Management of myocardial infarction in a child with Kawasaki disease

Infarctus du myocarde chez un enfant avec syndrome de kawasaki

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RÉSUMÉ

Les principales complications de la maladie de kawasaki sont cardiovasculaires et la mortalité est devenue très faible grace à un diagnostic précoce et au traitement par immunoglobulines.Toutefois dans certaines formes résistantes , le pronostic reste facheux surtout en rapport avec des complications coronariennes essentiellement par infarctus du myocarde sur thrombose d 'un anévrysme.Le cas présenté est celui d 'un garçon de 4 ans qui a présenté une maladie de kawasaki réfractaire au traitement usuel et compliquée d 'un infarctus du myocarde qui a été pris en charge avec succès par thrombolyse et traitement percutané.

Mots-clés

Kawasaki, Infarctus du myocarde, pédiatrie ,Ténecteplase, dilatation coronaire

SUMMARY

Although early treatment with intravenous immunoglobulin reduces the risk of cardiovascular complications in kawasaki disease , in refractory cases myocardial infarction can result from thrombosis of coronary artery aneurysms.This report describes successful management of myocardial infarction from coronary thrombosis in a 4 year old infant with kawasaki disease using intravenous Tenecteplase followed by percutaneous coronary intervention.

Key-words

Kawasaki, myocardial infarction , Tenecteplase, Percutaneous treatment

Kawasaki disease (KD) is an acute, systemic vasculitis of childhood. The early mortality of this disease results from coronary complications, mainly aneurysmal thrombosis with myocardial infarction (1). Although there have been reports of ischemic heart disease as late cardiologic sequelae of KD in young adults, acute myocardial infarction caused by coronary complications is rare.

CASE REPORT

A 4-year -old male child presented to pediatric emergency with fever and rash.

He initially underwent a septic workup, however Kawasaki disease was suspected and the boy was referred for echocardiography which showed a large aneurysm at the origin of the left anterior descending (LAD) coronary artery measuring 6 mm in diameter and a slight dilation of the circumflex coronary artery (Circ) .The right coronary artery was not dilated. Thus, KD was confirmed and the boy was treated with infusion of intravenous immunoglobulin (IVIG) and high-dose aspirin (80mg/kg/day). His fever persisted, and he received another dose of IVIG .Despite therapy with IVIG, there was enlargement of his coronary aneurysms reaching 8 mm and the RCA became dilated measuring 7 mm. Thus he received one pulse of intravenous methylprednisolone. He became apyretic and the inflammatory blood marquers decreased significantly. The patient was discharged home on subcutaneous low molecular–weight heparin and aspirin (6 weeks after the beginning of his symptoms). Two Weeks later, he was admitted with chest pain. Anamnesis revealed that anticoagulation therapy had been inadequate during the previous week. The patient underwent an electrocardiogram which was consistent with anterior myocardial ischemia (Figure 1).

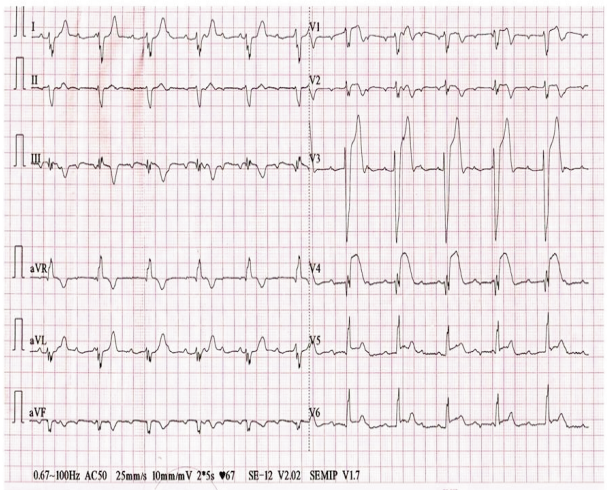

Figure 1 : Electrocardiogram showing the ST segment elevation in the anterior leads with atrio- ventricular block

The echocardiogram showed apical and septal hypokinesia with poor left ventricle function and moderate mitral regurgitation (Ejection fraction=35%). An aneurysm was present at the origin of the LAD with thrombus occluding the lumen. (Figure 2).The RCA and Circ branches were significantly dilated. The patient received 37.5 mg of clopidogrel and he was maintained with a heparin infusion of 15 U/kg/h. Immediate evolution was marqued by the occurrence of complete atrioventricular block .No signs of shock. Dobutamine was infused and a 0.7 unit dose of Tenecteplase (metalyse) was infused intravenously then the patient was transferred directly to the cardiac catheterization laboratory for urgent evaluation and treatment. A left heart catheterization was

