ramr
American Review of Respiratory Medicine
Revista Americana de Medicina Respiratoria

ORIGINAL ARTICLE

ISSN 1852-236X

Assessment of Patients with Bronchiectasis According to the Faced Score in the Hospital Italiano de Córdoba

Valoración de pacientes con bronquiectasias según score FACED en Hospital Italiano de Córdoba

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Received: 02/28/2024
Accepted: 04/21/2024

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ABSTRACT

Introduction: The definition of bronchiectasis (BE) is essentially anatomical and refers to the abnormal and irreversible dilations of medium caliber bronchi (greater than 2 mm in diameter). The severity or prognosis of bronchiectasis is not defined by a single variable. Epidemiological data for our country are still unknown.
In 2014, the European Respiratory Journal published the first multidimensional scale for use in bronchiectasis not related to cystic fibrosis. The five variables were dichotomized to make the calculation of the result as simple as possible, and it was named the FACED Score.
Objective: Due to the aforementioned, we have decided to carry out this work with the aim of recording and staging patients at our center according to the FACED score.
Materials and method: The study sample consisted of a total of 102 patients with non-cystic fibrosis bronchiectasis from the Hospital Italiano de Córdoba. According to the FACED score, 38.2% of the patients with bronchiectasis were categorized as grade III-IV, and 28.4% as grade V-VII. 12.7% of those patients with bronchiectasis died during the study period. When correlating mortality with the severity of bronchiectasis, no significant differences were found among the different FACED score grades (p=0.679).
Conclusions: The FACED score proved to be effective in predicting exacerbations, hospitalizations, and the need for oxygen therapy. At the end of this study, we can conclude that in our population of patients with non-cystic fibrosis BE, the majority of the cases fall into the category of “moderate” according to the FACED score.

Key words: Bronchiectasis; Faced

RESUMEN

Introducción: La definición de bronquiectasias (BQ) es básicamente anatómica,se refiere a las dilataciones anormales e irreversibles de los bronquios de mediano calibre (mayores de 2 mm. de diámetro). La gravedad o pronóstico de las bronquiectasias no se definen por una única variable. Los datos epidemiológicos de nuestro país son aún desconocidos.
En 2014, la revista European Respiratory Journal publica la primera escala multidimensional para su uso en bronquiectasias no debidas a fibrosis quística. Las cinco variables fueron dicotomizadas para que el cálculo del resultado fuera lo más sencillo posible y se lo llamó score FACED.

Rev Am Med Resp 2024;24:168-172
https://doi.org./10.56538/ramr.FAGR5493

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Objetivo: A causa de lo mencionado anteriormente hemos decidido llevar a cabo este trabajo con el objetivo de registrar y estadificar a los pacientes de acuerdo al score FACED en nuestro centro.

Materiales y método: La muestra estudiada estuvo conformada por un total de n = 102 pacientes conbronquiectasias no fibrosis quística en el Hospital Italiano de Córdoba. Según el score FACED 38,2 % de los pacientes con BQ, fueron categorizados como de grado III-IV, y 28,4 % como de grado V-VII.El 12,7 % de estos pacientes con BQ fallecieron durante el período que comprendióeste estudio. Al correlacionar la mortalidad con la gravedad de BQ, no se hallaron diferencias significativas en los distintos grados del score FACED (p = 0,679).

Conclusiones: El score FACED demostró ser efectiva al predecir exacerbaciones, hospitalizaciones e indicación de oxigenoterapia. Podemos concluir que en nuestra población de pacientes que padecen BQ no fibrosis quística el mayor grupo se encuentra en la categoría moderada de acuerdo a score FACED.

Palabras clave: Bronquiectasia; Faced

INTRODUCTION

The definition of bronchiectasis (BE) is essentially anatomical and refers to the abnormal and irreversible dilations of medium caliber bronchi (greater than 2 mm in diameter), with destruction of the elastic and muscular components of their walls.[1]

René Laënnec first described bronchiectasis in 1819. "This bronchial condition is always caused by chronic catarrh or another disease that frequently results in violent and repeated coughing attacks".[2]

Non-cystic fibrosis bronchiectasis ranks as the third most common chronic inflammatory airway disease, following asthma and chronic obstructive pulmonary disease (COPD). The pathogenesis of the disease is characterized by chronic dilation with irreversible and usually progressive destruction of the bronchial wall as a result of a pathogenic vicious cycle.[3]

