Section: Respiratory Medicine

Original Research Article

# STUDY TO EVALUATE PREVALENCE AND ASSOCIATED RISK FACTORS WITH ISOLATION OF MULTIDRUG RESISTANT PATHOGENS IN CHRONIC SUPPURATIVE LUNG DISEASE ATTENDING TERTIARY CARE CENTER, AT DEPARTMENT OF RESPIRATORY MEDICINE, TB & CHEST HOSPITAL, BADI, R.N.T. MEDICAL COLLEGE, UDAIPUR

***Suraj Prakash Sharma[1], Umesh Kumar Jatav[2], Mahesh Kumar Mahich[3]***

*[1]Junior Specialist, Department of Respiratory Medicine, District Hospital, Dausa, Rajasthan, India.*
*[2]Senior Consultant (NBE), Assistant Professor, Department of Respiratory Medicine, Government Medical College, Sawai Madhopur, Rajasthan, India.*
*[3]Assistant Professor (Interventional Pulmonologist), Department of Respiratory Medicine, RNT Medical College, Udaipur, Rajasthan, India.*

***Received*** *: 12/02/2025*
***Received in revised form*** *: 02/03/2025*
***Accepted*** *: 28/03/2025*

**Corresponding Author:**
**Dr. Mahesh Kumar Mahich,**
Assistant Professor (Interventional Pulmonologist), Department of Respiratory Medicine, RNT Medical College, Udaipur, Rajasthan, India.
Email: dr.mahich@gmail.com

**DOI:** 10.70034/ijmedph.2025.2.38

**Source of Support:** Nil,
**Conflict of Interest:** None declared

**Int J Med Pub Health**
2025; 15 (2); 221-227

**ABSTRACT**

**Background:** Chronic suppurative lung disease (CSLD) is the end result of chronic airway inflammation that is driven by persistent infection. The aim of this study to evaluate the prevalence and associated risk factors with isolation of multidrug resistant pathogens in chronic suppurative lung disease.
**Materials and Methods:** The present prospective study was conducted in fifty-two chronic suppurative lung disease patients between the age of 18-90 years at Respiratory Medicine Department of TB & Chest Hospital, Badi in R.N.T. Medical College, Udaipur during one-year period, after getting approval from institutional ethical committee.
**Results:** Suppurative lung diseases were more frequent in male patients. Male female ratio is 2.06. More than three fourth patients of suppurative lung disease belong to rural area. In both type of suppurative lung disease, pseudomonas was the most common organism isolated from the biological samples. Second common organism isolated was klebsiella in patients of bronchiectasis and lung abscess. Risk factors for MDR pathogen were multifactorial for both pseudomonas and klebsiella.
**Conclusion:** While dealing with suppurative lung disease antibiotic should be judicious and adequately used and underlying lung and systemic disease should be appropriately managed.
**Keywords:** Chronic suppurative lung disease (CSLD), Pseudomonas, Bronchiectasis, Lung abscess, Klebsiella, MIC.

## INTRODUCTION

Chronic suppurative lung disease (CSLD) is the end result of chronic airway inflammation that is driven by persistent infection.[1] As such, the natural history of CSLD depends largely on the susceptibility to both acute and chronic infection.[2] Historically, congenital malformations, cystic fibrosis, immune deficiency, and aspiration are common antecedents,[3] although a primary cause is not always identified. Further, measles, tuberculosis, and pertussis.[4,5] Once the most common causes of CSLD may be less important today in the wake of advances in vaccinations, antibiotics, and access to health care.[6]

Bronchiectasis is a chronic lung disease characterized by persistent and lifelong widening of the bronchial airways and weakening of the function mucociliary transport mechanism owing to repeated infection contributing to bacterial invasion and

mucus pooling throughout the bronchial tree.[7-9] The most common cause of bronchiectasis was thought to be an antecedent respiratory infection, often during childhood. The causes are idiopathic, acquired, or infection related. Bacterial Infections, Viral Infections, Fungal Infections, Bronchial obstruction, Post-inflammatory pneumonitis, Congenital/Genetic, Inflammatory diseases, Pulmonary Diseases, Altered immune response. History of a long-standing cough with purulence is typical of bronchiectasis. The hemoptysis is mild and manifested by blood flecks in the patient's usual purulent sputum, which is occasionally life-threatening. Often patients are diagnosed after many years of symptoms when cough or hemoptysis becomes chronic.

