Bilateral Pulmonary Resection for Metastatic Osteogenic Sarcoma: Case Report of a Seven Year "Cure"

W. R. RUMEL, M.D., F.C.C.P., P. R. CUTLER, M.D., F.C.C.P and W. R. HALLIDAY, M.D.
Salt Lake City, Utah

The merit of excision of a solitary metastatic pulmonary malignancy in selected cases now seems well established, if the primary lesion can be controlled.1-5 Many patients have been reported free of such disease for significant periods, one as long as 18 years after pulmonary resection.6 However, there have been only a few reported attempts to eradicate bilateral pulmonary metastases.2, 4, 5, 7-10 Nearly all of these have been cases with an apparently solitary metastasis with subsequent appearance of an additional metastatic lesion in the other lung. The only prolonged survival following resection of such bilateral metastatic pulmonary neoplasms, which could be found in a search of the American literature, was a case of a spindle cell neurosarcoma reported by Alexander.11 No evidence or recurrence developed eight and one-half years after her second lobectomy and nine and one-half years after the discovery of the first pulmonary metastasis.

In view of the current low mortality and morbidity rates associated with pulmonary resection, it has been our belief that the discovery of multiple or bilateral pulmonary metastases should not alone preclude attempts at surgical cure if the total number and distribution of the metastatic lesions is reasonably favorable from a surgical standpoint. Review of the literature indicates that others also hold this view, since at least four such cases have been reported.5, 8-10 In the first two of these, the second lobectomy was delayed six and eight months respectively. However, both patients soon died, one with extensive pulmonary metastases and the other with involvement of the liver. The third was free of disease six months following the second operation and the fourth had later undergone removal of pulmonary and renal recurrences with a subsequent follow-up of only five months.

Because of the limited overall experience in dealing with the excision of bilateral pulmonary metastases, a report of an additional case treated successfully seems justified.

From the Department of Thoracic Surgery, Latter-day Saints Hospital.
Case Report

In 1949 a local orthopedic surgeon* asked us to care for a 15 year old white girl who had multiple, bilateral pulmonary metastatic osteogenic sarcomata. In December, 1948, she had been hospitalized because of complaints referable to her right leg. Mild pain and a sensation of unusual warmth had been present in her knee for two months. Initial x-ray films of the joint were negative, but two weeks before admission when increased pain and swelling had developed, a rarified lesion in the distal end of the femur was demonstrated. Physical examination revealed no abnormality except for moderate swelling in this area. Laboratory studies were normal except that the alkaline phosphatase was 7.0 Bodansky units. A routine chest x-ray film was negative (Figure 1). On December 3, 1948, a mid-thigh amputation was performed, followed by an uneventful convalescence. The histologic diagnosis was osteogenic sarcoma. Routine x-ray films 11 months postoperatively revealed bilateral pulmonary metastases, although she was entirely asymptomatic (Figure 2). Physical and laboratory examinations were negative except for the evidence of amputation. On November 22, 1949, a right middle lobectomy was performed with removal of a solitary lesion measuring 5 cm. in diameter. On December 14, 1949, left lower lobectomy and lingulectomy with partial pericardiectomy was performed. The lower lobe contained two masses, each being 2 cm. in diameter and the lingula another, which was 4 cm. in diameter. Fibrous adhesions bound the lingular tumor to the pericardium in the region of the phrenic nerve but no gross invasion of the pericardium was present. After the second operation she developed a critical episode of hypotension with cardiovascular collapse and hyperthermia of 106°F, followed by oliguria, but she recovered fully. The histological appearance of the pulmonary lesions was identical to that of the primary femoral tumor. Subsequently, she has been normally healthy and active in all respects, being able to graduate from the State University and to continue on with steady employment after graduation. No clinical or radiological evidence of recurrence had developed up until March 27, 1957, more than seven years after her second resection (Figure 3).

*Dr. A. M. Okelberry, L. D. S. Hospital, Salt Lake City, Utah.
DISCUSSION

In the majority of instances pulmonary metastasis must result from tumor invasion of the regional veins followed by embolization, with or without local trauma. If the lesion is solitary and resection results in "cure," there can be no reasonable doubt that the embolization involved a single cell or cump of cells breaking away on a single occasion. Obviously, if the primary growth is not completely resected, further embolic episodes may, and generally do, occur periodically resulting in further implants in new areas of the lungs. Logically there would seem to be no reason why multiple cells or clumps of cells might not be dislodged into the blood stream as an isolated occurrence or repeatedly over a short period of time, particularly if the primary lesion were traumatized. Still, if the distribution and total number of the implants happened to be favorable, from the standpoint of resectability, excision should be possible for the same reasons that "cure" of solitary metastases has been attained. Again, we must assume that the primary growth would have been eradicated completely. Admittedly, an increase in the total number of implants, especially if the distribution were widespread throughout both lungs, would be followed by a decrease in the likelihood of "cure." In the above case the variation in the size of the nodules strongly suggested that more than one and probably three episodes of tumor embolization took place before extirpation of the primary tumor. The appearance of multiple bilateral lesions up to 5 cm. in diameter within a year after resection of the primary growth would seem to indicate that the tumor was not one of unusually low-grade malignancy, but an ordinary osteogenic sarcoma. Also, the microscopic characteristics favored this contention. In spite of these considerations, which would detract from the likelihood of success, the result obtained appears to satisfy the usual criteria of a "seven year cure" following resection of multiple bilateral pulmonary metastases arising from a primary osteogenic sarcoma of the lower end

FIGURE 2

Figure 2: Bilateral metastatic osteogenic sarcomata 11 months after mid-thigh amputation.—Figure 3: Roentgenogram over 7 years after resection of bilateral metastatic osteogenic sarcomata—showing no recurrence.
of the femur, and indicates that the presence of such metastases does not necessarily preclude the possibility of "cure" following surgical excision.

REFERENCES


10 Jones, J. F. (In discussion of Higginson'.)

11 Alexander, J. (In discussion of Seiler et al'.)