Bronchiectasis is not a disease in itself but rather the final result of different diseases that share common management approaches. BE can be associated with certain diseases that frequently cause it (allergic bronchopulmonary aspergillosis [ABPA], cystic fibrosis, common variable immunodeficiency) or else it can be secondary to inflammatory processes of various etiologies, such as bacterial infections.[4] It is worth noting that in approximately 50% of the cases, the cause of BE cannot be determined. In the early stages of this pathology, mucociliary clearance becomes compromised due to an initial insult to the airway, allowing prolonged contact of bacteria with the epithelium. This triggers a chronic inflammatory response with release of proteases that cause epithelial damage and further impair the mucociliary system, thus perpetuating the pathogenic vicious cycle. On a local level, respiratory secretions show an increase in neutrophils, elastase content, myeloperoxidase, tumor necrosis factor-alpha (TNF-alpha), interleukin 6 and 8, interleukin 1-alpha, interleukin 1-beta, and granulocyte colony-stimulating factor. The recruitment of neutrophils is primarily mediated by interleukin 8, TNF-alpha, and leukotriene B4, with this chemotactic action being particularly potent during periods of exacerbation.[5]

The severity or prognosis of bronchiectasis is not defined by a single variable. This clearly demonstrates that the extent of the disease, clinical presentation, or lung function alone cannot fully capture the overall severity of the patient's condition, although all of these factors likely contribute to varying degrees to what we refer to as the "severity" of the disease.

Epidemiological data for our country are still unknown. Its incidence and mortality (which was significant in the first half of the 20th century) declined with the advent of antibiotics and immunizations.

In 2014, the European Respiratory Journal published the first multidimensional scale for use in non-cystic fibrosis bronchiectasis, based on a multicenter database made up of a cohort of 819 patients. The final outcome upon which the scale was constructed was all-cause mortality within 5 years of diagnosis. However, the scale was also validated later for the

final outcome of death from respiratory causes. The five variables were dichotomized to make the calculation of the result as simple as possible, and it was named the **FACED score**, which stands for the initials of the five variables that make it up (F: forced expiratory volume in 1 second; A: age; C: chronic colonization by Pseudomonas aeruginosa, E: radiological extension, and D: dyspnea).[6]

Since the vast majority of available evidence on BE is currently generated from studies on patients with cystic fibrosis, recommendations for its management are extrapolated from cystic fibrosis BE. We do not have any records of our patients with a diagnosis of non-cystic fibrosis BE. Due to the aforementioned reasons, they are not yet categorized according to severity. Therefore, we have decided to carry out this work with the aim of recording and staging patients at our center according to the FACED score.

Objectives:

1. To determine the number of patients with non-cystic fibrosis bronchiectasis in the Pulmonology Department of the Hospital Italiano de Córdoba.
2. To categorize patients with bronchiectasis according to the FACED score.
3. To the severity grade (according to the FACED score) to exacerbations and hospitalizations.

MATERIALS AND METHODS

Prospective, observational, cross-sectional, descriptive study conducted at the Hospital Italiano de Córdoba from June 2020 to January 2023.

The study prospectively included adult patients (over 18 years old) with non-cystic fibrosis bronchiectasis, who were followed by pulmonologists. The presence of bronchiectasis was diagnosed by chest high-resolution computed tomography in patients with compatible clinical presentation.

We recorded the following: identification data (age, sex); smoking status (active smoker, former smoker); FACED score:

- FEV1 (forced expiratory volume in the first second) (> 50% = 0 points, ≤ 50% = 2 points).*
- Age (≤ 70 years = 0 points, > 70 years = 2 points).
- Chronic colonization (no Pseudomonas = 0 points, presence of Pseudomonas = 1 point).
- Extension (1 lobe = 1 point, ≥ 2 lobes = 2 points).
- Dyspnea (no dyspnea = 0 points, ≥ 2 on the Medical Research Council scale = 1 point).

Score
0-2 points = mild bronchiectasis
3-4 points = moderate bronchiectasis
5-7 points = severe bronchiectasis

*The FEV1 was determined through spirometry according to the standards of the ATS/ERS (American Thoracic Society/European Respiratory Society).

We recorded exacerbations with hospital admission (in general ward or ICU) and length of stay.

The diagnosis of BE was made through chest CT.

