The Truth Behind Hematuria

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Case Report

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Abstract

Background: Systemic lupus erythematosus(SLE) is an autoimmune disease involving multiple systems with various clinical manifestations,renal involvement is common, but intracardiac thrombus is rarely reported as a complication of antiphospholipid syndrome. Drug anticoagulation is the first choice, and surgical treatment is performed in severe cases, we report the case to improve clinicians' understanding of disease diagnosis.

Case presentation: A 8-year-old girl was admitted to our hospital because of left costal pain, hematuria and fever.She had obvious edema, urinary protein 3+and occult blood 3+,urinary protein 3.2g/24h, albumin 17.6g/L, total cholesterol 7.21mmol/L, consistent with diagnosis of nephrotic syndrome. Continued to track the etiology of nephrotic syndrome and performed a renal biopsy, dsDNA 1:10 positive,low C3, low platelets and hemoglobin, anti-cardiolipin IgM 12U/ml, anti-β2-glycoprotein I 223R/ml, renal pathology suggested lupus nephritis, finally diagnosed as systemic lupus erythematosus, secondary anticardiolipin syndrome, lupus nephritis. The patient was treated with hormone and immunosuppressant. Sixteen weeks later, urinary protein 1+,the quantity of urine protein was less than 0.5g/d. Echocardiography showed that the mass in the right atrium was thrombosis. Heparin anticoagulant therapy is effective.

Conclusion: Systemic lupus erythematosus can involve multiple systems,various complications, it is rare to have thrombus in the right atrium as a complication of antiphospholipid syndrome, early diagnosis and treatment is the key to improve the prognosis of children.

Background

Systemic lupus erythematosus (SLE) is a multi-system autoimmune disease with various clinical manifestations. Lupus nephritis (LN) is a common manifestation of SLE. Anticardiolipin antibody syndrome is easy to be complicated with thrombus, but intracardiac thrombosis is rare. Here, we report a child with nephrotic syndrome and then diagnosed as systemic lupus erythematosus, secondary anticardiolipin antibody syndrome complicated with right atrial thrombus to improve clinicians' understanding of the disease.

Case Presentation

A 8-year-old female who prensented with left rib pain, hematuria and fever was admitted to our hospital, max temperature reached to 39.9℃, no chills and rash, she was given cefepime and azithromycin for one day, cefotaxime for 5 days，methylprednisolone for one day. On physical examination: the general condition was poor, eyelid and lower limbs edema, coarse respiratory sounds and auscultation of blisters of both lungs were noted, no other abnormal finding was present at that time. Laboratory findings were as follows: white blood cell count $6.32*10^9$/L, neutrophil 0.48, lymphocyte 0.42, red blood cell count $3.40*10^{12}$/L, hemoglobin 93g/l, platelet count 48*10/L, urine revealed 363.69 red blood cells/hpf, protein

