An 11-month-old male infant was admitted to our hospital with fever, fussiness, poor feeding, vomiting, and tachypnea for two days prior. Physical examination revealed sporadic papules and vesicles occurring on his hands, feet, face, and perianal mucosa. Enterovirus 71 was identified from both throat swab and vesicle fluid using virus isolation techniques. The patient’s heart rate fluctuated in a very narrow range from 180~210/beats/min regardless of his physiologic state. An electrocardiogram showed P-waves buried within or occurring just after regular, narrow, QRS complexes. The patient was diagnosed as having hand, foot, and mouth disease in combination with paroxysmal supraventricular tachycardia (PSVT). The child recovered well with symptomatic treatment, including intravenous administration of acyclovir, glucocorticoids, immunoglobulin, adenosine, and sotalol. PSVT was terminated within 36 hours of hospitalization. The skin lesions became crusted on the third day, and then proceeded to heal spontaneously. Here we report on this unusual case and review the associated literature. (Ann Dermatol 24(2) 200 ∼ 202, 2012)

-Keywords- Electrocardiography, Hand, foot and mouth disease, Enterovirus 71, Paroxysmal supraventricular tachycardia

INTRODUCTION

Hand, foot, and mouth disease (HFMD), a common viral infection in childhood, is caused by enteroviruses, which are members of the Picornavirus family and most often associated with coxsackievirus A16 or enterovirus 71 (EV71)1,2. The disease derives its name from the characteristic papular or vesicular lesions involving primarily the skin of the hands, feet, and buccal mucosa3. In the majority of instances, HFMD typically follows a benign and self-limiting course. However, over the last decade this disease has emerged as a growing worldwide public health problem because of more frequent outbreaks with serious complications including neurological involvement, myocarditis, and pulmonary edema4-6. In the present report, we describe an unusual case of HFMD in combination with paroxysmal supraventricular tachycardia (PSVT) in an 11-month-old male infant. His parents consented to publication of this report and the accompanying photographs.

CASE REPORT

An 11-month-old male infant was admitted to the Department of Pediatrics, at the First Affiliated Hospital of Anhui Medical University in July 2010 with fever, fussiness, poor feeding, vomiting, and tachypnea over the previous two days. The birth and past medical history were non-significant, and the family had no history of similar disorders. Physical examination revealed the presence of sporadic papules and vesicles on his hands, feet, face, and perianal mucosa (Fig. 1). EV71 was identified from both throat swab and vesicle fluid by virus isolation techniques. An electrocardiogram revealed the patient’s heart rate to be fluctuating in a very narrow range from 180~210/beats/min regardless of his physiologic state. P-waves were buried within or occurred just after regular, narrow
Fig. 1. Sporadic papules and vesicles occurred on face, hands, and feet of an 11-month-old male infant from Hefei City, Anhui province, with enterovirus 71 infection (blue arrow).

Fig. 2. A 6-lead surface electrocardiogram showing P-waves buried within or occurring just after regular, narrow QRS complexes.

QRS complexes (Fig. 2). Serum electrolytes and myocardial enzymes were normal. A chest x-ray and echocardiogram demonstrated no pathologic findings. The patient was diagnosed as having HFMD in combination with PSVT, based on the results of the physical examination, virus isolation, and electrocardiogram results. The child subsequently recovered well with symptomatic treatment, including intravenous administration of acyclovir, glucocorticoids, immunoglobulin, adenosine, and sotalol.

**DISCUSSION**

Our case had the distinctive features of typical skin lesions associated with HFMD in combination with PSVT. Determination of the etiologic agent, EV71, relied on laboratory identification. The combination of throat swab plus vesicle fluid was most useful, increasing isolation rates from 49% with throat swab alone, and 48% with vesicle fluid alone, to 67%\(^7\). EV71 is related to more serious complications\(^8\). The risk factors contributing to severe HFMD are young male children (≤2 years old), atypical physical findings (tachycardia, tachypnea, hypotension, hypertension, bleeding in the gastrointestinal tract, and neurological deficits), a raised total leukocyte count, vomiting, and the absence of oral lesions\(^9\). Therefore, our patient was classified as a severe case due to the existence of several risk factors, including the fact that he was an 11-month-old male, with tachypnea, vomiting, the absence of oral lesions, and PSVT.