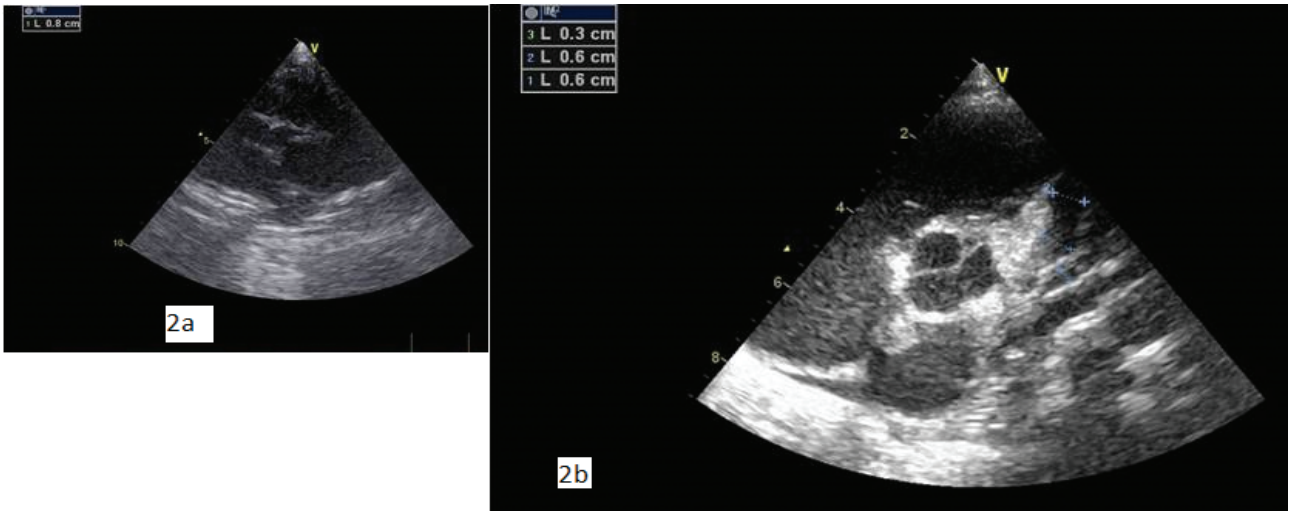

Figure 2: Echocardiogram from the parasternal short-axis view showed important right coronary artery dilation (2 a), left anterior descending artery (LAD) aneurysm, and dilated circumflex coronary artery (2b)

performed via the right femoral artery. The aortic pressure was 85/55 mmHg. Non selective angiography of the LCA was performed which showed a complete occlusion of this coronary artery (Figure 3).Intra left coronary artery infusion of heparin (50mg) was done followed by balloon angioplasty. This procedure was well tolerated and recanalization with complete reperfusion of the occluded artery was immediately achieved. Angiography into the RCA then was performed. The RCA was severely affected ;Aneurysms were present throughout the RCA and distal branches (Figure 3c).The heart block resolved 2 days later ,the boy improved clinically and was discharged 15 days later receiving clopidogrel , aspirin and acenocoumarol (minisintrom) which was brought back from abroad. The echocardiogram showed improvement of left ventricular contraction reaching 53% after a few weeks and further investigation didn't reveal other arterial obstruction.

DISCUSSION

This case illustrates a very rare occurrence of an acute myocardial infarction in a pediatric patient. Management of this condition which is commonly encountered in adults but seldom seen in children was challenging. Application of similar principles for a myocardial infarction was empiric. Initial symptoms were very suggestive of Kawasaki disease and echocardiography confirmed the the diagnosis by showing coronary aneurysms. Echocardiography is a very useful tool for identifying coronary artery lesions and performing follow-up examinations in patients with KD (2). After diagnosis, the child did not respond to treatment with two courses of IV IG and he experienced severe coronary involvement. IVIG has a potent anti-inflammatory effect in KD although the mechanisms of action are still unknown .The recommended dose is a single infusion of 2 g/kg over a period of 8-12 hours. Among refractory KD patients who receive a second high-dose of IVIG, 20 to 50 % of patients develop coronary artery complications (3). Large sized coronary aneurysms (≥ 6 mm in diameter) account for approximately 0.5-1.0% of the total cases of KD (4). In these patients, strict control of anti-thrombotic status using combinations of anti-coagulant and antiplatelet medications for at least 3 years after KD onset is essential.

