than odontogenic origin, originates from nasal inflammation followed by anterior ethmoid disease and secondary obstruction of the ostiomeatal unit. The role of anatomical variants that predispose to this pattern of disease is

discussed in detail with illustrative examples.The maxillary sinus is intimately related to the roots of the posterior maxillary teeth; the high frequency of mucosal disease and sinusitis of odontogenic aetiology is now well recognized. In addition, an understanding of the anatomy of the alveolar process, morphology of the alveolar recess of the maxillary sinus and neurovascular supply are essential both for deliberate surgical intervention of the sinus and complications related to oral surgical procedures.

Conclusions: An understanding of the fundamental principles of the development, physiology, anatomy and relationships of the maxillary sinus as depicted by multi-modality imaging is essential for radiologists reporting imaging involving the paranasal sinuses and midface

Dentomaxillofac Radiol, 48 (8), 20190205 Dec 2019

2. Innovations in Endonasal Sinus Surgery in Children

Sophie G Shay 1, Taher Valika 2, Robert Chun 3, Jeffrey Rastatter 4

Abstract

Although there have been many advances in new tools and procedures for endonasal sinus surgery in children, the management and care for pediatric chronic rhinosinusitis has remained relatively unchanged. However, there have been advances in skull base surgery and tumor removal and new knowledge about perioperative concerns in children. This article discusses the role and risks of endoscopic sinus surgery, the use of balloon sinuplasty in children, management of complicated rhinosinusitis, and advances in skull base tumors and choanal atresia repair.

Otolaryngol Clin North Am Oct 2019

3. The Clinical Usefulness of Closed Reduction of Nasal Bone Using Only a Periosteal Elevator With a Rubber Band

Young Ji Park 1, Woo Sang Ryu 1, Gyu Hyeon Kwon 1, Kyung Suk Lee 1

Abstract

Background: Closed reduction of nasal fracture with various instrument is performed to treat nasal fracture. Depending on the type of nasal fracture and the situation in which it is being operated, the surgeon will determine the surgical tool. The objective of this study was to investigate whether a periosteal elevator (PE) was a proper device to perform closed reduction for patients with simple nasal fractures.

Methods: From March 2018 to December 2018, 50 cases of simple nasal bone fracture underwent closed reduction performed by a single surgeon. These patients were divided into two groups randomly: nasal bone reduction was performed using only PE (freer) and nasal bone reduction was performed using Walsham, Asch forcep, and Boies elevator (non-freer, non-PE).

Results: The paranasal sinus computed tomography was performed on patients before and after operation to carry out an accurate measurement of reduction distance at the same level. According to the results, the interaction between instruments and fracture types had a significant influence on reduction distance ($p = 0.021$). To be specific, reduction distance was significantly ($p= 0.004$) increased by 2.157 mm when PE was used to treat patients with partial displacement compared to that when non-PEs were used.

Conclusion: Closed reduction using PE and other elevator is generally an effective treatment for nasal fracture. In partial-displacement type of simple nasal fracture, closed reduction using PE can have considerable success in comparison with using classic instruments

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4. Endoscopic Management of Posterior Epistaxis: A Review

S W McClurg_1,_R Carrau_1

Abstract

The paradigm for the management of epistaxis, specifically posterior epistaxis, has undergone significant changes in the recent past. Recent prospective and retrospective data has shown that the endonasal surgical management of posterior epistaxis is superior to posterior nasal packing and angiography/embolization with regards to various factors including pain, cost-effectiveness, risk and overall control of bleeding. Endonasal endoscopic surgical techniques for posterior epistaxis include direct cauterization and transnasal endoscopic sphenopalatine/ posterior nasal artery ligation or cauterization with or without control of the anterior ethmoidal artery. Despite the evidence provided by the current literature, a universal treatment protocol has not yet been established. This review article provides an up-to-date assessment of the available literature, and presents a structured paradigm for the management of posterior epistaxis

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5. Nasal Polyps and Rhinosinusitis

