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Original Research Article

Clinical Profile, Management Strategies, and Treatment Outcomes of Patients with Allergic Bronchopulmonary Aspergillosis: A Retrospective Cohort Study

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Abstract:

Background: An immunologically mediated pulmonary disorder due to hypersensitivity to Aspergillus fumigatus is known as Allergic Bronchopulmonary Aspergillosis (ABPA). The overlapping clinical presentations with other chronic respiratory diseases may lead to lung damage that can be irreversible, thus emphasizing the importance of diagnosing and treating these diseases early.

Aim: To analyze the clinical profile, treatment and management of patients attending tertiary care pulmonary center with ABPA.

Methodology: The methodology adopted for the present study was retrospective cohort study which comprised of 90 adult cases of ABPA diagnosed as per International Society for Human and Animal Mycology (ISHAM) criteria in the department of pulmonary medicine, Rajan Babu Institute of Pulmonary Medicine and Tuberculosis (RBIPMT), Delhi. All of the demographic, clinical, laboratory, radiological, treatment and follow-up data were obtained from hospital records and analyzed on SPSS version 26.0.

Results: The mean age of the patients was 41.8 ± 13.2 years and 57.8% of the patients were females. The underlying condition most common was bronchial asthma (86.7%) and the most frequent symptoms were cough (92.2%), breathlessness (85.6%) and wheezing (80.0%). Of the patients, 76.7% had central bronchiectasis. The combination of corticosteroid and antifungal drugs resulted in significant improvement in clinical, radiological and pulmonary function, decrease in serum IgE level and decrease in relapses, compared to the use of a single drug ($p < 0.05$). Low baseline serum IgE levels (<3000 IU/mL), eosinophils (<1000 cells/μL) and combination therapy were independent of good treatment outcomes.

Conclusion: ABPA is a disease that primarily impacts patients with asthma and is often underdiagnosed. The early recognition, thorough evaluation, and combined treatment with steroids and antifungal agents has a better treatment outcome, lower likelihood of relapse, and better long-term disease control.

Keywords: Allergic Bronchopulmonary Aspergillosis, ABPA, Aspergillus fumigatus, Retrospective Cohort Study, Corticosteroids, Antifungal Therapy, Bronchial Asthma, Serum IgE, Pulmonary Function, Treatment Outcomes.

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Introduction

Allergic bronchopulmonary aspergillosis (ABPA) is an immunologically mediated pulmonary disease that is a hypersensitivity reaction to chronic colonization of the airways with Aspergillus fumigatus. It is mostly seen in patients with asthma or CF but is now being identified in people with chronic obstructive pulmonary disease (COPD), bronchiectasis, and other chronic lung diseases. This combination of fungal colonization and hyperactive host response leads to chronic inflammation of the airways, mucous impaction, persistent pulmonary infiltrates and ultimately to progressive structural lung damage if untreated. Although there have been improvements in diagnostic methods, ABPA is still underdiagnosed and often misdiagnosed as poorly controlled asthma or recurrent pulmonary infections, resulting in delayed diagnosis and irreversible pulmonary complications [1,2].

There is no single test for the diagnosis of ABPA and it is based on a combination of clinical manifestations, immunological evidence and characteristic radiological findings. In addition, the International Society for Human and Animal Mycology (ISHAM) Working Group has set agreed diagnostic criteria for ABPA that include an underlying respiratory condition, high total serum immunoglobulin E (IgE), positive Aspergillus fumigatus-specific IgE or Aspergillus skin test, peripheral eosinophilia, and imaging features including central bronchiectasis or mucus plugging.[3,4] Moreover, the ISHAM classification has defined five clinical stages of ABPA from acute disease to advanced fibrotic lung disease. Patients who have been diagnosed at an early stage tend to respond well to therapy and can gain full remission while those who come in advanced stages often suffer from irreversible bronchiectasis, pulmonary fibrosis and progressive respiratory failure [3].

