Renal Arterial Thromboemboli, Recanalisation with Angioplasty and Intraarterial Streptokinase Injection in a Child With Rheumatic Heart Disease.

Romatizmal Kapak Hastalığı Olan Çocukta Renal Arter Trombozu, Anjioplasti ve İntraarteriel Streptokinaz ile Rekanalizasyon

Ali Baykan,
MD.,
Department of Pediatric Surgery,
Erciyes University Medical Faculty
abaykan@erciyes.edu.tr

Hakan M.Poyrazoğlu,
MD.,
Department of Pediatric Surgery,
Erciyes University Medical Faculty
mhpoyraz@erciyes.edu.tr

Nazmi Narin,
MD.,
Department of Pediatric Surgery,
Erciyes University Medical Faculty
nnarin@erciyes.edu.tr

Hakan Ceyran,
MD.,
Department of Pediatric Surgery,
Erciyes University Medical Faculty
ceyranh@erciyes.edu.tr

Abstract
In chronic atrial fibrillation thromboembolism is a well-known complication. Because of the relatively high renal blood flow, the kidneys are frequently the targets for embolism. Our case was a boy with rheumatic heart disease with severe mitral and aortic valve defects. He presented with central nervous system emboli, with baseline atrial fibrillation. In clinic survey the left renal arterial emboli and renal failure developed. For unilateral renal arterial emboli local streptokinase injection and renal arterial angioplasty applied. We want to emphasize that local streptokinase infusion with renal angioplasty may be beneficial in the treatment of acute renal arterial occlusion.

Keywords: **Atrial fibrillation; Child; Renal artery occlusion; Rheumatic heart disease; Streptokinase; Thromboembolisim.**

Özet
Kronik atrial fibrilasyonda tromboemboli bilinen bir komplikasyondur. Kan akımı yüksek olan böbrekler embolizasyon riski altındadırlar. Olgumuzda ağır mitral ve aort romatizmal kapak hastalığı ve atrial fibrilasyon zemininde gelişen santral sinir sistemi embolisi bulguları vardı. İzleminde akut böbrek yetmezliği gelişen ve renal arter embolisi tespit edilen hastaya renal arter anjioplastisi ve lokal streptokinaz uygulandı. Bu olgu sunumunda erken dönemde tespit edilen renal arter embolisinin lokal trombolitik ve anjioplasti ile rekanalize edilebileceğini vurgulamak istedik.

Anahtar sözcükler: **Atrial fibrilasyon; Çocuk; Renal arter oklüzyonu; Romatizmal kapak hastalığı; Streptokinaz; Tromboemboli.**

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Corresponding Author:
Ali Baykan,
Department of Pediatric Surgery,
Erciyes University Medical Faculty
Kayseri, Turkey

Telephone : +90 -352 - 2353046
E-mail : abaykan@erciyes.edu.tr

Introduction

Although atrial fibrillation (AF) is an uncommon childhood disorder, which is the most often the result of chronically stretched atrial myocardium, it occurs most frequently in older children with rheumatic mitral valve disease. Thromboembolism is a well-known complication in chronic AF. Kidneys, lungs and central nervous systems, which have relatively high blood flow, are the frequent embolized sites. Adult patients who are in chronic stages and operated for mitral stenosis have higher risk of AF and thromboembolism, but renal arterial occlusion due to atrial fibrillation is rare in children (1, 2, 3).

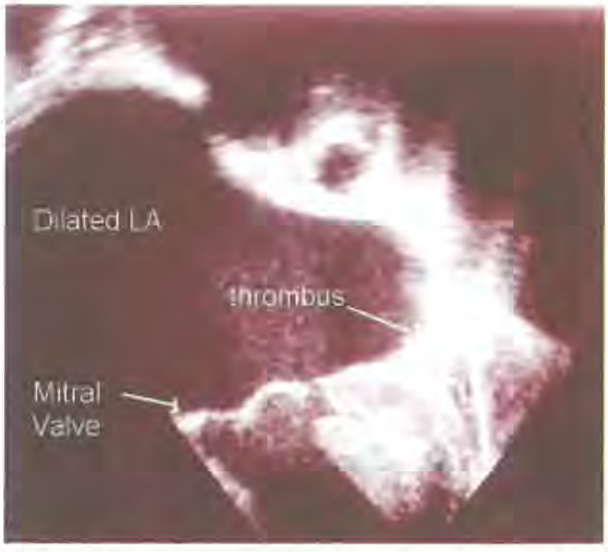
Traumas, thromboembolism from anywhere, underlying renal artery stenosis, cardiac dysrhytmia, atherosclerosis, and procoagulant states are main etiologic factors for acute renal artery thrombosis. Renal arterial occlusion is a reversible cause of renal dysfunction. However, a delay in treatment can lead to kidney loss (4). In principle treatment of the underlying condition causing occlusion is paramount. In practical terms, revascularization can often be attained by fibrinolytics, if the renal artery is normal prior to occlusion. The systemic or intrarenal arterial fibrinolytics have been used for gaining reperfusion (streptokinase, urokinase, Tissue Plasminogen Activator-tPA). Surgery is also an alternative method, which includes bypass and reconstruction, autotransplantation, at last nephrectomy (4).

