Unusual presentation of more common disease/injury

Kawasaki disease: always straight to the heart?

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Summary

Kawasaki disease is an important differential diagnosis when evaluating prolonged fever in childhood. Although the aetiology of this vasculitic disease process remains obscure, prompt recognition and treatment significantly reduces vascular complications such as coronary artery aneurysms. Patients presenting with atypical or incomplete diagnostic features remain a challenge. Here the authors describe the atypical features of Kawasaki disease that led to profound acute hearing loss in a 6-year-old boy with complex congenital heart disease. Coronary changes were not seen on early follow-up, but the patient required bilateral hearing aids. Considering Kawasaki disease early, even in the possibly confusing context of complex congenital heart disease and atypical symptomatology, is crucial to avoid long-term sequelae.

BACKGROUND

Kawasaki disease is an acute systemic vasculitis of unknown aetiology, which typically presents with prolonged fever, skin rash, cervical lymphadenopathy, mucous membrane erythema and cracked lips in children. Aneurysmatic coronary artery complications can lead to catastrophic consequences with sudden death due to myocardial ischaemia.¹ Early recognition of clinical features has led to improved outcome. Treatment with intravenous immunoglobulins (IVIG) during the acute illness phase significantly reduces coronary complications.² IVIG more than 10 days after the onset of fever may be less effective.³ Atypical clinical features of Kawasaki disease can easily be overlooked or misinterpreted. Here we describe the unusual presentation of Kawasaki disease with acute and profound sensorineural hearing loss.

CASE PRESENTATION

A 6-year-old boy with complex congenital heart disease had undergone total cavopulmonary connection surgery (Fontan circulation) a couple of years prior to presentation. Since his previous cardiac surgery, he had been regularly followed up and his general health had been described as good while taking an ACE inhibitor, diuretics and aspirin. He was admitted to his local hospital with a 10-day-history of general malaise, fever, corysal symptoms, bilateral ankle and knee swelling as well as scrotal oedema. His general practitioner had started oseltamivir and azithromycin for a presumed respiratory tract infection without improvement in the preceding week. Cardiovascular examination was unremarkable apart from evidence of previous cardiac surgery. He was transferred to the author's institution for further diagnostic evaluation, in particular to exclude a failing Fontan circulation. The acute onset of profound bilateral sensorineural hearing loss within days of admission prompted formal audiological assessment and led to the diagnosis of atypical Kawasaki disease in the third week of the patient's illness. Despite medical treatment with IVIG, high-dose steroids

and infliximab the patient's hearing impairment largely persisted at 2 months follow-up.

INVESTIGATIONS

Initial investigations focused around the evaluation of serum and urinary protein concentrations and ultrasound of joints and abdomen in the setting of prominent lower-limb oedema. These investigations were normal. Inflammatory markers were raised, but microbiological and autoimmune screens were negative. $\alpha 1$ Antitrypsin levels in the stool were normal. Cardiac evaluation revealed normal sinus rhythm, and adequate valvar and ventricular systolic functions on echocardiography. Table 1 summarises relevant abnormal blood results over the course of the illness. The parent first noted the patient to be hard of hearing and detailed audiological examination revealed profound bilateral hearing loss (figure 1).

DIFFERENTIAL DIAGNOSIS

In patients who have undergone palliation of univentricular heart conditions, such as hypoplastic left heart syndrome, peripheral oedema can be the presenting feature of protein losing enteropathy in the setting of a failing Fontan circulation. Timely cardiac assessment is paramount to exclude often-subtle atrial arrhythmias and assess cardiac performance by echocardiography. Hypoalbuminaemia and protein losses in the stool with

Table 1 Blood results at presentation, during admission and on follow-up

	On presentation	During admission	On follow-up
Haemoglobin (g/dl)	11.7	10.5	13.4
Platelets ($\times 10^9/l$)	251	825	437
C-reactive protein (mg/l)	187	43	<5
Erythrocyte sedimentation rate (mm/h)	141	124	19

Figure 1 Audiogram showing bilateral severe sensorineural hearing loss (X = left ear, O = right ear, Δ = bone conduction).

symptomatic diarrhoea and elevated faecal $\alpha 1$ antitrypsin levels can help establish this diagnosis.

Renal pathology may present with oedema and proteinuria, which should be excluded. Autoimmune processes can also be associated with malaise and oedema and autoantibody screening may point to this. Joint swellings are associated with multifocal septic arthritis requiring prompt orthopaedic input to minimise the risk of joint damage. Septic debris on ultrasound may give clues and aspiration of joint fluid may be diagnostic. Reactive arthritis secondary to, that is, viral causes is not uncommon in childhood and may be a diagnosis of exclusion that usually responds well to non-steroidal anti-inflammatory drugs (NSAIDs).

Acute sensorineural hearing loss in childhood may be overlooked initially and parental concerns prompted formal testing in this case. Cogan syndrome, a rare autoimmune disorder characterised by recurrent inflammation of the cornea associated with fever, fatigue, weight loss, episodes of dizziness, and hearing loss can lead to deafness or blindness if untreated. Since ophthalmological review revealed normal findings in this case, Kawasaki disease became the most likely diagnosis in the given context.

