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Treatment with CSE-1034 (Elores™) in the Management of Community Acquired Pneumonia Due to Multi Drug Resistant *Pseudomonas aeruginosa*

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Author's contribution

The sole author designed, analyzed and interpreted and prepared the manuscript.

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Case Study

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ABSTRACT

Introduction: Community acquired pneumonia (CAP) is one of the important cause of mortality and morbidity. CAP is defined as an infection of the lung parenchyma that is not acquired in a hospital, long-term care facility, or other recent contact with the health care system. Frequently, *Pseudomonas aeruginosa (P. aeruginosa)* is resistant to most antibiotics. This resistance is one of the main barriers in bacterial eradication and clinical cure of *Pseudomonas* infection. This delay in management of MDR *P. aeruginosa* with appropriate antibiotics, can lead to increased mortality and morbidity.
Case Presentation: Here we discuss a case of a CAP due to *P. aeruginosa* which clinically didn't respond to piperacillin-tazobactam & meropenem and was resistant to both classes of antibiotics. This was successfully treated with CSE-1034 (Ceftriaxone/Sulbactam/Disodium-edetate).
Conclusion: CSE-1034 (Elores™) proved to be safe and efficacious in treatment of a hospitalized patient with CAP due to MDR *P. aeruginosa*.

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Keywords: MDR; Elores™; CAP; Pseudomonas aeruginosa; Disodium-edetate; CSE-1034.

1. INTRODUCTION

Community acquired pneumonia (CAP) is associated with significant morbidity and mortality. CAP is defined as an infection of the lung parenchyma that is not acquired in a hospital, long-term care facility, or other recent contact with the health care system [1]. A retrospective study in Portugal showed that out of total hospitalized patients 3.7% were of CAP [2]. Diabetes is a risk factor for developing respiratory infections. There have been previous reports of association of diabetes with pneumonia [3]. 4-5 million cases of CAP per year were estimated. Out of these 25% need hospitalization [4]. Only in USA, 915,900 episodes of CAP are reported each year in adults >65 years [5]. In India, in 2004, 89.5 deaths per 100,000 population were estimated to be due to lower respiratory tract infection (LRTI) [6]. CAP is the second most common cause of mortality in India [7]. In India, epidemiology of CAP in different region varies from each other. *Pseudomonas aeruginosa* is a gram negative aerobic bacterium belonging to family *Pseudomonadaceae.* Usually *Pseudomonas aeruginosa (P. aeruginosa)* is not a frequent pathogen in CAP but it was found most prevalent in one study conducted in Ludhiana [8,9,10]. *P. aeruginosa* is an opportunistic pathogen, mostly involved in nosocomial infections, but in severe CAP, prevalence of *P. aeruginosa* was found to be 1.8% to 8.3% with higher mortality rates [10]. *P. aeruginosa* isolates that cause infections are thought to express various virulence factors [11]. Pneumonia due to *P. aeruginosa* can be transmitted in hospitals by nursing staff, medical equipment, sinks, disinfectants, and food. *P. aeruginosa* is resistant to most of the antibiotics. This resistance is one of the main barriers in bacterial eradication and clinical cure of *Pseudomonas* infection [11]. This delay in management of MDR *P. aeruginosa* with appropriate antibiotics, can lead to increased mortality and morbidity [11,12].

Elores™ (Ceftriaxone/Sulbactam/Disodium-edetate) is an antibiotic adjuvant entity which has been found to be effective against MDR *P. aeruginosa* in CAP [13].

Here we are discussing a case of 69 year old male patient with diabetes and CAP due to MDR *P. aeruginosa* treated successfully with CSE-1034 (Elores™).

2. CASE PRESENTATION

A 69 year old male patient with medical history of diabetes and hypertension presented at our hospital with chief complaints of fever and weakness. At presentation, Vitals of patient were as follows a) blood pressure 150/90 mmHg, b) pulse: 78/minute, body temperature: 101° F. Patient was presumptively diagnosed with community acquired pneumonia (CAP). Patient was given injection salbutamol stat at time of admission. He was empirically started with piperacillin-tazobactam on day of admission. On the second day meropenem was added to this regimen. For comprehensive management of CAP, other supportive treatment was also provided to the patient. Patient was managed with injection pantoprazole 40 mg q24h and insulin, nebulization with salbutamol and ipratropium bromide q8h and nebulization with budesonide/formoterol q12h. Injection fluconazole 150 mg stat was given as prophylaxis for fungal infection. Chest X-ray of patient suggests pneumonia as shown in Fig. 1.

