orally in one ingestion for five consecutive days. Daily blood counts remained normal. Five series of methotrexate at interval of two to three and one-half weeks were given. Frequent clinical, radiologic and hormonal controls were performed.

After an initial fall of urinary human chorionic gonadotropins (Fig 2) and a slight reduction of the lung shadow, an increase of gonadotropins indicated resistance to methotrexate. Chemotherapy with actinomycin-D was then started: 0.5 mg per day intravenously for five consecutive days. Three series at intervals of three and four weeks were given. We could not detect any influence upon the gonadotropins nor on the lung shadow.

After consultation with the thoracic surgeon, a right upper lobectomy was performed on October, 1971. Histologic examination showed metastatic choriocarcinoma. In the follow-up, the clinical and radiologic studies (Fig 3) were normal, and no more choriocarcinoma could be detected one year after operation.

**DISCUSSION**

Many problems are to be faced by a clinician when metastatic trophoblastic disease is present. He must consider the possibility of an occult primary in the uterus, the presence of solitary or multiple metastases, biologic activity, and finally the most adequate method of treatment, which today may include chemotherapy, surgery or both methods. At present radiotherapy is only used in brain metastasis in conjunction with chemotherapy. Experimental immunotherapy is being tried and constitutes a challenge for the future. The results, however, so far have been poor.

It is difficult to give a schematic program for the treatment of all cases with lung metastatic choriocarcinoma, because of the great individual variations in the clinical course and responsiveness to treatment. Chemotherapy is—in any case—the best initial treatment of choice. It may sterilize all occult foci, including an occult primary in the uterus, reduce the size of the tumor in the lung, and sometimes even result in a slow but definite resolution. The level of choriomic gonadotropins permits a more precise control of the disease.

In our patient, after an initial response to methotrexate, resistance developed after the fourth series. At this stage the lung shadow appeared slightly reduced. During the treatment with actinomycin-D, the choriomic gonadotropins tended to increase again. Lobectomy finally solved the situation, and follow-up controls remained normal one year following operation.

**REFERENCES**


**Aspergilloma: An Unusual Cause of Late Failure of Aortocoronary Bypass Graft***

**Richard B. Whiting, M.D.,** **Hendrick B. Barner, M.D.;** **Phillip Leone, M.D.;** and **Edwin E. Westura, M.D., F.C.C.P.**

A young woman abruptly developed the return of angina pectoris after a successful coronary bypass graft. Angiography and repeated surgery revealed a proximal occlusion of the vein graft, not related to poor distal run-off. Pathologic examination of the removed vein graft revealed thrombotic occlusion associated with an intimal mycotic abscess.

There is currently great interest in various myocardial revascularization techniques. Aortocoronary bypass grafting is being widely used, and preliminary data suggest very gratifying results in relieving angina pectoris and increasing exercise tolerance. A relatively

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low incidence of vein graft occlusion has been documented, but nonetheless, factors favoring such occlusion remain to be elucidated. The present case is described because it represents vein graft occlusion secondary to infection with Aspergillus.

CASE REPORT

A 37-year-old housewife entered Saint Louis University Hospital for the first time on Aug. 19, 1970, for evaluation of recurrent substernal pain over the previous three years. There was no history of hypertension, lipid disorders, use of contraceptives or diabetes mellitus, although her father had adult onset diabetes. The patient smoked approximately one package of cigarettes per day for some 15 years. She was married, but had never been pregnant, in spite of regular menstrual cycles.

Physical examination was that of a healthy woman: height 5'6", weight 112 pounds, blood pressure, 110/70 mm Hg, pulse rate, 60 per minute. The heart rhythm was regular, and there was no evidence of cardiomegaly or murmur. On admission, the complete blood count, urinalysis, blood urea nitrogen, fasting blood sugar (90 mg/100 ml), cholesterol (210 mg/100 ml) and chest radiograph were all within normal limits. Electrocardiogram revealed sinus bradycardia and an incomplete right bundle branch block pattern. A treadmill maximum exercise test result was positive with 2 mm depression of the ST segment.

At cardiac catheterization, a normal left ventricular end diastolic pressure (0-5 mm Hg) was demonstrated, with no aortic valve gradient and a normal ventriculogram. Selective coronary arteriography revealed an 80 percent stenosis of the main left coronary artery, with 5 mm poststenotic dilatation. The rest of the coronary arterial tree was free of major vessel disease.

On Sept. 23, 1970, grafting with a saphenous vein was undertaken to the left anterior descending (LAD) coronary artery, with good blood flow through the graft by electromagnetic flow meter.

Beginning one day before surgery and continuing for eight days, the patient received prophylactic antibiotics in the form of lincomycin, 600 mg, intramuscularly (IM) every eight hours, and kanamycin, 500 mg IM every 12 hours. There was no fever. Routine sputum culture grew alpha-hemolytic streptococci and a few colonies of Candida albicans. She was discharged and did remarkably well, without further angina pectoris.

