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Case Report

Hidden anatomy, recurrent infection: recurrent left lower limb erysipelas in a patient with suspected duplex kidney, ureterohydronephrosis and obesity

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ABSTRACT

Erysipelas is a superficial bacterial skin infection frequently caused by group A β-hemolytic streptococci involving the dermal layer of skin with superficial cutaneous lymphatics. The most commonly affected area is the lower extremities observed about 80% to 85% cases in modern clinical practice and is distinguished by characteristic cutaneous manifestations such as erythema, swelling and systemic symptoms such as fever and chills. A 54-year-old male patient presented with complaints of intense hyperemia, swelling, burning, and pain in the left shin, followed by fluctuating fever reaching a maximum of 39.0°C. Furthermore, the patient had a history of erysipelas of the left leg, with the current episode representing the third recurrence. The physical examination of this patient showed hyperemic, edematous, and warm skin on the left shin with decreased tissue turgor and the cardiovascular examination detected arrhythmic pulse initially and later rhythmic pulse, with blood pressure ranging from 110/80 to 160/100 mmHg during two different admissions The ultrasound imaging of the kidneys revealed duplication of the left kidney with ureterohydronephrosis of stage 1-2 on the left side and pyelectasis present on the right kidney. This case report illustrates the two occasions of erysipelas of the left leg in patients with concomitant anatomical anomalies, especially in the duplication of the left kidney and stage 1-2 ureterohydronephrosis and how to diagnostically approach and manage the patient.

Keywords: Erysipelas, Duplex kidney, Ureterohydronephrosis, Obesity, Case Report

INTRODUCTION

Erysipelas is a superficial bacterial skin infection frequently caused by group A β-hemolytic streptococci involving the dermal layer of skin with superficial cutaneous lymphatics.[1] The most commonly affected area is the lower extremities observed about 80% to 85% cases in modern clinical practice and is distinguished by characteristic cutaneous manifestations such as erythema, swelling and systemic symptoms such as fever and chills. The epidemiological pattern shows a distinct feature of peak incidence in both infant population and elderly population, despite this condition is presented in all age groups.[2] The clinical significance of this condition is the high recurrence frequency with lower extremities exhibiting a recurrence rate from 20% to 40% within a several years from initial episode of Erysipelas. Moreover, underlying comorbidities such as chronic lymphedema, venous sufficiency and severe obesity significantly affects immunity making legs susceptibility to recurrent infections.[3] Complications resulting from recurrent infections lead to local tissue necrosis, abscesses and systemic sepsis, when the patient is left untreated.[4]

Duplex kidney is frequent congenital anomaly in which a single kidney is presented with two ureters. This is further classified into partial duplication and complete duplication (upper and lower moiety). Additionally, the potential

complications include the following such as recurrent urinary tract infections, hydronephrosis, ureterocele, vesicoureteral reflex and nephroliathiasis.[5]

Ureterohydronephrosis is the dilation of ureter and the renal pelvis with the renal calyces. The major causes for this condition are ureteral calculus (ureterolithiasis), prostate hyperplasia, pregnancy, post-surgical scar tissue, tumor or abnormal growth around the ureter.[6]

Furthermore, it is relevant to take note that obesity is known to worsen ureterohydronephrosis by elevating the intra-abdominal pressure and disrupting the immune function, thus leading to more recurrent urinary tract infections. In addition, high body weight exerts more pressure on the bladder, thus leading to inadequate emptying of the bladder and stasis of urine in the bladder is a significant source for growth of bacterial infection. Excess fat is more prone to create an environment of mild inflammation, thus lowering the immune response as a result.[7]

The management of Erysipelas can be complicated by underlying anatomical and comorbid conditions. This case report illustrates the two occasions of erysipelas of the left leg in patients with concomitant anatomical anomalies, especially in the duplication of the left kidney and stage 1-2 ureterohydronephrosis. The main distinct feature of these cases lies in the co-occurrence of recurrent erysipelas and structural urinary tract abnormalities, which may affect this disease progression, treatment response, and risk of potential complications such as thrombus formation. Therefore, by documenting this clinical presentation, diagnostic challenges, and therapeutic approaches in these patients, this report aims to underscore the significance of broad evaluation of erysipelas cases with atypical and recurrent courses.

These findings highlight the need for incorporating urological assessment and individualized management approaches in patients presenting with erysipelas together with renal anomalies, thereby updating the clinical practice and improving patient outcomes.

