tion with subsequent normal coronary arteriograms. One of these patients demonstrated paradoxical motion of the anterior wall during left ventriculography. In one other patient recanlization was documented by serial coronary angiograms. A coronary artery embolus with subsequent thrombolysis offers one possible explanation of the finding of a normal anterior descending artery in our patient. Subacute bacterial endocarditis, marantic endocarditis, cardiac catheterization, or prostatic valve insertion can result in coronary artery embolus, but there is no clinical or historic evidence to support any of these diagnoses in this patient.

One possibility that must be considered is that the cineangiograms failed to detect coronary arterial lesions which were sufficient to cause localized myocardial death and aneurysm formation. The angiograms of this patient demonstrated multiple branches of the anterior descending coronary artery in three views without a starburst pattern, which left no area underperfused. Ross and Friesinger stated that luminal narrowings of 20 percent or more may be overlooked, particularly if the lesion is circumferential and discrete, and that twig lesions may not be detected. However, a 20 percent narrowing or distal occlusion, even if overlooked, is unlikely to result in aneurysm formation.

This report should serve as a caution that most if not all of the diagnostic characteristics of coronary artery disease may be seen in the presence of normal coronary arteriograms. The etiology of these disorders remains to be clarified. Occurrence of a regional myocardial infarction or ventricular aneurysm suggests prolonged interruption of coronary flow to that region. In this regard, prolonged vasospasm or an embolus with subsequent lysis are the most likely causes. Unfortunately, objective evidence of such occurrences is difficult to obtain.

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Balloon Catheter Control of Life-Threatening Hemoptysis*

Clement A. Hiebert, M.D., F.C.C.P.**

The successful use of a Fogarty balloon catheter to tamponade bleeding in a moribund patient with massive bronchial hemorrhage is described. An endotracheal tube was passed alongside the catheter after which the patient was resuscitated and prepared for lung resection.

Massive explosive bleeding from the tracheobronchial tree remains a stern test of a surgeon's and endoscopist's mettle. While immediate endoscopic identification of the source, followed by selective bronchial intubation, and an extirpative operation constitutes ideal management,1,2 the first two steps may be completely frustrated if the hemorrhage is overwhelming. The following case is presented to illustrate the value of endobronchial balloon catheter tamponade in such an instance. Subsequently, we have noted a discussion by Garzon3 endorsing the technique which was used.

CASE REPORT

A 61-year-old woman entered the Maine Medical Center on Aug. 10, 1970 because of hemoptysis. X-ray films taken at another hospital on the previous day had been normal, but bronchoscopic examination showed blood emanating from the right lower lobe bronchus. Following a single transfusion, her hematocrit was 30 percent and she was then transferred to the Maine Medical Center.

For 12 years the patient had experienced minor yearly self-limited bouts of hemoptysis for which she had not sought medical attention. She had smoked ten cigarettes a day for many years, had no known exposure to tuberculosis, was not a bleeder, and, except for her lung problem, had been quite well.

She continued to raise bright blood and chest x-ray films showed increasing signs of atelectasis of the right lower lobe. Four transfusions of whole blood were given and she was taken to the operating room, another bronchoscopy was performed, and a Carlen's endobronchial catheter was passed. On the basis of bronchoscopic and radiographic evidence suggesting bronchiecasis of the right lower lobe, resection of that lobe was carried out; immediate examination of the specimen by the pathologist supported the diagnosis.

Five hours after operation, the patient began to raise blood, intermittently at first, and then a torrent erupted. She ceased to breathe and blood pressure and pulse became unobtainable. Immediate bronchoscopy was performed, but hemorrhage obliterated all anatomic details; somewhat in desperation a Fogarty balloon catheter was inserted through the bronchoscope into the right main bronchus and inflated until breath sounds could no longer be heard over the right chest region. After this the trachea and left main bronchus could be vacuumed free of accumulated blood. The length of the catheter allowed the 45 cm scope to be withdrawn over it without disengaging the syringe. Conventional tracheal in-

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tubation was then done leaving the Fogarty catheter in place. The patient was resuscitated, transfused, and the remainder of the right lung resected. The removed lobes showed bronchiectasis, chronic bronchitis, emphysema, with fresh intra-alveolar hemorrhage; no discrete bleeding point was identified.

The patient's course was complicated by gram-negative pneumonia and the after effects of cerebral anoxia. She made a complete recovery from both of these problems, however, and has remained well in the ensuing four years.

**DISCUSSION**

Expectoration of blood is a common heralding event in diseases of the lungs and airway. While the symptoms may be alarming to the patient, to the endoscopist a trickle of blood is ordinarily a clue rather than a calamity. Armed with a fiberoptic bronchoscope and the technique of systematic segmental lavage, up to two-thirds of patients with hemoptysis may have a precise diagnosis established. Trained personnel, adequate equipment, proper instruments, and a prepared mind are the essentials according to Wilson.

When blood loss is extreme, the goal of the endoscopist and surgeon must become therapeutic as well as diagnostic. Indeed, one of life's more challenging moments is to preside over the imminent death of a patient suffocating with hemorrhage from an unknown source. As blood cascades from mouth and nose, the trachea assumes the character of the vena cava and usual methods of localization and hemostasis prove futile. In this instance, operation was inappropriately delayed because we were deluded by the history of repeated self-limited episodes and wedded to the desire for a more precise diagnosis. In the process, the patient nearly lost her life and doubtless would have, except for the fortuitous thought that if balloon occlusion works in a blood vessel it might also work in an airway that looks like a vessel.

**ACKNOWLEDGMENT:** I am grateful to E. C. Rosenow, III for assistance in editing this manuscript.

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**ANNOUNCEMENTS**

**Clinical Chest Diseases Postgraduate Course**

The Page and William Black Postgraduate School of Medicine, Mount Sinai School of Medicine (CUNY) announces the Postgraduate Course on Clinical Chest Diseases will be held November 11-15 at the Mount Sinai Medical Center, Fifth Avenue and 100th Street, New York City. Course directors are Drs. Louis E. Siltzbach and Alvin S. Teirstein. For information, write the Registrar, The Page and William Black Postgraduate School of Medicine, Mount Sinai School of Medicine, Fifth Avenue and 100th Street, New York City 10029.

**Third Annual Clinical Pulmonary Physiology Course**

The Third Annual Clinical Pulmonary Physiology Course, sponsored by the New York Trudeau Society, will be held November 6-8 at the Mohonk Mountain House, New Paltz, New York (near Poughkeepsie).

For further information, please write Mr. William Smith, American Lung Association of New York State, Inc., 8 Mountain View Avenue, Albany 12205.

**Course in Laryngology and Bronchoesophagology**

The Department of Otolaryngology, Abraham Lincoln School of Medicine, University of Illinois and the Eye and Ear Infirmary, University of Illinois Hospital, will conduct a continuing education course in laryngology and bronchoesophagology, November 18-23. The course is limited to 20 physicians and will be held under the direction of Dr. Paul H. Holinger. For information, write directly to the Department of Otolaryngology, Eye and Ear Infirmary, 1855 West Taylor Street, Chicago 60612.