Lung abscess is defined as a circumscribed area of pus or necrotic debris in lung parenchyma, which leads to a cavity, and after formation of bronchopulmonary fistula, an air-fluid level can be seen in lung abscess.[10] Lung abscess can be a sequalae of lung infections such as lung gangrene and necrotizing pneumonia which are characterized by formation of multiple abscesses.[11] Lung abscess can lead to sequelae such as chronic lung abscess, empyema or bronchiectasis.[12,13] The most common method of formation of lung abscess is aspiration of oropharyngeal secretions into the lung in patients who have history of loss or depressed in consciousness or having poor oro-dental hygiene. It may occur in patients who have disturbance in swallowing like esopharyngeal stricture, esophageal motility disorder, neuromuscular disorders etc or have impaired laryngeal closure like cuffed endotracheal tube; tracheostomy tube etc. Sometime infection spread via hematogenous spread.[14]

Over 90% cases of lung abscess, poly microbial bacteria can be found.[15] Anaerobic bacteria have been for decades the most dominant type of bacteria in lung abscess with Streptococcus spp. and Klebsiella pneumonia, so it is very important to have specific antibiotic therapy for those bacteria.[16,17]

Staphylococcus aureus is the most common isolated etiologic pathogen of lung abscess in children.[18,19] Other etiologic pathogen for lung abscess are Mycobacterium spp, fungal, parasitic, Actinomyces and Nocardia asteroides and they require a longer duration (6 months) of antibiotic administration.[20] Multi drug resistance pathogens were classified according to European Centre of Diseases Prevention and Control: P. aeruginosa was considered MDR if non susceptible to at least 1 agent in 3 or more antimicrobial categories; MRSA was defined when S aureus was resistant to oxacillin corresponding to a minimum inhibitory concentration (MIC) of ≥4 mcg/mL. Enterobacteriaceae was defined as ESBL+ when they presented resistance to most β-lactam antibiotics, including penicillin, cephalosporins.[21]

Necrotizing pneumonia refers to the development of necrosis, liquefication, and cavitation of the lung parenchyma from an infectious pathogen. Nearly 4% of all community-acquired pneumonias are necrotizing, although studies retrospectively evaluating the incidence have found it to be increasing during the past 20 years. Common presenting symptoms include fever, tachypnea, and cough, and most of those afflicted also develop complications such as parapneumonic effusions, empyemas, or bronchopleural fistulae.[22]

The aim of this study to evaluate the prevalence and associated risk factors with isolation of multidrug resistant pathogens in chronic suppurative lung disease.

## MATERIALS AND METHODS

The present prospective study was conducted in fifty-two chronic suppurative lung disease patients between the age of 18-90 years at Respiratory Medicine Department of TB & Chest Hospital, Badi in R.N.T. Medical College, Udaipur during one-year period, after getting approval from institutional ethical committee.

**Inclusion Criteria**

1. Patients having suppurative lung diseases.
2. Patients having bronchiectasis either post tubercular or nontubercular.

**Exclusion Criteria**

1. Patient would not give consent.
2. Patients refused for admission
3. Patients having massive hemoptysis.
4. Uncooperative patients
5. Moribund patients
6. Patients with age less than 18 years.

**Method**

Patients with suspected lung abscess and bronchiectasis presented to this department were the study population. After admission demographic profile (name, age, sex, residence), duration of present illness, past medical history (DM, HT, CVA, CAD, epilepsy) if any, personal history, occupational history and previous history of antibiotic intake within 90 days, previous history of admission in health care facility within 90 days of patients, immunocompromise status were carefully enquired and documented.

Detailed cardinal symptoms (cough, expectoration, dyspnea, chest pain, hemoptysis, and wheeze) were asked. Patients were asked about any constitutional symptoms (weight loss, fever, malaise, loss of appetite etc) and if present then recorded. General physical examination was done and positive findings were recorded. Oral cavity too was examined to check oro-dental hygiene.

Respiratory system was thoroughly examined and positive findings were recorded. Other systems were examination also examined. All patients were subjected to chest radiograph and HRCT thorax. Patients who had older chest radiograph were compared with fresh radiograph. In suspected pleural effusion cases, USG chest were done for confirmation and marking for thoracentesis.

Blood sample were drawn using universal precautions and sent to central laboratory of this medical college for routine investigations (CBC, RBS, ESR, LFT, RFT, HIV, S. Electrolyte). In special cases RA factor, ANA, ds DNA, SACE level was sent to rule out interstitial disease as a cause of bronchiectasis.

Morning sputum samples were collected in sterile container for sputum AFB examination, gram staining, and sputum pyogenic & culture sensitivity. One more sputum sample was collected in falcon tube for detection of MTB by CBNAAT.

