DOES LAMINECTOMY FOR DORSAL NEOPLASMS CREATE INSTABILITY

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ABSTRACT:

Laminectomy is a widely used approach to the dorsal spinal tumors. However, there are objections to performing without a stabilizing procedure. We reviewed our patients who had been undergone a laminectomy procedure for dorsal spinal tumors during the last ten years. Except one, we did not need any stabilizing technique in thirtyone cases. Postoperatively, no instability was observed on radiological examinations. So instability should not be considered as a disadvantage for laminectomy performed in normal limits.

INTRODUCTION :

Before 1980, surgical management of thoracal spine consisted of laminectomy. But later other procedures have been used increasingly (11). Stability is very significant in the operative treatment of the dorsal spinal tumors. Recently, laminectomy is suggested for tumors sited posteriorly and laminectomy plus resection of the lateral mass is recommended for tumors placed laterally. Costotransversectomy or anterior approach are used for anterior neoplasms (1). There is no consensus on whether laminectomy creates instability and needs a stabilization procedure in management of dorsal spinal tumors, or not. The maximum rate of instability reported for laminectomy is less than 9%. So we reviewed our 31 patients who undergone laminectomy by means of stability.

PATIENTS AND METHODS :

In the last ten years 35 patients had surgery related with tumors located dorsal spine. There is no difference between the sexes except the meningiomas. All of the five cases with meningioma were female. 18 of 35 cases were male.

Most of the epidural metastasis were seen in the sixth and seventh decades, on the other hand intradural extramedullary tumors were seen between third and fifth decades.

When the patients were admitted to our clinic, thirty-three had paraparesis, thirty had sensory deficits and seventeen had sphincter disorders. Lower extremity neurological function was graded according to a scale published by Cooper and Epstein in 1985 (Table 1).

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Table 1.

GRADE	Neurological function
0	Intact
1	Walks independently but not normally
2	Walks with cane or walker
3	Stands but is not ambulatory
4	Slight movement but can't walk or stand
5	No movement

In addition to plain and dynamic x-rays, computerized tomography (CT) in thirteen, magnetic resonance imaging in eleven, myelography in seventeen, myelo CT in eight and sintigraphy in five cases were employed for the diagnosis. Majority of the tumors were located extradurally (20 of 35) and half of these were metastatic lesions (Table 2).

In 31 cases, laminectomy was used as a route for approaching the tumors. The extent of resection of the posterior elements varied according to the size of the tumors (Figure 2).

Only one patient needed a posterior spinal instrument because of an extensive laminectomy. Two cases were treated via anterior approach. Because the anterior two columns were destructed by the tumors and after resection plus fusion with bone and methyl methacrylate, posterior instrument employed. In the thirth patient, posterolateral approach were used for resecting the tumors. Only biopsy was taken via paramedian incision in the last patient.

Reoperation was performed in 4 cases. One of them had rapid growing of another metastatic lesion located in the cervicothoracic region. Another one had

Table 2

LOCALIZATION	PATHOLOGY	CASES	TOTAL
Extradural	Metastasis	10	
	Hemangioma	2	
	Neurilemoma	1	
	Osteosarcoma	1	
	Giant-cell tumor	2	
	Plasmasitoma	1	20
	Meningioma	1	
	Osteoblastic benign tumor	1	
	Non-Hodgkin lymphoma	1	
Intradural extramedullary	Meningioma	4	
	Neurilemoma	3	
	Hemangioma	1	
	Arachnoid cyst	1	9
Intradural intramedullary	Ependymoma	1	
	Hemangioblast.	1	
	Astrocytoma	1	
	Dermoid tumor	1	
	Epidermal cyst	1	
	Round-cell tumor	1	6
TOTAL			35

an enlargement of a subtotally removed epidermal cyst. Rest two had an unidentified prior histopathological diagnosis, and operated for enlargement of the epidural tumor mass. The second biopsies reported as non-hodgkin lymphoma and benign osteoblastic tumor.

The histopathological examinations of the tumors revealed that metastasis in 9 cases, meningioma in 5 cases and neurilemmoma in 4 cases constituted the most frequently treated lesions. In one patient meningioma, in another nerilemmoma was located extradurally.

After laminectomy procedures 16 cases improved, 6 cases deteriorated and 9 cases remained the same. One case, operated via anterior approach did better, rest remained the same. Comparision of the preoperative and postoperative neurological function of the patients are shown on figure 1.

Postoperatively 8 patients were given external immobilizer, and all of the patients were ambulated and rehabilitated in the early postoperative period.

Postoperative radiotherapy was given in 10 patient.

Preoperatively 3 patients were determined as having unstability because of a metastatic disease and two of them were managed by vertebral body resection + anterior fusion with bone and methylmethacrylate + posterior spinal instrument (Alıcı spinal system). In these groupe neither postoperative instability nor other concerned complications were witnessed.

