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CASE REPORT

Diagnosis of cystic fibrosis in patient with nasal polyps: case report

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Diagnosis.

Abstract

Introduction: Cystic fibrosis is the main cause of severe chronic lung disease in children. Diagnosis is based on clinical findings and confirmed with biochemical or genetic testing. The disease produces alterations in the upper airways of every affected patient. Nasal polyps occur in 6-48% of the cases, but only 4% of the patients with nasal polyps are tested for cystic fibrosis. **Case Report:** A 13-year-old male adolescent was evaluated after presenting altered sweat chloride levels in a test ordered for relapsing nasal polyps. Computed tomography scans of the sinuses revealed the patient had polypoid sinusitis. Progressive polyp growth included juvenile nasopharyngeal angiofibroma (JNA) in differential diagnosis, but surgical resection and histopathology testing ruled JNA out. An additional sweat test was ordered and chloride levels read 90mEq/L, 92mEq/L, and 89mEq/L (reference value: < 60 mEq/L), thus confirming a diagnosis of cystic fibrosis. **Discussion:** Nasal polyps occur in 6-48% of the individuals with cystic fibrosis. Chronic upper airway inflammation causes patients to suffer from symptoms such as chronic nasal congestion, cough, and sleep disorders. Annual nasal endoscopy in patients with cystic fibrosis allows for early diagnosis and satisfactory management of the condition. **Conclusion:** Although frequent in cystic fibrosis, nasal polyps are rarely considered in patients with the disease.

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INTRODUCTION

Cystic fibrosis (CF) is the main cause of severe chronic lung disease in children[1]. It is caused by mutations on the gene that encodes the cystic fibrosis transmembrane conductance regulator (CFTR),[2] a protein that regulates the ion channels affected by gene mutations[1]. In general terms, CF leads to multi-systemic involvement characterized by progressive lung disease, exocrine pancreatic dysfunction, liver disease, impaired bowel movements, male infertility, and elevated electrolyte concentration in sweat as a consequence of the abnormally viscous fluids produced by mucous glands[3].

The diagnosis of CF is based on clinical findings and confirmed with biochemical or genetic testing: (1) sweat chloride levels ≥ 60mmol/L in two separate occasions; (2) presence of two gene mutations causing CFTR dysfunction; or (3) abnormal nasal potential difference[2].

Cystic fibrosis produces alterations in the upper airways of every affected patient such as chronic rhinosinusitis and nasal polyps[4]. Nasal polyps occur in 6-48% of the cases, but only 4% of the patients with nasal polyps are tested for cystic fibrosis[5].

This paper reports the case of a patient with CF and an atypical presentation upon diagnosis: relapsing nasal polyps.

The authors reviewed the medical records and complementary workup test results of a patient admitted to the Fernandes Figueira National Woman, Child, and Adolescent Health Institute (IFF/FIOCRUZ) and reviewed literature on the conditions presented by the patient and other relevant matters pursuant to this study.

CASE REPORT

A 13-year-old male adolescent came in for a first visit with a pediatric pulmonologist at the Fernandes Figueira National Woman, Child, and Adolescent Health Institute (IFF) after presenting altered sweat chloride levels in a test ordered for relapsing nasal polyps by a general practitioner.

The patient began to have frequent headaches associated with voluminous nosebleeds when he was eight years old. Computed tomography scans of the sinuses revealed the patient had polypoid sinusitis. Clinical follow-up showed the polyps grew gradually, and three years after the original examination the patient's sinuses were bulging out and an exophytic mass could be seen in his nasal cavity. The patient then had marked nasal congestion and trouble swallowing, in addition to intense facial pain. His condition deteriorated and he was referred to diagnostic testing. He was suspected for juvenile nasopharyngeal angiofibroma and was referred to the National Cancer Institute (INCA) in Rio de Janeiro.

At INCA, magnetic resonance imaging (MRI) of the sinuses was ordered in preparation for surgical excision of the mass when the patient was 11 years old. The scans showed his paranasal sinuses and nasal fossae had expanded and undergone bone remodeling as they were filled with polypoid-like tissue with peripheral contrast uptake that also invaded and obstructed the nasopharynx. He was still suspected for juvenile nasopharyngeal angiofibroma.

While waiting for surgery, the patient went into acute respiratory failure for total airway obstruction by the tumor and had a tracheostomy tube implanted. The patient had trouble swallowing during follow-up and had a gastrostomy tube put in place.

As soon as his clinical condition improved, the patient underwent surgery and a smooth bright pinkish polypoid mass measuring 10.5 x 5.6 x 2.0 cm was excised via transmaxillary approach. Histopathology indicated he had benign nasal polyps containing inflammatory fluid and areas of erosion.