In patients presented with pleural effusion, USG guided pleural aspiration was done and sent for cytological, biochemical and bacteriological examination including pyogenic and culture sensitivity. Pleural fluid was also sent for CBNAAT. After getting all the reports it was analysed and filled in preformed proforma final analysis. For culture, samples were inoculated on culture media like blood agar with sheep blood in microbiology department of this institution, Chocolate agar and Eosin Methylene blue (EMB) medium and incubated for 48hr-72hrs at 37ºC. If any bacteria grown on culture, the isolate was identified using standard conventional biochemical tests along with standard ATCC positive and negative controls for better interpretation of results and quality assurance. The microbiology of pleural effusions were classified as follows: Gram-positive bacteria, Gram-negative bacteria.

Antibiotic susceptibility testing was done using Kirby Bauer disk diffusion method using Mueller-hinton agar according to Clinical Laboratory Standards Institute [CLSI] guidelines. To determine qualitative categories, specific Minimum inhibitory concentration(MIC) values are used to classify bacteria as susceptible, intermediate, or resistant to a specific antibiotic. The MIC is the lowest concentration of antibiotic needed to inhibit the growth of an organism. The CLSI defines Susceptible as those isolates, that are inhibited by typical achievable concentrations of an antibiotic when the dosage recommended to treat the infection site is used.[23]The Resistant category encompasses isolates that are not inhibited by the usual achievable concentrations of an antibiotic agent or for which resistance mechanisms are likely and clinical efficacy of antibiotics has not been reliably shown. The Intermediate category includes isolates that approach usually attainable levels in blood and tissue by an antibiotic, and response rates are lower than susceptible isolates.

## RESULTS

Among 43 patients of bronchiectasis, 27 (51.92%) were male and 16 (30.76%) were female and among lung abscess patients (N=9), 8 (15.38%) and 1 (1.92%) were male and female respectively. Suppurative lung diseases were more frequent in male patients. Male female ratio is 2.06 (table 1).

Among patients of bronchiectasis, most of the patients were in age group of 51- 60 yrs and 61-700 yrs having 11 (21.15%) and 11 (21.15%) patients respectively. Lung abscess were more in age group of 41-50 yrs and 61-70 yrs. Only one patient of lung abscess falls in young age group (30-40yrs). More than three fourth patients of suppurative lung disease belong to rural area (table 1).

History of previous hospitalization and antibiotic use were the major risk factors for MDR pathogen in patients of bronchiectasis found in 21 (40.38%) patients whereas in lung abscess major risk factor for MDR pathogen was COPD found in 6 (11.54 %) patients (table 2).

Most common respiratory symptoms in patient with bronchiectasis were expectoration followed by cough and dyspnea whereas fever and anorexia were the common constitutional symptoms. Patients with lung abscess had dyspnea and chest pain as common respiratory symptoms and fever and anorexia were the common constitutional symptoms (Graph 1).

In both type of suppurative lung disease, pseudomonas was the most common organism isolated from the biological samples. Second common organism isolated was klebsiella in patients of bronchiectasis and lung abscess. No organisms were grown in 6 (13.95%) patients of bronchiectasis and 1 (11.11%) patient of lung abscess (table 3).

Out of 43 bronchiectasis patients 37 (86.05%) were drug resistant and out of them 10 (27.03%) patients were multidrug resistant pathogen. Risk factors for MDR pathogen were multifactorial for both pseudomonas and klebsiella. For pseudomonas, independent risk factor was previous use of antibiotic within 90 days other were history of hospitalization within 90 days, COPD and diabetic mellitus. For klebsiella previous use of antibiotic and previous hospitalization within 90 days was the independent risk factors other were DM and immunosuppression (table 4).

