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ORIGINAL RESEARCH

Analysis of Clinical Features and Related Factors of Silent Aspiration in Hospitalized COPD Patients

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ABSTRACT

Context • Silent aspiration is a common complication of chronic obstructive pulmonary disease (COPD). COPD's acute-exacerbation phase may be associated with silent aspiration, impacting a patient's prognosis. Silent aspiration may be more likely to occur in patients in poor basic physical condition.

Objective • The study intended to explore the clinical features and other factors related to silent aspiration in patients hospitalized with COPD.

Design • The research team designed a retrospective study using data from medical records of patient's hospitalized with COPD.

Setting • The study took place at the Sixth Hospital of Wuhan at the Affiliated Hospital of Jianghan University in Wuhan, China.

Participants • Participants were 49 patients with acutely aggravated COPD who had been hospitalized between January 2019 and December 2019 at the hospital.

Intervention • Participants had all received a radionuclide salivary test at the hospital in the past for silent aspiration. Based on the test results, 15 patients were included in the positive group, and 34 patients were included in the negative group.

Outcome Measures • The study compared the two groups': (1) clinical features— respiratory difficulty on the modified Medical Research Council (mMRC) scale, rate of concomitant pneumonia, number of prior admissions to the intensive care unit (ICU), number of acute exacerbations within the year preceding the study, and proportion of patients with two or more acute exacerbations within the year preceding the study; (2) lung function— forced expiratory volume (FEV1), (FEV1%pre), and FEV1/ forced vital capacity (FVC %); (3) blood gases— partial pressure of oxygen (PaO2) and partial pressure of carbon dioxide (PaCO2); and (4) laboratory parameters— white blood cell (WBC) counts, C-reactive protein (CRP), procalcitonin (PCT), and percentage of neutrophils. The research team used univariate and multivariate, logistic regression analysis to identify risk factors for silent aspiration in hospitalized COPD patients. All participants were followed for a mean duration of 18.98 ± 3.09 months, with a range 12 to 24 months.

Results • No patients died during the follow-up. No statistically significant differences existed between the groups in age, gender, course of illness, or other clinical variables ($P > .05$). The positive group had significantly lower scores on the mMRC than did the negative group. Some of the positive group's results were significantly higher than those of the negative group: (1) rate of concomitant pneumonia, (2) number of prior admissions to the ICU, (3) number of acute exacerbations within the year preceding the study, and (4) proportion of patients with two or more acute exacerbations within the year preceding the study ($P < .05$). No statistical differences existed between the groups in the FEV1, PaO_2), $PaCO_2$, WBCs, or percentage of neutrophils ($P > .05$). The FEV1%pre and FEV1/FVC%) were significantly lower and the CRP and PCT levels were significantly higher in the positive group than in the negative group ($P < .05$).

Conclusion • The mMRC scores, concomitant pneumonia, and prior admission to the ICU were risk factors for silent aspiration in hospitalized COPD patients. Hospital staff should pay more attention to patients with those risk factors during hospitalizations. (*Altern Ther Health Med.* 2022;28(7):125-131).

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Chronic obstructive pulmonary disease (COPD) is one of the most prevalent, chronic, airway diseases in the world, currently affecting more than 250-million patients globally. In China, the prevalence of COPD is approximately 13.7% among people aged above 40 years, affecting about 100-million patients.[1,2]

The disease is mainly characterized by persistent progression and repeated exacerbations. The more severe the disease is, the more frequently the acute exacerbations occur and the poorer the patients' prognoses are.[3] Currently, delaying the rapid decline in a patient's pulmonary function is the main goal of COPD treatment, aiming at decreasing the number of acute exacerbations, reducing the risk of death, and extending his or her life.

Silent aspiration is a common complication of COPD. It refers to aspiration of oropharyngeal or gastric contents into the lower respiratory tract. Contents in silent aspiration can be food, oral or nasal secretions, or regurgitated gastric contents. COPD's acute-exacerbation phase may be associated with silent aspiration, impacting a patient's prognosis.[4]

Hou et al[11] found that 14 out of 52 of their COPD participants had silent aspiration, with an incidence of 26.92%. Zheng et al[12] showed that the rate of silent aspiration was 33.3% in their COPD participants in the acute-exacerbation recovery phase. Cvejic et al[13] found that the incidence of silent aspiration was 56.00% in their COPD participants. The higher rate in that study compared to other studies may be due to a difference in their included patients; they didn't exclude patients with esophageal reflux or nervous system disease.

