# Percutaneous Transluminal Coronary Angioplasty Following Kawasaki Disease

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*Received: June 12, 2009;*
*Review: July 24, 2009;*
*Accepted: October 6, 2009.*

Kawasaki disease (KD) can result in coronary artery disease in the form of ectasia, aneurysm and stenosis. The final complication can be myocardial infarction. We report a child who presented with severe left ventricular dysfunction following KD and was detected on angiography to have total left anterior descending artery occlusion. Angioplasty was done which resulted in improvement in the flow. Follow up angiography a year later showed recurrence of total occlusion.

**Key words:** *Angioplasty, Child, Coronary artery disease, Kawasaki disease.*

Kawasaki disease (KD) is known to involve the coronary arteries in upto 20% of patients. Usually acute involvement is in the form of ectasia or aneurysm formation of the coronary artery [1,2]. Four percent of all cases may progress to ischemic heart disease [2]. We report a young child presenting subacutely following KD, with cardiac dysfunction and complete coronary occlusion. The child underwent coronary angiography and angioplasty.

## CASE REPORT

A 3 year 11 month old male child presented to us with signs and symptoms suggestive of congestive heart failure for the preceding one week. He had history of febrile illness 2 months prior to presentation, the exact cause of which was not diagnosed. He had peeling of skin on the sole of his feet and his reports revealed platelet count of 800,000/cu.mm during the illness. Creatinine phosphokinase and troponin I were normal. The electrocardiogram was suggestive of old anterolateral myocardial infarction with deep Q waves in lead I, aVL, and $V_1$- $V_4$. Echocardiogram showed aneurysmal proximal left main coronary artery and a normal right coronary artery. The left anterior descending (LAD) could not be delineated. The left ventricle (LV) was dilated and the interventricular septum was dyskinetic. The ejection fraction was 35%. Two clots were seen in the apex of left ventricular cavity. Intravenous heparin was started after admission and the child was discharged few days later on warfarin and clopidogrel. Echocardiogram a week later showed resolution of the LV clots. The child was then taken up for coronary angiography which revealed an aneurysm in the left main coronary artery and a complete occlusion of left anterior descending coronary artery (***Fig.* 1**). The percutaneous transluminal coronary angioplasty was performed 6 weeks later. Following the balloon angioplasty, angiogram revealed luminal flow into the thin left anterior descending coronary artery till the level of the 2nd diagonal branch. The patient tolerated the procedure well and recovered without co-morbidity. He was continued on warfarin and clopidogrel. He was followed up at 3, 6 and 12 months following the angioplasty. His echocardiogram at 1 year follow up showed improved left ventricular function with ejection fraction of 45%. Repeat angiogram one year after the angioplasty showed total re-occlusion of the LAD. Clinically the child is in New York Heart Association classification II.

## DISCUSSION

The index patient presented to us in congestive heart failure and an ECG suggestive of anterolateral

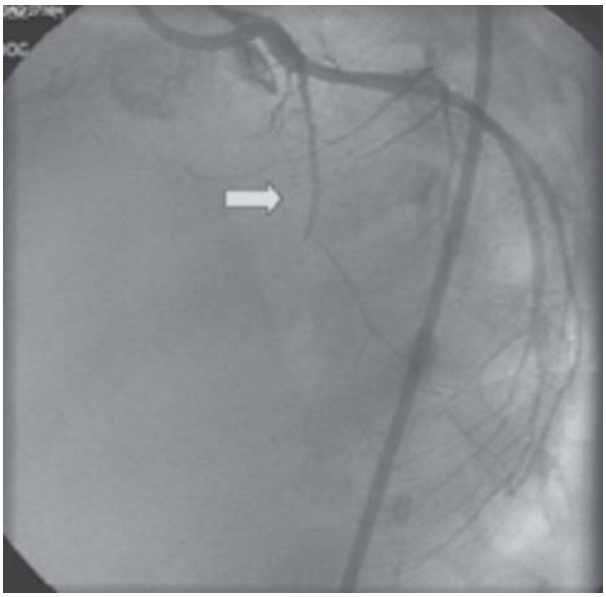

**FIG. 1** *Selective Left main coronary artery angiogram showing total occlusion of the Left anterior descending coronary artery.*

myocardial infarction. The past history and investigatins were suggestive of a diagnosis of KD.

The fate of coronary artery aneurysm in KD has been linked to its size [1,2] incidence of coronary artery stenosis in all cases of aneurysm in KD varies from 19-74% [2,4,5]. The indications of intervention in KD patients have been previously described [6]. We were dealing with total coronary occlusion; a less common lesion in KD. Surgery or percutaneous transluminal coronary angioplasty (PTCA) both were likely to be associated with re-occlusion. Treatment options for KD related coronary disease include PTCA, rotational ablation, stenting or coronary artery bypass grafting.

PTCA may be more effective if performed in younger patients and early in disease process [7]. Ino, *et al*. [8] showed that the effectiveness of PTCA depends on the time interval between disease onset and treatment, and age of the patient. They suggested PTCA to be performed in patients younger than 6 to 8 years of age in view of specific histopathologic features of the disease [8]. A shorter time interval from KD onset and catheter intervention in successful cases compared with unsuccessful cases was shown in a report by Japanese Pediatric Interventional Cardiology Investigation Group [6]. In the described patient, coronary angioplasty was the chosen method in view of the child's age and vessel size and presentation within 2 months of the disease onset.