Jason H Kwah, Anju T Peters

Abstract

Rhinosinusitis is defined as inflammation of one or more of the paranasal sinuses and affects approximately 12% of the population. Acute rhinosinusitis is defined as symptoms that last < 12 weeks, and chronic rhinosinusitis (CRS) is defined as symptoms that last > 12 weeks. CRS is divided into three groups: CRS with nasal polyps (CRSwNP), CRS without nasal polyps (CRSsNP), and allergic fungal rhinosinusitis. Nasal polyps are inflammatory outgrowths of paranasal sinus mucosa caused by chronic mucosal inflammation and are present in 20% of patients with CRS. Nasal polyps typically present with nasal congestion, nasal obstruction, and anosmia or hyposmia, and occur more frequently in patients with persistent asthma, aspirin-exacerbated respiratory disease (AERD), CRS, and cystic fibrosis. The sinus cavities are lined with pseudostratified ciliated columnar epithelial cells interspersed with mucous goblet cells. Cilia continuously sweep the mucous toward the ostial openings and are important in maintaining the proper environment of the sinus cavities. The frontal, maxillary, and anterior ethmoid sinuses drain into the ostiomeatal unit of the middle meatus. The posterior ethmoid sinuses and superior sphenoid sinuses drain into the sphenoethmoid recess of the superior meatus. Most acute sinus infections are caused by viruses, and, therefore, it is not surprising that the majority of patients improve within 2 weeks without antibiotic treatment. A bacterial infection should be considered if symptoms worsen or fail to improve within 7-10 days. Combining an intranasal corticosteroid with an antibiotic reduces symptoms more effectively than antibiotics alone. Topical nasal steroids are the treatment of choice for nasal polyps. They significantly decrease polyp size, nasal congestion, and rhinorrhea, and increase nasal airflow. Short courses of oral steroids may be needed to reduce polyp size, followed by maintenance therapy with topical steroids. Surgery is reserved for patients in which polyps cause severe obstruction or recurrent sinusitis and for patients for whom medical therapy has failed. Aspirin desensitization may decrease the requirement for polypectomies and sinus surgery in patients with AERD.

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6. Diagnosis and Treatment of Acute Invasive Fungal Sinusitis in Cancer and Transplant Patients

Monica Fung 1, Jennifer Babik 2, Ian M Humphreys 3, Greg E Davis 3

Abstract

Purpose of review: Modern advances in oncologic and end-organ therapies have led to an increase in immunocompromised patients and a corresponding rise in acute invasive fungal sinusitis (AIFS). Here, we present a comprehensive medical and surgical approach to the diagnosis and management of immunocompromised cancer and transplant patients with AIFS.

Recent findings: Aspergillus and Mucorales are the most common fungi to cause AIFS, though atypical fungal pathogens have been implicated particularly among patients on azole prophylaxis. Symptoms present in the majority of AIFS cases include fever, nasal congestion, and facial swelling. Nasal endoscopy and radiology are adjuncts to clinical exam with the gold standard diagnostic test still being histopathology, though molecular testing such as panfungal PCR is playing a larger role. The treatment of AIFS requires surgery, antifungal therapy, and reversal of immunosuppression. We recommend initiation of liposomal amphotericin B as an empiric therapy for AIFS, transitioned to targeted therapy when/if a fungal pathogen is identified. Goals of surgery include diagnostic sampling and debridement of necrotic tissue. Equally, if not more important, is reversal of underlying immune suppression. Immune-stimulating therapies hold promise for reducing mortality, but require additional study. Despite improvements in medical and surgical management of AIFS, mortality continues to approach 50%. Early diagnosis of this disease entity followed by aggressive surgical and medical management are important, including reversal of the underlying immunosuppression.