A cough reflex occurs upon silent aspiration in an attempt to get rid of silent aspirates promptly so that complications can be avoided. However, the contents and volume of silent aspiration are different in patients who don't have a cough reflex or have a weak cough, and the manifestations of silent aspiration can also different.

Silent aspiration may simply manifest as a cough, sputum production, or shortness of breath; it may also manifest as pneumonia, even life-threatening severe pneumonia.[7] Older patients are common among hospitalized COPD patients, and their tissues and physiological functions may have degenerated, leading to a reduced vital capacity and pulmonary compliance.

In addition, some patients have concomitant respiratory tract infections. With a prolonged stimulation of the oropharyngeal mucosa by inflammatory cytokines, aspiration pneumonia can readily develop, leading to exacerbations.[8] These in turn can aggravate the silent-aspiration risk, forming a vicious cycle. which isn't favorable to a patient's prognosis.[8] Therefore, silent aspiration should be actively prevented clinically in hospitalized COPD patients.

Mechanisms of Silent Aspiration

The possible mechanisms that can produce silent aspiration are complex. COPD patients' impaired swallow function and swallow-respiration coordination are the main causes of their silent aspiration. The abnormality in COPD patients' respiratory and swallow patterns could be due to chronic respiratory difficulties and hypercapnia.

Some other factors may contribute to the occurrence of silent aspirations. Silent aspiration may more readily occur during eating in the early phase of respiration, where the difference is maximal between the thoracic pressure and the oral-cavity pressure.

Hospitalized COPD patients could have an impaired defense against silent aspiration due to the diminished power of their respiratory muscles as a result of atrophy of the skeletal muscles and abdominal muscles.[14] They could have a functional impairment of the laryngopharynx muscles due to long term use of glucocorticoids, chronic hypoxemia, ongoing inflammation, chronic malnutrition, and smoking. Oral glucocorticoids, anticholinergic drugs and smoking could also cause impairment of esophageal motion and gastric emptying, lowering the esophageal sphincter pressure and esophageal-acid removal rate and finally leading to reflux-induced silent aspiration.

COPD patients' silent aspiration could also be due to a reduced sensitivity of their airway mucosa, inflammation, regurgitation of food, use of anticholinergic drugs and antihistamines.

Finally, COPD patients may also have comorbidities such as diabetes, chronic kidney disease, neurodegenerative diseases, gastroesophageal reflux, and obstructive sleep apnea, that can increase the risk of silent aspiration.[15]

Diagnosis of Silent Aspiration

The guidelines of the Global Initiative for Chronic Obstructive Lung Disease (GOLD) don't emphasize the impact of silent aspiration on acute exacerbation of COPD and long-term mortality risk and don't provide any specific recommendations for COPD patients. Also, no consensus exists about the criteria for the diagnosis of dysphagia and silent aspiration in COPD patients.

Common evaluation methods include: (1) a water-swallow test; (2) a radionuclide examination; (3) a simple, two-step, swallowing provocation test; (4) a repetitive-swallowing provocation test; and (5) a video, fluoroscopic swallowing examination.[9] A radionuclide examination uses radionuclides such as [1] in-chlorides (Tc-99m sulfur colloid) for diagnosing silent aspiration. Radionuclide imaging has a high sensitivity for silent aspiration and is safe and pain-free.[10]

During acute exacerbation, hospitalized COPD patients have common symptoms such as cough, sputum production, and respiratory difficulties and may have a concurrent fever, throat pain, or breathlessness, which are very similar to the symptoms of silent aspiration. Therefore, hospitalized COPD patients with silent aspiration can't be differentiated simply based on their symptoms.

Current Study

The current research team hypothesized that silent aspiration was more likely to occur in patients in poor basic

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physical condition. Therefore, the current study research team intended to explore the clinical features and other factors related to silent aspiration in hospitalized COPD patients.

METHODS

Participants

The research team designed a retrospective study using data from medical records of patients hospitalized with COPD. The study took place at the Sixth Hospital of Wuhan at the Affiliated Hospital of Jianghan University in Wuhan, China. Prospective participants were 116 patients with acutely aggravated COPD who were hospitalized between January 2019 and December 2019 at the hospital.