We didn't take into account small bronchiectases, visible in a single pulmonary segment, as they can appear in a significant percentage of the healthy population.

Definitions

Bronchiectases: these are abnormal and irreversible dilations of the bronchi, with impairment of the ciliary epithelium.

Exacerbation: the acute and sustained presentation of changes in the characteristics of the sputum (increased volume, consistency, purulence, or hemoptysis) and/or worsening dyspnea not attributable to other causes. This may be accompanied by increased coughing, fever, asthenia, general malaise, anorexia, weight loss, pleuritic chest pain in respiratory examination findings, chest X-ray abnormalities indicative of infection, deterioration in respiratory function, or increased systemic inflammation markers.

RESULTS

The study sample consisted of a total of 102 patients with non-cystic fibrosis bronchiectasis from the Pulmonology Department of the Hospital Italiano de Córdoba. Most patients were female, accounting for 76.5%.

Regarding age, 54.9% were over 70 years old, while the remaining patients were under.

When analyzing the body mass index (BMI), it was observed that 41.2% of the patients were overweight or obese, while 29.4% were underweight.

With regard to the smoking status, 37.3% of the patients were former smokers, while 5.9% were active smokers (Figure 1).

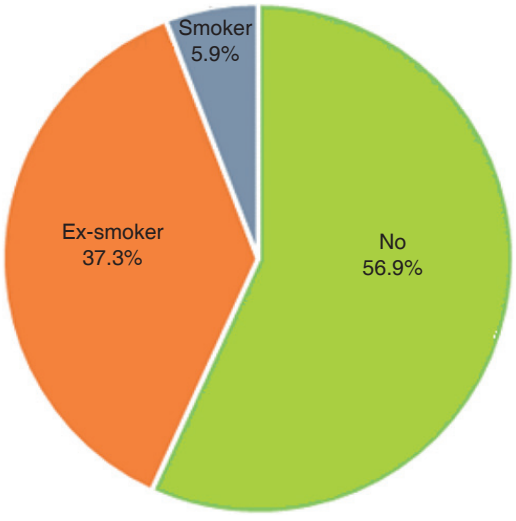

Figure 1. Sample distribution according to smoking status (n=102).

In terms of FEV1, 71.6% of patients had values above 50%. Dyspnea, according to the MRC scale, was grade I-II in most cases (61.8% of the patients being studied). The rest of the patients were categorized as grade III-IV. In the six-minute walk test, 58.8% of patients walked less than 350 meters. The number of affected lobes in the chest CT scan was more than 2 in 79.4% of the cases. Additionally, 34.3% of these patients showed daily sputum production.

13 of the 102 patients were colonized by Pseudomonas aeruginosa. (Table 1)

31.4% of the whole sample had an indication for continuous home oxygen therapy (CHOT). Only 5 patients had a prescription for chronic non-invasive ventilation (NIV).

According to the FACED score, 38.2% of the patients with bronchiectasis were categorized as grade III-IV, and 28.4% as grade V-VII (Figure 2).

During the study period, 12.7% of these patients with bronchiectasis passed away. When correlating mortality with the severity of bronchiectasis, no significant differences were found among the different FACED score grades (p=0.679).

Regarding hospitalizations, it was proven that patients with higher FACED scores had more frequent hospitalizations: 27.6% vs. 2.9%. (Figure 3) This difference in percentages was statistically significant (p=0.012).

For exacerbations in the previous year, a higher proportion was observed in more severe cases: 65.5%. (Figure 4) The difference compared to other severity grades was significant (p=0.016).

TABLE 1. Colonization by Pseudomona and other germs

Colonization	
Pseudomona	13
Moraxella	1
Nocardia	1
H. influenzae	1
Klebsiella	0
Micobacterias	0

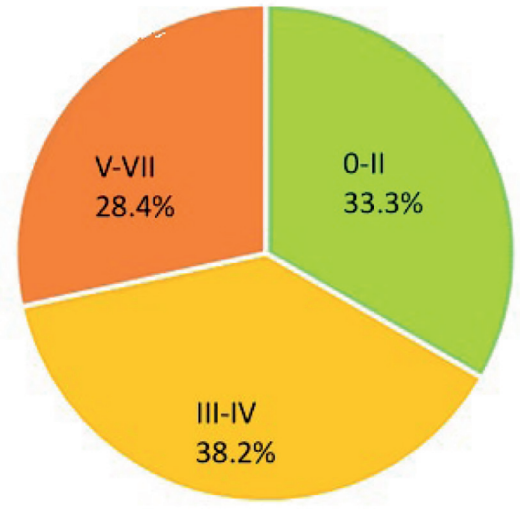

Figure 2. Sample distribution according to FACED (n=102).