A major problem in the management of ABPA is that there is significant time between the onset of symptoms and diagnosis. The early clinical signs are frequently non-specific and highly similar to those of asthma, pulmonary tuberculosis, eosinophilic lung diseases or recurrent bacterial pneumonia. Therefore, many patients are treated with multiple courses of antibiotics, bronchodilators, or even antitubercular therapy before the proper diagnosis is made. Prior research has found an average delay in diagnosis of nearly 10 years, at which point irreversible structural lung damage may already be present. These delays greatly contribute to morbidity, loss of pulmonary function, decrease in quality of life and difficulty in subsequent management. Thus, increasing clinician awareness and early recognition will continue to be an important aspect of ABPA care [4].

The basis of ABPA treatment is to control the hyperactive immune response and at the same time decrease the amount of fungus found in the airways. Systemic corticosteroids continue to be the treatment of first choice as they have a rapid anti-inflammatory effect and can help to decrease eosinophilic inflammation in the airway. But chronic use of steroids can have significant side effects such as diabetes mellitus, high blood pressure, osteoporosis, weight gain, cataracts and an increased risk of infection. To reduce the use of corticosteroid therapy, antifungal drugs like itraconazole, voriconazole and posaconazole are increasingly being used as adjunctive and steroid-sparing therapy. Biologic drugs, such as omalizumab, mepolizumab, benralizumab, and dupilumab, that target immune pathways are more recent and have shown encouraging results in those who are steroid-dependent and/or have recurrent disease, but there are still few robust long-term data [5,6].

Radiological assessment is a key component of diagnostics and monitoring of disease. High-resolution computed tomography (HRCT) usually shows central bronchiectasis, mucus plugging, transient infiltrates in the lungs, high attenuation mucus and different degrees of fibrotic changes in the advanced disease. Laboratory investigations such as raised total serum IgE, peripheral eosinophilia, Aspergillus specific IgE and IgG antibodies are also useful for aiding the diagnosis and monitoring the response to treatment. The serum level of total IgE is now a valuable tool for assessing disease activity and determining relapses in follow-up [7].

ABPA has been well studied in the western world but data from developing nations, especially India, is undergoing change. Asthma and pulmonary TB are prevalent diseases in India and pose a significant challenge in diagnosis of ABPA with similar clinical and radiological features. Multiple studies have reported significant differences in the presentation of disease, diagnosis and treatment, and outcomes among patients in different health care systems in India. Most of the studies, however, have small patient numbers, have largely been diagnostic, or have lacked the information needed to assess the long-term treatment results and prognostic factors [8]. Thus, a full institutional study to assess the clinical spectrum, treatment approach and response of ABPA in everyday clinical practice is needed.

Pulmonary Medicine Department of Rajan Babu Institute of Pulmonary Medicine and Tuberculosis (RBIPMT) is a major tertiary referral center dealing with a large number of patients with chronic respiratory diseases including ABPA. Retrospective analysis of patients treated at this institution can provide information regarding the demographic profile, presentation, laboratory abnormalities, radiological features, treatment modalities and clinical outcomes in real world Indian population. This information can help increase disease knowledge, aid in the early diagnosis of disease, maximize disease treatment, and minimize long term pulmonary complications.

Thus, the present retrospective cohort study has been carried out to assess clinical profile, management and outcome of treatment of Allergic Bronchopulmonary Aspergillosis patients at the Department of Pulmonary Medicine, Rajan Babu Institute of Pulmonary Medicine and Tuberculosis (RBIPMT), Delhi. The main goal of the study is to evaluate in detail the demographic, clinical, laboratory, radiological, therapeutic and treatment outcome data to generate evidence to guide clinical decision making and to improve patient care in the daily practice of pulmonary medicine.