3+, 5.1 white blood cells/hpf, erythrocyte sedimentation rate(ESR) 135mm/h, C-reactive protein(CRP) 25.20mg/L, albumin 17.6g/L, total cholesterol 7.21mmol/L, her urinay protein 3.2g/24h.Activated partial thromboplastin time(APTT) 138.7s, direct antiglobulin test positive, ferritin 358.4ug/L, D-D 4937.00ug/L FDG 33.8ug/ml. Serum C3 0.92g/L(0.9-1.8), C4 0.17g/L(0.1-0.4), ANA:anti-SSA-60 ±,anti-nRNP/Sm+, homogeneous 1:3200 positive, dsDNA1:10 positive, anti-nucleosome antibody +, anti-mitochondrial M2 +, anti-cardiolipin IgM 12U/ml(0-10), anti-β 2-glycoprotein I 223RU/ml(0-20). Bone marrow biopsy: s econdary anemia, globular red blood cell accounted for 5.5%. However, respiratory pathogens, myocardial enzymes, mycoplasma pneumoniae/chlamydia antibodies, procalcitonin, folic acid, vitamin B12, reticulocytes, bacterial cultures of blood, stool, tuberculosis spots, Epstein Barr virus, cytomegalovirus, ANCA were all negative. Hematuria location: urine abnormal red blood cell 60%, urine uniform red blood cell 40%. Bronchoscope: inflammation of endobronchial membrane. Pulmonary CT: patchy high-density shadows in all lobes of the lungs, especially in the lower lobes of the lungs(Fig.1). Color doppler ultrasonography of the lower limbs ruled out deep venous thrombosis. Abdominal color ultrasound: abdominal effusion. Echocardiography: a kind of round moderate echo with a diameter of about 2.0cm can be seen at the bottom of the right atrium nearby the opening of the inferior vena cava. diagnosis: right atrial thrombus(Fig.2). Renal pathology: light microscopic:52 glomeruli were found in the renal tissue, there were 52 glomeruli in renal tissue, slight proliferation of mesangial cells and mesangial matrix, swelling and slight proliferation of segmental foot nuclear endothelial cells, slight thickening of glomerular basement membrane and large amount of furophilic protein deposition subepithelial cell. No microthrombus and crescent were seen, and a small amount of inflammatory cell infiltration dominated by neutrophils was found in some glomeruli. There was slight edema in the renal interstitium, and there was no renal tubular atrophy and obvious inflammatory cell infiltration and fibrosis. No obvious abnormality was found in the arterioles. Immunofluorescence study was positive for IgA, IgM, IgG, C3, C4, C1q deposited along the glomerular capillary wall and segmental mesangial area. The above features were consistent with membranous lupus nephritis with mesangial proliferative lupus nephritis(consistent with typeV+II lupus nephritis)(Fig.3,Fig.4). Nephrotic syndrome is a common disease in pediatrics, which is characterized by edema, massive proteinuria (≥50mg/kg.24h), hypoproteinemia (≤25g/l) and hypercholesterolemia (≥5.7mmol/l), our patient was consistent with nephrotic syndrome[1]. Continued to track the etiology of nephrotic syndrome, the child had no family history of renal disease, we should pay attention to secondary factors, positive serology was positive for ANA and anti-dsDNA with low C3,platelets and hemoglobin were significantly lower than normal, but she had no rash, arthralgia, photosensitivity, oral ulcer, butterfly erythema, so a renal biopsy was performed, renal pathology suggested lupus nephritis, finally diagnosed as systemic lupus erythematosus, lupus nephritis. She was treated with pulse methylprednisolone for three days and IV diuretic with albumin, followed by oral steroids after three days 1mg/kg.d, with rapid resolution of edema. Anti-cardiolipin IgM 12U/ml, anti-β2-glycoprotein I 223R/ml, consisent with secondary anticardiolipin syndrome. What is the cause of the space occupying mass in the right atrium? At this point, as no clear etiological evidence was found, finally repeated echocardiography indicates that the nature of the right atrial mass is thrombus. The mass was reduced by anticoagulant therapy with heparin for two weeks. By three weeks, proteinuria

came down to 1.0 g/day and by sixteen weeks he was in complete remission with <0.5g proteinuria. After six months follow-up, he remains in complete remission, but on 2.5 mg of prednisolone per day.

