cally, the extent of VASP phosphorylation is used to monitor the success of an anticoagulatory therapy, as during clopidogrel therapy, and reflects the success of platelet activation during an anticoagulatory therapy.[7]

Therefore we were wondering whether the authors think that VASP phosphorylation could be a useful monitor in their experimental system, and whether the monitoring the extent of VASP phosphorylation could be a valuable tool to monitor the clinical effectiveness if an inhaled nitric oxide therapy.

David Köhler, Ph.D., Christian Mutz, M.D., Valbona Mirakaj, M.D., Peter Rosenberger, M.D., Ph.D.* *Tübingen University Hospital, Tübingen, Germany. peter.rosenberger@medizin.uni-tuebingen.de

References

1. Nagasaka Y, Fernandez BO, Garcia-Saura MF, Petersen B, Ichinose F, Bloch KD, Feelisch M, Zapol WM: Brief periods of nitric oxide inhalation protect against myocardial ischemia-reperfusion injury. ANESTHESIOLOGY 2008; 109:675–82

2. Gries A, Bode C, Peter K, Herr A, Böhrer H, Motsch J, Martin E: Inhaled nitric oxide inhibits human platelet aggregation, P-selectin expression, and fibrinogen binding *in vitro* and *in vivo*. Circulation 1998; 97:1481–7

3. Radomski MW, Palmer RM, Moncada S: Comparative pharmacology of endothelium-derived relaxing factor, nitric oxide and prostacyclin in platelets. Br J Pharmacol 1987; 92:181–7

4. Massberg S, Grüner S, Konrad I, Garcia Arguinzonis MI, Eigenthaler M, Hemler K, Kersting J, Schulz C, Muller I, Besta F, Nieswandt B, Heinzmann U, Walter U, Gawaz M: Enhanced *in vivo* platelet adhesion in vasodilator-stimulated phosphoprotein (VASP)-deficient mice. Blood 2004; 103:136–42

5. Davì G, Patrono C: Platelet activation and atherothrombosis. N Engl J Med 2007; 357:2482–94

6. Li Z, Ajdic J, Eigenthaler M, Du X: A predominant role for cAMP-dependent protein kinase in the cGMP-induced phosphorylation of vasodilator-stimulated phosphoprotein and platelet inhibition in humans. Blood 2003; 101:4423–9

7. Geiger J, Brich J, Hönig-Liedl P, Eigenthaler M, Schanzenbächer P, Herbert JM, Walter U: Specific impairment of human platelet P2Y(AC) ADP receptor-mediated signaling by the antiplatelet drug clopidogrel. Arterioscler Thromb Vasc Biol 1999; 19:2007–11

(Accepted for publication February 2, 2009.)

Anesthesiology 2009; 110:1199–200 Copyright © 2009, the American Society of Anesthesiologists, Inc. Lippincott Williams & Wilkins, Inc.

Continuous Positive Airway Pressure Applied Through a Bronchial Blocker as a Treatment for Hypoxemia due to Stenosis of the Left Main Bronchus

To the Editor:—We have developed a simple, lightweight continuous positive airway pressure (CPAP) delivery device for the nondependent lung during one-lung ventilation,[1] and we applied this device to a patient with urgent hypoxemia caused by acute airway obstruction where mechanical ventilation before installation of the stent device[2,3] did not improve the hypoxemia sufficiently. To our knowledge, this is the first report of selective CPAP delivery to a derecruited lung in which a bronchial blocker tube treated hypoxemia caused by severe stenosis of the main bronchus.

A 58-yr-old male who received an esophagostomy for esophageal cancer 7 yr ago began coughing. Two weeks later, chest computed tomographic imaging showed that his left main bronchus was narrowed by a submucous tumor, which was considered a recurrence of the esophageal cancer. While plans were being made for radiation therapy and chemotherapy to reduce the size of the tumor, the patient suddenly experienced severe dyspnea in the ward and was transferred to the intensive care unit. Even with the administration of oxygen of over 15l/min with an oxygen facemask, his peripheral saturation of oxygen (Spo_2) did not improve and stayed at around 70%, accompanied by tachypnea, tachycardia, and perspiration. No sound could be heard from the left lung through a stethoscope. To treat the hypoxemia, we intubated the patient's trachea to administer mechanical ventilation with 100% oxygen, but conventional mechanical ventilation did not improve the hypoxemia sufficiently (results of arterial blood analysis with 100% O_2: pH 7.41, $Paco_2$ 41 torr, Pao_2 50 torr, Spo_2 around 75 to 85%, heart rate 100 to 110 beats/min). The bronchoscopy after the unsuccessful conventional ventilation revealed that the left main bronchus seemed to be totally occluded.