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7. Nasopharyngeal Angiofibroma

Craig A. Tork 1, Dustin L. Simpson 2

Excerpt

The earliest known documentation of nasopharyngeal angiofibroma (NA) dates to Hippocrates in the fifth century B.C. Commonly referred to as juvenile nasopharyngeal angiofibroma (JNA), it is also known as juvenile angiofibroma (JAF), or fibromatous or angiofibromatous hamartoma of the nasal cavity. Nasopharyngeal may not be entirely accurate, as some sources state that it arises from the sphenopalatine foramen and the posterior nasal cavity, while others proffer that it has more of a choanal and nasopharyngeal origin. What

research does agree upon is that JNA is a benign, highly vascular lesion that comprises approximately 0.05 to 0.5% of all head and neck masses. Though histologically benign, it often demonstrates aggressive features with local invasion into the nasal turbinates, nasal septum, and medial pterygoid lamina. It commonly extends into the nasal cavity, nasopharynx, and pterygopalatine fossa, with larger lesions extending into the sphenoid, maxillary, and ethmoid sinuses. They can also demonstrate extension through the inferior orbital fissure, and into the masticator space through the infratemporal fossa. Severe disease is likened to have orbital and intracranial involvement, seen in approximately 10 to 37% of cases. As previously mentioned, JNA is a highly vascular lesion, with one or more arterial vascular pedicles. The most common primary arterial supply is the internal maxillary artery, a branch of the external carotid artery. Larger lesions may invoke multiple feeding arteries, with even bilateral involvement. The ascending pharyngeal artery is the second most common sizeable supplying branch of the external carotid artery, with additional accessory arteries including the middle meningeal, accessory meningeal, and facial artery branches. Research has also described the recruitment of internal carotid artery branches, most commonly the vidian artery, and to a slightly lesser extent the ophthalmic artery.

In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2019 Jan–.2019 Nov 24.

8. Pathological Changes From the Originating to the Peripheral Sites of Sinonasal Inverted Papilloma Are the Underlying Mechanisms of Preoperative MRI-tumor Origin Prediction

S Ma 1, M Xian 1, B Yang 2, G Fang 3, H Lou 1, W Yu 2, X Wang 4 5, J Xian 2, X Song 1, E Fan 4, Y Li 4, L Zhang 1 2 5, C Wang 1

Abstract

Background: Our previous study showed that convoluted cerebriform pattern (CCP)-based reverse tracing method in preoperative magnetic resonance imaging (MRI) is a reliable tool in predicting originating site of sinonasal inverted papilloma (SNIP). This study aimed to determine the underlying pathological mechanism of the preoperative MRI-CCP reverse tracing method by assessing the histopathological changes from the origin to the peripheral sites of SNIP.

Methodology: The originating site of SNIP was predicted by preoperative MRI in 30 consecutive patients suspected to have primary SNIP. Samples of SNIP originating and peripheral sites were processed by pathological staining for evaluation of stroma score, micro-vessel density (MVD), and tight junction proteins (claudin-5, zonula occludens (ZO)-1 and occludin) expression.

Results: The originating site of SNIP was accurately predicted by preoperative MRI in all patients. Stroma scores, and MVD were significantly greater in the periphery of SNIP than in the

originating site. In contrast, Claudin-5 expression in micro-vessels was greater at the originating site than the periphery.

Conclusions: More edematous stroma and intensive micro-vessels with defective tight junction in periphery of SNIP result in more contrast agent diffusing and CCP that can only be observed at the periphery of SNIP on T2 and contrast-enhanced T1 weighted MR images, which may be the mechanisms underlying the CCP reverse tracing method.