Discussion

Systemic lupus erythematosus(SLE) is an autoimmune disease that can involve multiple organs. Its pathological manifestations are immune complex deposition and vasculitis changes. Lupus nephritis (LN) is a common manifestation of SLE. In the early stage of SLE, LN may show slight abnormalities in urine(microhematuria and /or albuminuria and /or leukuria)[2–5], or nephrotic syndrome, hypertension, or renal failure [6–7]. In this case, the child was diagnosed with nephrotic syndrome and renal biopsy revealed lupus nephritis. According to the International Society of Nephrology (ISN/RPS), lupus nephritis is divided into six grades (I-VI grade)[8]. Nephrotic syndrome is usually associated with diffuse (grade Ⅳ) or membranous (grade Ⅴ) lupus nephritis[9]. In this case, membranous lupus nephritis or mesangial proliferative lupus nephritis is rare in children. Echocardiography revealed occupying mass in right atrium. The nature of the mass was an neoplas, tumor, or thrombus. The neoplasms were most common on the valves, no neoplasms were found by Echocardiography. Scholars[10]pointed out that myxoma is the most common cardiac tumor, most located in the left atrium, usually attached to the atrial septum. Cardiac myxoma is mostly found in the left atrium, which is mostly attached to the atrial septum, accounting for about 15% of the right atrium, while atrial thrombus is more common in the left atrial appendage. right atrium is rare. How to distinguish between atrial thrombus and myxoma. In fact, the identification of the two is mainly in ultrasound, generally speaking, the identification is not very difficult. Cardiac myxoma can be accompanied by blood flow swing, but thrombus generally does not. The shape of cardiac myxoma can change with the relaxation or contraction of the heart, but the thrombus will not, anticoagulants can dissolve part of the thrombus, but cardiac myxoma will not be dissolved by anticoagulants. The volume of atrial mass was reduced in our children after anticoagulation with heparin.

Our children have anticardiolipin antibody syndrome with right atrial thrombus, intracardiac thrombosis is a rare complication of APS, the physiological mechanism is not clear. The hypercoagulable state of nephrotic syndrome can easily lead to thrombosis, systemic lupus erythematosus with positive anticoagulant activity or medium or high level of anticardiolipin antibody, the risk of thrombosis or thromboembolism in the heart increases[11]. 37% of SLE patients with anticardiolipin antibody syndrome were positive for β-2-glycoprotein 1 antibody[12]. Positive anti-β2GPI is an independent risk factor for thrombosis[13]. The chronic inflammatory state of SLE also increases the risk of thrombosis. Some scholars[14]have pointed out that thrombosis is related to the presence of LAC positive and anti-RNP/Sm antibodies, and the combined use of LAC and anti-RNP/Sm antibodies as predictors of venous thromboembolism is worth studying. In this case, right atrial thrombosis is associated with secondary anticardiolipin syndrome, which has a higher risk of thrombosis and valvular disease than patients without antiphospholipid antibodies [15]. In addition, a study[10, 16–17]pointed out that when the thrombus in the cardiac cavity is large and irregular, it is easy to fall off and lead to a very high risk of recurrent

pulmonary embolism. In this case, pulmonary CT showed inflammatory and consolidation changes in both lungs(Fig. 1). The patient was treated with heparin for anticoagulation, and the echocardiography showed that the volume of thrombus was reduced, no surgery was performed. Therefore, for SLE patients with high risk factors of thrombosis, attention should be paid to thrombus screening and timely anticoagulation therapy.

Conclusions

In summary, we report a rare case of atrial thrombosis caused by secondary anticardiolipin syndrome. Atrial thrombus is rare, anticoagulant therapy is a first-line treatment. This case is proposed to improve clinicians' understanding of the disease, to find the real cause behind the disease, early diagnosis and treatment, and to improve the prognosis of patients. For adolescent, when multiple systems are involved, it is more likely to SLE. The diagnosis of SLE can be confirmed by perfecting immunological examination and renal biopsy as soon as possible.

Abbreviations

SLE: Systemic lupus erythematosus; CRP: C reactive protein; ESR: erythrocyte sedimentation rate; LN: Lupus nephritis; APTT: Activated partial thromboplastin time; LAC: Lupus anticoagulant

Declarations

Acknowledgments

Not applicable.

Authors’ contributions

LYM assisted in revising and reviewing manuscripts; YHB assisted in the initial data search, acquisition of resources, drafted, revised, and reviewed the manuscript; all authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work., and all authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

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Availability of data and materials

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Ethics approval and consent to participate

Consent for publication

Consent has been given by the parents.

Competing interests

None of the authors have any financial or any non-financial competing interests to declare in relation to this manuscript.