PTCA may be associated with a high success rate, but new aneurysm formation rate is higher than stent implantation or rotational atherectomy. The etiology of new aneurysms is probably intimal dissection caused by balloon angioplasty [3]. The incidence of re-stenosis after PTCA is high. Approximately one quarter of the patients develop re-stenosis or occlusion as happened in our patients [9]. The mechanism responsible for restenosis is the same as that responsible for failure of adequate balloon dilation. Coronary arteries with thick intimal hyperplasia probably recoil easily, even if dilated adequately. Angioplasty for KD associated coronary disease has recently been reported in several young children including as young as 2 years old [9]. These authors have reported medium term patency with angioplasty.

The long term prognosis of MI is not good and there is likelihood of more areas of stenosis leading to myocardial infarction. 16% of the survivors from the first attack had a second attack. Fatality was 63% for the second attack and 83% for the third [10]. Our current objective of management of this patient is to avoid recurrence of myocardial infarction and optimization of medical management of heart failure. Since myocardial muscle has already infracted, the patient is unlikely to benefit from future bypass grafting.

*Contributors:* VK: Review of first write up and revisions, editing; MSS: Collection of data, references, first write up, corrections, review of literature; and VR: Correction of write ups.
*Funding:* None.
*Competing Interest:* None stated.

## REFERENCES

1. Kato H, Ichinose E, Yoshioka F, Takechi T, Matsunaga S, Suzuki K, *et al*. Fate of Coronary aneurysm in Kawasaki disease: Serial coronary angiography and long term follow up study. Am J Cardiol. 1982;49:1758-66.
2. Kato H, Sugimara T, Akagi T, Sato N, Hashino K, Maeno Y, *et al*. Long term consequences of Kawasaki disease: a 10 to 21 year follow up study of 594 patients. Circulation. 1996;94:1379-85.

3. Akagi T. Interventions in Kawasaki disease. Pediatr Cardiol. 2005;26:206-12.
4. Onouchi Z, Hamaoka K, Kamiya Y, Hayashi S, Ohmochi Y, Sakata K, *et al*. Transformation of Coronary artery aneurysm to obstructive lesion and the role of collateral vessels in myocardial perfusion in patients with Kawasaki disease. J Am Coll Cardiol. 1993;21:158-62.
5. Tsuda E, Kamiya T, Ono Y, Kimura K, Kurosaki K, Echigo S. Incidence of stenotic lesions predicted by acute phase changes in coronary arterial diameter during kawasaki disease. Pediatr Cardiol. 2005;26:73-9.
6. Akagi T, Ogawa S, Ino T, Iwasa M, Echigo S, Kishida K, *et al*. Catheter interventional treatment in Kawasaki disease: a report from the Japanese pediatric interventional cardiology investigation group. J Pediatr. 2000;137:181-6.
7. Kuramochi Y, Ohkubo T, Takechi N, Ogawa S. Feasibility of percutaneous transluminal coronary angioplasty to patients with kawasaki disease as an early management strategy. Pediatr Cardiol. 2001;22:183-7.
8. Ino T, Akimoto K, Ohkubo M, Nishimoto K, Yabuta K, Takaya J, *et al*. Application of percutaneous transluminal coronary angioplasty to coronary arterial stenosis in kawasaki disease. Circulation. 1996;93:1709-5.
9. Tsuda E, Miyazaki S, Takamuro M, Fuse S, Tsuji Y, Echigo S. Strategy for localized stenosis caused by Kawasaki disease: midterm results of percutaneous transluminal coronary balloon angioplasty in two infants. Pediatr Cardiol. 2006;27:272-5.
10. Kato H, Ichinose E, Kawasaki T. Myocardial infarction in Kawasaki disease: clinical analyses in 195 cases. J Pediatr. 1986;108:923-7.

# Necrotizing Fasciitis Following BCG Vaccination

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*Received: August 6, 2009;*
*Initial review: September 1, 2009;*
*Accepted: October 21, 2009.*

We report a newborn with methicillin-resistant *Staphylococcus aureus* mediated necrotizing fasciitis after Bacilli-Calmette-Guerin vaccination. Radical debridement of the affected area coupled with twice daily surgical honey dressing and intravenous vancomycin and clindamycin resulted in satisfactory healing.

**Key words**: *Bacille-Calmette-Guerin vaccine, Necrotizing fasciitis, Neonate, Staphylococcus aureus.*

Necrotizing fasciitis is characterized by vascular thrombosis and necrosis following rapidly spreading bacterial infection of the skin, subcutaneous fat and fascia. Systemic dissemination and toxicity may at times be marked [1]. The most common organisms implicated include Streptococci of groups B, A and D, Staphylococci, Gram-negative Enterobacteriae and anaerobes. We described a neonate that developed *Staphylococcus aureus* (*S. aureus*) necrotizing fasciitis involving the left upper arm following BCG vaccination.

## CASE REPORT

A 7 day old previously healthy female neonate, born spontaneously to a non-consanguineous primipara was initially seen for fever associated with swelling and redness over the left upper arm. The baby had received BCG vaccine at our institute, about 18 hours prior to presentation. The inoculation using 26 G hypodermic needle was strictly intradermal, as evidenced by a satisfactory 4 mm bleb formation immediately after the procedure. Sterile saline with cotton was employed to swab clean the proposed site of vaccination. The mother's antenatal period and delivery were uneventful. Examination revealed an excessively irritable febrile neonate (core temperature 103ºF), with a warm and tender erythematous swelling, involving the outer aspect of the middle third of the left arm (approximately 3 cm