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Letter to the editor

Femoral arterial hypotension secondary to the placement of a pediatric intraaortic balloon

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To the Editor: Despite the overwhelming success of balloon counterpulsation in adults, pediatric use of intraaortic balloon pumping (IABP) to support a depressed myocardium is not well established. Several factors contribute to the unfavorable results of IABP in children, including higher heart rates, increased aortic elasticity, and a higher incidence of right ventricular and biventricular dysfunction [1]. However, there have been few reports regarding aortic pressure differences between the proximal and the distal sides of the balloon. We report a case in a child in which the insertion of the IABP was disappointing.

A 5-year-old girl, 104 cm in height and 15.7 kg in weight, suffered from respiratory distress following upper respiratory infection. It progressed to overt congestive heart failure with ventilatory fatigue, dyspnea, palpitations, and cardiac dilatation in the first week of the infection. An echocardiogram showed dilated cardiomyopathy with a left ventricular ejection fraction of 10%. A subsequent right ventricular endomyocardial biopsy specimen manifested inflammatory cardiomyopathy with unidentified viral infection. Since drug therapy, including furosemide, dobutamine, and carvedilol, did not improve the symptoms, and urinary output was reduced, we planned to use the IABP with meticulous hemodynamic monitoring by pulmonary artery catheterization and with mechanical ventilatory support by endotracheal intubation.

Before the IABP catheter (Pediatric IAB 5.5 Fr 7 cc, Tokai Medical Products, Japan) was inserted through the left femoral artery by the surgical technique, the right femoral arterial, pulmonary arterial, and central venous pressures were 71/42, 36/24, and 14 mmHg, respectively. The right brachial artery pressure was 70/44 mmHg measured by a cuff. After placement of the IABP, the right femoral artery pressure acutely decreased to 50/30 mmHg while the right brachial artery pressure was 80/50 mmHg. Because we suspected that the inflation of the IABP balloon was the cause of the pressure difference between the upper and the lower extremities, we stopped the driving of the device (Datascope System 90T). However, the right femoral artery pressure was still 50/30 mmHg, whereas the right brachial artery pressure was 80/50 mmHg. We then changed the IABP catheter to another one (Datascope Pediatric IAB, 5.5 Fr 7 cc) with the same driving device. However, the pressure difference was the same. We gave up on placement of the IABP because further decrease accompanied by femoral arterial hypotension was desperate in this patient. We pulled out the catheter along with recording the femoral arterial blood pressure (Fig. 1), which increased from 51/40 to 70/46 mmHg. The brachial artery pressure was then 71/48 mmHg. Sixteen days later, the heart failure worsened and cardiac arrest suddenly occurred, resulting in death.

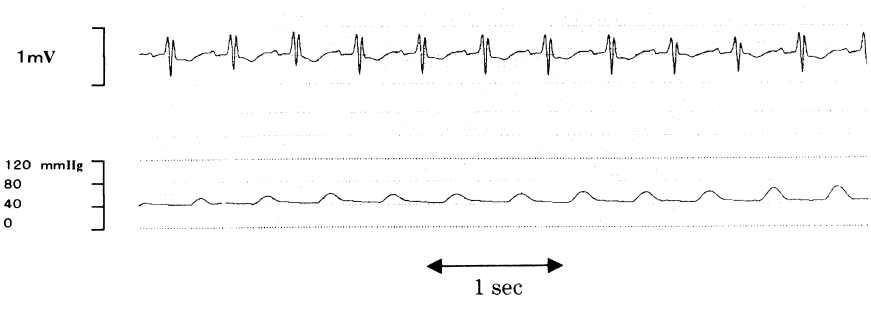

Fig. 1. ECG and right femoral arterial pressure during the withdrawal of intra-aortic balloon pumping. The right femoral artery pressure increased from 51/40 to 70/46 mmHg

Hilberman et al. recorded the difference between the radial and femoral arteries (proximal and distal to the intraaortic balloon) in eight adult cases in which the maximally observed pressure gradients were 5 and 6 mmHg [2]. However, there is no report describing the pressure difference between the IABP balloons in pediatric cases. The diameters of the balloon in this case were 10 mm and 9 mm, standard sizes for pediatric use, whereas it could contribute to the major pressure difference even with the balloon deflated. More detailed survey may be required regarding the possible pressure difference between the proximal and the distal sides of the IABP balloon in pediatric cases [3].

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