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Figures

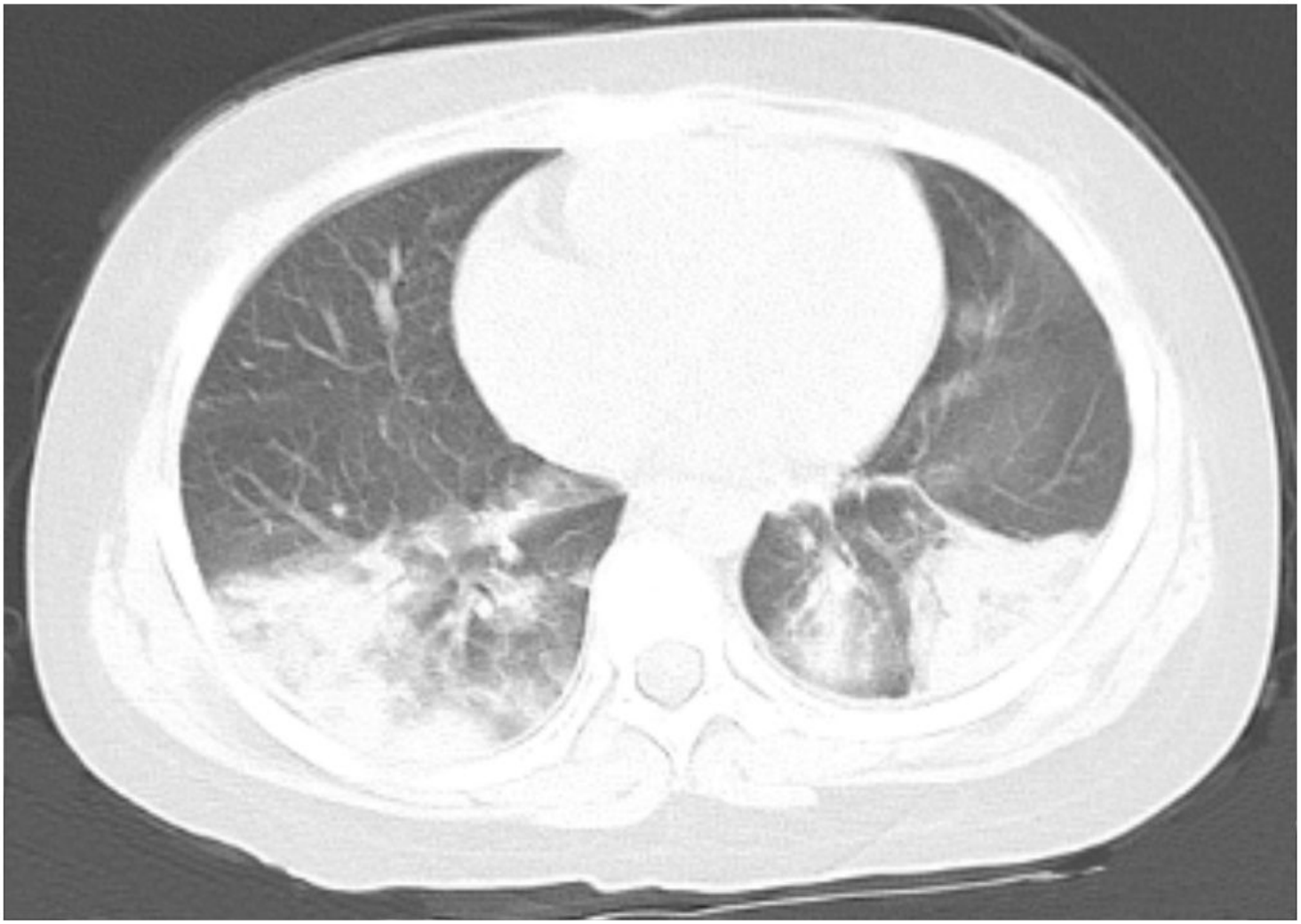

Figure 1

high-density shadows