

Sciatic Nerve Resection

Is That Truly an Indication for Amputation?

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En bloc resection of the sciatic nerve with an adjacent bone or soft tissue tumor has been assumed to be associated with a poor functional outcome and, therefore, was considered an indication for amputation. Although many surgical oncologists today challenge this assumption and do limb-sparing resection in these patients, a report of the functional outcome of a series of patients who had this procedure has not been published. Between 1991 and 1999, the authors treated 15 patients who had resection of the sciatic nerve. There were 10 females and five males, ranging in age from 2 to 73 years. Diagnoses included 11 high-grade soft tissue sarcomas, one primary bone sarcoma, and three metastatic bone tumors. Four lesions were located in the pelvis, one in the buttock, and 10 in the posterior thigh. At the most recent followup, 14 patients were ambulatory, seven of whom required a walking aid. Because of peroneal nerve palsy, all patients required a short-leg brace.

However, overall function was determined to be good in 11, moderate in three, and poor in one patient. None had a pressure sore of the foot and none required a secondary amputation. Good function is achieved in most patients who have sciatic nerve resection. Therefore, the necessity to resect the sciatic nerve is not an indication for amputation.

En bloc resection of the sciatic nerve with a malignant tumor of the pelvis or thigh rarely is done and has been considered an indication for amputation. This approach was based in the belief that the expected motor and sensory loss around the leg and foot would result in an intolerable functional deficit and the development of pressure sores and, therefore, high rates of secondary amputation.⁶ Others challenged this hypothesis and reported their impression that these limbs are associated with a functional outcome superior to that provided by an amputation and that the postoperative complications would not necessarily lead to an eventual amputation.^{1,2,5} As a result, they recommended doing a limb-sparing resection of the sciatic nerve (sciatic nerve resection with preservation of the extremity) in these patients.^{1,2,5}

Between 1991 and 1999, the current authors treated 15 patients who had a malignant tumor around the sciatic nerve and were treated

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with limb-sparing resection of the sciatic nerve. The functional outcome of these patients is reported.

MATERIALS AND METHODS

Between 1991 and 1999, the authors treated 15 patients who had limb-sparing resections of a malignant tumor of the thigh, buttock, or pelvis, all of which necessitated en bloc resection of a segment of the sciatic nerve with the tumor mass. Complete preoperative staging, which included plain radiographs, magnetic resonance imaging (MRI) scans of the affected extremity, and computed tomography (CT) scans of the chest, was obtained in all patients. The necessity to do en bloc resection of the sciatic nerve was determined only at the time of surgery, and after wide exposure of the tumor mass. The sciatic nerve was considered unsalvageable when there was direct and gross tumor involvement with no plane of dissection between the tumor mass and the nerve.

These patients included 10 females and five males, ranging in age from 2 to 73 (median, 57 years). Diagnoses included 11 high-grade soft tissue sarcomas (four of which originated from the sciatic nerve), three metastatic bone tumors, and one primary bone sarcoma. Ten lesions were lo-

cated in the posterior thigh, four in the pelvis, and one in the buttock. Patients with metastatic bone disease had surgery because of a locally advanced and symptomatic disease associated with a slow progression of their metastases elsewhere. Table 1 shows the histologic diagnoses and Figure 1 shows the anatomic location of the lesions along the sciatic nerve.

After surgery, the lower extremity was immobilized in a posterior splint for 3 to 4 weeks, or until soft tissue healing was established. During that time, rehabilitation emphasized straight leg raising exercises. Passive and active extension and passive flexion of the knee were gradually introduced. All patients required a short-leg brace because of the peroneal nerve palsy and padded shoes to prevent pressure sores.

Followup ranged from 14 to 102 months (mean, 34 months). For the first 2 years after surgery, patients were evaluated every 3 months. On each visit, physical examination, MRI scans of the affected extremity, and CT scans of the chest were obtained. Patients were evaluated semiannually for an additional 3 years and annually thereafter. An orthopaedic oncologist analyzed the clinical records, imaging studies, operative reports, and histopathologic diagnoses. Functional evaluation was done according to the American Musculoskeletal Tumor Soci-

TABLE 1. Histologic Diagnoses and Anatomic Location of 15 Tumors Treated With En Bloc Resection of the Sciatic Nerve