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9. Endoscopic Resection of Pediatric Skull Base Tumors: An Evidence-Based Review

Kerolos Shenouda 1, Brian T Yuhan 1 2, Ahsan Mir 1, Nathan Gonik 1 3, Jean Anderson Eloy 4 5 6 7, James K Liu 4 6 7, Adam J Folbe 2 8, Peter F Svider 4

Abstract

Objectives To perform a systematic review examining experiences with endoscopic resection of skull base lesions in the pediatric population, with a focus on outcomes, recurrence, and surgical morbidities. **Methods** PubMed/MEDLINE, Cochrane Library, Embase, and Web of Science databases were evaluated. Studies were assessed for level of evidence. Bias risk was evaluated using the Cochrane Bias tool, Grades of Recommendation, Assessment, Development and Evaluation (GRADE), and Methodological Index for Non-Randomized Studies (MINORS) criteria. Patient characteristics, pathology, site of primary disease, presenting symptoms, stage, procedure specific details, and complications were evaluated. **Results** were reported using the Preferred Reporting Systems for Systematic Reviews and Meta-Analysis guidelines. Results Ninety-three studies met criteria for inclusion, encompassing 574 patients with skull base tumors. The GRADE and MINORS criteria determined the overall evidence to be moderate quality. The most common benign and malignant pathologies included juvenile nasopharyngeal angiofibromas (n = 239) and chondrosarcomas (n = 11) at 41.6 and 1.9%, respectively. Of all juvenile nasopharyngeal angiofibroma tumors, most presented at stage IIIa and IIIb (25.8 and 27.3%, respectively). Nasal obstruction (16.5%) and headache (16.0%) were common symptoms at initial presentation. Surgical approaches included endoscopic endonasal (n = 193, 41.2%) and endoscopic extended transsphenoidal (n = 155, 33.1%). Early (< 6 weeks) and late (>6 weeks) complications included cerebrospinal fluid leak (n = 36, 17.3%) and endocrinopathy (n = 43, 20.7%). Mean follow-up time was 37 months (0.5-180 months), with 86.5% showing no evidence of disease and 2.1% having died from disease at last follow-up. **Conclusion** Endoscopic skull base surgery has been shown to be a safe and effective method of treating a variety of pediatric skull base tumors. If appropriately employed, the minimally invasive approach can provide optimal results in the pediatric population

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10. Reversal of Olfactory Disturbance in Allergic Rhinitis Related to OMP Suppression by Intranasal Budesonide Treatment

Ah Yeoun Jung 1, Young Hyo Kim 2

Abstract

Purpose: We evaluated the severity of olfactory disturbance (OD) in the murine model of allergic rhinitis (AR) and local allergic rhinitis (LAR) in mice. We also investigated the therapeutic effect of an intranasal steroid on OD.

Methods: Forty BALB/c mice were divided into 5 groups (n = 8 for each). The control group was sensitized intraperitoneally (i.p.) and challenged intranasally (i.n.) with saline. Mice in the AR group got i.p. and i.n. ovalbumin (OVA) administration for AR induction. The LAR group was challenged i.n. with 1% OVA for inducing local nasal allergic inflammation, without inducing the systemic allergy. The OD group got an i.p. methimazole administration (75 mg/kg) to induce total destruction of olfactory mucosa. Mice in the intranasal budesonide group received i.n. budesonide (12.8 μ per time, 30 minutes after the i.n. OVA challenge) while using OVA to cause systemic allergies. We conducted a buried-food pellet test to functionally assess the degree of OD in each group by measuring the time taken until finding hidden food. We evaluated the damage to olfactory epithelium using histopathologic evaluation and compared the degree of olfactory marker protein (OMP) expression in olfactory epithelium using immunofluorescent staining.

Results: Mice of the AR (81.3 ± 19.8 seconds) and LAR groups (66.2 ± 12.7 seconds) spent significantly more time to detect the pellets than the control group (35.6 ± 12.2 seconds, $P < 0.01$). After treatment, the intranasal budesonide group exhibited significantly better results (35.8 ± 11.9 seconds) compared with the AR and LAR groups ($P < 0.01$). The AR and LAR groups showed considerable olfactory epithelial damage and suppression of OMP expression compared with the control group. In the intranasal budesonide group, the olfactory lesions and OMP expression had improved substantially.

Conclusions: OD may be caused by olfactory epithelial damage and suppression of OMP expression in nasal allergic inflammation and could be reversed using an intranasal steroid.

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