Prospective participants were included in the study if they: (1) met the diagnostic criteria for acute exacerbation of COPD according to the COPD Diagnosis and Treatment Guidelines (2013 Revised Edition) of the Chinese Medical Association Respiratory Medicine Division,[5] (2) had received radionuclide salivary tests for silent aspirations during stable acute exacerbations, (3) had available a complete medical history and data from physical examinations, a chest imaging study, and previous lung-function tests from a stable period compatible with COPD, (4) had a forced expiratory volume (FEV1)/forced vital capacity (FVC) ratio of <70% after bronchodilator inhalation; (5) had a smoking history of ≥30 packs/year; and (6) were mentally alert, communicative, and cooperative.

Prospective participants were excluded from the study if they: (1) had a mental handicap or cognitive impairment; (2) were unwilling to participate in the study; (3) had severe cardiovascular disease; (4) had a prior history of oral, nasopharyngeal surgery (uvulopalatopharyngoplasty); larynx surgery; esophagectomy; or a history of radiation; or (5) had a known nervous system disease, such as dementia, cerebrovascular accidents, myasthenia gravis, traumatic brain injury, myasthenia gravis, cerebral palsy, infantile paralysis, or a progressive disease, such as Parkinson's disease and Huntington's disease.

Participants and their family members signed a written informed consent. The study's protocol was in accordance with the Declaration of Helsinki and approved by the Ethics Committee of The Sixth Hospital of Wuhan.

Procedures

Groups. Participants had all received a radionuclide salivary test at the hospital in the past for silent aspiration. Based on the results of a radionuclide salivary test for silent aspiration, patients with positive results were assigned to the positive group, and patients with negative results were assigned to the negative group.

Radionuclide imaging for silent aspiration. Participants were placed in the supine position, and radionuclide imaging agents were instilled into their mouths at a constant speed of 24 ml/h. Participants were instructed to swallow freely during that instillment.

Data were collected using a low-energy, all-purpose collimator with a 20% test-window width, a matrix 128×128, and an energy peak of 140 keV. Data were collected from the oropharynx to the esophagus and stomach.

Dynamic imaging was done every 30 s for 30 min. After completion of dynamic imaging, participants were told to slowly drink 1 mL of tepid water with their heads bowing down, and static images, posterior and anterior, were collected for 5 min.

In tracheal and bronchial trees, radionuclide images = silent aspiration and no radionuclide images = no silent aspiration.

Outcome Measures. At admission, data was obtained on blood gases—partial pressure of oxygen (PaO_2) and partial pressure of carbon dioxide ($PaCO_2$)—and laboratory parameters—white blood cell (WBC) counts, C-reactive protein (CRP), procalcitonin (PCT), and percentage of neutrophils, and lung function.

The research team collected participants' ages, genders, history of smoking, history of diseases other than COPD, respiratory difficulty score (mMRC), and prior COPD disease history—chronic cor pulmonale or concomitant pneumonia.

The general clinical features, lung function, blood gases, and laboratory parameters were compared between the two groups and a univariate and a multivariate logistic regression analysis were conducted on risk factors for silent aspiration in hospitalized COPD patients.

Follow up visits. The research team followed up with patients by telephone, WeChat or QQ, and obtained data on patients' general information, comorbidities, complications, ability for normal food intake, and survival. The study's endpoint was death.

Outcome Measures

mMRC scores. The modified Medical Research Council (mMRC) scale measure respiratory difficulty. Qian et al[16] showed that mMRC is a risk factor for silent aspiration in COPD patients and that silent aspiration is an important factor in acute exacerbation for COPD patients. The modified mMRC classification criteria from the UK Medical Research Council was used for evaluation.[6] The scale's scores ranges from 0-4, with 0 = no breathing difficulty except during heavy exercise; 1 = short of breath when hurrying on the level or walking up a slight hill; 2 = having to walk slower than most people on the level because of shortness of breath or having to stop to take a breath when walking on the level; 3 = having to stop for breath after walking about 100 meters, or after a few minutes, on the level; 4 = too breathless to leave the house. Higher scores indicate greater severity of respiratory difficulties.

The data collection for the two groups was independently completed by two physicians on the second day after each participant's admission, and the average value was taken as the final data.

Lung function. Liu et al[17] found that silent aspiration and FEV1 are frequent risk factors for acute exacerbation in COPD patients. A computerized lung-function device (JAEGR, city, state, Germany) was used to measure FEV1, FEV1%pre, and FEV1/FVC % for all participants.

