Endocarditis Due to *Cardiobacterium hominis* in a 4-Year-Old Boy, Complicated by Right Lower Lobe Pulmonary Artery Mycotic Aneurysm

Abraham Groner,1 Shanna Kowalsky,2 Rica Arnon,1 and Michael F. Tosi2
Divisions of 1 Cardiology and 2 Infectious Diseases, Department of Pediatrics, Kravis Childrens Hospital, Mount Sinai School of Medicine, New York, New York

Corresponding Author: Michael F. Tosi, MD, Department of Pediatrics, Division of Infectious Diseases, Mount Sinai School of Medicine, 1 Gustave L. Levy Pl, New York, New York 10029. E-mail: michael.tosi@mssm.edu.

Received June 26, 2012; accepted September 24, 2012; electronically published October 18, 2012.

Key words. Endocarditis in Children; *Cardiobacterium hominis*; Mycotic Aneurysm

The fastidious, slow-growing bacteria of the species designated by the “HACEK” acronym (Haemophilus parainfluenzae, Haemophilus aphrophilus, Haemophilus paraphrophilus, Actinobacillus actinomycetemcomitans, Cardiobacterium hominis, Eikenella corrodens, and Kingella kingae) are important causes of gram-negative endocarditis [1]. Haemophilus species account for the largest number of such infections in children, followed by *K kingae*, then *A actinomycetemcomitans* [2, 3]. In children, we found no published reports of *E corrodens* endocarditis and only 2 reports of *C hominis* endocarditis; 1 in a 17-year-old in the United Kingdom and the other in a 3-year-old in Japan [4, 5]. To our knowledge, we describe here the first reported case of endocarditis due to *C hominis* in a child in the western hemisphere, and, for this infection, the unique occurrence of a large pulmonary vessel mycotic aneurysm.

CASE REPORT

The patient was a 4-year-old male with DiGeorge syndrome, developmental delay and complex congenital heart disease. His heart disease consisted of tetralogy of Fallot with pulmonary atresia, small pulmonary arteries, and major aortopulmonary collaterals. He had hypoparathyroidism but had normal T-cell numbers and function. At 3 months of age, he underwent placement of a right ventricle-to-pulmonary artery (RV-PA) non-valved conduit. At 18 months of age he underwent ventricular septal defect (VSD) patch closure, replacement of his RV-PA conduit with a Contegra 16-mm valved conduit, and patch plasty of the left pulmonary artery. His most recent echocardiogram, 1 month before presentation, had revealed an insignificant residual VSD at the patch margin, trivial tricuspid regurgitation, RV pressure equal to ¾ systemic pressure, moderate RV hypertrophy, mild aortic insufficiency, and normal biventricular function.

The patient presented to the Mount Sinai Kravis Children’s Hospital emergency department with a 1-week history of fever as high as 102°F, intermittent cough, irritability, and decreased appetite. Physical findings on presentation included mild irritability, temperature of 38.9°C, abnormal facies consistent with DiGeorge syndrome, coarse breath sounds bilaterally, and a harsh, grade 3/6 systolic heart murmur, loudest at the base, radiating to the back. Dentition was intact, and there were no mucosal or skin lesions. Pulse oximetry revealed reduced oxygen saturation, and a chest radiograph showed bilateral patchy areas of opacification. Blood was obtained for cultures and other laboratory studies, treatment for presumed pneumonia was begun with intravenous ceftriaxone and oral azithromycin, and the patient was admitted to the inpatient unit for continued management. The peripheral white blood count was 16 900/mm³, with 73% neutrophils, and the serum C-reactive protein level was 162 µg/L. The single blood culture drawn at admission was reported positive at 64 hours (Bactec 9240 System; Becton Dickinson, Franklin Lakes, NJ) for small gram-negative bacilli. The isolate was subsequently identified as *C hominis* and was found to be susceptible to ceftriaxone (VITEK 2; bioMérieux, Durham, NC). Subsequent single blood cultures drawn on hospital days 2, 4, and 5 all were negative.
A transthoracic echocardiogram showed a mobile echobright structure consistent with a vegetation near the xenograft valve in the RV-PA conduit (see A of Figure). The valve leaflets were free and mobile with no restriction to flow. The patient’s condition improved during the first 2 weeks of treatment. By hospital day 10, a chest radiograph showed improvement in the areas of opacification noted initially. Fever resolved by hospital day 12, and on hospital day 17, the serum C-reactive protein level was reduced to 43.3 µg/L. The patient was discharged on hospital day 20 and completed a 6-week course of intravenous ceftriaxone as an outpatient.

Two months after discharge, the patient underwent cardiac catheterization for hemodynamic assessment. Findings included a 3×3 cm aneurysm of the right lower lobe pulmonary artery that had not been present on cardiac catheterization 1 year previously (see B of Figure). Two weeks later, he underwent a cardiac catheterization and coil embolization of the large right lower lobe pulmonary artery aneurysm. A total of 23 coils was inserted into the aneurysm after which no flow was seen in the distal right lower lung segments. He tolerated the procedure well and was discharged home shortly thereafter. One month later, the patient suffered a sudden cardiac arrest while at home. Emergency medical services were called, but attempts to resuscitate him were unsuccessful. An autopsy was not performed.

DISCUSSION

Endocarditis due to several of the HACEK organisms listed above, although relatively uncommon, is well described in both adults and children and has been reviewed recently [1–3]. Before the current case, the only patients under 18 years of age reported to have had endocarditis due to C. hominis were a 17-year-old in the United Kingdom and a 3-year-old in Japan [4, 5]. To our knowledge, this is the first report of a child with this type of infection complicated by development of a mycotic aneurysm, in this case involving the right lower lobe pulmonary artery. Endocarditis caused by C. hominis, which is rare in adults and extremely rare in children [1–3], has not been reported previously in a child in the western hemisphere. Cardiobacterium hominis is found as part of normal respiratory flora—the likely source of the organism in our patient—but it is seldom identified in that setting due to its slow growth characteristics compared with other resident bacteria [3]. The 64-hour interval between the initial blood draw and the report of the positive culture result in our patient is typical of this slow-growing organism, and this isolate’s susceptibility to ceftriaxone is also characteristic [1–3]. Endocarditis accounts for virtually all identified infections caused by C. hominis, and, as with our patient, most children who develop endocarditis with organisms of the HACEK group have cardiac abnormalities that predispose them to this infection [3]. The presence of several bilateral patchy areas of opacification on the chest radiograph at presentation, along with the presence of a vegetation in the conduit adjacent to the xenograft valve, suggests the likelihood that the lung lesions seen on chest radiographs were due to pulmonary septic emboli, a well-described complication of right-sided endocarditis [1, 2]. The development in our patient of a mycotic aneurysm in the pulmonary circulation is a rare but well-documented complication of right-sided endocarditis in children [6]. This complication is unique among the rare (3 known) cases of endocarditis caused by this organism in children and is consistent with our patient’s initial radiographic evidence of pulmonary septic emboli. Likely causes of death in our patient might include a fatal cardiac
arrhythmia or rupture of the mycotic aneurysm. However, there was no surgical specimen, nor was an autopsy performed, so we are not able to evaluate the histological features of the aneurysm in our patient or to ascertain his immediate cause of death.

Acknowledgments

Potential conflict of interest. All authors: No reported conflicts.
All authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Conflicts that the editors consider relevant to the content of the manuscript have been disclosed.

References

5. Maekawa Y, Sakamoto T, Umezu K, et al. Infective endocarditis in a child caused by Cardiobacterium hominis after right ventricu-