CASE REPORT

A 54-year-old male patient presented with intense hyperemia, swelling, burning sensation, and pain localized to the left shin, accompanied by fever reaching a peak at 39.0°C and general weakness. Physical examination showed moderate general condition, conscious and oriented with a Glasgow Coma Scale score of 15. The left shin displayed erythema, edema, warmth to touch, and declined tissue turgor consistent with age. Particularly, an area of hemorrhage (5x5 cm) was noticed on the posterior surface of the left shin during a follow-up. Additionally, the vital signs fluctuated, with blood pressure varying from 110/80 to 160/100 mmHg and pulse irregularities were also observed with no palpable lymphadenopathy detected. The cardiovascular, respiratory, neurological, and abdominal examinations were normal. The patient's body mass index varied from 30.5 to 34.9 kg/m², suggesting grade 1 obesity, which could potentially complicate the clinical assessment and management. Furthermore, the patient had a significant medical history for recurrent erysipelas of the left leg and varicose veins of the lower extremities. This patient was with multiple hospitalizations in the period of October to November 2025 and May to June 2026 respectively for multiple episodes of erysipelas. The patient was devoid of any known allergies. The surgical history of this patient depicted surgical removal of varicose veins in the right lower leg in the period of 2024.

Lab findings

The laboratory findings during the acute phase of this disease displayed leukocytosis with neutrophilia (WBC up to 13.24x10^9/l), significantly increased C-reactive protein (up to 131.1 mg/l), and a markedly elevated antistreptolysin O titer (ASLO 4665 IU/ml), which reduced with treatment. And renal function tests revealed mild elevations in creatinine (up to 111.5 μmol/l) and urea, with transient elevations in blood glucose and fibrinogen levels. Furthermore, the procalcitonin levels were slightly elevated. All these findings are shown in Table 1.

Imaging and instrumental findings

The ultrasound imaging of the kidneys and adrenal glands displayed duplication of the left kidney with associated ureterohydronephrosis of stage 1-2 and suspected sinus cysts. Additionally, the right kidney revealed signs of pyelectasis. These anatomical abnormalities were recognized during infusion therapy, which may have affected the imaging clarity. The presence of obesity (BMI 30.5–34.9 kg/m²) in this patient probably caused the difficulty in clinical and imaging assessment, potentially hiding and complicating the diagnosis of underlying renal anomalies and affecting the severity and recurrence of erysipelas.

Conservative management

This patient was given the following treatment recommendations to ensure a proper recovery and better prognosis. The treatment recommendations consisted of antibacterial therapy, antipyretic and symptomatic treatment, infusion therapy and detoxification, antithrombotic/antiplatelet therapy, gastroprotection therapy, supportive and adjunctive therapies (phytotherapy following the antibiotic therapy, lifestyle modifications).

The treatment for the primary diagnosis of erysipelas of the left leg (erythematous form) with moderate severity consisted of the following antibacterial therapy; the initial intravenous administration of beta-lactam antibiotics such as Cefazolin 1.0 g IV every 8 hours during acute phase (initial episode of erysipelas), which was later followed by Ceftriaxone 1.0 g IV twice daily or Sultasin (piperacillin/

tazobactam) 1.5 g IV three times daily. Moreover, the poor response which prolongated fever necessitated the addition of Levofloxacin 500 mg IV once daily. Therefore, over clinical improvement of the patient which lead to discharge; the antibiotics were transitioned to Bicillin 5 (benzathine penicillin) 1,500,000 IU intramuscularly once a month for 6 months as prevention against relapse of this condition.

The antipyretic and symptomatic treatment included the following; Paracetamol 500 mg orally to control body temperature above 38.5°C, IV analgesic preparations such as Analgin, Dimedrol and Papaverine. The infusion therapy and detoxification consisted of IV rehydration and detoxification with isotonic saline (0.9% NaCl) and glucose 5% solutions.

Additionally, the antithrombotic/antiplatelet therapy was recommended due to the history of varicose veins and thrombosis, and elevated fibrinogen/D-dimer levels; which consisted of Rivaroxaban 10 mg orally once daily for thromboprophylaxis and Aspirin (Aspicard) 75 mg orally once daily used initially but controlled according to Fibrinogen levels. However, gastroprotection was required to combat gastrointestinal side effects of antibiotics and antiplatelet therapy, which was Omeprazole 20 mg orally once daily.

Furthermore, supportive and adjunctive therapies included phytotherapy (e.g., Hofitol) and probiotics for gut flora support during and after antibiotic therapy, weight management and lifestyle modification tips such as low-cholesterol diet, low-salt diet, and controlled physical activity.

Table 1: CBC parameters, biochemical parameters and coagulation profile.