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Table 1. Comparison of Demographic and Clinical Features Between the Groups (N = 49)

Variables	Positive Group n = 15 Mean ± SD n (%)	Negative Group n = 34 Mean ± SD n (%)	*t*	*P* value
Age, y	67.98 ± 8.97	67.23 ± 8.78	0.274	.785
Gender			0.231	.631
Male	13 (86.67)	31 (91.18)		
Female	2 (13.33)	3 (8.82)		
Course of Illness, mos	17.23 ± 1.38	17.76 ± 1.43	-1.208	.233
mMPC Scores	3.57 ± 0.56	3.98 ± 0.51	-2.518	.015*
COPD Disease History				
Chronic cor pulmonale	12 (80.00)	24 (70.59)	0.473	.492
Chronic hyperuricemia	8 (53.33)	10 (29.41)	2.563	.109
History of Other Diseases				
Pulmonary embolism	1 (6.67)	2 (5.88)	0.011	.916
Concomitant pneumonia	7 (46.67)	1 (2.94)	14.567	<.001[a]
Concomitant asthma	1 (6.67)	4 (11.77)	0.295	.587
Pneumothorax	1 (6.67)	1 (2.94)	0.369	.544
Bronchiectasis	3 (20.00)	1 (2.94)	4.040	.079
Left cardiac insufficiency	2 (13.33)	3 (8.82)	0.231	.631
Wet bronchiectasis	1 (6.67)	3 (8.82)	0.065	.799
Connective tissue disease	0 (0.00)	1 (2.94)	0.450	.502
Stroke	1 (6.67)	2 (5.88)	0.011	.916
Hypertension	2 (13.33)	3 (8.82)	0.231	.631
Prior admission to ICU	6 (40.00)	0 (0.00)	15.498	<.001[a]
Diabetes	0 (0.00)	2 (5.88)	0.092	.338
Number of acute exacerbations within the preceding year	1.97 ± 0.34	0.87 ± 0.63	6.746	<.001[a]
Proportion of patients with two or more acute exacerbations within the preceding year	8 (53.33)	1 (2.94)	17.627	<.001[a]

[a]$P < .05$, indicating that the mMPC scores were significantly lower and the rate of concomitant pneumonia, number of prior admissions to the ICU, number of acute exacerbations, and proportion of patients with two or more acute exacerbations were significantly higher for the positive group than for negative group

Abbreviations: ICU, intensive care unit; mMPC, modified Medical Research Council scale

Statistical Analysis

Data was analyzed using SPSS 23.0. Normally distributed data were expressed as means ± standard deviations (SDs), and the intergroup comparisons were done using a t test. Non-normally distributed data were expressed as medians (P25, P75), and the intergroup comparisons were done using the Mann-Whitney U test. Categorical data were compared using chi-square test or Fisher exact test. $P < .05$ indicated a statistically significant difference.

Univariate and multivariate, logistic regression analysis was done on the risk factors for silent aspiration in hospitalized COPD patients. For the univariate logistic regression analysis, the independent variables were significant clinical features, lung function, laboratory indexes, mMRC scores, concomitant pneumonia, prior admission to the ICU, number of acute exacerbations within the preceding year, proportion of patients with 2 or more acute exacerbations within the preceding year, FEV1%pre, FEV1/FVC%, CRP, and PCT. Silent aspiration in hospitalized COPD patients was the dependent variable.

For the multivariate logistic regression analysis, the independent variables were mMRC scores, concomitant pneumonia, prior admission to the ICU, number of acute exacerbations within the preceding year, proportion of patients with two or more acute exacerbations within the preceding year, FEV1%pre, FEV1/FVC%, and CRP. Silent aspiration in hospitalized COPD patients was the dependent variable.

RESULTS

Participants

Of the 116 prospective COPD participants, 49 met the inclusion criteria (Table 1). Based on the results of the radionuclide salivary test for silent aspiration, 15 participants with positive results were assigned to the positive group, and 34 with negative results were assigned to the negative group. The positive group included 13 males and 2 females, and

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their mean age was 67.98 ± 8.97 years, with a range of 46-76 years. The negative group had 31 males and 3 females, and their mean age was 67.23 ± 8.78 years, with a range of 46-74 years. No statistically significant differences existed between the groups in age or gender ($P > .05$).

General Clinical Features

The mean duration of follow-up was 18.98 ± 3.09 months, with a range 12 to 24 months (data not shown). No patients died during the follow up. No statistically significant differences existed between the groups in course of illness or other clinical variables.

The positive group had significantly lower mMRC scores than did the negative group ($P = .015$). For the positive group, the rate of concomitant pneumonia ($P < .001$), number of prior admissions to the ICU ($P < .001$), number of acute exacerbations within the preceding year ($P < .001$), and proportion of patients with two or more acute exacerbations within the preceding year ($P < .001$) were significantly higher than those of the negative group.