However, six months after resection the patient had nasal congestion and trouble swallowing again. Computed tomography of the sinuses showed a polypoid mass occupying the right maxillary sinus extending into the right nasal fossa, and hypodense tissue partially obliterating the left nasal fossa and the left maxillary and ethmoid sinuses, revealing a fast-growing mass with a similar appearance to the previously resected tumor (Figure 1).

The first surgery and the ensuing histopathology examination of the mass ruled juvenile nasopharyngeal angiofibroma out. The patient was then referred to an otorhinolaryngologist. The ENT physician ordered a sweat test as part of the diagnostic investigation for the relapsing mass. The tests were carried out at IFF in three different occasions, confirming a diagnosis of cystic fibrosis based on the following results for chloride level: 90 mEq/L, 92 mEq/L, and 89 mEq/L, (reference value < 60 mEq/L).

The patient was hospitalized for additional testing, disease staging, and treatment. Genetic tests for the CFTR gene showed heterozygosis for ΔF508/P205S mutations. In regard to lung disease, a chest CT scan showed a lung parenchyma with loss of aeration and bronchiectasis in both lungs, with more exuberant right-side involvement and some bronchial mucocele, in addition to a bilateral thickened peribronchovascular interstitium (Figure 2). Sputum test was positive for non-mucoid *Pseudomonas aeruginosa* strains. Lung function tests showed the patient had a mild obstructive ventilation defect (grade 1) with negative bronchodilator response.



Figure 1. CT scan of the sinuses showing relapsed polyps six months after surgical resection.

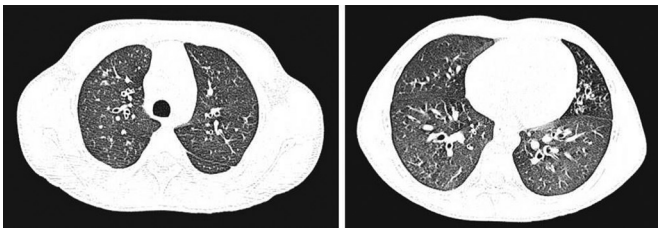


Figure 2. Chest CT scan showing loss of aeration and bronchiectasis.

The patient was referred to follow-up care at the Cystic Fibrosis Ward.

DISCUSSION

According to the literature, nasal polyps occur in 6-48% of the patients with CF[5]. However, studies on the subject have reported significantly different results. Franco *et al.*[6] assessed 100 patients diagnosed with cystic fibrosis and found nasal polyps in 14% of them in a study carried out in the Brazilian state of Minas Gerais[10]. In the Brazilian state of São Paulo, Weber & Ferrari[4] found nasal polyps in 39.1% of 23 patients. In another study in São Paulo however using a different method, SAKANO *et al*.[7] found nasal polyps in 36% of 50 patients[11].

Two studies found nasal polyps in 2% of 605 patients[8] and 0.2% of 894 patients[9] with CF. The patients appeared to have better lung function and nutritional status than patients with other early signs of disease[10].

Differently from our case, the mutations more commonly associated with nasal polyps are homozygosis for Δ-F508 mutation and heterozygosis for Δ-F508/G551D mutations[10]. Our patient had heterozygosis for ΔF508/P205S mutations, even though the P205S mutation is extremely rare in Brazil. According to the 2015 Brazilian Cystic Fibrosis Registry, this mutation is found in only 0.11% of the patients in the nation[11].

The pathogenesis of nasal polyps in CF has not been clearly established[3]. However, mutations affecting the CFTR might impair the respiratory epithelium and cause dysfunction in the excretion and absorption of sodium and chloride. The ensuing imbalance might lead to an outflow of water and a thereby drier mucosa and more viscous mucus, which might mechanically obstruct the opening of the sinuses, produce chronic inflammation of the nasal mucosa, and consequently lead to the development of polyps[12].

On account of chronic upper airway inflammation, patients with CF experience symptoms such as chronic nasal congestion, cough caused by postnasal drip, and sleep disorders[2]. Annual nasal endoscopy in patients with cystic fibrosis allows for early diagnosis and satisfactory management of the condition[5]. Endoscopy is relatively easy to perform and is particularly relevant for patients experiencing difficult-to-manage respiratory symptoms with an undefined diagnosis[6].

Clinical management includes topical steroids, while surgery is reserved for patients submitted to unsuccessful drug therapy[13]. A prospective cohort study enrolling individuals with CF and nasal polyps reported improvement after six months of clinical therapy in 77.7% of the cases and complete resolution of polyps in 85.7% of them[4].