In January, a repeated exercise test was without ST segment deviation, although the test was similar in duration and acceleration to the original one. Angiography revealed the bypass graft to be patent, with excellent filling of the LAD and also retrograde filling of the circumflex coronary artery.

On August 25, she was awakened by her first episode of nocturnal angina and over the next several days experienced bouts of anginal pain at rest. She, therefore, was readmitted to the hospital, and cardiac catheterization demonstrated total block of the aortocoronary bypass graft near its proximal end.

On Sept. 14, 1971, the patient was returned to the operating room where the original vein graft was identified, and the first three centimeters of the graft were seen to be encased in dense scar tissue, surrounded by softer areas appearing caseous, but without definite purulence. When the vein graft was transected at the junction of the proximal and middle third, a 3 mm lumen with excellent back-bleeding was
HEPARYN ABSORPTION DURING LUNG LAVAGE

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Heparin Absorption during Heparin-Saline Lung Lavage in a Patient with Pulmonary Alveolar Proteinosis

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Lung lavage with heparin-saline solution in the treatment of a patient with pulmonary alveolar proteinosis was no better than lavage with saline alone. Sufficient heparin was absorbed from the lung so that the patient's clotting time was prolonged and he sustained a retroperitoneal bleed. We believe clinicians should be alert to the possibility of heparin absorption from the lung, especially when large doses are used during lung lavage.

Heparin has been added to the fluid used for long lavage of patients with pulmonary alveolar proteinosis (PAP) since 1963; however, in amounts used, there has been increasing doubt about the value of the heparin for the treatment of PAP. Clinicians who use heparin by aerosol or lavage have not reported absorption of the drug from the lung nor problems due to bleeding that one might ascribe to heparin effect. We wish to report our experience with the use of a high concentration of heparin while a patient with PAP was being lavaged.

CASE REPORT

The patient, 17 years of age, developed PAP at 14 years of age and had two massive bilateral lung lavages during the next 2 years. The later lavage was done in October 1970 with good results and he continued well until March 1971 when he noted increasing exertional dyspnea, cough and sputum production, headaches and early fatigue. His hematocrit rose from 53 percent to 61 percent and lung vital capacity fell from 2400 to 2000 milliliters.

On April 12, 1971 lavage of the left lung was performed with the use of 12 liters of sterile 0.9 percent saline solution in one liter cycles. To each liter of solution were added 200,000 units of sodium heparin.* Lee-White blood clotting time before the procedure was nine minutes, during the lavage it was prolonged to 35 minutes, and at the end of the washing it was one hour with poor clot formation. Therefore he was treated with 200 mg of protamine sulfate by intravenous drip over two hours. Clotting time returned to normal and a slightly bloody discharge from his nares stopped. He had ecchymoses about the venipuncture sites on his arms but none from a femoral artery puncture area.

The next morning he had bowel cramps, moderate lower abdominal rebound tenderness with associated decreased bowel sounds. We felt that he had endured abdominal bleeding; his hematocrit had dropped to 49 percent and his stools were guaiac positive without visible blood. Symptoms were alleviated with simple analgesics whereafter the patient became ambulatory, developed a good appetite and felt better during the day. Flat plate radiographs of the abdomen were interpreted as normal and of the chest showed the left lung more radiolucent than before the lavage. His hematocrit stabilized at 44.8 percent. Two days later he developed fever, increased cough and sputum production, shortness of breath and lower abdominal pains. He felt most comfortable with his legs flexed onto his abdomen.

An intravenous pyelogram demonstrated prompt renal function, but there was elevation and retrodisplacement of the bladder, presumably due to a blood clot about the inferior border. An ecchymosis appeared on the lower left abdominal wall. Although the left inguinal area remained nontender and normal in appearance, we believed the patient had bled from the posterior wall of the femoral artery. His white blood count was normal. However, penicillin and ampicillin antibiotics were selected for therapy because sputum cultures before and after lavage had yielded Hemophilus influenza and once previously had yielded Actinomyces. His symptoms abated except for mild suprapubic tenderness elicited with walking or during micturition; no complications developed and he was sent home.

Three weeks later his right lung was lavaged with 8 liters of plain N/S with the majority of the sediment being removed in the first 4 liters of lavage fluid. Even though there were no problems, he was treated prophylactically with penicillin and sulfonamide after the procedure. Since then his vital capacity has risen to 2000 ml and chest radiographs show further clearing.

DISCUSSION

Heparin has been used or evaluated for use in such lung diseases as asthma, cystic fibrosis and PAP. Previous concentrations have varied from 5 to 250 units per millimeter of N/S. For a short time prior to the first massive lavage of this patient in 1968, he was treated with a solution of 250 units of heparin per millimeter sterile N/S via transtracheal catheter drip and the PAP effluent was noted to be much more emulsified than with N/S alone. Since the higher concentration of heparin acted as a better solvent that saline alone and since none of the previous lavages in this patient appeared to remove all the PAP sediment, we believed more material might be removed with a high concentration of heparin during a massive lavage. Ramirez and colleagues also

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