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Investigation Of The Frequency Of Side Effects Of Inhaled Glucocorticosteroids From The Respiratory System In Children With Bronchial Asthma

Abulashova Madina Sirajutdinovna [1*], Shaipova Aida Ibragimovna[2], Gadzhieva Khurzaday Khizirievna[3], Davudgadzhieva Aishat Mukhtarovna [4], Izieva Asiyat Makhachevna [5], Shangiraeva Patimat Shamkhalovna [6], Tagirova Amina Abubakarovna[7], Magomedkhabibov Mukhammad Magomedsalimovich [8], Azizova Karina Shakirovna[9], Kaialov Yakub Gazimagomedovich[10], Vagabova Shuainat Abdulaevna[11]

[1*,2,3,4,5,6,7,8,9,10,11]Federal State Budgetary Educational Institution of Higher Education "Dagestan State Medical University" of the Ministry of Health of the Russian Federation

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Abstract

Bronchial asthma is a chronic inflammatory disease of the respiratory tract that causes the development of bronchial hyperreactivity, which leads to repeated episodes of wheezing, expiratory shortness of breath, chest congestion and coughing, increasing at night or early in the morning. The main groups of drugs for the basic therapy of bronchial asthma are inhaled glucocorticosteroids in the form of individual drugs or in combination with anticholinergic or B-2 agonists. Medication inhaled glucocorticosteroids have a number of side effects, one of which is oropharyngeal candidiasis, which often occurs according to a number of instructions (>1/100,<1/10). This is due to the fact that inhaled glucocorticosteroids create favorable conditions for the growth of yeast-like fungi of the genus Candida in the oral cavity and pharynx, due to the suppression of the protective functions of macrophages, neutrophils and T-lymphocytes on the surface of the oral mucosa, as well as due to the appearance of dry mouth. In this regard, IGCS drugs there are instructions for use. Namely, taking into account the risk of developing oropharyngeal candidiasis, the patient should thoroughly rinse his mouth with water after each inhalation of the drug. Inhaled glucocorticosteroids, like other medications, have a number of side effects, one of which is candidiasis of the oropharynx. Objective: to study the frequency of infection of the pharynx with Candida fungi and to determine their sensitivity to antifungal drugs in children who have been using inhaled glucocorticosteroids for a long time. The main group included 65 patients. From the main group of the study, Candida fungi were found in 25 patients 38.5%± 6.78%. The sensitivity of Candida fungi to antifungal drugs was 100% to nystatin and clotrimazole, 96% to fluconazole.

Keywords: bronchial asthma, inhaled glucocorticosteroids, Candida, Pulmicort

1. Introduction

Bronchial asthma is a chronic inflammatory disease of the respiratory tract that causes the development of bronchial hyperreactivity. In 2017, the Center for Disease Control and Prevention in the United States published results according to which more than 25 million patients suffer from bronchial asthma in the country, which is 7.9% of the country's population. In the structure of morbidity, 6.2 million were children, of whom patients aged 1-4 years accounted for 4.4%; children from 5 to 14 years — 8.8%, children aged 15-17 years — 11.1% [1,2,3,4]. Despite the high incidence rates, most patients who suffer from bronchial asthma respond well to basic therapy and have disease control. This is achieved thanks to basic therapy drugs. These include inhaled glucocorticosteroids (IGCS) in the form of individual drugs or in combination with anticholinergic or B-2 agonists. IGCS inhibit the synthesis of leukotrienes and prostoglandins, inhibit the production of cytokines, and prevent the migration and activation of inflammatory cells. They increase the number of active Adrenoreceptors, restore the body's response to B-adrenergic bronchodilators. IGCS as a basic therapy for bronchial asthma have good efficacy, with a lower frequency of side effects than when using systemic GCS. Drugs of this group are well tolerated with prolonged use and do not have mineralocorticoid activity [5,6,7]. The use of IGCS is effective as a prevention of bronchial asthma by physical effort. IGCS are highly effective as a therapy for both persistent bronchial asthma and for the prevention of exacerbations of bronchial asthma in children and adults. The dosage of IGCS preparations is carried out individually. For children aged 6 months and older, the dose is 0.25-2 mg / day [8,9]. But like other medications, IGCS have a number of side effects, one of which is oropharyngeal candidiasis. This is due to the fact that IGCS create favorable conditions for the growth of yeast-like fungi of the genus Candida in the oral cavity and pharynx due to the suppression of the protective functions of macrophages, neutrophils and T-lymphocytes on the surface of the oral mucosa, as well as due to the appearance of dry mouth. In this regard,

IGCS preparations have indications for use. Namely, taking into account the risk of developing oropharyngeal candidiasis, the patient should thoroughly rinse his mouth with water after each inhalation of the drug. In the case of candidiasis, the use of appropriate antifungal agents may be required, and in some patients, the abolition of inhaled corticosteroids.

2. Objectives

To study the frequency of side effects and the presence of contamination of the oral cavity with Candida fungi, as well as to determine sensitivity to antifungal drugs in children with bronchial asthma who use inhaled glucocorticosteroids for a long time.