Our patient was initially suspected for juvenile nasopharyngeal angiofibroma, and topical steroids were not prescribed. The patient has not been tested for steroid therapy since he has been diagnosed with recurrent nasal polyps and CF.

CONCLUSION

Although frequent in cystic fibrosis, nasal polyps are rarely considered in patients with the disease. This speaks of the relevance of testing patients with nasal polyps for CF, since institution of early treatment for this systemic condition improves patient survival.

REFERENCES

1. Blatter JA, Finder JD. Congenital Disorders of the Lung. In: Kliegman RM, Stanton BF, St. Geme JW III, Schor NF, eds. Nelson Textbook of Pediatrics. 20th ed. Philadelphia: Elsevier: 2015.
2. Katkin JP, Mallory GB, Hoppin AG. Cystic fibrosis: genetics and pathogenesis. UpToDate. [Internet] [acesso 2017 Jul 25]. Disponível em: https://www.uptodate.com/contents/cystic-fibrosis-genetics--and-pathogenesis?source =see_link
3. Kang SH, Dalcin PTR, Piltcher OB, Migliavacca RO. Rinossinusite crônica e polipose nasossinusal na fibrose cística: atualização sobre diagnóstico e tratamento. J Bras Pneumol [Internet]. 2015;41(1):65-76 [acesso 2017 Jul 25]. Disponível em: http://www.jornaldepneumologia.com.br/detalhe_artigo.asp?id=2373
4. Weber SA, Ferrari GF. Incidence and evolution of nasal polyps in children and adolescents with cystic fibrosis. Braz J Otorhinolaryngol. 2008;74(1):16-20.
5. Weber SAT, Iyomasa RM, Corrêa CC, Florentino WNM, Ferrari GF. Nasal polyposis in cystic fibrosis: follow-up of children and adolescents for a 3-year period. Braz J Otorhinolaryngol. 2017;83(6):677-82.
6. Franco LP, Camargos PA, Becker HM, Guimarães RE. Nasal endoscopic evaluation of children and adolescents with cystic fibrosis. Braz J Otorhinolaryngol [Internet]. 2009;75(6):806-13. [acesso 2018 Abr 16]. Disponível em: http://www.scielo.br/pdf/bjorl/v75n6/v75n6a06.pdf

7. Sakano E, Ribeiro AF, Barth L, Condino Neto A, Ribeiro JD. Nasal and paranasal sinus endoscopy, computed tomography and microbiology of upper airways and the correlations with genotype and severity of cystic fibrosis. Int J Pediatr Otorhinolaryngol [Internet]. 2007;71(1):41-50. [acesso 2018 Abr 16]. Disponível em: http://www.ijporlonline.com/article/S0165-5876(06)00334-X/fulltext

8. Slavin RG. Nasal polyps and Sinusitis. JAMA [Internet]. 1997;278(22):1849-54. [acesso 2017 Dez 12]. Disponível em: https://jamanetwork.com/ journals/jama/article--abstract/419321?redirect=true

9. Schmitt EJ, Neaville W, Pongdee T. Prevalence of cystic fibrosis in children who present with nasal polyposis. J Allergy Clin Immunol [Internet]. 2005;115(2 Suppl):S16. [acesso 2017 Dez 12]. Disponível em: https://www.jacionline.org/article/S0091-6749(04)03334-2/fulltext.

10. Kingdom TT, Lee KC, FitzSimmons SC, Cropp GJ. Clinical characteristics and genotype analysis of patients with cystic fibrosis and nasal polyposis requiring surgery. Arch Otolaryngol Head Neck Surg [Internet]. 1996 Nov;122(11):1209-13. [acesso 2017 Dez 12]. Disponível em: https://jamanetwork.com/journals/ jamaotolaryngology/article-abstract/623757?redirect=true

11. Grupo Brasileiro de Estudos de Fibrose Cística (GBEF). Registro Brasileiro de Fibrose Cística [Internet]. 2015. [acesso 2007 Dez 12]. Disponível em: http://portalgbefc.org.br/wp-content/uploads/2017/11/Registro2015.pdf

12. Mak GK, Henig NR. Sinus disease in cystic fibrosis. Clin Rev Allergy Immunol [Internet]. 2001;21(1):51-63. [acesso 2017 Jul 26]. Disponível em: https://link.springer.com/article/10.1385%2FCRIAI%3A21%3A1%3A51

13. European Academy of Allergy and Clinical Immunology (EAACI). European Position Paper on Rhinosinusitis and nasal polyps. Zurich: EAACI [acesso 2017 Jul 26]. Disponível em: http://www.eaaci.org/attachments/671_Rhinosinusitis%20and%20nasal%20Polyps%20(complete%20doc).PDF