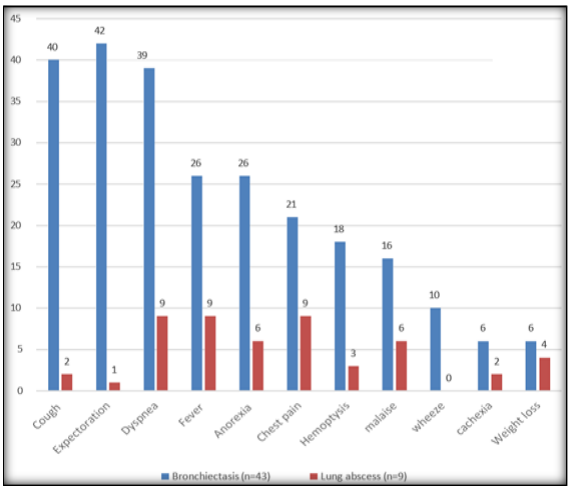


**Figure 1: Clinical symptoms among study population**

**Table 1: Distribution of study population according to demographic profile**

| VARIABLES | BRONCHIECTASIS (N=43) | LUNG ABSCESS (N=9) | TOTAL |
|---|---|---|---|
| SEX | | | |
| Male | 27 (51.92) | 8 (15.38%) | 35 (67.30%) |
| Female | 16 (30.76%) | 1 (1.92%) | 17 (32.69%) |
| **AGE (YEARS)** | | | |
| 18-30 | 3 (5.77%) | 1 (1.92%) | 4 (7.69%) |
| 31-40 | 5 (9.61%) | 1 (1.92%) | 6 (11.53%) |
| 41-50 | 7 (13.46%) | 3 (5.77%) | 10 (19.23%) |
| 51-60 | 11 (21.15%) | 0 (0%) | 11 (21.15%) |
| 61-70 | 11 (21.15%) | 3 (5.77%) | 14 (26.92%) |
| >70 | 6 (11.54%) | 1 (1.92%) | 7 (13.46%) |
| **RESIDENCE** | | | |
| Rural | 36 (69.23%) | 8 (15.38%) | 44 (84.61%) |
| Urban | 7 (13.46) | 1 (1.92%) | 8 (15.38%) |

**Table 2: Presence of risk factors for MDR pathogen in study population.**

| Risk factor | Bronchiectasis | Lung abscess |
|---|---|---|
| **History of hospitalization within 90 days** | 21(40.38%) | 3 (5.67%) |
| **Use of antibiotics in previous 90 days** | 21 (40.38) | 3 (5.67%) |
| **COPD** | 19 (36.54%) | 6 (11.54%) |
| **DM** | 7 (13.46%) | 3 (5.67%) |
| **Immunosuppression status** | 6 (11.54%) | 1 (1.92%) |
| **Lung Malignancy** | 3 (5.67%) | 1 (1.92%) |

**Table 3: Pyogenic organism isolated from the biological specimen of study population**

| Name of pyogenic organism | Bronchiectasis N=43 | Lung abscess N=9 |
|---|---|---|
| **Pseudomonas** | 18 (41.86%) | 6 (66.67%) |
| **Klebsiella** | 11 (25.58%) | 1(11.11%) |
| **Citrobactor** | 0 | 1 (11.11%) |
| **E. coli** | 2 (4.65%) | - |
| **Streptococcus pneumoniae** | 2 (4.65%) | - |
| **Staphylococcus aureus** | 2 (4.65%) | - |
| **No organism grown** | 6 (13.95%) | 1 (11.11%) |
| **Mixed** | 2 (4.65%) | - |

**Table 4: Distribution of patients with bronchiectasis according to presence of risk factors for MDR pathogen and isolated organism. (N=10)**

| MDR pathogens | Risk factors for MDR pathogen | | | | | | |
|---|---|---|---|---|---|---|---|
| | H/O hospitalization within 90 days | Use of antibiotics in prev. 90 days | COPD | DM | Immuno supp. | Lung cancer | C R F |
| **Pseudomonas N=7** | 5 (71.43%) | 7 (100%) | 5 (71.43%) | 1 (14.29%) | 0 (0%) | 0 (0%) | 0 (0%) |
| **Klebsiella N=3** | 3 (100%) | 3 (100%) | 1(33.33 %) | 2 (66.66 %) | 1 (33.33%) | 0 (0%) | 0 (0%) |

## DISCUSSION

In this study out of 52 patients with suppurative lung disease, 43(82.70 %) patients had bronchiectasis and 9 (17.30%) patients had lung abscess. No one was having necrotizing pneumonia. Suppurative lung diseases are a group of disorders which result in chronic lung infection, with pus in the lungs. Individuals with suppurative lung diseases present with chronic purulent sputum and recurrent respiratory tract infections. The aetiology of these conditions is variable. Bronchiectasis is a relatively common condition. The most common clinical suppurative lung conditions in children are empyema, lung abscess, and bronchiectasis, and to a less often necrotizing pneumonia. Until recently, bronchiectasis was the most common form of persistent suppurative lung disease in children.[2]

In present study, majority of Bronchiectasis patients (27) 51.92% patients were male, 30.76% were female. This finding was consistent with the EMBARC study,[24] in which 56.9% were male, 38.9% were female; male was predominantly affected. In another study, by Mehmet Ali Habesoglu et al,[25] 45.70%were male, 54.30% were female. Male predominance may be because of smoking and alcohol habit is predominantly seen in male person which is a risk factor for development of pneumonia which ultimately may leads to bronchiectasis and SLD. Smoking is a direct cause of bronchiectasis also. Secondly, in developing countries, women do not approach health care facilities very easily due to social restriction. This may be a cause of male predominance.

