Raoultella planticola: A Rare Bacteria, a Novel Co-infection

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ABSTRACT

There has been an increase in published cases involving *Raoultella planticola* in the last year, which demonstrates its threat as an emerging pathogen of wildly varying anti-microbial resistance. Our case identifies *Raoultella planticola* in sputum after an aspiration event in a patient with severe necrotizing pancreatitis, leading to pneumonia. This represents a rare case of *R. planticola* pneumonia; and the only case showing co-infection with *Streptococcus pneumonia*. Awareness of *Raoultella planticola* is important as trends in the literature point to increasing clinical relevance, especially in the immunocompromised and critically ill patients.

Keywords: Aspiration pneumonia with rare bacteria, Raoultella planticola, Raoultella planticola aspiration pneumonia

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INTRODUCTION

Raoultella planticola is a gram-negative bacterium formerly of the *Klebsiella* genus, and reclassified as *Raoultella* in 2001 (1). There are limited case reports showing isolates with causative clinical scenarios, but there are cases throughout medical literature including urinary tract infections (UTI), cholangitis and cholecystitis, cellulitis, prostatitis, necrotizing fasciitis, gastroenteritis, surgical site infection, central line associated blood stream infections (CLABSI), conjunctivitis, pancreatitis and bacteremia (1–11). Furthermore, there has been a recent increase in published cases involving *Raoultella planticola* in the last year, which demonstrates its threat as an emerging pathogen of wildly varying anti-microbial resistance. The following case identifies *Raoultella planticola* in sputum after an aspiration event in a patient with severe necrotizing pancreatitis, leading to pneumonia. This represents a rare case of *R. planticola* pneumonia; and the only case showing co-infection with *Streptococcus pneumonia*. In aspiration pneumonia in the alcoholic patient, *Klebsiella* is classically an organism requiring empiric treatment coverage (12). In our case, an alcoholic patient had aspiration pneumonia, but instead grew *Raoultella*.

CASE REPORT

A 53-year-old male presented to the emergency department for evaluation of abdominal pain. His past medical history included chronic pancreatitis, gastroesophageal reflux disease, dyslipidemia, prostate cancer, and alcohol abuse. His initial lipase was elevated, and a computerized tomography (CT) scan showed inflammatory changes and distal necrosis of the pancreas, consistent with acute necrotizing pancreatitis. He was admitted to the telemetry floor

and started on fluids as well as an alcohol withdrawal protocol with lorazepam. On day 4 of his hospital stay, the patient became tachypnic due to atelectasis, abdominal pain, and distension. He became lethargic and was subsequently upgraded to the intensive care unit. Later the patient became febrile, and had an aspiration event requiring intubation for airway protection and hypoxia. Sputum cultures were obtained at the time of intubation. He had copious secretions requiring frequent suctioning, and was diagnosed with pneumonia based on imaging. Due to increasing abdominal distension, repeat CT imaging of the abdomen and pelvis was performed, which subsequently revealed extensive inflammatory changes of the pancreas (worse when compared to initial imaging) with an increased region of necrosis. Empiric antibiotics were started with improvement in clinical course. His antibiotic treatment (meropenem) was primarily directed toward necrotizing pancreatitis.

The sputum culture obtained at the time of the patient's intubation was positive for *Raoultella planticola* and *Streptococcus pneumonia.* [Sensitivity panel: Figure] Despite the near pan-sensitivity of both organisms, meropenem was continued due to necrotizing pancreatitis. After two ventilator days, the patient was extubated. He was subsequently discharged to a subacute rehabilitation facility on hospital day 13 with a plan of two weeks of intravenous meropenem.

DISCUSSION

Since 1984, there have been a limited number of cases involving *R. planticola*. *R. plantiola* had previously been generally considered an environmental bacterium without human infection risk (8). In the 30 plus years since its first isolation as a source of human infection, there have been

few documented cases, with only three other cases of pneumonia (2, 8, 11). In our case, the bacterium was isolated from a sputum sample in a patient with a clinical scenario and diagnostic imaging consistent with pneumonia. Co-infection with *Streptococcus pneumonia* is also the first reported case, based on our review of the literature. A previous report described co-infection associated with *S. aureus* (1). The sensitivity panel suggested excellent sensitivity to multiple antibiotic options, and was nearly identical to the sensitivity panel reported in the case of pneumonia co-infection with *S. aureus* (1).