in all lobes of the lungs（arrow）

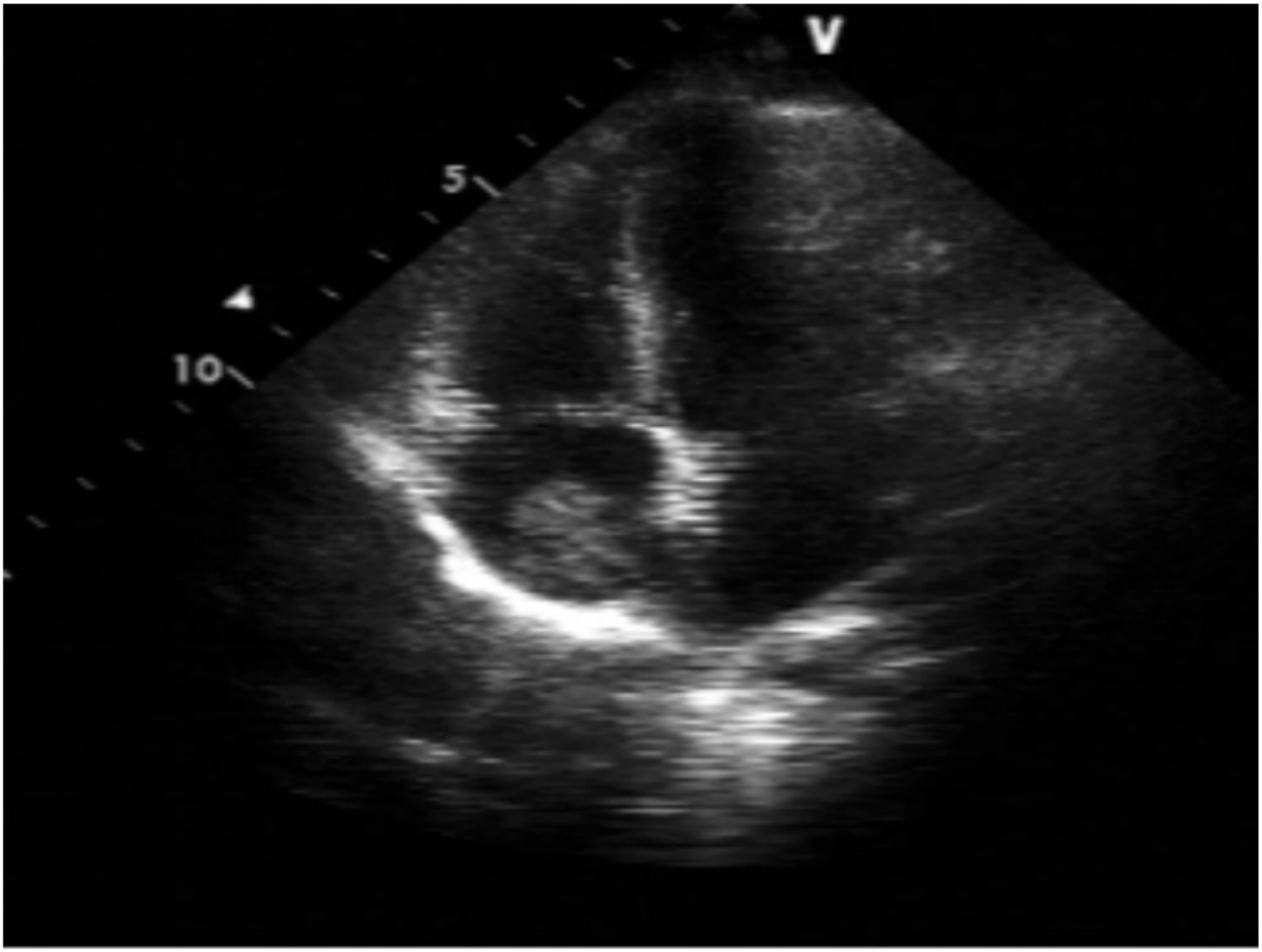

Figure 2

Echocardiography: right atrial thrombus(arrow)