During bronchoscopy after moderate hypoxemia that continued for 10 h after the tracheal intubation we found that a fiberscope head tip of 2.8 mm diameter could be wedged through the severe stenosis, which had previously appeared as total occlusion at the left main bronchus. To recruit the left lung to treat the hypoxemia, we replaced the endotracheal tube with a Univent tube (Fuji System Corp., Tokyo, Japan), and placement of the bronchial blocker tube beyond the severe stenosis was easily achieved without bleeding. CPAP was applied by supplying oxygen to the left lung through a CPAP-delivery device composed of a three-way stopcock (Connecta Plus 3; Becton Dickinson, Helsingborg, Sweden) whose side port works as a pressure relief port.[1]

With the CPAP delivery device, we performed a recruitment maneuver of the lower lobe of the left lung, which had been isolated and derecruited by the severe stenosis caused by the tumor, by using a finger to temporarily occlude the side port of the three-way stopcock while carefully monitoring the blood pressure and heart rate to avoid excessive overinflation of the left lung. The maneuver improved Spo_2 to 100% immediately, and the partial recruitment of the lower lobe of the left lung was confirmed by aeration in the chest radiograph.

The relationship between CPAP produced with the device and oxygen flow rate was confirmed before the application, where 5l/min and 10l/min of oxygen flow rate created 4 cm H_2O and 14 cm H_2O, respectively. When we decreased the oxygen flow rate to 5l/min while the right lung was ventilated with a fractional inspired oxygen tension of 0.4, Spo_2 fell under 90%, and therefore the oxygen flow rate was raised again to 10l/min and Spo_2 stayed at over 99%. After oxygenation was stabilized, the right lung was ventilated by pressure support to assist the patient's spontaneous ventilation, while CPAP was applied to the left lung. To avoid accidental overinflation that could cause barotrauma and pneumothorax of the left lung during CPAP application, we used a piece of adhesive tape to hold the device's stopcock fully open in three directions, and we took care not to obstruct the side port of the stopcock.

On the third day of the patient's stay in the intensive care unit, with CPAP delivery to the left lung under mechanical ventilation with 100% oxygen to the right lung, pulmonary gas exchange was stable (results of arterial blood gas analysis: pH 7.48, $Paco_2$ 35 torr, and Pao_2 367 torr) and a chest radiograph showed total recruitment of the left lower lobe. The installation of a self-expanding stent device (Ultraflex; Boston Scientific, Natick, MA) at the stenosis was conducted successfully, and both lungs were ventilated with the Univent tube with the bronchial blocker withdrawn. The patient was tracheally extubated without

Copyright © by the American Society of Anesthesiologists. Unauthorized reproduction of this article is prohibited.

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/110/5/1199/532914/0000542-200905000-00056.pdf by guest on 17 April 2024

complications 6 h later in the intensive care unit. On the fourth day, the chest radiograph did not show any atelectasis, and the patient was discharged from the intensive care unit and followed with radiation therapy and chemotherapy.

Hiroshi Sasano, M.D., Ph.D.,* **Nobuko Sasano, M.D., Ph.D., Shoji Ito, M.D., Ph.D., Yoshihito Fujita, M.D., Ph.D., Takeshi Sugiura, M.D., Ph.D., Masato Morita, M.D., Kazuya Sobue, M.D., Ph.D.** *Nagoya City University Graduate School of Medical Sciences, Nagoya, Aichi, Japan. hsasano@med.nagoya-cu.ac.jp

References

1. Sasano H, Sasano N, Ito S, Azami T, Morita M, Takeuchi A, Sobue K: A simple, lightweight CPAP delivery device, composed of a three-way stopcock, for the nondependent lung. J Anesth 2009; 23:93–8

2. Lo CP, Hsu AA, Eng P: Endobronchial stenting in patients requiring mechanical ventilation for major airway obstruction. Ann Acad Med Singapore 2000; 29:66–70

3. Ernst A, Feller-Kopman D, Becker HD, Mehta AC: Central airway obstruction. Am J Respir Crit Care Med 2004; 169:1278–97

(Accepted for publication January 23, 2009.)

Downloaded from http://asa2.silverchair.com/anesthesiology/article-pdf/110/5/1199/532914/0000542-200905000-00056.pdf by guest on 17 April 2024

Copyright © by the American Society of Anesthesiologists. Unauthorized reproduction of this article is prohibited.