Simultaneous development of Kawasaki disease in identical twins: A case report

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Abstract

Kawasaki disease (KD) is the most common cause of multisystem vasculitis in children. The coronary arteries are most commonly damaged in KD. Coronary aneurysm or dilatation is recognized by two-dimensional echocardiography or coronary angiography. The diagnosis is made by presentation of fever for at least 5 days and at least four of the following signs:

1. Bilateral bulbar conjunctival injection without exudate
2. Changes in lips and oral cavity: red lips, strawberry tongue, diffuse injection of oral and pharyngeal mucosa
3. Polymorphous exanthem
4. Changes in peripheral extremities (acute phase: red palms and soles, indurative edema) (convalescent phase: membranous desquamation from fingertips)
5. Acute nonpurulent cervical lymphadenopathy.

Although a role for genetics in susceptibility to KD has been widely accepted, data regarding concordance of KD in twins have been conflicting. The current hypothesis is that an infectious agent triggers immune activation in genetically susceptible hosts who then manifest the clinical syndrome that we recognize as KD.

Environmental exposure to the unknown agent of KD is thought to be an inciting event. Because twins during childhood often share the same environmental exposures, one would expect a high rate of concordance for KD in twin pairs.

To our knowledge, there is only one published series of monozygotic twins that found a concordance rate of 11 of 78 (14.1%). We present here a case of KD in twin brothers, in one of whom vasculitis would have been missed without high index of clinical suspicion, laboratory, and ECHO studies.

Keywords: Genetic susceptibility, Kawasaki disease, simultaneous development in identical twins

Introduction

Kawasaki disease (KD) is the most common cause of multisystem vasculitis in children. The coronary arteries are most commonly damaged in KD. Coronary aneurysm or dilatation is recognized by two-dimensional echocardiography or coronary angiography. The diagnosis is made by presentation of fever for at least 5 days and at least four of the following signs:

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Case History

Twin A
The younger brother, who has been previously healthy, developed high fever on day 1 of his illness and subsequently developed rashes over his body, redness of eyes, red cracked lips, strawberry tongue, erythema, and swollen red palms and soles. He was admitted to our hospital on 10th day after fever onset with skin peeling of palms and soles. On admission, he met five of six diagnostic criteria for KD. His laboratory data are given in Table 1.

Paediatric cardiology consultation was sought to rule out coronary artery lesion.

ECHO: normal study, normal coronaries, normal Left Ventricular Function (LV), no Aortic regurgitation (AR)/Mitral Regurgitation (MR), no Pericardial Effusion (PE).

The patient was treated with IVIG 2 g/kg and aspirin, to which he responded well and achieved defervescence the next day and all his symptoms disappeared promptly. He was discharged on day 6 of his hospitalization.

Twin B
The elder brother developed high fever which lasted for 6 days, rashes over hand and foot, and sore throat simultaneously with his brother. He developed skin peeling, cracked lips, and strawberry tongue on day 9 of illness. At presentation to hospital, he was clinically well. But due to the history and shared genetic potential for KD, laboratory investigations and ECHO were done for him [Table 2]. Unlike his brother, he met only three of the diagnostic criteria for KD upon admission, so was diagnosed as incomplete KD.

However, his ECHO revealed surprising findings:
- Normal LV function, mild Coronary Artery Lesion (CAL)-Left Coronary Artery (LCA) 2.5 mm, Left Anterior Descending Artery (LAD) (proximal) 3 mm, mid LAD 3.5–4 mm
- Bulbosity of LCA
- Right Coronary Artery (RCA) normal
- Bicuspid aortic valve.

He was also treated with IVIG 2g/kg and aspirin, to which he also responded well and was discharged on day 6 of hospitalization with advice to follow-up.

Discussion
Here, we have presented a case of 4-year-old twins who simultaneously developed KD. There have been only few case reports of simultaneous development of KD.

A genetic role in the pathogenesis of KD seems likely as evidenced by the following:
- Higher risk of KD in Asian children regardless of country of residence
- Sibling and children of individuals with a history of KD.

Genome-wide association studies, including sibling pair analyses, have identified susceptibility loci. Some functional single-nucleotide polymorphisms of genes such as inositol 1,4,5-triphosphate-3-kinase C and caspase 3 significantly increase susceptibility to KD.

Increasing evidence supports the hypothesis that KD susceptibility is genetically determined and siblings of an index case have a higher risk of KD when compared with population controls.

In our case report, twin B had incomplete KD. Without specific testing for subclinical vasculitis, he would not have come to medical attention.

Conclusion
Our case report contributes further evidence that genetic susceptibility plays an essential role in development of KD. When KD is diagnosed in a patient who has a twin, the apparently well twin should also be screened for symptoms and clinical signs of KD. Any evidence of illness should precipitate an evaluation for subclinical coronary artery vasculitis including laboratory and ECHO investigations.

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Conflicts of interest
There are no conflicts of interest.

Table 1: Laboratory investigations of Twin A

| Parameter       | Value      |
|-----------------|------------|
| Total WBC count | 18400/cumm |
| Platelet count  | 502 lakhs/cumm |
| Serum albumin   | 4g/dl      |
| T. bilirubin    | 0.3mg/dl   |
| AST             | 32U        |
| ALT             | 14U        |
| CRP             | 26         |
| ESR             | 101 mm     |

Table 2: Laboratory investigations of Twin B

| Parameter       | Value      |
|-----------------|------------|
| Total WBC count | 18100      |
| Platelet count  | 458 lakhs  |
| T. bilirubin    | 0.4        |
| AST             | 28         |
| ALT             | 16         |
| CRP             | 0.8        |
| ESR             | 20         |