unaccompanied by other lesions has its merit because it segregated from a conglomerate of conditions with diffuse interstitial infiltrates a particular one, responding to a specific form of therapy with a relatively high degree of consistency.

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REFERENCES

Serial Flow-Volume Loops as an Aid to Management of Primary Oat Cell Carcinoma of the Trachea

To the Editor:

The diagnosis of tracheal tumors with the maximum flow-volume curve has been described, and the advantage of following the course of such lesions with it has been alluded to. A case report of ours confirms this advantage.

![Diagram of flow-volume loops](image)

**Figure 1.** Maximum flow-volume curves. A, Initial curve (January 1975), showing reduced peak expiratory and inspiratory flow. B, Curve after therapy with radiation and chemotherapy, showing improvement. C, Curve in June 1975, showing marked decrease in both inspiratory and expiratory flows. D, Curve after additional therapy with radiation and chemotherapy, showing improvement.

CASE REPORT

A 47-year-old woman was referred to the Bishop Clarkson Memorial Hospital, Omaha, in January 1975 with complaints of cough, hemoptysis, and dyspnea for two months, and a heavy smoking history. Stertorous breathing with inspiratory stridor was localized to the neck, and no other abnormalities were noted on physical examination.

A maximum flow-volume curve demonstrated reduced peak expiratory and inspiratory flow (Fig 1A), and bronchoscopic examination revealed a hemorrhagic lesion 5 cm below the cords. It was horsehoe-shaped, narrowing the tracheal lumen to 6 mm; and pathologic sections revealed anaplastic oat cell carcinoma. No evidence for metastases could be found. Therapy with radiation (4,900 rads in 5% weeks) and combined chemotherapy with cyclophosphamide, vincristine, and methotrexate produced clinical improvement, confirmed by a repeat maximum flow-volume curve (Fig 1B).

In June 1975, the patient was dyspneic, the maximum flow-volume curve (Fig 1C) showed a marked decrease in both inspiratory and expiratory flows, and the chest x-ray film was consistent with lymphangitic metastases. Bronchoscopic examination revealed a necrotic mass causing 80 percent obstruction of the trachea. The patient improved (Fig 1D) after therapy with an additional 1,000 rads and an intermittent three-week schedule of dosage with cyclophosphamide, doxorubicin (adriamycin), and methotrexate, but she died from an overwhelming infection 26 months after diagnosis.

**DISCUSSION**

Miller and Hyatt noted the tendency to overlook obstructing lesions of the major airway in favor of chronic obstructive pulmonary disease in patients with dyspnea and noisy breathing. Hemoptysis was a clue in this particular case.

This patient's initial maximum flow-volume curve is consistent with a fixed lesion similar to the artificial orifices utilized by Miller and Hyatt. After treatment the inspiratory slowing persisted, but the rate of expiratory flow improved, changing the pattern to a variable extrathoracic intratracheal obstruction. With recurrence the pattern reverted to fixed and then returned to variable with retreatment. The variable pattern suggested residual tumor or scar of the trachea secondary to therapy with radiation.

Our patient appears to represent the eighth reported case of primary oat cell carcinoma of the trachea. Previously, the longest reported period of survival for a patient with this tumor in this unique location was nine months.

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Insertion of the Lead of a Permanent Transvenous Pacemaker Utilizing an Axillary Approach
A Solution to the Unsuitable Cephalic Vein

To the Editor:

Leads of permanent transvenous pacemakers are most commonly inserted through the cephalic vein at the deltopectoral groove. A subclavicular incision is used to create a prepectoral pocket for the pulse generator and to insert the lead through the cephalic vein. Whenever the cephalic vein is thrombosed, is too small, or is traumatized at the time of insertion, some surgeons insert the lead through the external jugular vein or the internal jugular vein. This approach requires an additional incision, and at times it is difficult to pass the lead from the external jugular vein into the subclavian vein.

Surgical Technique

In patients with unsuitable cephalic veins, we prefer to insert the pacemaker's lead through one of the tributaries of the axillary vein, most commonly the lateral thoracic vein. The incision used to search for the cephalic vein is utilized but extended medially about 2 cm (Fig 1). The clavicular and sternal heads of the musculus pectoralis major are separated, and self-retaining retractors are inserted. The clavicular fascia is visualized, and the underlying musculus pectoralis minor is identified. The clavicular fascia is incised, the musculus pectoralis minor is divided at its insertion in the coracoid process, and the ends are suture-ligated with 2-0 silk.

After this, the axillary vein and several large tributaries can be seen. One of the large tributaries, usually the lateral thoracic vein, is looped, and a venotomy is performed and the lead inserted. Since these branches are of large caliber, insertion is easy. The lead can be advanced into the axillary vein, the subclavian vein, and into the heart without difficulty.

After the lead is firmly and accurately placed in the right ventricle, the pulse generator is connected. The lead is exteriorized from the axilla, and the pulse generator is placed in the usual pocket anterior to the greater pectoral muscle. The clavicular and sternal heads of the musculus pectoralis major are approximated with absorbable suture, and the wound is closed in layers without drains.

Discussion

The technique described is easy to perform and usually takes a short period of time. It has the advantage that the veins utilized are easy to cannulate, the operation can be performed using only one incision, and the lead can be advanced into the heart without difficulty. This technique has been utilized in 12 patients without morbidity; it requires no instruments other than those routinely provided in trays for insertion of permanent transvenous pacemakers.

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