We believe that the patient likely introduced the organism to his own respiratory tract due to aspiration events that also eventually necessitated intubation. This is consistent with past case reports of the organism being found in the gastrointestinal tract (1, 3, 7). There has been a case of this bacteria found in an infected pancreatic cyst and another where the organism was believed to be the causative organism in a patient with peritonitis (3-4). In both of these cases the patient was immunocompromised, with either end stage renal disease (ESRD) (3), or poorly controlled Human Immunodeficiency Virus [HIV] (4). Our patient was not immunocompromised; however he did have necrotizing pancreatitis in addition to his pneumonia, which complicated his hospital course. If the patient's aspiration were the source of pneumonia, which is believed, then it is likely that its source is gastrointestinal.

The rapid improvement with appropriate antibiotic therapy, and the sensitivity panel in our case, initially seem suggestive of low virulence. However *R. planticola* represents a clinically significant bacterium that has limited case reports and consequently, also limited understanding of pathogenesis in human infection (8). There appears to be a growing awareness, however, as reports of the organism have been increasing. In this specific case the organism was noted to be pan-sensitive, however there have been case reports of this organism showing

resistance to both extended-spectrum beta-lactamases as well as to carbapenems (5). The problem is compounded, as this organism is also believed to form bio-films (6). There have been two cases of catheter-associated infections noted in the literature, one being a central venous catheter (CVC), and the other a catheter used for peritoneal dialysis. In the case of the CVC, the infection was noted at the exit site, and removal of the CVC, as well as anti-microbial therapy resulted in resolution of infection (6).

Despite the current evidence that this organism mainly causes infection in the immunocompromised, it has many factors that could potentially enable it to be extremely virulent. It has already been documented to develop resistance to extended spectrum beta-lactamases as well as carbapenems; it has been documented in co-infections of a pancreatic cyst, and now for the first time, with *Streptococcus pneumoniae* as described in this case. On an interesting note, many aspiration pneumonias in alcoholic patients that were initially ascribed to *Klebsiella*, may in fact have been due to *Raoultella* (12). As commercial kits become more advanced, it is possible that more cases of *Klebsiella* will be identified as *Raoultella*.

Once considered an environmental bacterium, *R. Planticola* is demonstrating clinical significance. This may be due to increased virulence, increased testing sensitivity, or both. We describe a case of aspiration pneumonia of this rare bacterium along with a novel co-infection in an alcoholic patient. Awareness of this organism is important as trends in the literature point to increasing clinical relevance, especially in the immunocompromised and critically ill patients.

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	2	4
Comment		
Result Value	Raoultella planticola	Streptococcus pneumoniae
Status	Final Result	Final Result
AMPIC/SULBAC	<=2 S	
AMPICILLIN	R	
CEFAZOLIN	<=4 S	
CEFOTAXIME (NONMEN)		<=0.12 S
CEFOTAXIME(MENING)		<=0.12 S
CEFTRIAXONE	<=1 S	
CEFTRIAXONE-MENING		<=0.12 S
CEFTRIAXONE-NONMEN		<=0.12 S
CIPROFLOXACIN	<=0.25 S	
CLINDAMYCIN		<=0.25 S
ERYTHROMYCIN		2 I
GENTAMICIN	<=1 S	
LEVOFLOXACIN		0.5 S
PENICILLIN-MENING		<=0.06 S
PENICILLIN-NONMENING		<=0.06 S
PIPERA/TAZOBACT	<=4 S	
TRIMETH/SULFA	<=20 S	<=10 S
VANCOMYCIN		0.5 S

Figure: Identified bacteria and associated antibiotic sensitivities in the patient's sputum. The sputum sample was obtained via endotracheal tube.