3. **Methods**

In this work, 139 medical records of children aged 3 to 17 years who were treated at the GBU RD "ROTC" in Makhachkala were analyzed. 3 study groups were identified. The first group included 71 patients who received Pulmicort at doses of 500-1000 mcg per day for more than a year, the second group included 55 patients who received Pulmibud inpatient treatment and the third group included 13 patients who received Budesonide-native inpatient treatment.
To study the contamination of the oral cavity with fungi of the genus Candida, 65 patients aged 5 to 18 years were included in the main group, the average age was 10.1± 2.0 years. The subjects in the main group had a confirmatory diagnosis of bronchial asthma of varying severity. All patients used inhaled glucocorticosteroids in doses of 500-1000 mcg per day for more than a year. The main drug used was Budesonide. The control group included 48 children who did not use IGCS.
Also, during the study period, a questionnaire was conducted in the form of testing in children diagnosed with bronchial asthma and their parents. 43 subjects aged 5 and over were selected as the study group under 18 years of age, the average age is 13.3±2.1 years. Among those analyzed, the female subjects were 24 people, and the male ones were 19 children. As well as the survey, 30 parents whose children suffer from bronchial asthma were interviewed. The children were diagnosed with persistent mild bronchial asthma (21 subjects) or moderate severity (11 children) with well-controlled or partially controlled bronchial asthma. The duration of the disease was more than 1 year. All patients used inhaled glucocorticosteroids in small and medium doses for at least a year. The main drugs used are Pulmicort.
As part of the study, the subjects were divided into the following age groups: the first group — children aged 10-14 years (23 people), the second group – children aged 15-18 years (20 people), the third group - parents whose children are diagnosed with bronchial asthma (30 people). A swab was taken from the oral cavity and pharynx in all patients to study the contamination with fungi of the genus Candida.

4. **Results**

Irritation of the oropharyngeal mucosa and dry mouth were noted in 14 patients (19.7±4.7%), bronchospasm was not observed. In the second study group, dry mouth in 8 patients (14.5±4.8%), bronchospasm was not observed. In the third study group, 2 patients (15.3±10.4%) had paradoxical bronchospasm, shortness of breath, paroxysmal cough, hyperemia of the facial skin.
In the main study group, Candida fungi were detected in 25 patients, which was 38.5±6%. In the control group, Candida fungi were detected in 9 patients (18.8±5.6% of cases). The sensitivity of Candida fungi isolated from the oral cavity to nystatin and clotrimazole was 100%, to fluconazole 96±3.9%. (1 out of 25 subjects showed resistance of the Candida strain to flucanazole). The sensitivity of fungi of the genus Candida, 18 isolated from the control group was 100% to clotrimazole, nystatin and flucanazole.
To the question "Do I need to rinse my mouth and wash my face after inhalation with pulmicrot?" the subjects from the age group of 10-14 years (23 people) 2 "I find it difficult to answer", 1 answered "no", 20 answered "yes"; "Will you caress your mouth and wash your face after each inhalation?" 19 answered "always", 2 "almost always", 1 "sometimes", 1 answered "no".
Age group 15-18 years old (20 people) to the question: "Do I need to rinse my mouth and wash my face after inhalation with pulmicrot?" 1 answered "I find it difficult to answer", 0 answered "no", 19 answered "yes"; to the question: "Will you caress do you wash your mouth and face after each inhalation?" 17 answered "always", 2 answered "almost always", 1 answered "sometimes", 0 answered "no".
The third group of parents (30 people) to the question: "Do I need to rinse my mouth and wash my face after inhalation with pulmicrot?" 0 answered "I find it difficult to answer", 0 answered "no", 30 answered "yes"; to the question: "Will your child caress his mouth and wash his face after each inhalation?" 27 answered "always", 3 answered "almost

always", 0 answered "sometimes", 0 answered "no". In the first study group, Candida fungi were detected in 7 patients, which is 30.4±7.5%.
Clinical manifestations in the form of a whitish plaque with a hyperemia zone were present only in 2 patients (8.7±5.2%). In the second study group, fungi of the genus Candida were detected in 5 patients, which amounted to 25±8.3%. No clinical manifestations could be detected in this group.

4. **Discussion**

Thus, based on the results obtained, it can be concluded that the most effective and with fewer side effects from the IGCS group are the drugs "Pulmicort" and "Pulmibud". Budesonide Native should be used with caution and for the first time exclusively under the supervision of a doctor. It is strongly recommended that when taking these drugs, it is necessary to rinse your mouth with warm water in order to reduce the risk of developing oral candidiasis. At each patient's appointment, an oral examination should be performed, if necessary, a microbiological examination should be performed, and prevention should be reminded in order to detect early and reduce the risk of developing oral candidiasis Fungi of the genus Candida have sensitive strains to all studied antifungal drugs. Patients who use IGCS for a long time have a higher risk of infection with Candida fungi than children from the control group ($p = 0.0056674$). Conducting an examination of the oral cavity and conducting a planned microbiological examination, as well as taking a swab from the throat during hospitalization for bronchial asthma, will reduce the risk of developing candidiasis, make a correct diagnosis in a timely manner and conduct adequate etiotropic therapy. It should be noted that in order to diagnose candidiasis of the oral cavity, it is necessary to have clinical manifestations and the detection of fungi of the genus Candida in a smear. The instructions attached to the drugs from the group of inhaled glucocorticosteroids say that candidiasis of the oral cavity when using the drug on a regular basis and carrying out appropriate prevention is recorded in <10% of cases. The indicators of oral candidiasis in both study groups are not higher than the stated statistics in the instructions of drugs from the inhalation group glucocorticosteroids, which confirms the implementation of the doctor's recommendations for the prevention of fungal lesions of the mucous membranes of the oropharynx. Parents and older children from 15-18 years old are well aware of the need to rinse their mouths thoroughly with water after each inhalation of IGCS. The presence of good awareness is confirmed by the frequency of candidiasis in the studied groups, which remains within <10%, which indicates the implementation of the doctor's recommendations related to rinsing and washing the face after each inhalation. Based on the data obtained, it can be concluded about the effective work of health schools and educational conversations with doctors at appointments, which are an important part of the prevention of diseases of this kind. On each When receiving a patient, an oral examination should be performed, if necessary, a microbiological examination should be performed, and prevention should be reminded in order to detect early and reduce the risk of developing oral candidiasis.

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