Patient Number	Gender	Age (years)	Histopathologic Diagnosis		Anatomic Site	
1	F	17	Soft tissue sarcomas	Primary nerve	Neurofibrosarcoma	Thigh
2	F	65		sarcomas	Neurofibrosarcoma	Thigh
3	F	57		Neurofibrosarcoma	Thigh	
4	F	61		Malignant peripheral nerve sheath tumor	Thigh	
5	M	73	Other primary soft tissue sarcomas	Malignant fibrous histiocytoma	Thigh	
6	F	58		Malignant fibrous histiocytoma	Buttock	
7	M	60		Malignant fibrous histiocytoma	Thigh	
8	F	70		Fibrosarcoma	Thigh	
9	M	2		Fibrosarcoma	Pelvis	
10	F	40		Synovial sarcoma	Thigh	
11	M	50		Liposarcoma	Thigh	
12	F	68	Metastatic bone lesions	Hypernephroma	Pelvis	
13	F	40		Adenocarcinoma of breast	Pelvis	
14	F	45		Thyroid carcinoma	Pelvis	
15	M	23	Primary bone sarcoma	Ewing's sarcoma	Thigh	

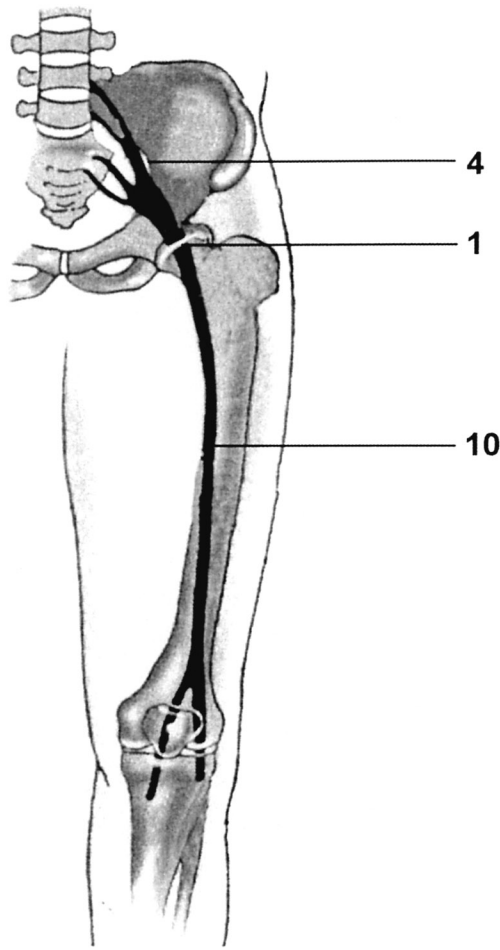


Fig 1. The anatomic locations of the 15 tumors along the sciatic nerve are shown.

ety System.³ This system assigns numerical values for each of six categories: pain, function, and emotional acceptance, use of supports, walking, and gait. The results presented here are based on each patient's most recent followup.

RESULTS

At the most recent followup, 14 patients were ambulatory; the remaining patient was wheelchair bound. Of the ambulatory patients, seven patients required a walking aid (crutches or a cane). Functional outcome was determined as good in 11 patients, moderate in three, and poor in one patient. Table 2 shows the functional outcome in relation to the anatomic level of sciatic nerve resection. Although all patients had an anesthetic ipsilateral foot, none had phantom limb pain, causalgia, or pressure sore. None of the patients required a secondary amputation.

DISCUSSION

The decision to do en bloc resection of the sciatic nerve in a patient having surgery for removal of a malignant tumor of the pelvis, buttock, or the posterior thigh results in a major motor and sensory loss. Therefore, every endeavor should be made to preserve the nerve. The nerve sheath initially provides a barrier to tumor extension; however, locally aggressive tumors that remain undiagnosed for a long time may violate the nerve sheath and penetrate the nerve.⁴ Although findings of the physical examination and results of imaging studies provide an estimation of the degree of nerve involvement, the final decision is made in surgery—if the tumor can be dissected from the nerve sheath, even when positive microscopic margins exist, the nerve is preserved and patients are treated with adjuvant radiation therapy. The nerve is resected only in cases where the nerve is grossly invaded by

TABLE 2. Functional Outcome of 15 Patients Who Had Sciatic Nerve Resection

Level of Sciatic Nerve Resection	Functional Outcome ³		
	Good	Moderate	Poor
Pelvis	2	1	1
Buttock	—	1	—
Thigh	9	1	—
Total	11	3	1

the tumor mass and no plane of dissection can be developed.

The results in this series of 15 patients show that limb-sparing resection of the sciatic nerve is associated with a good functional outcome in most patients who have this procedure. The current series is too small and variable to permit a valid statistical analysis of any subgroup of patients who had sciatic nerve resection. However, it seems that patients who had resection of the nerve at a lower anatomic level had better functional outcomes than did patients whose resections involved a higher level. A possible explanation is that the innervation to the semimembranosus, semitendinosus, and long head of the biceps femoris is preserved in lower-level resections.

The followup in some patients in this series was short. One can speculate that a longer followup might show a significant number of patients with pressure sores that eventually will require an amputation. However, because of the short-term benefit of a functional lower ex-

tremity and because an amputation always can be done if indicated, the necessity to resect the sciatic nerve with a tumor is not an indication for an amputation.

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