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An Adaptive Approach to Recurrent Pseudomonas Cellulitis and Bacteremia in Patients with Comorbid Complexities

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ABSTRACT: Pseudomonas aeruginosa has become increasingly difficult to manage due to its acquired antibiotic resistance and patient specific complications. The objective of this case study was to help guide management of resistant Pseudomonas in patients with complex comorbidities such as chronic kidney disease, recurrent cellulitis, venous insufficiency and more. Initial measures for treatment included Ciprofloxacin, Doxycycline, Levofloxacin and Vancomycin, but the patient either responded poorly with recurrent infections or did not respond at all to the treatment regiments. The patient felt relief and held the longest period of resolution when the treatment regimen included Daptomycin and Meropenem.

KEYWORDS: Antibiotic resistance, Chronic cellulitis, Chronic kidney disease, Pseudomonas aeruginosa, Venous stasis dermatitis

INTRODUCTION

Pseudomonas aeruginosa is a gram-negative bacillus that can cause an array of clinical infections. These infections can pose challenging to manage due to the organisms intrinsic and acquired resistance to standard antibiotics [1]. These challenges are further complicated in patients with comorbidities such as chronic venous insufficiency, cirrhosis, Chronic Kidney Disease (CKD) and obesity [2]. The treatment regimen involves managing patients with interdisciplinary care and tailoring to personalized strategies for optimal outcomes. Through this case report, we aim to illustrate the unique approaches and complications encountered in treating recurrent Pseudomonas bacteremia and cellulitis in a patient with multiple comorbidities.

CASE PRESENTATION

A 47-year-old male with a history of hypertension, cirrhosis of the liver, CKD stage 3, and recurrent pseudomonas bacteremia presents with cellulitis and flu-like symptoms. Blood cultures have identified *Pseudomonas aeruginosa* which lead to hospitalization. After being discharged the patient experienced recurrent bacteremia and was readmitted. The patient's clinical course and management was complicated by drug resistance and cellulitis recurrence. Physical examination findings showed bilateral lower extremity edema, chronic venous insufficiency, hepatomegaly, and confusion. The patient has had elevated white blood cell count, poor renal function, and elevated ammonia levels.

DISCUSSION

Chronic venous insufficiency and obesity are continuous underlying conditions contributing to the patient's medical complexity. Venous insufficiency leads to leg edema and skin changes, increasing the risk for cellulitis. Obesity exacerbates venous insufficiency and complicates treatment. The chronic venous insufficiency was managed with chronic wound care, diuresis, and compression stockings as per vascular surgeon recommendations. The patient's obesity required no specific interventions, but it is a complicating factor for venous insufficiency and surgical recovery. Cirrhosis, specifically alcoholic liver cirrhosis is noted, contributing to his overall morbidity. Ascites and splenomegaly were observed, indicating portal hypertension. Management is with standard care, although complications such as ascites were noted. Stage 3a CKD, complicating medication management, especially diuretics and antibiotics. Management included monitoring and adjustments to medication dosages, especially antibiotics, in order to manage adequate renal function.

First admission to the hospital for right left leg cellulitis was treated with ciprofloxacin and doxycycline, which successfully resolved the cellulitis. He had already been diagnosed with multiple other conditions at this time, including anxiety, depression, chronic venous insufficiency, anemia due to CKD stage 3a, hepatic cirrhosis with ascites, and morbid obesity. Approximately one year later,

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cellulitis of the right leg recurred and Levofloxacin was initiated. However, leukocytosis was noted therefore Levofloxacin was changed to Meropenem, with the later addition of Daptomycin, for maximal treatment efficacy. Levofloxacin was again resumed, but later discontinued due to the development of tendinitis. The patient has continued to present with recurrent pseudomonal bacteremia intermittently. Chronic wound care was also planned for chronic venous insufficiency at this time. Since the initial presentation of cellulitis, the patient has had multiple recurrent episodes occurring every few months without absolute recovery.

Challenges also stemmed from prioritizing this patient's prior comorbid conditions and ensuring their adequate treatment. Additionally, care was given in specifically choosing antibiotics that were tailored for this patient's needs that would not interfere with his current daily medication regimen nor exacerbate his current comorbid conditions, most notably alcoholic liver cirrhosis and stage 3a CKD. This also posed significant challenges in selecting antibiotics with a patient already struggling with limited hepatic and renal function. The aim was to achieve optimal outcomes while not exacerbating his current comorbid conditions.

Despite the fact that practicing standard guidelines may be easier for a treating physician, this case report highlights that standard treatment regimens may lack efficacy for the involved patient, and that when recurrent infections occur, specifically with patients with multiple comorbid conditions, a personalized multifaceted approach may be indicated. Optimal wound care requires a multidisciplinary approach with ample communication between specialties, the patient, and the leading physician. Trust, patience and good communication is vital for a strong patient-physician relationship, where both patient and physician can work together to determine the optimal treatment for that specific patient. This can have an impact on successful patient outcomes and may make the patient more open to behavioral and life-style modifications [3].

CONCLUSION

This case highlights that a personalized multidisciplinary approach is required in achieving successful remission when multiple comorbidities are involved in treating recurrent infections. This unique case highlights the crucial balance between tackling recurrent infections and attending to the comorbid conditions that influence these infections. It also reinforces the critical role of antimicrobial pharmacotherapy and the need for ongoing research into innovative treatment modalities as we face an era of antibiotic-resistance infections. Furthermore, it emphasizes the significance of addressing the underlying causes and predisposing risk factors for recurrent infections, which is beneficial in achieving successful outcomes.

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