In present study, out of 9 lung abscess patients 8(88.89%) patients were male, 11.11% were female.

This was consistent with study carried out by Madhusmita Mohanty Mohapatra et al.[26] In their study 56.9% were male, 38.9% were female. In another study, by Thomas maitre et al,[27] there were 73.4% were male, 26.6%were female. The causes of male dominance in lung abscess patient may be same as describe above.

Among patients of bronchiectasis, most of the patients were in age group of 51-60 yrs and 61-70 yrs in 11 (21.15%) and 11 (21.15%) patients respectively. Lung abscess were more in age group of 41-50 yrs and 61-70 yrs. Majority of patients Bronchiectasis (53.49%) were above 50 Years of age. This was consistent with other studies. In the EMBARC study,[24] most of the patient of Bronchiectasis were above age of 50 years. In another study, carried out by Mehmet Ali Habesoglu et al,[25] most of the distribution of Bronchiectasis patients were above age of 50 years. Patients in the older age group are more susceptible to infection because of waning in immunity and defect in pulmonary defense mechanisms. Increasing age is also a risk factor for chronic lung disease (COPD) and other systemic diseases like DM, HT, CVA, CKD etc in which secondary bacterial or mycobacterial infections are common and subsequently development of bronchiectasis and Lung abscess.

Majority of patients Lung abscess (66.67%) were between 40-60Years of age in our study. This was consistent with other study by Madhusmita Mohanty Mohapatra et al,[26] majority of the patients were above 40 years (58.7%). In another study, carried out by Thomas Maitre et al,[27] most of the distribution of Lung abscess patients were of age group 43-58 years. Patients in this age groups are more susceptible because of poor oral hygienic, oral cavities, alcoholic and smoking habits. In our study, out of 9 lung abscess patient 8 were from rural area and with poor orodental hygiene. Poor orodental hygiene is a predisposing factor for development of lung abscess.

In present study, history of previous hospitalization and prior use of antibiotics were the major risk factors for MDR pathogen in patients of bronchiectasis found in 21 (40.38%) patients whereas in lung abscess major risk factor for MDR pathogen was COPD found in 6 (11.54 %) patients followed by previous use of antibiotics and DM Rosario Menéndez et al,[21] found three independent multidrug resistant risk factors were found for MDR pathogens in Bronchiectasis: chronic renal disease, hospitalization in the previous year and prior multidrug-resistant isolation. In another study done by Riccardo Inchingolo et al,[28] found several risk factors are independently associated with the isolation of MDR bacteria—the most frequent being previous MDR isolation, hospitalization in the previous years and chronic kidney disease. Most of the patients in this study were from rural areas where health care facilities are not very strong. Patients with lung abscess and bronchiectasis from these are a primary contacted with unexperienced hand and they use to treat with antibiotics without proper knowledge of dose and frequency. Patients with COPD also has frequent exacerbation. physician or quakes use antibiotic unethically to treat such patients. These are the factors supposed to be a cause of drug resistant.

In present study, most common respiratory symptoms in patient with bronchiectasis were expectoration (97.60%) followed by cough (93.02%) and dyspnea (90.70%) whereas fever (60.47%) and anorexia (60.47%) were the common constitutional symptoms. Mehmet Ali Habesoglu et al,[25] evaluated bronchiectasis patients and found expectoration (82.60%), cough (79.5%), dyspnoea (71.4%), and haemoptysis (26.7%) as a common symptom. In another study done by Maeve P. Smith et al29 found cough (90.2%), sputum (75.0%), dyspnea (60.0%) and Hemoptysis (40%) were the common symptoms. Findings of our study was consistent with the study by Mehmet Ali Habesoglu et al.[25]

Patients with lung abscess had dyspnea (100%) and chest pain (100%) as common respiratory symptoms and fever (100%) and anorexia (66.67%) were the common constitutional symptoms. Study done by Madhusmita Mohanty Mohapatra et al,[26] in which they found cough (91%), expectoration (76%), Chest pain (21.7%) and in constitutional symptoms Fever (83%) were most common. This finding was not consistent with the study by Mehmet Ali Habesoglu et al.[25] This finding may be because most of the lung abscess had COPD as an associated pulmonary disease. Infection by pyogenic organism leads to acute exacerbation of COPD which present as increase breathlessness.

Most of the patients with bronchiectasis in our study were in both lung and in both side it was common in upper zone whereas lung abscess was common in right lung and it was more common in upper zone in both side.