However, In KD patients with giant coronary aneurysms (≥8 mm), thrombus formation is occasionally seen despite the use of antithrombotic agents (5). Myocardial infarction is very rare in children. There are no controlled trials or specific recommendations to guide early treatment in this age group and the use of thrombolytics in children is commonly met with anxiety and an appropriate concern for bleeding complications, limiting the number of children who may benefit from early therapy. However, there has been little clinical experience with the use of thrombolytic therapy in children with KD. This experience involved the intravenous administration of streptokinase and urokinase and tissue plasminogen activator (TPA), as well as the monoclonal platelet glycoprotein (GP)IIb/IIIa receptor inhibitor, abciximab . Also, improved outcome was reported when thrombolytic agents were administered directly into the coronary arteries; Tsubata et al. (6) infused TPA at a dose of 50,000 U/kg into the RCA and LCA of a 7-month-old boy with massive thrombi and decreased LV function. The thrombi decreased in size, and the LV function returned to normal with no complications. Sohn and Kwon (7) infused 1 mg/kg of TPA into the coronary artery of a 7-year-old boy with resolution

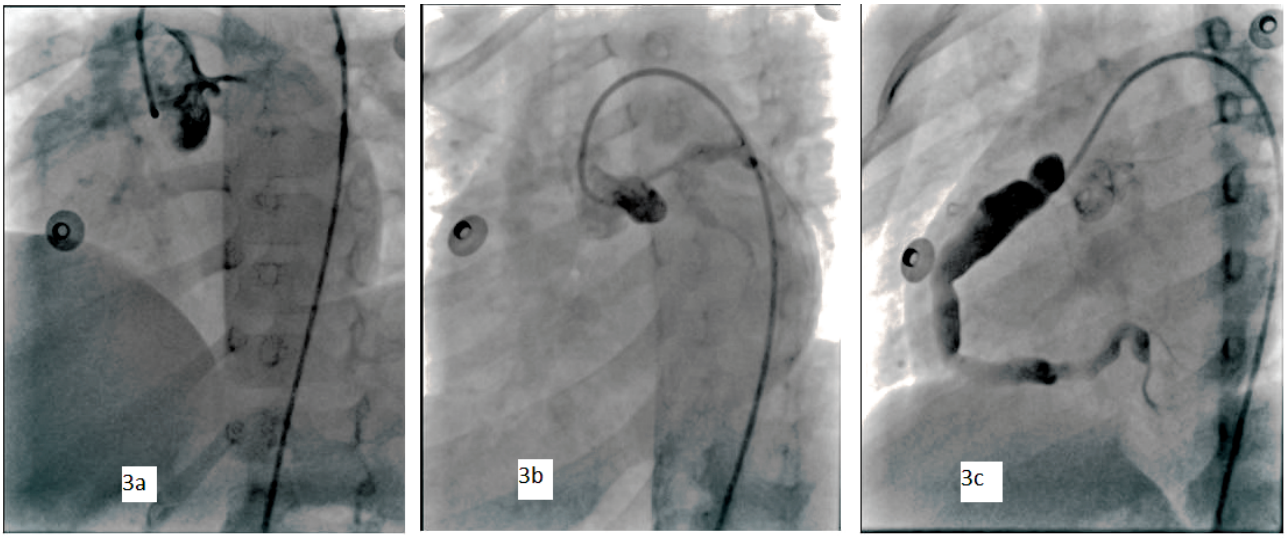

Figure 3 : Coronary angiogram demonstrated occluded left anterior descending artery (3 a) that has been repermeabilised after balloon angioplasty (3 b) .Angiography showing total dilation with multiple aneurysms of the right coronary artery(3c)

of the ischemia. To the best of our knowledge this is the first use of tenecteplase for KD in children. There were no bleeding complications from this medication and it would have been more efficient to administrate thrombolytic therapy into the coronary artery instead of heparin. However, intravenous thrombolysis also facilitated the percutaneous intervention and it is likely that this patient would not have survived without this immediate rapid therapy. Percutaneous coronary interventions can be considered although there may be difficulties in successfully passing a guidewire through an occluded aneurysm. Balloon angioplasty may not yield a durable result, and it doesn't seem easy that a stent could be deployed within an acutely occluded aneurysm. The experience in literature is very scarce. Consequently, either intracoronary thrombolysis or intravenous coronary thrombolysis must be the therapeutic strategy for AMI in children. Severe complications are uncommon and do not require special facilities (8).

CONCLUSION

This case illustrates the importance of synergistic teamwork among pediatric intensive care, and both pediatric congenital and adult interventional cardiology when encountering coronary artery disease in pediatric patients. Physicians should carefully monitor KD patients who do not respond to initial IVIG therapy and show progressive coronary artery dilatation. Coronary thrombosis must be treated aggressively with thrombolytic and platelet inhibitor to rescue the myocardium by reestablishing coronary perfusion.

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