Penicillin therapy was initiated. On the third hospital day, the patient was still febrile, and a transtracheal aspiration was performed. Gram-positive diplococci were again seen on smear, but subsequent aerobic and anaerobic cultures were both negative. Blood cultures taken on admission grew *Bacteroides capillulosus*. The patient responded well to four weeks' therapy of intravenous penicillin and clindamycin. Of interest was the appearance of a 2 cm by 2 cm subcutaneous, anterior cervical mass at the site of transtracheal aspiration four days after the procedure. Incision and drainage revealed purulent material with Gram-positive cocci seen on smear, but aerobic and anaerobic cultures again yielded no growth. The abscess responded to conservative local therapy.

**Discussion**

Local infection has been an uncommon occurrence with transtracheal aspiration.\(^3\)\(^4\) The explanation for this is unclear, since many of the patients subjected to this procedure have significant bronchopulmonary infections. Contamination of the puncture site as the catheter is withdrawn from the tracheobronchial tree would seem very likely. However, Pecora and Kohl\(^3\) experienced only two instances of infection of the needle tract (with tubercle bacilli in patients with active tuberculosis) out of 400 transtracheal aspirations. Reams and Bosniak\(^4\) reported one case of localized cellulitis due to non-hemolytic Streptococcus at the site of cricothyroid membrane puncture. The same organism was also recovered from the tracheobronchial tree. Pathogens isolated from local paratracheal infections resulting from cricothyroid membrane puncture may not always be related, however, to the tracheobronchial flora. In our first patient, the organism cultured from the abscess was not recovered from the lower respiratory tract. Standard aseptic procedures were observed, and the technique for transtracheal aspiration described by Kalinske and associates\(^5\) was used. It is possible therefore that *de novo* infection may have occurred at the puncture site.

In addition to determining the microbial flora of the lower respiratory tract, cricothyroid membrane puncture has been utilized for tracheal anesthesia in preparation for intubation and bronchoscopy.\(^4\) The procedure is the same as a transtracheal aspiration, except that a local anesthetic is instilled into the tracheobronchial tree instead of aspirating for a specimen. Adriani andParmley\(^6\) reported a case of diffuse cellulitis of the neck associated with an indurated mass (abscess?) in the region of the thyroid gland following transcrioid anesthesia. Similarly, Harken and Salzberg\(^7\) reported three cases of superficial cellulitis of the soft tissues around the site of injection. One case resolved spontaneously, while the other two cases required incision and drainage. Except for the latter patients and our cases, the only other recorded instance of paratracheal abscess associated with cricothyroid membrane puncture was by Guy and Elder.\(^8\) Their patient developed an abscess anterior to the trachea following the usage of this procedure for bronchoscopy.

Thus, it must be recognized that paratracheal abscess does occur after cricothyroid membrane puncture during transtracheal aspiration, but that it is uncommonly reported. Rigorous aseptic techniques, meticulous care of the wound site and initiation of specific therapy following the results of the transtracheal aspirate are probably the reasons for the infrequency of this complication.

**Addendum**

Since the completion of this manuscript, the authors had the opportunity to see a third patient with a paratracheal abscess secondary to transtracheal aspiration. The abscess extended posterior to the esophagus, requiring wide incision and drainage. The organisms recovered were alpha-hemolytic streptococcus, two *Bacteroides* species and *Staphylococcus epidermidis*. Additional therapy with clindamycin and gentamicin resulted in complete resolution of the abscess.

**References**


**Arteriovenous Communication Associated with Obstructive Arteriosclerotic Coronary Artery Disease and Myocardial Infarction**

Peter A. Phillips, M.D., F.C.C.P., and Albert J. Libanoff, M.D.

An arteriovenous fistula from the anterior descending coronary artery to the great cardiac vein was detected by coronary cineangiography in a 53-year-old man. The fistula was believed acquired secondary to occlusive

*From the City of Hope National Medical Center, Duarte, Calif.*

Reprint requests: Dr. Phillips, City of Hope National Medical Center, Duarte, California 91010

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arteriosclerotic coronary artery disease. Clinical findings and cardiac catheterization revealed evidence of left ventricular failure, and a surgical procedure was undertaken to close the fistula and re-establish normal hemodynamic parameters.

Arteriovenous fistulae have become a recognizable entity, and various reports on diagnosis and treatment are available. All previous communications have related congenital and traumatic pathogenesis. This report describes an arteriovenous communication from the left anterior descending to great cardiac vein detected on coronary angiography following myocardial infarction. It is believed the fistula was acquired secondary to the arteriosclerotic occlusive process in the left anterior descending coronary artery.

**Case Report**

**History**

A 53-year-old white man, while doing heavy labor, became dizzy and experienced nausea, but felt no chest pain. He was taken to a local hospital where an electrocardiogram and enzyme studies indicated an acute myocardial infarction. Cardiac arrest ensued, and he was resuscitated, but remained unconscious for 48 hours. Complete heart block, which developed on the fifth hospital day, was treated with a temporary pacemaker. After three weeks, he was discharged in satisfactory condition, following reversion to normal sinus rhythm. He was digitalized and treated with diuretics, remaining in the hospital one week. Chronic heart failure persisted.

