obstructive lesion either in the pulmonary veins or beyond the pulmonary circulation. Strong evidence for the obstruction to pulmonary venous flow beyond the pulmonary veins was supplied by the hypoplastic left ventricle. An additional support for disease involving the left side of the heart was seen in the angiocardiogram which showed a reversal of contrast material in the aortic arch from the ductus arteriosus. As suggested earlier, the aortic stenosis was probably an important factor in determining the hemodynamics of the proximal aorta that would underlie this observation.

In classic examples of total anomalous pulmonary venous connection, the left side of the heart is normal. Under this circumstance, it is anticipated that a left atriogram would yield essentially normal findings. In our case, in contrast, a left atriogram showed the presence of pulmonary veins joining the left atrium which, of itself, would exclude the diagnosis of total anomalous pulmonary venous connection and, in addition, demonstrated the anomalous channel which is the subject of this report.

REFERENCES

Subcutaneous Implantation of Cancer: A Rare Complication of Pleural Biopsy

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A case of subcutaneous implantation and growth of mammary cancer following needle biopsy of the parietal pleura is reported. This is a rare complication which does not affect the prognosis of patients with malignant pleural effusions. Fear of such local spread of tumor should not serve as a contraindication to pleural biopsy.

Since DeFrancis* introduced needle biopsy of the parietal pleura in 1955, this technique has been universally accepted and employed in the diagnosis of pleural disorders. Complications, chiefly pneumothorax and intrapleural bleeding, have been unusual and almost always of minor extent. Subcutaneous implantation of cancer along the needle tract has been reported only once before.* This paper describes a second case.

CASE REPORT

A 42-year-old housewife underwent radical mastectomy in November 1964 for scirrhous carcinoma of the right breast. Postoperatively, she received Cobalt-60 teletherapy which was complicated by fibrosis of the right upper lung and pericardial effusion, the latter subsiding spontaneously.

She remained asymptomatic until August 1966, when she began to note progressively severe dyspnea. A roentgenogram of the chest showed bilateral pleural effusions and densities radiating peripherally from both hilar areas compatible with lymphatic spread of tumor. Thoracentesis and biopsy of the right parietal pleura were performed with a Cope needle. Both cytological and cell block examinations of the fluid revealed malignant cells, and the biopsy showed a cluster of similar cells compatible with metastatic breast carcinoma. Identical malignant cells also were noted in fluid removed subsequently by a left thoracentesis which was performed without biopsy. Thio-TEPA was instilled in each pleural space, and therapy with testosterone was begun. (Bilateral oophorectomy had been performed elsewhere in September 1963, for a benign disorder).

No changes occurred in the bilateral pleural densities during the ensuing year, but there was clinical and roentgenographic evidence of increasing lymphatic spread of tumor in both lungs. Further palliative therapy included stilbestrol, radiotherapy of metastatic lesions of the spine and pelvis, and three courses of 5-fluorouracil.

In March 1967, six months after thoracentesis and needle biopsy, she developed a firm, tender nodule measure-
ing two centimeters in its longest dimension and located immediately beneath the scar of the small incision made for insertion of the biopsy needle (Fig 1). Biopsy with a Vim-Silverman needle disclosed clusters of tumor cells embedded within collagenous connective tissue (Fig 2). The microscopic appearance was compatible with metastatic breast carcinoma. After radiation therapy, the nodule decreased in size so as to be barely palpable. There was no recurrence up to the time of her death, due to pneumonia, in August 1967.

**COMMENT**

A review of the literature since needle biopsy of the parietal pleura was introduced in 1955 covers reports of biopsies performed on 1,419 patients, 246 of whom had malignant pleural effusions. Only one instance of tumor spreading along the needle tract was reported in this group, a case described by Mestitz and his colleagues wherein subcutaneous growth of cancer was noted 18 months following biopsy. Dolley and Jones noted a similar occurrence after simple thoracentesis in a patient with a malignant pleural effusion. With the exception of the present case, I have never encountered this complication in my personal experience with over 100 biopsies.

Local metastasis is a rare complication of needle biopsy of the pleura. Certainly, fear of this possibility should never serve as a contraindication. The advantages implicit in a positive histological diagnosis outweigh the slight risk of tumor implantation. When there is pleural carcinomatosis, such individuals are no longer candidates for curative resection. Thus, local spread to a limited area of the chest wall after biopsy does not adversely affect the ultimate prognosis; this particular minor facet of metastatic disease can be treated by surgery or irradiation. Extrathoracic metastasis as the result of needle biopsy has not been documented, and there is experimental evidence to suggest that this is unlikely to occur.

**REFERENCES**


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