Complete heart block in a 9 year old girl caused by borreliosis

H P Gildein, S Günther, R Mocellin

Abstract
A complete atrioventricular block was seen in a nine year old girl in whom an infection with Borrelia burgdorferi was confirmed by serological testing. There were no other symptoms or cutaneous manifestations of the disease. Though a rash on the right ear was later recalled by her parents. The patient was treated with high dose penicillin and orciprenaline was given intermittently. The complete heart block disappeared within four days.

(Br Heart J 1993;70:88–90)

Acquired complete atrioventricular block is rare in children and is usually congenital or induced by cardiac surgery. It can also be a complication of various infectious diseases, particularly viral infections. Borreliosis is caused by the spirochaete Borrelia burgdorferi. It usually affects the skin and causes "flu"-like symptoms and at later stages of the disease it can cause neurological and musculoskeletal disorders.1 The heart is rarely affected but there are reports of the conduction system being involved.2,4 We report an unusual case of atrioventricular block in a child caused by an infection with Borrelia burgdorferi.

Case report
A previously healthy nine year old girl was admitted to the hospital after she had fainted on exertion. She had complained of dizziness and fatigue for two days. On admission she was pale with a temperature of 38°C. Haemodynamic function was stable with a pulse rate around 50 beats/min. An electrocardiogram showed complete heart block with an escape rhythm of 48 beats/min. The QRS configuration was predominantly wide with a left bundle branch block pattern indicating a ventricular escape rhythm (fig 1). For short periods there was a junctional escape rhythm with a slightly faster heart rate (fig 2). The atrial rate was approximately 120 min. Echocardiography showed a morphologically

Figure 1 Electrocardiogram at hospital admission showing complete heart block with a ventricular escape rhythm of 48 beats/min. Paper speed 25 mm/s for leads I, II, III, aVR, aVL, aVF, and 50 mm/s for the precordial leads.
following three weeks, the first degree atrioventricular block gradually resolved. She was treated with intravenous penicillin (6·5 million IU three times a day) for 10 days after the results of the serological tests were obtained. She was discharged from the hospital without further treatment. Follow up examinations showed regular sinus rhythm with a normal PR interval.

Discussion
Cardiac involvement is a well known complication of borreliosis and was mentioned in the initial report of Lyme disease in 1977.5 Cardiac manifestations can occur when the disease becomes more generalised in the second stage, days to weeks after onset.6 Whereas the heart was affected in 4–10% of patients in North America,2 in Europe only 0·3–4% of patients with borreliosis had cardiac manifestations.7 This geographical difference can be accounted for by different strains of Borrelia burgdorferi. Myocarditis, cardiomyopathy, congestive heart failure, pericarditis, and atrial and ventricular tachycardias have been described.8 Conduction abnormalities occur in about 20% of patients with cardiac involvement causing various kinds of different bundle branch block and degrees of atrioventricular block.9 Rapid progression from first degree to third degree atrioventricular block within minutes has been reported.10 Complete atrioventricular block was reported in about 50% of patients with conduction defects.11 We know of no other reports of children with second or third degree atrioventricular block.

A temporary pacemaker is often used to manage profound bradycardia.12 17 But in some cases conservative management with continuous infusion of atropine and/or isoprenaline7 or orciprenaline is effective. Because the complete atrioventricular block normally resolves within a week to 10 days,7 a conservative approach is worthwhile, especially in children. In our case haemodynamic function was stable at a heart rate of 48 beats/min, and implantation of a temporary pacemaker was regarded as unnecessary. However, on the second day in hospital the heart rate dropped to 30 beats/min for a few minutes and the child complained of vertigo. Infusion of orciprenaline at low doses was tried and resulted in an immediate increase in heart rate to about 60 beats/min. The complete heart block resolved within four days.

Concomitant treatment with salicylates and steroids has been suggested for high grade atrioventricular block.18 Steere et al.18 recommended treatment with steroids only if the complete atrioventricular block persisted for more than a week, which is rare. We did not need to use steroid treatment because the complete heart block resolved quickly.

Antibiotic treatment was delayed because diagnosis of borreliosis was established only by serological testing. Our patient did not have the symptoms that are typical of the disease. A rash of the right ear was recalled by

Figure 2 Electrocardiogram showing complete heart block with junctional escape rhythm for short periods at a rate of 68 beats/min. Paper speed 50 mm/s.

normal heart with excellent contractility (shortening fraction 51%). There was slight mitral regurgitation.

Laboratory findings included an erythrocyte sedimentation rate of 72 mm in the first hour and 110 mm in the second hour, a haemoglobin concentration of 121 g/l, and a leucocyte count of 9800 mm3 with 6% band cells, 63% segmented neutrophils, 26% lymphocytes, 3% monocytes, and 2% eosinophils. Serological testing and stool examinations ruled out viral diseases and an infection with Mycoplasma pneumoniae. Complement, antinuclear antibodies, and streptococcal antibody tests were normal. Serological tests for Borrelia burgdorferi were positive for IgM (1:1536) and for IgG (1:128). Repeat tests two weeks later showed an increase in IgG (1:512) and a decrease of IgM (1:384). There were no cutaneous symptoms.

After admission to hospital the patient was immobilised and the electrocardiogram was continuously monitored. The next day the heart rate dropped to approximately 30 beats/min for short periods and the girl complained of dizziness. Before we considered insertion of a temporary pacemaker we gave her a continuous infusion of orciprenaline (0·1 µg/kg/min), which increased the pulse rate to about 60 beats/min. After four days, the complete atrioventricular block changed to a 2:1 second degree atrioventricular block. Two days later there was mainly a first degree atrioventricular block with a PR interval of 440 ms and for short periods an intermittent second degree atrioventricular block. Orciprenaline treatment was stopped. During the

---

89 Complete heart block in a 9 year old girl caused by borreliosis

---

Downloaded from http://heart.bmj.com/ on June 25, 2017 - Published by group.bmj.com
the parents. This could have been an atypical erythema migrans. A similar case in an adult was reported by Kimball et al.9

Cardiac involvement in childhood has rarely been reported.4,10,11 Among the 20 cases reported by Steere et al4 a six year old girl presented with a first degree atrioventricular block. Jacobs et al10 described a 15 year old girl with syncope and a positive gallium scan. Satz et al11 reported on a 17 year old patient with carditis and inverted T waves. We believe that our case report is the first of a child with complete atrioventricular-block caused by borreliosis.

Complete heart block in a 9 year old girl caused by borreliosis.

H P Gildein, S Günther and R Mocellin

Br Heart J 1993 70: 88-90
doi: 10.1136/hrt.70.1.88

Updated information and services can be found at:
http://heart.bmj.com/content/70/1/88

These include:

Email alerting service
Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Notes

To request permissions go to:
http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/