In EMBARC study,[24] the extent, site, type and lobar distribution of bronchiectasis were dependent on the underlying aetiology. Bronchiectasis had a predominant lower lobe involvement in patients with syndromes of impaired mucociliary clearance and upper lobe involvement of TB, radiation fibrosis, sarcoidosis and pneumoconiosis.

In Study done by Mehmet Ali Habesoglu et al,[25] they found bronchiectasis in multilobar area, bilateral disease in 62.5% cases and commonly lower lobe involved in 73.71% cases. Findings of our study were inconsistent with the study describe above. This inconsistency may be because, in this study many patients had past history of tuberculosis which is commonly affect upper lobe. That is the reason for upper lobe involvement.

Study done by Madhusmita Mohanty Mohapatra et al,[26] radiologically majority of lung abscess was found to be located on the right side with the most common site being right upper lobe in 23 cases (52.17%) followed by right lower lobe in 9 cases

(19.56%). Lung abscess was also present on left lung with the most common site being left upper lobe in 6 cases (13.10%). Finding of our study was consistent with the study by Madhusmita Mohanty Mohapatra et al[26] for lung abscess right lung is the common site for oropharyngeal secretion aspiration as right main bronchus remains in continuity with the trachea. Although aspiration commonly occurs in lower lobe but involvement may be positional dependent and patients who lines in lateral decubitus position, upper lobe involvement may occur in those patients.

In both type of suppurative lung disease, pseudomonas was the most common organism isolated from the biological samples. Second common organism isolated was klebsiella in patients of bronchiectasis and lung abscess. No organisms were grown in 6 (13.95%) patients of bronchiectasis and 1 (11.11%) patient of lung abscess. This is consistent with EMBARC study,[24] in this study P. aeruginosa (13.1%) and Enterobacteriaceae spp. constituted the major pathogens in bronchiectasis patients. In another study by Rosario Menéndez et al21 two hundred thirty three exacerbations of bronchiectasis were included and microorganisms were isolated in 159 episodes. Pseudomonas aeruginosa (48.5%), methicillin-resistant Staphylococcus aureus (18.2%) and extended spectrum betalactamase + enterobacteriaceae (6.1%) were the common pathogen.

In Lung abscess study done by Thomas Maitre et al,[27] the four more frequently identified bacteria were Staphylococcus aureus (17.2%), Pseudomonas aeruginosa (9.4%) Streptococcus spp. (4.7%) and Haemophilus influenzae (4.7%). In another study done by Madhusmita Mohanty Mohapatra et al,[26] in which they found klebsiella (50%), E.coli (26.08%),Mixed (19.6%), Str pneumonae (4.35%).Bacteriological profile of lung abscess in this study was little different from the study by Thomas Maitre et al,[27] this difference may be due to local risk factors, underlying lung disease, immune status of the patients and local bacteriological pattern.

Most of the pseudomonas was sensitive to amikacin, colistin, meropenem doxycycline. Few were sensitive to other beta-lactam and fluoroquinolone. Maximum antibiotic sensitivity of klebsiella was with colistin, meropenem and amikacin. Ecoli, S. Aureus and streptococcus pneumoniae were sensitive most of the antimicrobial agents.

In the study by Ahmad H, Sadiq A, Bhatti HW et al,[30] found Klebsiella was most sensitive to Cefoperazone + sulbactam(81.8%) and tazocin (71.4%)Pseudomonas was shown to be 66.7% sensitive to Cefoperazone + sulbactam, other gram-negative bacilli of this study included Escherichia coli and coliforms which were sensitive to amikacin (80%) and imipenem (100%) the gram-positive cocci, Staphylococcus aureus and Enterococcus, were sensitive to vancomycin (100%) Acinetobacter was most sensitive to tigecycline (94.7%) followed by Cefoperazone + sulbactam (7.7%).

Most of the pseudomonas was sensitive to amikacin, colistin, meropenem doxycycline. Few were sensitive to other betalactum and fluoroquinolone. Maximum antibiotic sensitivity of Klebsiella was with colistin, meropenem and amikacin. Citrobactor isolated from lung abscess was sensitive to all available antimicrobial.

In our study, sensitivity pattern to antibiotics were different from the study by Ahmad et al.[30] This may be because of different sensitivity pattern in local region. Secondly, testing of samples with limited antibiotic in the laboratory may change the sensitivity pattern.

