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A Case Report on Multi Drug Resistance in Community Acquired Pneumonia Due to *Escherichia coli* with Cholangiocarcinoma

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ABSTRACT

Escherichia coli is an important cause of severe community acquired pneumonia with mortality higher than pneumococcal pneumonia but like other gram-negative pneumonia. Antibiotics are the treatment of choice in treating pneumonia. When it comes to bacterial community-acquired pneumonia, multidrug resistant *Escherichia coli* (MDR *E. Coli*) is a less common cause than *Staphylococcus aureus* and *Streptococcus pneumoniae.* The majority of patients with community-acquired pneumonia (CAP) respond well to typical antibiotic regimens consisting of either a fluoroquinolone or a macrolide plus cephalosporin. We present a case where patient diagnosed with *E. coli* causing pneumonia showed MDR to various empirical antibiotics and managed with culture sensitive antibiotics. Antibiotic resistance has become a major issue for healthcare providers, where the effective management of patients will be more challenging which necessitates the need for optimising the use of antibiotics.

Keywords: Multi Drug Resistance, Community Acquired Pneumonia, *Escherichia Coli,* Cholangiocarcinoma.

INTRODUCTION

Pneumonia caused by *Escherichia coli* (*E. coli*) is regarded as an uncommon occurrence. Gram-positive bacteria like *Staphylococcus aureus* and *Streptococcus pneumoniae* cause the majority of community-acquired pneumonia cases; however, gram-negative bacteria are becoming more widely known. According to earlier research, just 3-12% of all bacteria that cause community-acquired pneumonia are *E. coli*. (1) The epidemiology, risk factors, and clinical consequences of acute community-acquired pneumonia caused by gram-negative bacteria, particularly *E. coli*, are of considerable interest due to the growing significance of multidrug resistance among these bacteria in recent years. (2) When it comes to bacterial community-acquired pneumonia, multidrug resistant *Escherichia coli* (MDR *E. Coli*) is a less common cause than *Staphylococcus aureus* and *Streptococcus pneumoniae*. This case report describes a community-acquired pneumonia caused by MDR E. Coli, which was identified through culture and sensitivity test following debulking of cholangiocarcinoma. (3) Furthermore, the spread of germs that are resistant to drugs (MDR) throughout the community has emerged as a significant public health concern. Due to their high mortality rates and constrained treatment options, MDR *Pseudomonas aeruginosa*, *Acinetobacter baumannii*, and carbapenem-resistant *Enterobacter* are becoming more and more isolated in patients residing at home or in long-term care facilities. These bacteria pose a significant challenge to clinicians. The

identification of patients with CAP at high risk for resistant etiology is of considerable clinical relevance, since postponing adequate medication may impair the outcome. (4) A lower respiratory tract infection's clinical diagnosis is made based on a group of symptoms that include fever, coughing, expectoration, chest discomfort, dyspnea, and indications of alveolar space infiltration. (5) The medical history of the patient as well as clinical indicators and symptoms such as fever, purulent sputum, cough, auscultation findings, acute pulmonary infiltration, and dyspnea are currently used to diagnose pneumonia. Common radiographic imaging methods used to diagnose pneumonia include computed tomography scans and chest radiography. A suitable specimen must be acquired for laboratory identification of the bacteria causing pneumonia, as the etiology cannot be ascertained from a clinical examination alone.

The majority of patients with community-acquired pneumonia (CAP) respond well to typical antibiotic regimens consisting of either a fluoroquinolone or a macrolide plus cephalosporin. When the right medications and dosages are administered in individuals with CAP typically do not experience treatment failure due to the high rates of current β-lactam resistance. (6)

Cholangiocarcinoma (CCA) is a diverse category of cancers that can develop in any part of the bile ducts. Incidence and fatality rates have increased worldwide during the past 20 years, despite the disease being rare (0.3-6 cases per 100,000 inhabitants annually in Western countries, and >6 cases in some East Asian regions). Many patients may not have a clear cause at diagnosis, despite the identification of various risk factors, which makes it more difficult for surveillance programs to discover problems early. Furthermore, the aggressiveness, oligo/ asymptomatic character, and medication resistance of CCA severely impair patient outcomes in its early phases. One potential treatment for CCA is complete surgical resection. However, CCA is usually detected late (about 70% of cases), when the disease has already spread and is incurable, leaving palliative treatment as the sole option. This is because patients are typically asymptomatic in the early stages of the illness. (8)

CASE REPORT

Here we present a case of 77 years old male patient who admitted in the tertiary care teaching hospital with the complaints of fever and chills for 3 days, vomiting 2-3 episodes per day for 10 days, cough with sputum for 10 days and breathlessness for 6 days, who had previous history of hypertension with neoplastic etiology of focal intraductal cholangiocarcinoma was on tab Amlodipine 5mg + Perindopril 4mg once daily for hypertension. And systemic examination on respiratory system suggests during inspection there was no apex beat and crepitations present at a left intra scapular, intraaxillary and inframammary region.

MRI of abdomen with MRCP demonstrates: Focal T2 hypo intensity with corresponding abrupt tapering in distal CBD suggestive of Stricture due to neoplastic etiology Focal intraductal cholangiocarcinoma and multiple scattered hyperintense lytic areas in visualized bones as described-likely Metastasis (Stage IV).

