Acute Pulmonary Thromboembolism Treated Successfully by Balloon Angioplasty—A Case Report

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Abstract

Acute pulmonary thromboembolism frequently occurs in patients on protracted bed rest and by itself can cause acute right ventricular failure. The authors report findings in a patient with this disorder treated successfully by balloon angioplasty.

Case Report

A seventy-two-year-old woman was referred to our department complaining of chest pain and severe dyspnea. She has been well except for mild essential hypertension for twenty-two years. Two weeks prior to admission she had undergone right radical mastectomy for a filtrating ductal carcinoma. Evidence of metastasis was nil. She had been on bed rest for two weeks after the operation. She seemed to be in great distress and the jugular veins were distended. The pulse rate was regular at 66 beats/min, the blood pressure was 136/84 mmHg, and the respiratory rate 30/min. Cardiac examination revealed normal S₁ and S₂. Chest x-ray showed cardiomegaly (CTR 63%) and a clear lung field. An electrocardiogram showed a small Q wave in lead III and T wave inversion in leads III, aVF, V₃, V₄. Pulmonary angiography showed massive obstruction of the descending branch of right pulmonary artery. Areas of reduced perfusion were detected on the radioisotope perfusion lung scan. Echocardiograms showed a right ventricular overload.

Heparin (5 \times 10^3 \text{ U} + 1 \times 10^3 \text{ U/day}) was given intravenously and streptokinase (72 \times 10^4 \text{ U}
+ 12 \times 10^4 \text{U/day}) was given through a Swan-Ganz catheter which had been placed in the right pulmonary artery. Four weeks after the onset of pulmonary thromboembolism, the pO_2 was 73 mmHg and the pulmonary arterial pressure was 50/20 mmHg. Dyspnea on exertion remained. Because apparently no further improvement could be expected with drug therapy, we attempted balloon angioplasty. The internal jugular vein was chosen as an insertion site. After the guiding catheter had been positioned in the descending branch of the right pulmonary artery, the balloon catheter, 6 mm in diameter, with the protruding guidewire was inserted and the balloon was advanced across the lesion. Following four inflations and deflations (8 atmospheres for 30 seconds), the result was evaluated angiographically (Figure 1). Other evaluations are shown in Figure 2. She did well and arterial saturation increased (pO_2 of 80 mmHg). The pulmonary arterial pressure decreased to 40/18 mmHg. She was discharged on a warfarin regimen on the ninetieth day following onset of symptoms.

Discussion

The most serious complication of venous thrombotic disease is pulmonary thromboembolism. The disease is often mistaken for other conditions that give similar clinical pictures such as pneumonia, congestive heart failure, myocardial infarction, or anxiety with hyperventilation. However, unless a high level of suspicion is maintained, the diagnosis will be delayed, and recurrent, potentially fatal thromboemboli may be allowed to occur. The management of acute pulmonary thromboembolism begins when the diagnosis is first suspected on history and physical examination. An intravenous injection of heparin should be administered while supportive diagnostic studies are being carried out. If the diagnosis is established, the treatment can be continued or changed to another therapy. The best treatment may be the elimination of
pulmonary vascular obstruction to relieve symptoms resulting from the embolic episode. As a treatment for pulmonary thromboembolism, thrombolytic drugs together with heparin, are required for patients with angiographic evidence of pulmonary embolism and with signs of pulmonary hypertension or right ventricular failure because of the risk of bleeding. Cade et al reported that low-dose streptokinase infused directly into the pulmonary artery not only enhanced thromboembolic resolution but also reduced hemorrhagic complications. The first successful pulmonary embolectomy using temporary cardiopulmonary bypass was reported by Cooley et al and operative mortality was 23%. Sasahara recommended pulmonary embolectomy for those who, one hour after maximum drug therapy, have systolic blood pressure under 90 mmHg, urinary output less than 20 ml per hour, and an arterial pO2 of less than 60 mmHg. The present patient did not satisfy Sasahara’s recommendation for the embolectomy. Balloon angioplasty has been done in patients with congenital pulmonary stenosis in whom operative management is difficult but apparently has not been done in patients with pulmonary thromboembolism. The balloon angioplastic indication was debated. We concluded that it was the best way to correct the dyspnea and improve the pulmonary hypertension. The most significant complication of balloon angioplasty for peripheral pulmonary arterial stenosis is perforation of the distal pulmonary artery with the stabilizing guidewire. Rocchini prevented this complication by using a flexible J-type guidewire. We used a high-torque floppy guidewire, which is the most flexible and is used for percutaneous transluminal coronary angioplasty.
Conclusion

Balloon angioplasty should be considered for patients with massive pulmonary thromboembolism who do not respond to drug therapy.

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References