Lung Function, Blood Gases, Laboratory Indexes

No statistically significant differences existed between the groups in FEV1, PaO_2, $PaCO_2$, WBC, or the percentage of neutrophils ($P > .05$). The positive group had a significantly lower FEV1%pre ($P = .001$) and FEV1/FVC% ($P = .002$) but a significantly higher CRP ($P < .001$) and PCT ($P < .001$) than the negative group did, as Table 2 shows.

Univariate Logistic Regression Analysis

The univariate logistic regression analysis showed that the risk factors for silent aspiration in hospitalized COPD patients were: (1) mMRC scores ($P < .001$), (2) concomitant pneumonia ($P = .012$), (3) prior admission to the ICU ($P = .004$), (4) number of acute exacerbations within the preceding year ($P = .014$), (5) proportion of patients with 2 or more acute exacerbations within the preceding year ($P = .018$), (6) FEV1%pre ($P = .029$), (7) FEV1/FVC% ($P = .004$), and (8) CRP ($P = .032$), as Table 3 shows.

Multivariate Logistic Regression Analysis

The multivariate logistic regression analysis showed that the risk factors for silent aspiration in hospitalized COPD patients were: (1) mMRC scores, (2) concomitant pneumonia, and (3) prior admission to ICU, as Table 4 shows.

DISCUSSION

The current study found no differences in age, gender, course of illness, or other clinical variables between the two groups ($P > .05$), but the positive group had significantly lower mMRC scores than the negative group and significantly higher rates of concomitant pneumonia, prior admissions to the ICU, number of acute exacerbations within the preceding year, and the proportion of patients with two or more acute exacerbations within the preceding year than the negative group ($P < .05$). The current research team suggests that it's likely that other hospitalized COPD patients with silent aspiration will show the same results because the disease is more severe in hospitalized COPD patients with concomitant silent aspiration.

Table 2. Comparison of Lung Function, Blood Gases, and Laboratory Indexes Between the Groups (N = 49)

Variables	Positive Group n = 15 Mean ± SD	Negative Group n = 34 Mean ± SD	*t*	*P* value
FEV1, L	0.99 ± 0.43	0.78 ± 0.41	1.628	.110
FEV1%pre, %	32.98 ± 6.87	42.19 ± 10.92	-3.570	.001[a]
FEV1/FVC%, %	33.12 ± 6.92	42.78 ± 10.09	-3.366	.002[a]
PaO_2, mmHg	75.23 ± 18.98	73.29 ± 19.28	0.326	.746
$PaCO_2$, mmHg	58.76 ± 18.65	60.09 ± 18.46	-0.232	.818
CRP, mg/mL	31.29 ± 10.29	11.76 ± 3.98	9.646	<.001[a]
WBC, ×109/L	8.76 ± 2.09	8.19 ± 2.18	0.854	.397
PCT, ng/mL	0.41 ± 0.06	0.21 ± 0.09	7.848	<.001[a]
Neutrophils, %	81.28 ± 9.87	75.98 ± 9.76	1.746	.087

[a]$P < .05$, indicating that the FEV1%pre (%) and FEV1/FVC% (%) were significantly lower and the CRP and PCT were significantly higher for the positive group than for negative group

Abbreviations: CRP, C-reactive protein; FEV1, forced expiratory volume; FEV1%pre; FVC%, forced vital capacity %; PaO_2, partial pressure of oxygen; $PaCO_2$, partial pressure of carbon dioxide; PCT, procalcitonin; WBC, white blood cells.

The current study found that the two groups had no statistically significant differences in FEV1, PaO_2, $PaCO_2$, WBC and the percentage of neutrophils ($P < .05$). Furthermore, compared to the negative group's results, the positive group's lower FEV1%pre and FEV1/FVC% and higher CRP and PCT suggest a markedly reduced lung function for hospitalized COPD patients with silent aspiration. The positive group's increased CRP and PCT levels indicates higher levels of inflammation in the body. It's likely that the lowered lung function of hospitalized COPD patients and their higher levels of inflammation could reduce the sensitivity of the airway mucosa.

The multivariate logistic regression analysis demonstrated that mMRC scores, concomitant pneumonia, and prior admission to ICU can be risk factors for silent aspiration in hospitalized COPD patients. This is likely because the higher mMRC scores were, the more severe the respiratory difficulties of hospitalized COPD patients became. Severe cases are more prone to silent aspiration.

