Editorial

Metastatic spinal cord tumors

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In this issue Chaichana et al.1 offer a 10,000-foot overview of a large population of 114 patients with cancer who have been co-managed by experienced neurosurgeons for metastases to the spinal epidural space, front, back, and sideways resulting in epidural thecal sac/neural compression. All were treated aggressively with decompressive surgery, typically (in 86% of cases) followed by internal fixation and attempted fusion. The authors’ conclusion is that this retrospective review, with ambulatory status and survival as the outcome measures, provides insight into risk stratification for patients with neoplastic processes metastatic to the spinal epidural space. Indeed it appears to offer some insight. The majority of patients who were able to ambulate preoperatively (81 of 88 patients) retained that ability. Seven (27%) of the patients who were not able to ambulate before surgical treatment regained and had kept that function at last follow-up. Patients with metastatic breast cancer, kidney cancer, or melanoma had lengthy mean survivals following neurological spinal surgery compared with similar patients with lung, breast, prostate, or gastrointestinal cancers.

Unfortunately, the median duration of survival for the entire group was only 7.0 months, with only 50% of patients surviving 6 months after major spinal operative procedures—and these numbers include the lengthy average survival (40.9 months) of 12 patients with malignant melanoma. As we well know, even these selected patients (the selection criteria for this review eliminated the most compromised, sickest of patients the authors have managed) are significantly systemically ill, typically poorly nourished, have limited physiological reserve, are remarkably fragile, and are clinically depressed. These patients and their bodies are being parasitized by a systemic neoplastic disease that will dramatically shorten their remaining lives and will kill them (as they know it).

In general, I agree with the authors that “prolonged functional independence is more important than prolonged survival with functional impairment.” Further, the authors conclude that “surgery may maximize these patients’ quality of life despite their reduced survival.” Indeed it “may,” but most often (although not always) in carefully selected patients. Perhaps as a result of this review, the best candidates for surgical intervention are those who are comparatively robust, younger patients with breast or kidney cancer or melanoma metastatic to the spinal epidural space?

Before those of us who care for these patients and have read this manuscript become more aggressive in our approach to patients with metastatic epidural spinal disease, several important points are worthy of discussion. In spite of good work and heroic efforts on behalf of a large number of terribly ill, symptomatic patients with impending and potentially permanent neurological loss, the authors have few patients with prolonged survival and prolonged functional independence as measured by ambulation. They have performed a variety of operative procedures appropriate for each patient’s spinal level and location of the neoplastic spinal involvement. Dorsal decompression alone is a major operation (even for benign disease) and is reasonably well tolerated even among the most systemically ill patients. When we add internal fixation and attempted fusion to spinal cord decompression (these patients rarely achieve fusion—due to their disease, adjuvant treatments at the surgical/fusion site, or short survival), we have added substantially to the surgical burden and recovery of these patients. Anterolateral thoracic and proximal lumbar procedures for tumor resection/decompression with stabilization, especially front-back procedures (35% in this series) become a major assault for frail patients with limited physical and physiological reserves. These are big procedures in patients with benign disease, but are of far greater magnitude and physiological consequence for those dying of cancer metastatic to their spinal columns.

These patients are miserable. As outcome measures, survival status and ability to ambulate do not measure “misery”—or improvement in or worsening of misery in these unfortunate dying individuals. In my opinion and experience (with hundreds of similar patients and my own family members), only long survival with long functional recovery without complications or additional misery (perhaps like the authors’ breast cancer, kidney cancer, and melanoma patients, and a few others in the other cancer groups) is a reasonable tradeoff to an earlier, perhaps more noble death without all of the machinations (hospitalization, struggles in the ICU and wards, pain, drains, tubes, potential hospital readmissions, rehabilitation, and follow-up) and unrealized hopeful expectations of major spinal reconstructive surgery.

