Cellulitis as complication of nephrotic syndrome in a pediatric patient

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Abstract. Nephrotic syndrome is a chronic disease that may act as a risk for other major infection in skin, respiratory and urinary tract, while also increasingthe chance for other diseases, like peritonitis, meningitis, and cellulitis. Cellulitis is often caused by *Streptococcus β-hemolytic, Staphylococcus aureus,* and *Escherichia coli*. The clinical features of cellulitis marked with redness rash and well-defined borders, pain pressure and swelling. Hypoalbuminemia which occurs due to proteinuria occurred in this patient acts as a risk factor for cellulitis. It has been reported the case of cellulitis as one of the complications of the nephrotic syndrome in the pediatric patient. The treatment has been given to the patient such as antibiotics and supportive therapy and also planned albumin substitution.

1. Introduction

Cellulitis is one of many complications of nephrotic syndrome (NS), in addition to other complications such as peritonitis, pneumonia, urinary tract infections and bacteremia. An estimate of 17% of infection incidencefound on NS patient.[1,2] In Indonesia, 4.2 to 5.2% patients experienced cellulitis as complications.[3]

Cellulitis is an acute inflammation that occurs in the epidermal or dermal layer, adipose tissue or connective tissues. The most common site of cellulitis is on the lower extremities, which is about 75-90% cases.[4] Various kinds of microorganisms can cause cellulitis. The most common are *Streptococcus β-hemolytic, Staphylococcus aureus,* and *Escherichia coli* as well as gram-negative bacilli (i.e.; *Pseudomonas, Proteus, Citrobacter, Enterobacter*), the anaerobe microorganism, others opportunistic pathogens (example: *Helicobacter cinaedi, Fusarium sp*), mycobacteria and fungi (example: *Cryptococcus*).[5,6] Patients with immunocompromised condition, such as patients who receive corticosteroid, may be easier to experience cellulitis as complication including persistent cellulitis.

2. Case

Patient, CFA, medical record 38.04.43, 15 years and 2 months old female, admitted to Pediatric Non-Infection unit of RSUP. H. Adam Malik General Hospital on May 11, 2017, with the main complaint of swelling on the whole body. The patient had experienced the symptom since three weeks ago and get worst. The swelling initially experienced on the eyes followed by the face, feet, and abdomen. The

swelling of the eyes and feet had appeared since a year ago and often repeated. Breathing difficulties happenedone week ago, progressively worsen during the last four days.

Swollen, red area of skin that feels hot and tender on the right side of the thigh area experienced in the last two days with local lymph node involved. There is no history of such complaint before. Patient experienced fever for three days. Fever was reduced with antipyretic drugs. Defecation and micturition were normal.

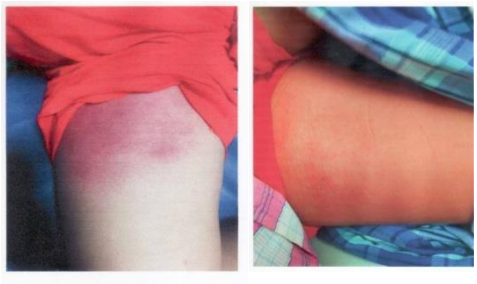

Figure 1. The swollen and red area on the right thigh area of the patient.

From the history taken, the patient is diagnosed with Nephrotic Syndrome Steroid Resistant and is a registered patient in Pediatric Nephrology unit of H. Adam Malik General Hospital, however without regular treatment. History of drugs used was Furosemide, spironolactone, methylprednisone, and cyclophosphamidechemotherapy (CPA) given once in December 2016.

Initial laboratory studies revealed anemia ($10.6x10^6/mm^3$), leukocytosis ($15050/mm^3$), thrombocytosis ($476000/mm^3$), severe hypoalbuminemia (1.1 g/dl). Urinalysis examination obtained proteinuria +3. From the clinical features and laboratoryfinding, the patient is diagnosed with cellulitis and relapse nephrotic syndrome.

The patient was treated with Oxygen 2L/min from thenasalcannula, Ceftriaxone injection 1 g/12 hours via intravenous as the broadspectrum antibiotic, Paracetamol tab 500 mg, a low salt diet of 1850 kcal + 95 grams of protein each day. An albumin substitution, chest x-ray, and blood culture examination for cellulitis are performed as well. The result of blood culture shows no growth ofany microorganism.

3. Discussion

There are serious risk factors associated withcellulitis, and one of them is lymphodema which is an accumulation of fluid in the interstitial space. Dupuy et al. in 1999 described a significant correlation between lymphoedema with cellulitis.[7] Lymphoedema will cause a flow disruption of the lymphatic system. The lymphatic fluid that is rich in protein is a good media for the growth of bacteria and obstruction of the flow of the lymphatic system as a result of edema causing bacteria living in the lymphatic vessels. This will later cause cellulitis.[8]

The clinical symptoms of cellulitis depend on thepresence of acute infection. Generally, all forms marked with redness rash and well-defined borders, pain pressure and swelling. The spread of the redness can arise quickly around the wound or ulcer accompanied by fever and malaise. On acute condition, bulla might present. Lymphadenopathy lymphangitis may also be found.[9]

Cellulitis is usually preceded by systemic symptoms such as fever, tremble, and malaise. In the affected areas, the four signs ofinflammation namely rubor (erythema), color (warm), dolor (pain) and the tumor (swelling) are present. The lesion appeared dark red in color, with a well defined borderline but without elevation on the margin. In severe infections, vesicles, bulla, pustular, or necrotic tissue may also be found. The enlargement can be found in the regional lymph nodes and ascending lymphangitis. In this case, we found cellulitis involving the local lymph nodes.

The immunocompromised patients are vulnerable to have infection although the pathogens are with low pathogenicity. If not treated, the symptoms will spread around primary lesions to the proximal vein.[10,11] In our case, the result of blood culture shows no growth of any microorganism. Perl et al.

in this study mentioned that out of 757 samples who suffer cellulitis, only two percent showed positive blood culture.[12] Management of cellulitis includes elevating and resting the lower limbs and feet. Systemic treatment is also needed by administering antibiotics.[10]

Hypoalbuminemia which occurs due to proteinuria occurred in this patient act as risk factors for cellulitis. Hypoalbuminemia leads to the occurrence of edema as well. Edema will cause a blockage of the lymphatic flow that causes bacteria to congregate and develop in the lymphatic duct to facilitate local infection such as cellulitis.[10] In addition, such immunocompromised condition act as apredisposing factor in the development of cellulitis, so albumin infusion is a mandatory therapy for such patients.

4. Conclusion

It has been reported the case of cellulitis as one of the complications of the nephrotic syndrome in thepediatric patient. The treatment given to the patient were antibiotics, supportive therapy, and also planned albumin substitution.

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