Methodology

Study Design: The present study is a retrospective cohort study that aimed at assessing the clinical profile, management and treatment outcome of patients diagnosed with "Allergic Bronchopulmonary Aspergillosis (ABPA)"". The study included the re-

view of the medical records of the hospital that were already entered in the medical records of the patients who met the diagnostic criteria for ABPA. A retrospective design was chosen to allow all clinical features, radiological parameters, treatments and outcomes to be evaluated in a defined study time period, without impacting patient management. The study followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for observational studies.

Study Area: The study was carried out at the Department of Pulmonary Medicine, Rajan Babu Institute of Pulmonary Medicine and Tuberculosis (RBIPMT), Delhi, India.

Study Duration: The same study was performed for a one-year period.

Sample Size: A total of 90 patients (N = 90) with the diagnosis of Allergic Bronchopulmonary Aspergillosis (ABPA) who met the study's predetermined eligibility criteria were included in the study. This was a retrospective cohort study, in which all available patient records for the study period were selected, and so were included using consecutive sampling.

Sample Population: The study population comprised the adult patients diagnosed with ABPA and who attended the Department of Pulmonary Medicine at RBIPMT. The study has taken both male and female patients who are aged 18 years and above. The underlying lung diseases were bronchial asthma or other predisposing pulmonary diseases, and the patients met the diagnostic criteria of the International Society for Human and Animal Mycology (ISHAM) Working Group for ABPA.

Data Collection: A structured data extraction form was used to retrieve the data from the medical records of the hospital, case files of both in and outpatients, electronic medical records, laboratory, radiology, and pulmonary function test records retrospectively. Detailed information gained included demographic information (age, sex, residence and smoking history); clinical information (duration of symptoms, bronchial asthma, previous pulmonary tuberculosis, chronic obstructive pulmonary disease (COPD), diabetes mellitus, other comorbidities and presenting symptoms including cough, expectoration, wheezing, breathlessness, fever, hemoptysis, chest pain, and weight loss. Laboratory tests included complete blood count, absolute eosinophil count, total serum levels of IgE, Aspergillus fumigatus-specific IgE, Aspergillus-specific IgG (available), and skin prick test (available). A chest radiograph and high-resolution computed tomography (HRCT) to assess central bronchiectasis, mucoid impaction, high-attenuation mucus, fleeting pulmonary infiltrates, fibrosis, consolidation, cavitary lesion and other pulmonary abnormalities were included in the radiological assessment. Forced vital capacity (FVC), forced expiratory volume in one second (FEV_1), FEV_1/FVC ratio and bronchodilator reversibility as available were reviewed in the pulmonary function test records. Treatment-related information covered the use of oral corticosteroids, use of antifungal medication (itraconazole or voriconazole), combination therapy, bronchodilator therapy, the duration of the treatment, modifications to the treatment and adverse drug reactions. The clinical improvement, symptomatic remission, decrease in serum IgE, radiological improvement, pulmonary function improvement, disease relapse or recurrence, hospitalization during follow-up, and for some patients, mortality were included to assess treatment outcome.

Inclusion Criteria

Patients were considered for the study if they fulfilled all of the following:

- Adults (18 years and older).
- Dx Allergic Bronchopulmonary Aspergillosis by ISHAM diagnostic criteria.
- Full medical records are available with good clinical, laboratory, radiological and treatment data.
- RBIPMT treated and followed patients during the period of the study.

Exclusion Criteria

Patients were excluded if they had any one of the following:

- Age below 18 years.
- Failure to transcribe or maintain complete medical records. Not completing or filing medical records.
- Any patient who has a doubtful diagnosis of ABPA.
- ABPA patients who do not meet diagnostic criteria who have other invasive fungal infections or chronic pulmonary aspergillosis.
- Treatment outcome measures were not completed for all patients. Follow-up was lost before treatment outcome was assessed.