Five months later, the patient was admitted to the City of Hope National Medical Center complaining of dyspnea on mild exertion, and fatigue. He denied chest pain, but had not been able to return to work.

Physical examination revealed a chronically ill Caucasian man in no acute distress. He weighed 72 kg and was 190 cm in height. The blood pressure was 100/70 mm Hg; the pulse was regular at 62 beats per minute. There was no neck vein distention; the liver was palpable 2 cm below the right costal margin; ankle edema was absent. Breath sounds were diminished in both lung bases, but inspiratory rales were audible bilaterally. There were no heaves, thrills, or murmurs. No gallop was detected.

**Routine Laboratory Data**

Results of laboratory studies of hemoglobin, hematocrit, white blood cell count, urinalysis, electrolytes, fasting glucose, serum glutamic oxaloacetic transaminase (SGOT), calcium, and phosphorus were normal. The blood urea nitrogen value was 24 mg percent; the creatinine level 1.5 mg percent; and the uric acid level was 10 mg/100 ml. Cholesterol and triglyceride levels were both within the normal range.

**Special Laboratory Data**

Electrocardiographic and vectorcardiographic studies demonstrated right ventricular dominance secondary to previous anterolateral and anterior wall myocardial infarction. The chest roentgenogram revealed cardiomegaly and pulmonary congestion with bilateral pleural effusions. At cardiac catheterization, the left ventricular end diastolic pressure measured 15 to 29 mm Hg, and mean left atrial pressure was 24 mm Hg. On cineangiography, the main left coronary and circumflex arteries and the great cardiac vein opacified simultaneously. No dye entered the left anterior descending coronary artery below the bifurcation with the circumflex, but a vessel was identified arising from the area of occlusion and entering the myocardium adjacent to the great cardiac vein. This was interpreted as an arteriovenous communication (Fig 1, 2, 3, and 4).

**Hospital Course**

An attempt was made to isolate and close the coronary arteriovenous fistula. The procedure was performed through...
a median sternotomy, with extension into the fourth interspace extrapleurally. Palpation revealed a short systolic thrill over the area of the occlusive plaque in the left anterior descending artery 2 cm beyond its origin. There was no evidence of recent hemorrhage or acute inflammatory changes in the area of dissection.

A vascular stalk was identified arising from the left anterior descending artery and entering the myocardium adjacent to the great cardiac vein. Two silk ties were placed about the fistula, and it was severed. A saphenous vein bypass from the aorta to the proximal left anterior descending artery was placed below the obstruction. A flow of 75 ml/min was measured. A silk tie was placed about the left anterior descending artery at its origin to prevent saphenous vein bypass flow from “stealing” into the coronary sinus in the event the arteriovenous communication remained open.

The immediate course was satisfactory after operation. Bilateral pleural effusions and congestive heart failure recurred during the second week after operation and persisted despite repeated thoracenteses. One month after operation, a cerebrovascular accident caused a permanent left hemiparesis. Six months following operation, the patient died from cecal volvulus and a perforated jejunum.

Postmortem Examination
The dominant lesion was an old, massive myocardial infarction involving the septum, posterolateral and anterior wall of the left ventricle. The occlusion of the left anterior descending artery was atherosclerotic in nature, with recanalization observed by microscopic examination. The circumflex coronary artery was normal; the right coronary artery showed mild atherosclerotic changes. Further examination of the heart revealed no connection between the left anterior descending artery and great cardiac vein.

Discussion
Coronary arterial communications have been reported, with congestive heart failure of varying severity occurring in approximately 50 percent of fistulae terminating in the coronary venous system. Our patient experienced the onset of his medical problems with myocardial infarction and subsequent congestive heart failure. There were no specific clinical findings that might lead to the diagnosis of arteriovenous fistula. Left ventricular failure was the major hemodynamic finding at cardiac catheterization, and the diagnosis was established after coronary angiography. Congestive heart failure and the possibility of subacute bacterial endocarditis are important factors for considering elective repair following diagnosis.

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Hypercapnia during Iatrogenically Induced Metabolic Alkalosis*

Francisco Perez-Guerra, Lt Col, USAF, MC, FCCP

A 21-year-old woman with lymphocytic lymphoma developed severe hyperuricemia and acute oliguric renal failure following antitumor chemotherapy. Large doses of sodium bicarbonate were given in an effort to minimize uric acid precipitation in the kidneys. Hypercapnia ensued as a consequence of the iatrogenically induced metabolic alkalosis in conjunction with azotemia. It is suggested that hypercapnia may be the result of either acute

*From the Pulmonary Disease Service, Department of Medicine, Wilford Hall USAF Medical Center (AFSC), Lackland Air Force Base, Texas.

Reprint requests: Col Perez-Guerra, USAF Hospital, Lackland Air Force Base, Texas 78236

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