Risk factors for MDR pathogen were multifactorial for both pseudomonas and klebsiella. For pseudomonas, independent risk factor was previous use of antibiotic within 90 days other were history of hospitalization within 90 days, COPD and diabetic mellitus. For klebsiella previous use of antibiotic and previous hospitalization within 90 days was the independent risk factors other were DM and immunosuppression. Rosario Menéndez, Raúl Méndez1 et al (2017),[21] found in their study shows two hundred thirty three bronchiectasis exacerbations were included and microorganisms were isolated in 159 episodes. Multidrug-resistant pathogens were found in 20.1% episodes. Three independent multidrug resistant risk factors were found: chronic renal disease (Odds ratio (OR), 7.60, 95% CI 1.92–30.09), hospitalization in the previous year (OR, 3.88 95% CI 1.37–11.02) and prior multidrug-resistant isolation (OR, 5.58, 95% CI 2.02–15.46). The proportion of multidrug-resistant in the 233 exacerbations was as follows: 3.9% in patients without risk factors, 12.6% in those with 1 factor and 53.6% if ≥2 risk factors.

Riccardo Inchingolo et al,[28] during episodes of exacerbation, MDR pathogens are frequently isolated from patients with bronchiectasis, particularly if hospitalized. Pseudomonas, MRSA and ESBL + Enterobacteriaceae are the most frequently encountered MDR bacteria. Several risk factors are independently associated with the isolation of MDR bacteria—the most frequent being previous MDR isolation, hospitalization in the previous year and chronic kidney disease. In present study and the study describe above, previous hospitalization is a common risk factor for multidrug resistant pathogen. While dealing patients with bronchiectasis and lung abscess risk factor for MDR pathogen should be kept in mind and empirical treatment should include broad spectrum antibiotic. Out of 9 lung abscess patients 8 (88.89 %%) were drug resistant and out of them 2 (25%) patients were multidrug resistant pathogen. Risk factors for MDR pathogen were multifactorial. Independent risk factors were history of hospitalization within 90 days and use of antimicrobial drug within 90 days.

In a study by Jiun-Ling Wangr,[31] found the susceptibility data for 40 anaerobic bacteria isolated from patients with community-acquired lung abscess were as follows: for penicillin, 15% of isolates were resistant, and 5% were intermediate; for clindamycin, 5% were resistant, and 2.5% were intermediate; for metronidazole, 5% were resistant, and 2.5% were intermediate; for cefoxitin, 2.5%. were resistant; for ampicillin-sulbactam, 2.5% were resistant. Of 30 isolates of K. pneumoniae, all were resistant to ampicillin, 1 (3%) had intermediate resistance to cefazolin, 1 (3%) had intermediate resistance to amoxicillin-clavulanate, and all were susceptible to second- and/or third-generation cephalosporins, gentamicin, and ciprofloxacin. Of 19 isolates from the S. milleri group, 21% were resistant to clindamycin, and 11% were resistant to penicillin.

## CONCLUSION

In the present study commonest MDR organism isolated from patients with chronic suppurative lung disease was Pseudomonas Aeroginosa, Klebseilla Pneumoniae was second most common organism. Pseudomonas and klebsiella were resistant to beta-lactum antibiotics so while treating patients with suppurative lung disease this antibiotic-resistant pattern should keep in mind and start antibiotics after receiving culture and sensitivity report. If empirical antibiotics to be given then beta-lectum antibiotics should not be included in the regimen. While dealing with suppurative lung disease antibiotic should be judicious and adequately used and underlying lung and systemic disease should be appropriately managed.