Study Procedure: A retrospective analysis of the hospital database and medical records showed all the patients who were diagnosed with Allergic Bronchopulmonary Aspergillosis (ABPA) during the study period. Patient records were selected for study according to the inclusion and exclusion criteria set. Patient records were identified for study by pre-defined inclusion and exclusion criteria. Data were collected on a standardized case record form, including demographic, clinical, laboratory, radiological, pulmonary function, treatment and follow-up data. Diagnosis was made based on the diagnostic criteria of International Society for Human and Animal Mycology (ISHAM) according to clinical presentation, immunological investigations and radiological find-

ings. Patients' records were examined for chest high-resolution computed tomography (HRCT) findings and spirometry reports. Patients were classified by the treatment strategy they received (corticosteroids, antifungal agents or a combination of both). This was assessed based on the results of clinical symptoms improvement, reduction in serum IgE, pulmonary function changes, radiologic changes, relapses and/or recurrence of disease, and the overall treatment outcome.

Statistical Analysis: Data were entered into Microsoft office Excel spreadsheet and analyzed using Statistical Package for the Social Sciences (SPSS) version 26.0 (IBM Corp., Armonk, NY, USA). Shapiro–Wilk test was used to determine the normality of continuous variables. Continuous variables that were normally distributed were presented as mean ± standard deviation (SD) and those that were not presented as median (IQR). Categorical variables were presented in terms of frequencies and percentages. The independent Student's t-test, Mann–Whitney U test and one-way analysis of variance (ANOVA) and Kruskal–Wallis test were used as appropriate to make comparisons between treatment groups. Categorical variables were compared with each other using Chi-square test or Fisher's exact test. Before- and after-treatment comparisons of serum IgE levels and pulmonary function were performed by the paired t-test or Wilcoxon signed-rank test, depending on the distribution of the data. A multivariate logistic regression analysis was performed to determine independent variables associated with favorable treatment outcome after adjusting for potential confounding factors, such as age, sex, baseline serum IgE, absolute eosinophil count, duration of asthma and radiological severity. All analyses were considered statistically significant at a p-value of < 0.05 (two-tailed)".

Result

The baseline demographical and clinical parameters of 90 patients with Allergic Bronchopulmonary Aspergillosis (ABPA) are summarized in Table 1. The study population mean age was 41.8 ± 13.2 years with the highest number of patients being in the third age group (31-45 years) (38.9%). The female population accounted for 57.8 per cent and the male population accounted for 42.2 per cent of the population that was studied. The majority of patients (68.9%) lived in urban areas while 81.1% were non-smokers. The most common underlying respiratory condition in the patients was bronchial asthma (86.7%), followed by past pulmonary tuberculosis (21.1%), diabetes mellitus (20.0%) and COPD (11.1%).

Table 1: Baseline Demographic and Clinical Characteristics of Patients with ABPA (N = 90)

Variable	Frequency (n)	Percentage (%)
Age (years), Mean ± SD	**41.8 ± 13.2**	—
18–30 years	20	22.2
31–45 years	35	38.9
46–60 years	24	26.7
>60 years	11	12.2
Male	38	42.2
Female	52	57.8
Rural residence	28	31.1
Urban residence	62	68.9
Current/Former smoker	17	18.9
Non-smoker	73	81.1
History of bronchial asthma	78	86.7
Previous pulmonary tuberculosis	19	21.1
COPD	10	11.1
Diabetes mellitus	18	20

The most common presenting clinical signs of patients with ABPA are outlined in Table 2. The common symptoms reported were cough (92.2%), breathlessness (85.6%), wheezing (80.0%) and expectoration (75.6%). Chest pain, weight loss and hemoptysis were seen in 20.0%, 17.8% and 12.2% of patients, respectively, and fever was present in 25.6% of patients. The mean duration of symptoms prior to diagnosis was 16.9 ± 9.4 months, suggesting that many patients had been having respiratory symptoms for a long period of time before they were diagnosed with ABPA.