In this article, a case of renal failure due to acute renal failure, caused by unilateral renal arterial thrombosis with poor systemic perfusion because of heart failure, and management with renal angioplasty and local streptokinase application was presented (this sentence should be rewritten).

Case report

Fifteen years old boy, who has rheumatic heart disease for 3 years and ordered mitral and aortic valve replacement, but have not been operated yet, was admitted to our hospital with syncope. On auscultation, gallop rhythm and 4th degree heart sounds were audible on all regions. Hepatomegaly was present. On neurological examination he was lethargic, and muscle tonus was decreased on right arm. He had cardiomegaly on telecardiography, and atrial fibrillation on ECG. Echocardiography revealed left atrial and left ventricular enlargement and thrombus (11 x 8 mm) in left atrial appendage (Picture 1). Patient was hospitalized and treated for congestive heart failure with (enalapril 0.2 mg/kg, furasemide 1mg/kg/bid and digoxin (0.035 mg/kg) and heparin infusion began (50 U/kg/hr). Because of resistant atrial fibrillation, addition to digoxin antiarhythmic therapy: amiodarone was started in addition to digoxin antiarhythmic theraphy. But arrhythmia did not resolve with medical therapy, and in the follow-up period the renal function tests got worsen (Table I). The renal arterial embolus was suspected with clinical deterioration of patient. Doppler USG revealed left renal artery occlusion. Cranial magnetic resonance imaging revealed bilateral basal ganglial infarct and ischemic changes in periventriculer regions of 3rd and lateral ventricles.

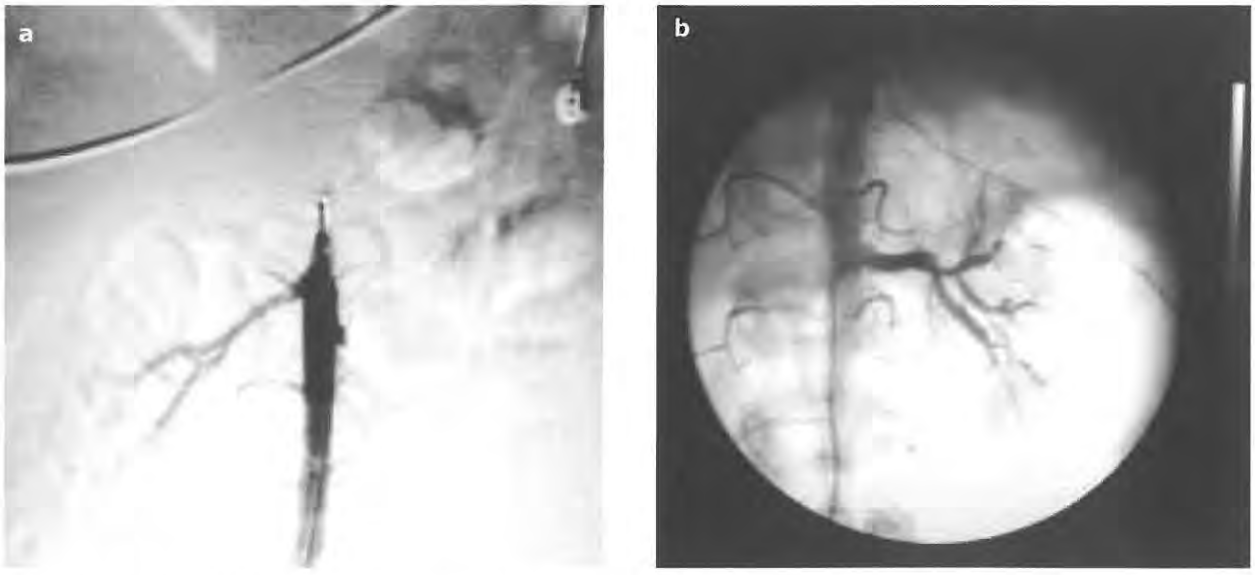
DC cardioversion was done for resistant AF and amiodarone infusion continued. With angiographic evaluation the thrombus was demonstrated and renal arterial streptokinase (4000 U/kg) infusion and renal arterial angioplasty was performed. After 15 minutes, in control renal angiography, renal perfusion demonstrated (Picture 2). Also Doppler USG revealed bilateral renal perfusion. Streptokinase infusion 1000 U/kg/hr continued for 48 hours. But in the following days the patient did not show any improvement and died from respiratory and central complications. In the autopsy of the patient, renal pathology revealed minimal subcortical glomerular necrosis and normal renal histological structure in the rest.