In addition, the development of pneumonia is related to silent aspiration, and patients' admissions to the ICU are related to pulmonary encephalopathy or severe pneumonia. To improve the prognosis of patients, rehabilitation training to prevent silent aspiration should be undertaken. It's very important to prevent aspiration-associated pneumonia.

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Table 3. Univariate Logistic Regression Analysis of Risk Factors for Silent Aspiration in Hospitalized COPD Patients

Variables	Regression Coefficient	Criteria Error	Wald χ^2	*P* value	OR (95%Cl)
mMPC scores	0.104	0.312	9.707	<.001[a]	3.502 (3.113-4.113)
Concomitant pneumonia	1.363	0.529	8.089	.012[a]	1.801 (1.029, 2.687)
Prior admission to ICU	0.637	0.956	0.459	.004[a]	2.797 (2.001, 3.689)
Number of acute exacerbations within the preceding year	0.617	0.132	3.786	.014[a]	1.312 (1.019, 2.209)
Proportion of patients with two or more acute exacerbations within the preceding year	61.765	8.837	50.654	.018[a]	4.476 (1.187, 7.321)
FEV1%pre	0.813	0.301	6.219	.029[a]	1.689 (1.308-2.421)
FEV1/FVC%	0.309	0.269	6.207	.004[a]	1.805 (1.611-2.123)
CRP	0.448	0.776	0.421	.032[a]	1.611 (1.012-2.221)
PCT	0.589	0.859	0.462	.083	0.721 (0.512, 2.709)

[a]$P < .05$, indicating that the mMPC scores, concomitant pneumonia, prior admission to the ICU, number of acute exacerbations within the preceding year, Proportion of patients with two or more acute exacerbations within the preceding year, FEV1%pre, FEV1/FVC%, and CRP were significant risk factors for silent aspiration in hospitalized COPD patients in the univariate logistic regression analysis

Abbreviations: COPD, chronic obstructive pulmonary disease; CRP, C-reactive protein; FEV1, forced expiratory volume; FEV1%pre; FVC%, forced vital capacity %; ICU, intensive care unit; mMPC, modified Medical Research Council scale; PCT, procalcitonin.

Table 4. Multivariate Logistic Regression Analysis of Risk Factors for Silent Aspiration in Hospitalized COPD Patients

Variables	Regression Coefficient	Criteria Error	Wald χ^2	*P* value	OR (95%Cl)
mMPC scores	1.016	0.708	1.518	<.001[a]	3.502 (3.113-4.113)
Concomitant pneumonia	0.816	0.216	11.231	<.001[a]	2.121 (1.321, 3.765)
Prior admission to ICU	1.678	0.734	5.049	.023[a]	5.289 (1.232, 14.376)
Number of acute exacerbations within the preceding year	0.376	0.114	0.209	.092	1.123 (1.003, 1.376)
Proportion of patients with two or more acute exacerbations within the preceding year	0.121	0.019	0.168	.718	0.819 (0.543, 1.227)
FEV1%pre	0.305	0.603	0.353	.089	0.219 (0.169, 1.321)
FEV1/FVC%	0.528	0.816	0.431	.472	1.105 (0.478-1.601)
CRP	0.006	0.008	2.413	.103	1.001 (0.519-1.507)

[a]$P < .05$, indicating that the mMPC scores, concomitant pneumonia, and prior admission to the ICU, were significant risk factors for silent aspiration in hospitalized COPD patients in the multivariate logistic regression analysis

Abbreviations: COPD, chronic obstructive pulmonary disease; CRP, C-reactive protein; FEV1, forced expiratory volume; FEV1%pre; FVC%, forced vital capacity %; ICU, intensive care unit; mMPC, modified Medical Research Council scale; PCT, procalcitonin.

The current research team recommends individualized and evidence-based rehabilitation, including rehabilitation counseling, for hospitalized COPD patients with silent aspiration, in the belief it can improve respiratory function, alleviate symptoms, lessen disease severity, and reduce the occurrences of silent aspiration.

The current study had several limitations. First, the study was retrospective, based on the data from previous inpatients, and a bias existed for enrollment. Additionally, there involved a few risk factors for silent aspiration in patient with COPD. Furthermore, accurate and prospective research with a larger sample size is warranted.

CONCLUSION

The mMRC scores, concomitant pneumonia, and prior admission to the ICU were risk factors for silent aspiration in hospitalized COPD patients. Hospital staff should pay more attention to patients with those risk factors during hospitalizations.

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AUTHOR CONTRIBUTIONS

Sisi Chen and Yu Hu contributed equally to this paper.

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