Table 2: Clinical Presentation of Patients with ABPA (N = 90)		
Clinical Feature	**Frequency (n)**	**Percentage (%)**
Cough	83	92.2
Breathlessness	77	85.6
Wheezing	72	80
Expectoration	68	75.6
Fever	23	25.6
Chest pain	18	20
Hemoptysis	11	12.2
Weight loss	16	17.8
Duration of symptoms (months), Mean ± SD	**16.9 ± 9.4**	—

Table 3 shows the laboratory and radiological data of the study population. The mean absolute eosinophil count was 982 ± 426 cells/µL and the median total serum IgE was 2350 IU/mL (IQR: 1680 – 3920 IU/mL). The Aspergillus fumigatus specific IgE positivity was seen in 93.3% of patients, the Aspergillus-specific IgG and skin prick test positivity in 68.9% and 64.4% of patients respectively. The most frequent radiological finding was central bronchiectasis seen in 76.7% of the patients by high-resolution computed tomography (HRCT). Other abnormalities were mucoid impaction (46.7%), transient pulmonary infiltrates (41.1%), consolidation (24.4%), high-attenuation mucus (20.0%), fibrosis (15.6%), and cavitary lesions (6.7%).

Table 3: Laboratory and Radiological Findings (N = 90)	
Parameter	**Value**
Absolute eosinophil count (cells/µL), Mean ± SD	982 ± 426
Total serum IgE (IU/mL), Median (IQR)	2350 (1680–3920)
Positive A. fumigatus-specific IgE	84 (93.3%)
Positive Aspergillus-specific IgG	62 (68.9%)
Positive skin prick test	58 (64.4%)
Central bronchiectasis	69 (76.7%)
Mucoid impaction	42 (46.7%)
High-attenuation mucus	18 (20.0%)
Fleeting pulmonary infiltrates	37 (41.1%)
Fibrosis	14 (15.6%)
Consolidation	22 (24.4%)
Cavitary lesions	6 (6.7%)

The treatment modalities used for ABPA patients are summarized in Table 4. Combination therapy (oral corticosteroid + antifungal) was given to more than half of the patients (52.2%), corticosteroids alone to 31.1% and antifungal alone to 16.7%. 90.0% of patients were prescribed bronchodilator therapy. Treatment was modified in 21.1% of patients at follow-up, either because of poor response or side effects; 13.3% had adverse drug reactions noted.

Table 4: Treatment Strategies Adopted (N = 90)		
Treatment Modality	**Frequency (n)**	**Percentage (%)**
Corticosteroids alone	28	31.1
Antifungal therapy alone	15	16.7
Combination therapy	47	52.2
Bronchodilator therapy	81	90
Treatment modification	19	21.1
Adverse drug reactions	12	13.3

Table 5 shows how well each management strategy works for the treatment. Combination therapy achieved the best clinical improvement (91.5%), radiological improvement (80.9%), reduction in serum IgE levels >35% (85.1%) and improvement in pulmonary function (78.7%). Patients who received combination therapy had the lowest relapse rate (12.8%) than patients who received only corticosteroid therapy (25.0%) or antifungal therapy (33.3%). The clinical improvement, radiological improvement, serum IgE reduction, pulmonary function improvement, and relapse rates of the treatment groups differed significantly from each other ($p < 0.05$). There was no significant difference in the number of hospitalizations between the treatment groups ($p = 0.214$).

Table 5: Treatment Outcomes According to Treatment Strategy				
Outcome	**Corticosteroids (n=28)**	**Antifungal (n=15)**	**Combination (n=47)**	**p-value**
Clinical improvement	22 (78.6%)	10 (66.7%)	43 (91.5%)	**0.041**
Radiological improvement	18 (64.3%)	9 (60.0%)	38 (80.9%)	**0.048**
IgE reduction >35%	20 (71.4%)	9 (60.0%)	40 (85.1%)	**0.032**
Pulmonary function improvement	19 (67.9%)	8 (53.3%)	37 (78.7%)	**0.049**
Disease relapse	7 (25.0%)	5 (33.3%)	6 (12.8%)	**0.045**
Hospitalization	4 (14.3%)	3 (20.0%)	3 (6.4%)	**0.214**

Table 6 shows the changes in pulmonary function parameters and serum IgE after treatment. The mean FEV_1 improved significantly from 62.4 ± 14.8% at baseline to 74.9 ± 13.2% during follow-up ($p < 0.001$). Similarly, mean FVC increased from 71.8 ± 12.6% to 81.6 ± 11.5%, while the FEV_1/FVC ratio improved from 68.5 ± 8.2 to 73.7 ± 7.6. A significant decrease in serum IgE levels was also seen after treatment from 2350 IU/mL to 1180 IU/mL ($p < 0.001$), showing a good response to therapy.