Picture 1. Echocardiographic demonstration of left atrial thrombus

Table I: Renal parameters before and after renal angioplasty and streptokinase infusion

	On admission	Before manipulation	2 days after manipulation
Blood pressure (mmHg)	100/70	120/80	110/70
Urine output (cc/day)	1300	190	340
Hematuria	-	+	+/-
Blood flow in doppler USG		-	+
BUN (mg/dl)	12	159	79
Creatinine ((mg/dl)	0.9	5.8	4.2



Picture 2: Angiographic findings. Thrombotic left renal artery (a), reperfusion after the angioplasty and local streptokinase (b)

Discussion

In atrial fibrillation and flutter, there is an ineffective and uncoordinated contraction of the atria. Most atrial fibrillations in children are the result of rheumatic heart disease. In chronic atrial fibrillation the risk of thromboemboli increases, especially in pulmonary and central nervous systems, but because of high blood flow in renal vasculature thromboemboli risk on kidneys is also high (5).

Any reduction of blood flow through the renal artery can impair kidney function. A complete blockage of blood flow usually causes permanent failure of the kidney. Lack of functioning of one kidney may not cause symptoms because the second kidney adequately filters the blood. If there is not a second functional kidney, blockage of the renal artery may cause symptoms of acute kidney failure. Acute arterial occlusion of the kidney may occur after injury or trauma to the abdomen, side, or occasionally the back. Heart diseases like mitral stenosis or atrial fibrillation increase the risk of emboli. Occasionally, renal artery stenosis or atheroembolic renal disease may cause sudden thrombosis of the renal artery (4). AF prevalence doubles with each advancing decade of age, from 0.5 % at age 50-59 years to almost 9 % at age 80-89 years (1), but the atrial fibrillation and also renal arterial occlusion caused by fibrillation are rare conditions in childhood.

In chronic atrial fibrillation the anticoagulant therapy is essential for prophylaxis of thromboembolism. If anticoagulant therapy is insufficient and thromboemboli is evident in any system recanalisation procedures may be used. Like kidneys, prolonged obstruction of the circulation may result in permanent organ dysfunction. The time of recanalisation is important for vitality. The longest recorded renal artery occlusion with anuria from which complete resolution of renal function ensued is 42 days (6). The collaterals may provide enough blood for the kidney to maintain its vitality. In our case we treated the patient for AF and also anticoagulant therapy was given, but the delay in admission to hospital and ineffectiveness of anticoagulation, renal arterial emboli had developed. Although he had unilateral renal arterial occlusion, because of the heart failure and poor systemic perfusion, other kidney was not sufficient for adequate renal function. At the third day of renal arterial obstruction we demonstrated the unilateral renal arterial emboli with renal angiography and recanalize the renal artery with renal arterial angioplasty and intrarenal arterial streptokinase infusion. The use of different fibrinolytic agents and effectiveness of them are well known (7-10), but the usage in pediatric population is rare. In our patient renal arterial angioplasty was done. At the same time streptokinase infusion begun with 4000 U/kg and continued 1000 U/kg/hr for 48 hours. In post procedure evaluation of the renal functions the doppler USG revealed renal arterial blood flow and the biochemical renal function tests also improved. Although the renal and cardiac functions improved partially, the patient had been lost.

In conclusion, the renal arterial angioplasty for renal arterial thrombosis and local streptokinase infusions are effective and useful applications in children with renal arterial thrombosis. But for prevention of further system damage and improvement of prognosis, early diagnosis and treatment is the most important thing. We presented the case because of rarity of rheumatic heart disease associated atrial fibrillation and renal arterial thromboembolism in children, and for emphasizes the effectiveness of local streptokinase with angioplasty.

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