Hemogram showed TLC of 13000/cumm, Polymorphs: 80%, Lymphocytes: 18%, Monocytes: 0%, Eosinophils: 02 % on third day. Culture and susceptibility test showed the presence of multi drug resistant *P. aeruginosa*. Based on chest x-ray, blood counts, culture and susceptibility reports, patient was diagnosed with of CAP. As patient didn't respond clinically to meropenem after 48 hours, CSE-1034 was initiated. CSE-1034 (Elores™) 3g q12h via IV infusion for 90 minutes was started for 3 days followed by Elores™ 1.5 g q12h for next 4 days. Fever normalized, WBC counts settled (6200/cumm) and the patient was discharged from the hospital on the 7th day.

3. DISCUSSION

CAP due to *P. aeruginosa* is associated with high mortality. Cases of CAP due to *P. aeruginosa* have been reported since 1960 [13]. Henderson et al. [14] in 1992 reported two cases of CAP infection with *P. aeruginosa* of which both patients died in 36 h due to CAP. In CAP due to *P. aeruginosa,* mortality is high (30-35%) and treatment is difficult because of development of resistance to traditional antibiotics used for treatment of CAP [13]. *P. aeruginosa* develops resistance by various mechanisms including over expression of efflux pump, Extended-Spectrum

β-Lactamases (ESBLs), Metallo-β-Lactamases (MBLs) and target site or outer membrane modification [12,15].

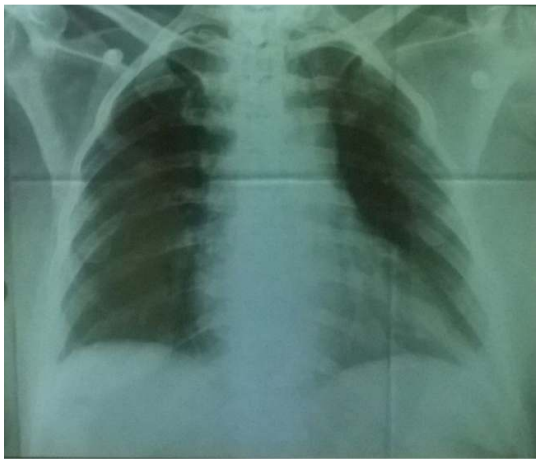

Fig. 1. Chest X-ray at the time of admission

In the present case, 69 year old male patient presented with CAP due to MDR *P. aeruginosa*. The patient also had a history of diabetes and hypertension. Diabetes is a risk factor for widespread dissemination of *P. aeruginosa* in the body [16]. Salbutamol was given as a bronchodilator to patient. Patient was started empirically on piperacillin-tazobactam and meropenem as per guidelines [17]. Culture and susceptibility report showed resistance to both of these antibiotics. C/S report showed *P. aeruginosa* was susceptible towards Elores™ (ceftriaxone/ sulbactam/disodium-edetate).

CSE-1034 (Elores™) was selected based on established safety, efficacy, broad-spectrum activity against ESBL/MBL and culture and susceptibility testing. A study published in 2013 support use of Elores™ as it showed MBL and ESBL + MBL producing isolates of *P. aeruginosa* were resistant to most of antibiotics (piperacillin+tazobactam, imipenem, meropenem, ceftazidime and cefepime) except Elores™. CSE-1034 in MBL and ESBL + MBL producing isolates of *P. aeruginosa* showed significant susceptibility [12]. Elores™ has synergistic action because of its components. Ceftriaxone is a third generation cephalosporin and sulbactam is ß lactamase inhibitor. Disodium edetate helps in penetration and reduces the antibiotic resistance via reducing overexpression of efflux pump, enhances bacterial cell permeability, chelation of divalent ions and acting on other resistance mechanisms [18,19]. In a phase 3 trial on 93 LRTI patients, Elores™ showed significantly higher clinical cure rate than the ceftriaxone group alone. When compared with ceftriaxone, Elores™ produced significantly less side effects [20]. Finally patient responded to Elores™ which helped this elderly patient to recover completely.

In present case study, Elores™ was used successfully in treatment of CAP due to multi drug resistant *P. aeruginosa*.

4. CONCLUSION

Increased incidence of CAP due to MDR pathogens increases morbidity and mortality. Due to increased antibiotic resistance clinicians face challenge in selecting antibiotics to treat infections due to for MDR *P. aeruginosa*. In the present case, Elores™ showed to be safe and efficacious in the treatment of a hospitalized patient with CAP due to MDR *P. aeruginosa*.

CONSENT

All authors declare that written informed consent was obtained from the patient for publication of this paper and accompanying images.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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