Table 6: Pulmonary Function and Serum IgE Before and After Treatment (N = 90)			
Parameter	**Baseline**	**Follow-up**	**p-value**
FEV_1 (% predicted)	62.4 ± 14.8	74.9 ± 13.2	<0.001
FVC (% predicted)	71.8 ± 12.6	81.6 ± 11.5	<0.001
FEV_1/FVC ratio	68.5 ± 8.2	73.7 ± 7.6	0.002
Serum IgE (IU/mL), Median (IQR)	2350 (1680–3920)	1180 (740–2030)	<0.001

Table 7 shows the results of a multivariate logistic regression analysis that identified predictors of favorable treatment outcomes. With the adjustment for possible confounding factors, patients with baseline serum IgE levels < 3000 IU/mL were significantly more likely to have favorable treatment outcomes (AOR = 2.54, 95% CI: 1.20–5.39, p = 0.015). Similarly, an absolute eosinophil count below 1000 cells/μL (AOR = 1.90, 95% CI: 1.01–3.57, p = 0.046) and the use of combination therapy (AOR = 3.42, 95% CI: 1.43–8.18, p = 0.006) were independently associated with improved treatment outcomes. These factors, however, were not shown to be significant factors predicting the treatment response, unlike age, sex, duration of asthma and presence of central bronchiectasis.

Table 7: Multivariate Logistic Regression Analysis for Predictors of Favorable Treatment Outcome			
Variable	**Adjusted Odds Ratio (AOR)**	**95% Confidence Interval**	**p-value**
Age (>45 years)	0.79	0.41–1.53	0.482
Female sex	1.17	0.60–2.27	0.645
Asthma duration >5 years	0.88	0.45–1.72	0.706
Baseline serum IgE <3000 IU/mL	2.54	1.20–5.39	0.015
Eosinophil count <1000 cells/μL	1.9	1.01–3.57	0.046
Combination therapy	3.42	1.43–8.18	0.006
Central bronchiectasis	0.93	0.44–1.97	0.852

Discussion

In the present retrospective cohort study of 90 patients with ABPA, the disease was found to affect mainly middle-aged adults (mean age 41.8 ± 13.2 years) with the highest proportion in the age group 31–45 years (38.9%). There were more females (57.8%) than males (42.2%) and the majority of patients were urban (68.9%) and non-smoking (81.1%). Most frequent associated disease was bronchial asthma (86.7%), followed by previous pulmonary tuberculosis (21.1%), diabetes mellitus (20.0%) and COPD (11.1%). The results are similar to those of Agarwal et al. [3] and Zeng et al. [9] who also found asthma as the main predisposing condition for ABPA, but our study demonstrated a greater predominance of female over male in its occurrence, as compared to many previous reports".

The clinical profile seen in our patients was similar to that of the classical presentation of ABPA. The most common symptoms were cough (92.2%), breathlessness (85.6%), wheezing (80.0%) and expectoration (75.6%) while fever, chest pain, weight loss and hemoptysis were seen infrequently. The average duration of symptoms before the diagnosis was made was 16.9 ± 9.4 months, indicating late diagnosis. Similar delays observed in the case of ABPA by Zeng and Muthu [10] were underscored, explaining that there is a high incidence of misdiagnosis of ABPA due to its similarity with uncontrolled asthma and other chronic respiratory conditions.