The precipitating factors of PSVT are often difficult to identify, but occasionally a febrile illness may give rise to an episode. Symptoms of PSVT in infants are inconspicuous and include irritability, poor feeding, tachypnea, diaphoresis, and poor color\(^10\). In the present case, the chief complaints were fever, fussiness, poor feeding, vomiting, and tachypnea, which might be attributed, in part, to PSVT. The mechanisms underlying the pathogenesis of PSVT caused by EV71 infection are unknown. However, in reference to PSVT associated with respiratory syncytial virus infection\(^11\)-\(^13\), the following hypotheses may be relevant to understanding EV71 arrhythmia syndrome. EV71 first directly invades myocardial cells\(^14\); subsequently, lymphocytic infiltration, interstitial edema, and myocardial necrosis are triggered\(^15\); and associated post-infectious immunological reactions may persist for several months\(^16\).

The prognosis for HFMD is satisfactory. According to the latest report from Fuyang City, Anhui province, the fatality rate was only 0.4%\(^17\). Our patient also recovered well following the above-mentioned comprehensive treatments. PSVT was terminated within 36 hours of hospitalization and the lesions on his hands, feet, face, and perianal mucosa became crusted on the third day and proceeded to heal spontaneously.
REFERENCES

1. Osterback R, Vuorinen T, Linna M, Susi P, Hyypiä T, Waris M. Coxsackievirus A6 and hand, foot, and mouth disease, Finland. Emerg Infect Dis 2009;15:1485-1488.

2. Wong SS, Yip CC, Lau SK, Yuen KY. Human enterovirus 71 and hand, foot and mouth disease. Epidemiol Infect 2010; 138:1071-1089.

3. Mehta KI, Mahajan VK. Hand foot and mouth disease. Indian Pediatr 2010;47:345-346.

4. Sasidharan CK, Sugathan P, Agarwal R, Khare S, Lal S, Jayaram Paniker CK. Hand-foot-and-mouth disease in Calicut. Indian J Pediatr 2005;72:17-21.

5. Chatproedprai S, Theanboonlers A, Korkong S, Thongmee C, Wananukul S, Poovorawan Y. Clinical and molecular characterization of hand-foot-and-mouth disease in Thailand, 2008-2009. Jpn J Infect Dis 2010;63:229-233.

6. Chen CY, Chang YC, Huang CC, Lui CC, Lee KW, Huang SC. Acute flaccid paralysis in infants and young children with enterovirus 71 infection: MR imaging findings and clinical correlates. AJNR Am J Neuroradiol 2001;22:200-205.

7. Ooi MH, Solomon T, Podin Y, Mohan A, Akin W, Yusuf MA, et al. Evaluation of different clinical sample types in diagnosis of human enterovirus 71-associated hand-foot-and-mouth disease. J Clin Microbiol 2007;45:1858-1866.

8. Chen KT, Chang HL, Wang ST, Cheng YT, Yang JY. Epidemiologic features of hand-foot-mouth disease and herpangina caused by enterovirus 71 in Taiwan, 1998-2005. Pediatrics 2007;120:e244-252.

9. Ooi MH, Wong SC, Mohan A, Podin Y, Perera D, Clear D, et al. Identification and validation of clinical predictors for the risk of neurological involvement in children with hand, foot, and mouth disease in Sarawak. BMC Infect Dis 2009; 9:3.

10. Kantoch MJ. Supraventricular tachycardia in children. Indian J Pediatr 2005;72:609-619.

11. Menahem S. Respiratory syncytial virus and supraventricular tachycardia in an infant. Int J Cardiol 1991;32:249-251.

12. Misirlioglu ED, Aliefendioglu D, Alphan N. Supraventricular tachycardia in a neonate with respiratory syncytial virus infection. Anadolu Kardiyol Derg 2006;6:198.

13. Ocaña AI, Navarro DM, Soblechero EG, Fuentes CG, Quintero ML. Paroxysmal supraventricular tachycardia and severe respiratory syncytial virus infection in the neonatal period. An Pediatr (Barc) 2011;74:277-278.

14. Chan LG, Parashar UD, Lye MS, Ong FG, Zaki SR, Alexander JP, et al. Deaths of children during an outbreak of hand, foot, and mouth disease in sarawak, malaysia: clinical and pathological characteristics of the disease. For the Outbreak Study Group. Clin Infect Dis 2000;31:678-683.

15. Chan KP, Goh KT, Chong CY, Teo ES, Lau G, Ling AE. Epidemic hand, foot and mouth disease caused by human enterovirus 71, Singapore. Emerg Infect Dis 2003;9:78-85.

16. Rose NR, Hill SL. The pathogenesis of postinfectious myocarditis. Clin Immunol Immunopathol 1996;80:592-99.

17. Zhang Y, Zhu Z, Yang W, Ren J, Tan X, Wang Y, et al. An emerging recombinant human enterovirus 71 responsible for the 2008 outbreak of hand foot and mouth disease in Fuyang city of China. Virol J 2010;7:94.