CBC parameters, biochemical parameters and coagulation profile		Reference range
White blood cells / *10^9/l	13.24	(4-9) *10^9
Red blood cells / *10^{12}/l	5.44	(4.7-6.1) *10^{12}
Hemoglobin / g/l	160	130-160
Platelets/ *10^9/l	124	180-320
Hematocrit (%)	46	40-54
ESR / mm/h	3	0-15
C-reactive protein / mg/l	131.1	0-5
Creatinine / µmol/l	111.5	62-106
Urea / mmol/l	5.6	2.14-7.14
Aspartate aminotransferase/ U/l	19.6	0-40
White blood cells / *10^9/l	13.24	(4-9) *10^9
Red blood cells / *10^{12}/l	5.44	(4.7-6.1) *10^{12}
Alanine aminotransferase/ U/l	18.9	0-41
ASLO / IU/ml	4665	≤200
Blood glucose / mmol/l	7.87	3.3-5.6
Fibrinogen / g/l	6.97	1.7-4.2
Procalcitonin / ng/ml	0.42	0-0.5

DISCUSSION

This case illustrates the significant role that underlying anatomical abnormalities, specifically a suspected duplex kidney and ureterohydronephrosis, may participate in the pathogenesis of recurrent erysipelas of the left lower limb. The duplex kidney and following ureterohydronephrosis likely lead to urinary stasis and impaired drainage, nurturing a breeding ground for bacterial persistence and recurrent infections. This persistent bacterial may strain the immune system and facilitate systemic dissemination with localized inflammatory responses that clinically present as erysipelas.[8,9] Obesity further predisposes this risk by disrutping lymphatic drainage, damaging skin integrity, and impairing immune function, thereby elevating susceptibility to skin and soft tissue infections and resulting in antitherapeutic effect.[10,11] Alternative etiologies such as chronic venous insufficiency, lymphedema, or underlying immunodeficiency pose as significant considerations, as these conditions can single-handedly or combine together to aggravate infection recurrence and severity.[12]

The global literature reports the connection between urinary tract anomalies, including duplex kidneys and hydronephrosis, and recurrent urinary tract infections with their direct correlation with recurrent erysipelas is rarely reported.[13] Cases depicting recurrent erysipelas in patients with urological abnormalities are seldom, underscoring the novelty of this presentation. Obesity is globally recognized as a major risk factor for recurrent erysipelas, with multiple studies validating the increased incidence and severity of this condition in obese populations.[14] Additionally, in comparison to previously reported cases concerntrating particularly on either urological anomalies

or obesity as isolated risk factors, this case presents with both, highlighting the nature of multifactorial etiology in this case.[15] Globally, similar cases are rare, and contrasting ones partially to which anatomical abnormalities are examined in recurrent skin infections.[16] Current literature gap consist of a limited understanding of the pathophysiological mechanisms connected from renal anatomical variants to cutaneous infections and the lack of standard management protocols for such multifactorial case presentations.

This case highlights the crucial need for broad evaluation of patients with recurrent erysipelas to pinpoint potential underlying anatomical and systemic contributors. Early detection of duplex kidney and ureterohydronephrosis can allow targeted interventions to be implemented at resolving urinary stasis and preventing the recurrence of infection. Obesity should be addressed through multidisciplinary interventions such as diet, physical activity, and possibly bariatric therapies are essential to alleviate its influence on infection risk and treatment response. Clinicians should consider incorporating care from infectious disease specialists, nephrologists, urologists, and nutritionists to control the multifactored challenges presented by such case presentations. Preventive medicine protocols should concentrate on improving skin care, treating venous insufficiency or lymphedema if present, immediate treatment of urinary tract infections, and evaluate the potential benefits of surgical correction of anatomical anomalies. This comprehensive approach has the potential to decrease the morbidity and elevate the quality of life for patients with recurrent erysipelas complicated by multifactorial comorbidities.

CONCLUSION

This case illustrates the important effect of underlying anatomical abnormalities, particularly a suspected duplex kidney and ureterohydronephrosis, in the pathogenesis of recurrent erysipelas of the left lower limb. The co-occurrence of obesity further increases the risk by disrupting lymphatic drainage, skin integrity, and immune function. The nature of multifactorial etiology displayed here emphasize the significance of broad evaluation in patients with recurrent erysipelas, taking into account both anatomical and systemic factors. Current literature is inadequate of the pathophysiological connection between renal anatomical variants and cutaneous infections, suggesting the crucial necessity for further research.

Future recommendations

Future recommendations consist of thorough assessment for anatomical abnormalities such as duplex kidneys and ureterohydronephrosis in recurrent erysipelas cases. Clinicians should implement multidisciplinary management protocols comprising of infectious disease specialists, nephrologists, urologists, and nutritionists to combat the complicated interplay of risk factors such as obesity and urinary tract anomalies. Preventive medicine protocols should concentrate on focus on skin care, management of venous insufficiency or lymphedema, subsequent management of urinary tract infections, and opting for surgical correction of anatomical defects, if necessary. Future research should focus to elaborate the pathophysiological pathways connecting the renal anomalies to recurrent skin infections and create standard guidelines to improve diagnosis, treatment, and prevention in such multifactorial case presentations.

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