Laboratory tests showed significant eosinophilia (982 ± 426 cells/µL) and elevated levels of median serum IgE (2350 IU/mL). 93.3% of patients were positive for Aspergillus fumigatus-specific IgE, 68.9% for Aspergillus-specific IgG and 64.4% for skin prick test. Central bronchiectasis (76.7%), mucoid impaction (46.7%) and transient pulmonary infiltrates (41.1%) were most commonly identified by HRCT. These findings are similar to those reported by Agarwal et al. and Zeng et al., who found that central bronchiectasis, high IgE level, eosinophilia and mucus plugging are all associated with disease severity and recurrence [11].

As far as management, the most common treatment (52.2%) was combination therapy (oral corticosteroid and antifungal treatment), followed by oral corticosteroid monotherapy (31.1%) and antifungal monotherapy (16.7%). 90% of patients received bronchodilators and 21.1% required treatment modification and 13.3% required adverse drug reactions (ADRs). These treatment patterns are in line with the current recommendations for fungus burden reduction with first-line therapy of corticosteroid plus adjunctive antifungal agents. Other studies have shown better disease control and longer time to exacerbation with combination therapy, as reported by Agarwal et al. and Zeng et al. [12].

Combination therapy again proved to be superior to treatment outcomes. The clinical improvement rate (91.5%), radiological improvement (80.9%), serum IgE reduction>35% (85.1%) and pulmonary function improvement (78.7%) were seen in patients receiving combined treatment, with the lowest relapse rate (12.8%). These differences were statistically significant, but rates of hospitalization were not. The combined corticosteroid-antifungal therapy has been shown to have similar benefits in reducing the relapse and disease control in the long-term by Agarwal et al. and Zeng et al. [11].

Objective treatment response was also reflected by significant improvement in pulmonary function and immunological markers. Mean FEV_1 increased from 62.4% to 74.9%, FVC from 71.8% to 81.6%, and the FEV_1/FVC ratio from 68.5 to 73.7, while median serum IgE levels declined significantly from 2350 IU/mL to 1180 IU/mL. Similar results have been seen in previous studies and decreases in the serum levels of IgE and improvements in spirometry parameters are considered reliable measures of the success of the treatment.

Baseline serum IgE levels <3000 IU/mL (AOR=2.54), eosinophil count <1000 cells/µL (AOR=1.90) and combination therapy (AOR=3.42) were independent factors that were associated with favorable treatment outcome. On the other hand, age, sex, duration of asthma, and central bronchiectasis were not significant. Both studies highlight the importance of reducing inflammatory burden and effective combination therapy for a better prognosis although Zeng et al. found that exacerbation was predicted by prolonged asthma duration, mucus plugging and impaired lung function.

The overall results suggest that there is a high prevalence of delayed diagnosis, even with characteristic clinical, laboratory and radiological parameters of ABPA. Combination therapy is also shown to be superior in clinical, radiological and functional outcomes versus monotherapy; and low pre-treatment serum IgE and eosinophil count may be helpful as prognostic factors. Although there are some slight variations to previous reports, the overall results do support existing evidence and support the need for early recognition and evidence-based management to minimise disease progression and improve outcomes for patients.

Conclusion

The current retrospective cohort study has shown that Allergic Bronchopulmonary Aspergillosis is a clinically important respiratory condition which mainly presents in patients with an underlying asthma diagnosis and has characteristic clinical, immunological and radiological characteristics. Delayed diagnosis is still observed due to the similarity of symptoms with other chronic respiratory conditions and warrants more clinical awareness and timely diagnosis. Combination therapy of the corticosteroids and antifungal agents had better clinical, radiological, immunological and pulmonary function outcomes and lower risk of disease relapse compared with monotherapy, the study found. In addition, lower baseline inflammatory markers were identified as good predictors of treatment response. Overall, these results underline the significance of early diagnosis, thorough evaluation and combination treatment based on evidence for better disease control, avoiding irreversible pulmonary complications and for optimal long-term results in ABPA patients.

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