MDCT of chest demonstrates that multifocal areas of centrilobular opacities with linear branching pattern giving tree in bud appearance & patchy areas of ground glass opacities seen scattered in bilateral lung fields and consolidation involving superior lingular segment of left upper lobe. Mild centrilobular & para septal emphysematous changes in bilateral upper lobes and bilateral mild pleural effusion with adjacent atelectasis which was feature of infective etiology

Gram staining demonstrates the presence of both gram positive and negative bacilli and concurrently the culture sensitivity sputum samples were collected and isolated for the selection of antibiotics, the organism isolated was found to be Escherichia coli.

TABLE 1: LABORATORY INVESTIGATION

Day: 1	**Hb:12.5 g/dl**	**TLC:11550 cells/cu.mm**	**SGOT: 51 IU/L**	**ALP: 175.6 IU/L**	**-------**
Day:2	pleural fluid protein: 3.1	pleural fluid sugar: 11.3	pleural fluid chloride: 109.4	-------	-------
Day:3	Hb:11.1 g/dl	Cl:106.5 mEq/L	-------	-------	-------
Day:4	K+: 3.1 MEq/L	Proteins: 5.1g/L	SGOT: 41 IU/L	albumin: 2.7 g/dl	ALP: 158 IU/L
Day:5	LDH: 300 U/L	amylase: 22 U/L	Procalcitonin: 0.26 ng/mL	-------	-------
Day:6	Hb:10.7	RBC:3.7millions/cumm	Neutrophil:18%	Lymphocytes:10%	PCV:32.1%

TABLE 2: CULTURE REPORT

Culture and Sensitivity	
Sample	Sputum
Organism isolated	*E, coli*
Antibiotic sensitivity	
Ampicillin	Resistant
Amoxycillin-Clavulanate	Resistant
Amikacin	Resistant
Ceftazidime	Resistant
Cefotaxime	Resistant
Ceftriaxone	Resistant
Ceftriaxone-Sulbactam	Resistant
Cefepime	Resistant
Ciprofloxacin	Resistant
Cotrimoxazole	Resistant
Cefazolin	Resistant
Gentamicin	Resistant
Imipenem	Resistant
Levofloxacin	Resistant
Meropenem	Resistant
Ofloxacin	Resistant
Piperacillin-Tazobactam	Resistant
Tetracycline	Resistant

DISCUSSION

The findings of Gram staining demonstrate the presence of both gram positive and negative bacilli and concurrently done culture sensitivity sputum samples for the selection of antibiotics suggests the organism was Escherichia coli and MDCT of chest impression shows multifocal areas of centrilobular opacities with linear branching pattern giving tree in bud appearance & patchy areas of ground glass opacities seen scattered in bilateral lung fields and consolidation involving superior lingular segment of left upper lobe. Mild centrilobular & para septal emphysematous changes in bilateral upper lobes and bilateral mild pleural effusion with adjacent atelectasis due to *E. coli* infection causing an etiology for community acquired pneumonia.

The antibiotic sensitivity test for *E. coli* was done and following antibiotics showed resistance to the organism like Ampicillin, Amoxycillin-Clavulanate, Amikacin, Ceftazidime, Cefotaxime, Ceftriaxone, Ceftriaxone-Sulbactam, Cefepime, Ciprofloxacin, Cotrimoxazole, Cefazoline, Gentamicin, Imipenem, Levofloxacin, Meropenem, Ofloxacin, Piperacillin-Tazobactam, tetracycline. The MRI of abdomen with MRCP demonstrates the focal T2 hypo intensity with corresponding abrupt tapering in distal CBD suggestive of Stricture due to neoplastic etiology of focal intraductal cholangiocarcinoma and multiple scattered hyperintense lytic areas in visualized bones as described-likely Metastasis which suggests the presence of carcinoma in last stage.

Our case supports increased incidence of antibiotic resistance towards β-Lactam antibiotics and other antibiotics in *E. coli* infections. A study by Mączyńska B et.al (8) describes the majority of infections in the investigated hospital and throughout the nation were caused by the same microbe, *Escherichia coli*. However, around 90% of these infections were caused by strains of the bacteria that were resistant to several antibiotics, and infections with *K. pneumoniae* and *E. coli* ESBL (+) as the etiological agents accounted for the greatest number of cases in 2018.

Our study acts as a marker for a major issue for global healthcare and it is the ongoing and quick drop in the effectiveness of currently existing antibiotics in treating prevalent bacterial illnesses, along with a concurrent decline in the rate of new drug discovery. As current antibiotics lose their efficacy, new

medications and pharmacological class of drugs must be continually developed to maintain the use of antibiotics in the treatment of infectious diseases. Everyone agrees that there is a huge need for innovative anti-infective medications in healthcare, and time is of the essence.

Our case highlights the class of drugs resistant to the gram-negative bacteria E. coli, antibiotic resistance in community-acquired pneumonia with cholangiocarcinoma, and the significance of managing CAP with CCA and focuses on selection of antibiotics beside from empirical therapy to treat and enhance the patient's condition.

CONCLUSION

In our case report, we present a case of multidrug resistance in treating community acquired pneumonia with cholangiocarcinoma. Since most of the antibiotics used along with anti-neoplastic drugs used during the treatment of CCA was one of the reasons for multidrug resistance and this study also gives importance to the current antibiotics losing their efficacy, new medications and pharmacological class of drugs must be continually developed to maintain the use of antibiotics in the treatment of infectious diseases.

Declaration by Authors

Patient Consent: The authors declare that patient consent was taken for the publication.

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