Among the patients treated via laminectomy one who has a preoperatively detected instability caused by a metastatic lesion, needed to be stabilized by posterior spinal instrument (Alıcı spinal system). Only one pa-

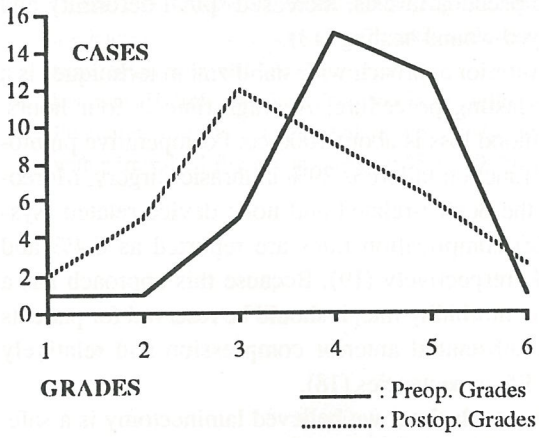

Figure 1.

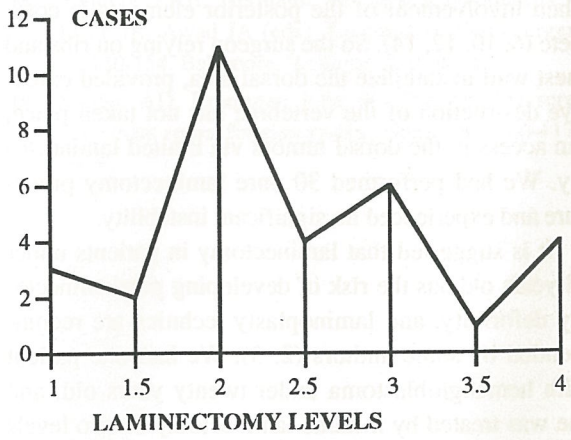

Figure 2.

tient who had a reoperation with two levels laminectomy had shown a minimal increase in her preexisting kyphosis but no instability was determined with dynamic x-ray.

Fortunately, we did not observed any septic complication after laminectomy procedures.

DISCUSSION :

Most intradural tumors are approached through a posterior laminectomy. This approach is relatively safe and accurate for removing tumors located in the posterior three-fourths of the spinal canal. Because the posterior approach requires minimal bone removal and surgical time, it has a lower morbidity and mortality, and is recommended for most patients (4). We have no death in the first month of the postoperative period.

The postoperative instability is the most frequently claimed disadvantage of the laminectomy procedure without posterior fusion plus instrumentation especially for the tumors affecting the vertebral body. The highest rate for postlaminectomy instability was reported 9%. Currently, no consensus exist on defining major vertebral bone distraction of metastatic spinal instability. Surgical stabilization has been recommended when vertebral body collapse is greater than 50%, when there is a metastatic involvement of the pedicles, when involvement of 50% of the vertebral body, or when involvement of the posterior elements is complete (6, 10, 12, 14). So the surgeon relying on ribs and chest wall to stabilize the dorsal area, provided extensive destruction of the vertebrae has not taken place, can access to the dorsal tumors via limited laminectomy. We had performed 30 pure laminectomy procedure and experienced no significant instability.

It is suggested that laminectomy in patients under 18 years old has the risk of developing postlaminectomy deformity, and laminoplasty technics are recommended by some authors (2, 3). We had one patient with hemangioblastoma under twenty years old, and she was treated by midline laminectomy of two levels and had no kyphosis deformity during her follow-up.

The average neurological improvement rate for anterior approaches is about 72% versus 40% in posterior approaches (16). In our two anteriorly approached cases, one of them did better. Sixteen of the 31 patients operated through a laminectomy procedure did better, while six worsened. Patients having a lower extremity neurological function scores better than grade IV and III (six patients) improved postoperatively. But patient with higher grades seemed worsening after treatment. This may be due to the trauma, created by the manipulation of the instruments used for laminectomy, to injured and compressed cord in the narrowed spinal canal. Postalinectomy trauma was reported as 20%, (17) and fine instruments and sometimes microsurgical technics should be employed to avoid this complication.

It is stated that laminectomy is unsuccesful in controlling pain because of the created instability. We failed in controlling intractable pain surgically in only one case with metastasis, and implanted morphine pump.

We did not have any septic complication after all procedures. Postlaminectomy infection rate ranges between 0.5% and 1%. But this rate increases to 7% after fusions with polymethylmethacrylate and spinal instrumentations (7). Especially, the peroperative seedings on death spaces is the reason for early infections. Results of skin breakdown over prominent hardware with subsequent percutaneous seeding of the implant, and hematogenous seeding on foreign body reaction tissues are blamed on late infections after massive instrumentations and polymethylmethacrylate fusions. Also the removal of the instruments for treatment predisposes to pseudoarthrosis, increased spinal deformity and delayed wound healing (13).

Anterior approach with stabilization techniques is a long lasting procedure. Average time is four hours, and blood loss is about 1000 cc. Postoperative pulmonary function failure is 39% in thrasic surgery. Moreover, the device-related and none device-related (systemic) complication rates are reported as 8.4% and 6.4%, respectively (19). Because this approach has a higher morbidity rate, it should be reserved for patients with substantial anterior compression and relatively long life expectancies (18).

In conclusion, we believed laminectomy is a safe, short and easy procedure for either decompression or removal of tumors located in the dorsal spine. If the facet joints are preserved and resected levels do not exceed three laminae, limited midline laminectomy procedure do not lead to instability as described elsewhere. We do not suggest routinely instrumentation for possible instability after laminectomy. Patients

having laminectomy exceeding three levels are given external mobilizer for 2-3 months during ambulations. But if instability or an increased deformity occurs reduction and stabilization should be attempted.

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