48.3% of patients with FACED grades V-VII, and 5.9% of those with FACED grades I-II required CHOT, showing a significant difference (p=0.0001).

No significant differences were found when correlating smoking with the severity score.

CONCLUSION

Non-cystic fibrosis bronchiectasis is a multidimensional disease with a negative impact on quality of life, and no single parameter has been shown to have sufficient power to fully determine its severity and prognosis. The FACED score is a tool for assessing the severity of bronchiectasis, validated for patients with non-cystic fibrosis bronchiectasis. In our personal experience, using it to assess our patients has proven effective in predicting exacerbations, hospitalizations, and the need for oxygen therapy. At the end of this study, we can conclude that in our population of patients with non-cystic fibrosis BE, the majority of the cases fall into the category of "moderate" according to the FACED score. The FACED score proved useful at our center for predicting exacerbations, hospitalizations, and the need for CHOT in patients categorized as severe. We challenge ourselves to keep registering and categorizing these patients in order to develop management and complication prevention strategies.

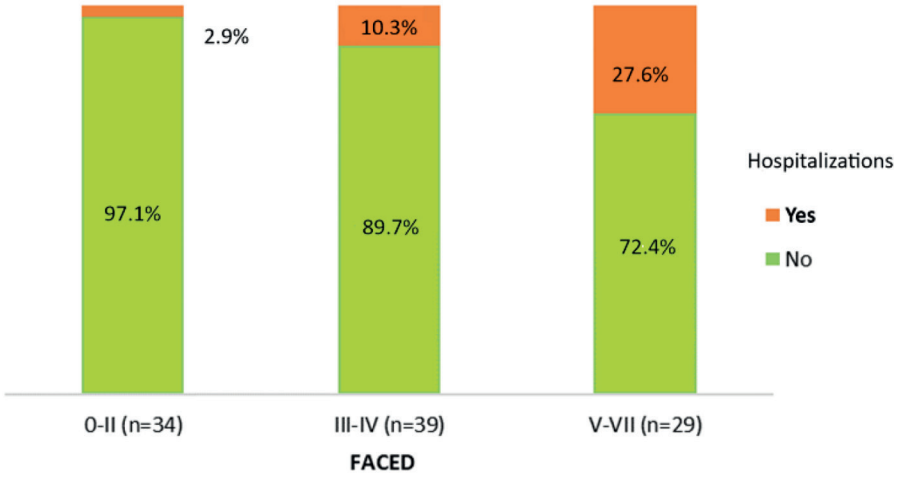

Figure 3. Hospitalizations according to FACED (p=0.012).

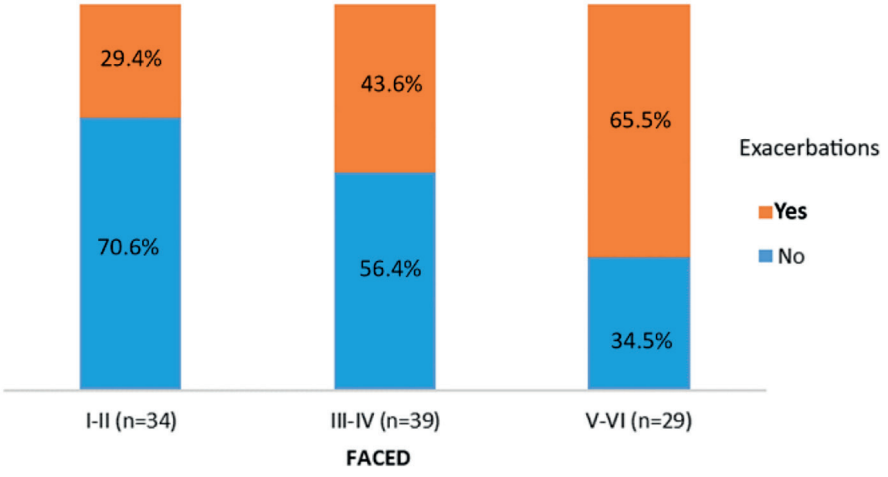

Figure 4. Exacerbations the previous year according to FACED.

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