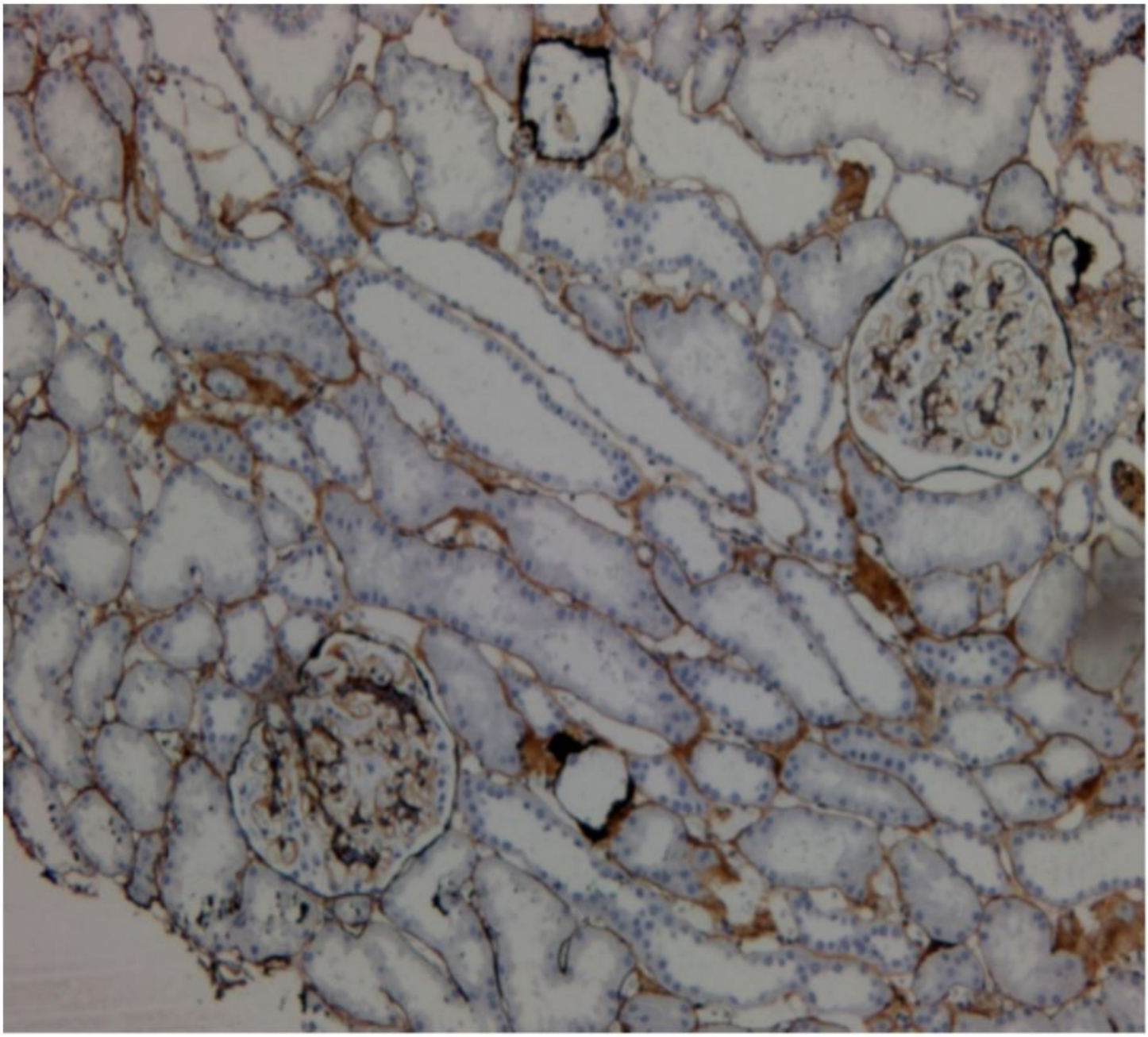

Figure 3

slight proliferation of mesangial cells and mesangial matrix（arrow）