TREATMENT

Following initial treatment with azithromycin and oseltamivir, the patient was started on NSAIDs and intravenous ceftriaxone for 5 days at his local hospital. IVIG (2 g/kg) was given in the setting of elevated inflammatory markers and profound hearing loss during the third week of the illness. As the acute hearing did not improve rapidly, pulsed methylprednisolone (20 mg/kg/day over 3 days) and infliximab (4 mg/kg) was given. Existing aspirin medication was continued at 5 mg/kg/day. The patient's inflammatory markers normalised subsequently, but bilateral hearing aids had to be fitted 4 weeks after the onset of the illness.

OUTCOME AND FOLLOW-UP

This 6-year-old boy required bilateral hearing aids for persistent severe sensorineural hearing impairment secondary to Kawasaki disease. Steroids could be weaned over 1 month with no further deterioration of the hearing loss. Cardiac findings remained stable 3 months after the onset of symptoms.

DISCUSSION

Kawasaki disease is an acute systemic vasculitis affecting approximately eight in 100 000 children, predominantly under 6 years of age.⁴ Atypical Kawasaki disease is diagnosed when classical symptoms are not complete, but other (ie, laboratory) evidence supports the diagnosis.⁴⁻⁷ It is usually a self-limiting illness, but the risk of vascular complications such as coronary artery aneurysms can lead to devastating consequences. Early recognition of clinical features aims to minimise cardiac risks by commencing IVIG as early as possible.¹⁻⁶ Other recognised features of Kawasaki disease that underline the systemic involvement of the disease are related to gastroenterological symptoms (diarrhoea, vomiting and abdominal pain), hepatic dysfunction, hydropic gallbladder, urethritis, arthritis and arthralgia, extreme irritability and aseptic meningitis.⁷⁻⁸ This case highlights another significant complication of Kawasaki disease: acute sensorineural hearing loss. Though infrequently reported in the literature, previous case reports have documented the development of hearing loss between 2 and 4 weeks after the onset of symptoms.⁹⁻¹¹ Magalhaes *et al*¹² found sensorineural hearing loss more frequently than coronary complications in a cohort of 40 patients. The authors saw an association between persistent sensorineural hearing loss and prolonged anaemia, thrombocytosis, high erythrocyte sedimentation rate and administration of IVIG more than 10 days after the onset of Kawasaki disease.

Learning points

- ▶ Atypical Kawasaki disease remains a diagnostic challenge, as timely treatment appears to significantly reduce complications. Optimal treatment is challenging during late phases of the acute illness, as published evidence is limited.
- ▶ Sensorineural hearing loss is a recognised complication of Kawasaki disease and current literature suggests it may easily be overlooked.
- ▶ Acute hearing loss in children requires prompt audiological input to evaluate its aetiology, guide medical management and minimise long-term sequelae.

Competing interests None.

Patient consent Obtained.

REFERENCES

1. **Kato H.** Cardiovascular complications in Kawasaki disease: coronary artery lumen and long-term consequences. *Progr Pediatr Cardiol* 2004;**19**:137–45.
2. **Oates-Whitehead RM,** Baumer JH, Haines L, *et al.* Intravenous immunoglobulin for the treatment of Kawasaki disease in children. *Cochrane Database Syst Rev* 2003;(4):CD004000.
3. **Muta H,** Ishii M, Yashiro M, *et al.* Late intravenous immunoglobulin treatment in patients with Kawasaki disease. *Pediatrics* 2012;**129**: e291–7.
4. **Newburger JW,** Takahashi M, Gerber MA, *et al.* Diagnosis, treatment and long term management of Kawasaki disease. *Circulation (AHA)* 2004;**110**:2747–71.
5. **Dummer KB,** Newburger JW. Acute management of Kawasaki disease. *Progr Pediatr Cardiol* 2004;**19**:129–35.
6. **Dajani AS,** Taubert KA, Gerber MA, *et al.* Diagnosis and therapy of Kawasaki disease in children. *Circulation* 1993;**87**:1776–80.
7. **Newburger JW,** Takahashi M, Gerber MA, *et al.* Diagnosis, treatment, and long-term management of Kawasaki disease: a statement for health professionals from the Committee on Rheumatic Fever, Endocarditis, and Kawasaki Disease, Council on Cardiovascular Disease in the Young, American Heart Association [published correction appears in *Pediatrics* 2005;115:1118]. *Pediatrics* 2004;**114**:1708–33.
8. **Kato H,** Sugimura T, Akagi T, *et al.* Long-term consequences of Kawasaki disease. A 10–21 year follow up study of 594 patients. *Circulation* 1996;**94**:1379–85.
9. **Sundel RP,** Newburger JW, McGill T, *et al.* Sensorineural hearing loss associated with Kawasaki disease. *J Pediatr* 1990;**117**:371–7.
10. **Sundel RP,** Cleveland SS, Beiser AS, *et al.* Audiologic profiles of children with Kawasaki disease. *Am J Otol* 1992;**13**:512–15.
11. **Novo A,** Pinto S, Prior AC, *et al.* Kawasaki disease and sensorineural hearing loss: an (un)expected complication. *Eur J Pediatr* 2012;**171**:851–4.
12. **Magalhaes CM,** Magalhaes Alves NR, Oliveira KM, *et al.* Sensorineural hearing loss: an underdiagnosed complication of Kawasaki disease. *J Clin Rheumatol* 2010;**16**:322–32.

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