## REFERENCES


1. King P. Pathogenesis of bronchiectasis. Paediatr Respir Rev. 2011;12:104-10.
2. Chang AB, Marsh RL, Upham JW, Hoffman LR, Smith-Vaughan H, Holt D, et al. Toward making inroads in reducing the disparity of lung health in Australian indigenous and New Zealand Maori children. Front Pediatr. 2015;3:9.
3. Chang AB. Bronchiectasis: so much yet to learn and to do. Paediatr Respir Rev. 2011; 12:89–90.
4. Clark NS. Bronchiectasis in childhood. Br Med J (1963) 1:80–8.
5. Field CE. Bronchiectasis. A long-term follow-up of medical and surgical cases from childhood. Arch Dis Child (1961) 36:587–603.
6. Chang AB. Bronchiectasis: so much yet to learn and to do. Paediatr Respir Rev (2011) 12:89–90.
7. Ho T, Cusack RP, Chaudhary N, Satia I, Kurmi OP. Under- and over diagnosis of COPD: a global perspective. Breathe (Sheff). 2019 Mar;15(1):24-35.
8. Ferri S, Crimi C, Heffler E, Campisi R, Noto A, Crimi N. Vitamin D and disease severity in bronchiectasis. Respir Med. 2019 Mar;148:1-5.
9. Guan WJ, Han XR, de la Rosa-Carrillo D, Martinez-Garcia MA. The significant global economic burden of bronchiectasis: a pending matter. Eur Respir J. 2019 Feb;53(2).
10. Seo H, Cha SI, Shin KM, et al. Focal necrotizing pneumonia is a distinct entity from lung abscess. Respirology 2013;18:1095-100.
11. Yazbeck MF, Dahdel M, Kalra A, et al. Lung abscess: update on microbiology and management. Am J Ther 2014;21:217-21.
12. Bartlett JG. The role of anaerobic bacteria in lung abscess. Clin Infect Dis 2005;40:923-5.
13. Kuhajda I, Zarogoulidis K, Tsirgogianni K, Tsavlis D, Kioumis I, Kosmidis C, et al. Lung abscess-etiology, diagnostic and treatment options. Ann Transl Med. 2015 Aug;3(13):183.
14. Crofton's Douglas's text book Respiratory Disease; edition 5th; volume 1,page no-461.
15. Stock CT, Ho VP, Towe C, et al. Lung abscess. Surg Infect (Larchmt) 2013;14:335-6.
16. Takayanagi N, Kagiyama N, Ishiguro T, et al. Etiology and outcome of community-acquired lung abscess. Respiration 2010;80:98-105.
17. Nicolini A, Cilloniz C, Senarega R, et al. Lung abscess due to Streptococcus pneumoniae: a case series and brief literature review. Pneumonol Alergol Pol 2014;82:276-85.
18. Brook I. Anaerobic pulmonary infections in children. PediatrEmerg Care 2004;20:636-40.
19. Patradoon-Ho P, Fitzgerald DA. Lung abscess in children. Paediatr Respir Rev 2007;8:77-84.
20. Yildiz O, Doganay M. Actinomycoses and Nocardia pulmonary infections. CurrOpinPulm Med 2006;12:228-34.
21. Menéndez R, Méndez R, Polverino E, Rosales-Mayor E, Amara-Elori I, Reyes S, Sahuquillo-Arce JM, Fernández-Barat L, Alcaraz V, Torres A. Risk factors for multidrug-resistant pathogens in bronchiectasis exacerbations. BMC Infect Dis. 2017 Sep 30;17(1):659.
22. Nicolaou EV, Bartlett AH. Necrotizing Pneumonia. Pediatr Ann. 2017 Feb 1;46(2):e65-e68.
23. Performance standards for Antimicrobial susceptibility testing; 23rd informational supplement,CLSI.
24. Bronchiectasis in India: results from the European MulticentreBronchiectasis Audit and Research Collaboration (EMBARC) and Respiratory Research Network of India Registry.
25. Habesoglu MA, Ugurlu AO, Eyuboglu FO. Clinical, radiologic, and functional evaluation of 304 patients with bronchiectasis. Ann Thorac Med. 2011 Jul;6(3):131-6.
26. Mohapatra MM, Rajaram M, Mallick A. Clinical, Radiological and Bacteriological Profile of Lung Abscess - An Observational Hospital Based Study. Open Access Maced J Med Sci. 2018 Sep 23;6(9):1642-1646.
27. Maitre T, Ok V, Calin R, Lassel L, Canestri A, Denis M, Hamidi M, Tavolaro S, Verdet C, Parrot A, Cadranel J, Pialoux G. Pyogenic lung abscess in an infectious disease unit: a 20-year retrospective study. Ther Adv Respir Dis. 2021 Jan-Dec;15:17534666211003012.
28. Inchingolo R, Pierandrei C, Montemurro G, Smargiassi A, Lohmeyer FM, Rizzi A. Antimicrobial Resistance in Common Respiratory Pathogens of Chronic Bronchiectasis Patients: A Literature Review. Antibiotics (Basel). 2021 Mar 20;10(3):326.
29. Smith MP. Diagnosis and management of bronchiectasis. CMAJ. 2017 Jun 19;189(24):E828-E835.
30. Ahmad H, Sadiq A, Bhatti HW, Bhatti AA, Tameez-Ud-Din A, Ibrahim A, Chaudhary NA. Bacteriological Profile and Antibiogram of Cultures Isolated from Tracheal Secretions. Cureus. 2019 Jun 21;11(6):e4965.
31. Jiun-Ling Wang,1 Kuan-Yu Chen,1 Chi-Tai Fang et al. Changing Bacteriology of Adult Community-Acquired Lung Abscess in Taiwan: Klebsiella pneumoniae versus Anaerobes; Clinical Infectious Diseases 2005; 40:915–22.