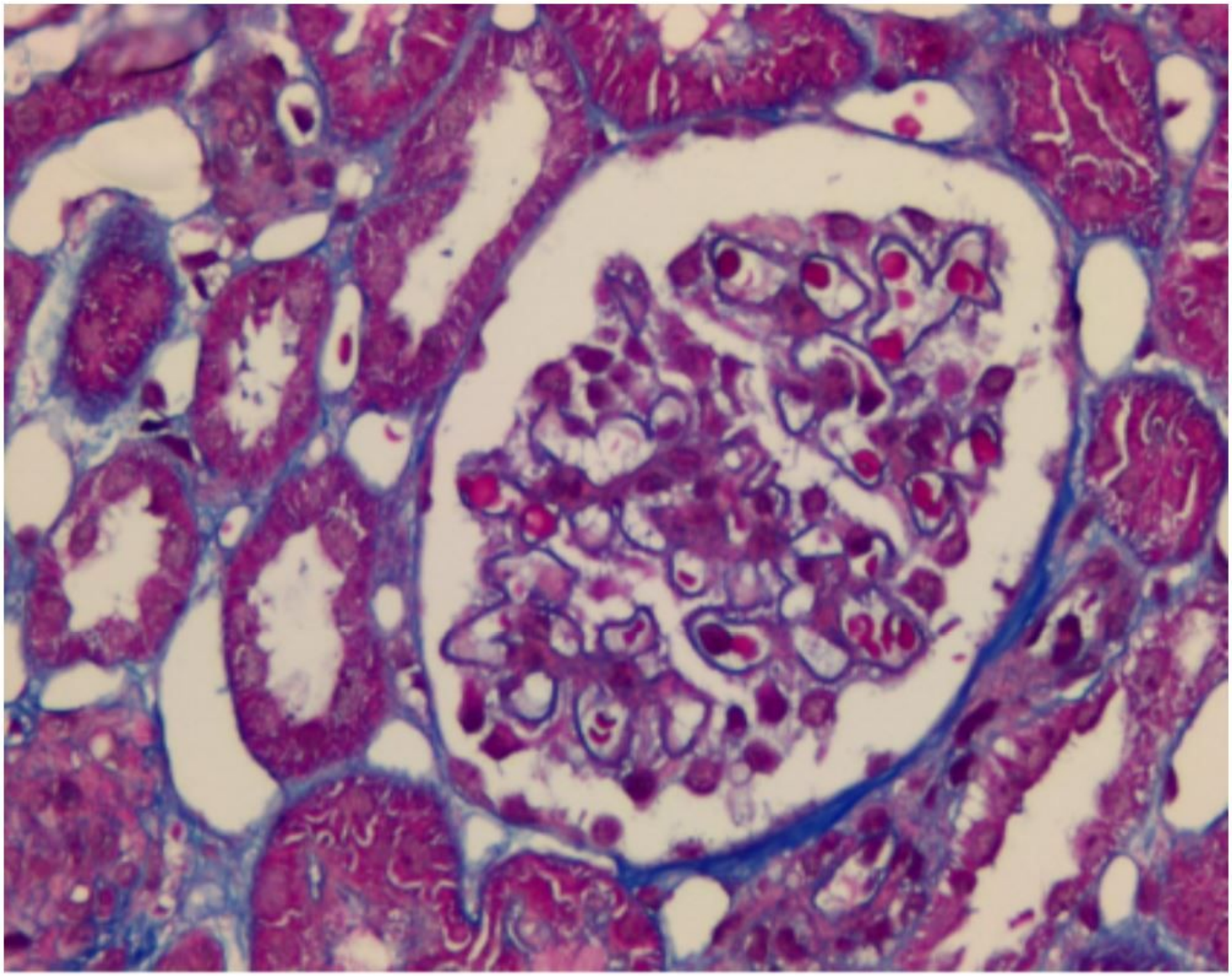

Figure 4

large amount of furophilic protein deposition subepithelial cell (arrow)