From my perspective, and without criticism of the conscientious, complex, compassionate, multimodal care provided by and reported by the authors, median survivals of 4.3 months (lung cancer), 3.8 months (prostate cancer) and 5.1 months (gastrointestinal cancer) mean that more than half of 27 patients with lung cancer, 20 patients with prostate cancer, and 13 patients with gastrointestinal can-
cer (plus some in the other cancer subgroups) might have been offered dignified and compassionate palliative care and perhaps should not have been operated upon. Mine may be a controversial view in this age of super medicine and super surgery. It is a position I have gained with time and experience, both personal and professional. Certainly all who do this work can cite handfuls of patients with systemic disease whom we have influenced very favorably with spinal decompression, reconstruction, and fusion. There are also those whom we treat similarly—and we are stunned by their short survivals (the patients and families are too). How about those we treat who regain the ability to walk, live longer than otherwise suspected, and are terminally miserable? I will never forget a fellow I treated 10 years ago for metastatic esophageal carcinoma to the upper thoracic spine/cord. He had been receiving adjuvant therapy when he fell and became paraparetic (severe) due to a T-7 pathologic fracture with spinal cord compression. I performed a right anterolateral resection and strut reconstruction with a whole tibial shaft and low-profile anterolateral internal fixation, T6–8. The oncological surgeons resected his esophagus and brought his stomach up into his right chest to recreate continuity of his alimentary tract. For 6 months this fellow looked like the picture of health. He bounced back after this complex combination of surgical procedures as if he were made of rubber. From my perspective, he could ambulate after surgery without assistance, had manageable pain but far less than preoperatively, required no rehabilitative therapy, and was out of the hospital in a week and back at work running a large company within 3 weeks. We fixed his spinal cord dysfunction and his radiographic images and, indeed, he was doing well clinically and radiographically. A little over 6 months postoperatively he started to have digestive dysfunction and deep chest pain. Ultimately his stomach wall adjacent to the spinal column suffered necrosis. His surgeons tried to repair it but could not. With endoscopy we could look directly through his gastric cavity wall at his anterolateral internal fixation hardware! He received a feeding tube and required a chest drainage tube. He was in and out of the hospital every third week and required skilled nursing assistance at home. This man failed and dissolved before our eyes, yet ambulated until he died 20 months postoperatively after a miserable, miserable final 13 months. This man, whom I was quite close to and saw regularly, expressed to me that he wanted to die about 10 months postoperatively. We couldn’t fix him, and despite our best efforts, we couldn’t relieve his progressive misery. Were he part of the authors’ series reported in this issue, he would be considered a good result—not by the authors (they would have agonized over him like I did), but by the outcome measures of their review of ambulation and survival (20 months).

OK, what should we do? To whom should we offer surgery. Whom should we counsel and advise not to have surgery? Clearly, as the authors have experienced and reported, many patients with these horrible diseases benefit from our surgery and do enjoy prolonged, meaningful survivals as well as maintaining their ambulation skills. For many of these patients, we importantly minimize or eliminate—at least for a valuable time—a great deal of their misery and add to the quality and length of their remaining lives.

To my thinking, the duration of the metastatic compression, the length/extent of the mass, the portion of the spinal cord involved, the presence of a compression fracture with pain, and acute structural instability are all key features. Certain cancers (breast) may be more prone to cause acute cervical pathologic fracture collapse with relatively focal (1- or 2-segment involvement) cord compression. These patients tend to present earlier than those without loss of structural integrity of the spinal column—that is, those with more indolent thoracic lesions that may spread over multiple segmental levels in the vertebral bodies and epidural space without causing early loss of stability. Cervical cord compression (and surgery to eliminate it and reconstruct the spine) is typically much better tolerated than upper- to mid-thoracic lesions due to the regional blood supply/vulnerability issues of the human spinal cord. Patients with cancers that involve multiple levels and many small or even micro foci in addition to the primary lesion causing epidural compression (prostate cancer, multiple myeloma) will typically do less well, and have higher rates of failure and recurrence after attempted resection/reconstruction than those with a single gross metastatic lesion (kidney cancer, malignant melanoma).

The care of every patient must be individualized based on general health, total tumor burden, virulence/susceptibility of the tumor itself, neurological status (and duration of that compromised state), the extent and location of the tumor, the presence of structural instability versus cord compression alone, their medical comorbidities, their nutritional status, their projected length of survival without our intervention (paraplegic or not), and the magnitude of the procedure(s) required to provide palliative treatment to the epidural metastasis we are being asked to advise upon. We as expert clinician surgeons can fix radiographic findings pretty reliably but cannot as often positively affect patient outcome in meaningful, measurable and durable ways. We must approach patients as one clinician among a team of providers. The decision to offer surgery should be one of a consensus. We must engage these patients personally and we must be realistic about what we can accomplish with surgery, and how that may translate to patient benefit. To paraphrase William Osler, we should not only recall and recount to patients our best results with these disorders and procedures, we should always be mindful of our worst results (the latter we must always remember and learn from). We perhaps should not offer false high expectations about “prolonged survival and functional independence” when we know most patients (half or more) will not likely live beyond 4 to 6 months post-procedure depending on their cancer type. Finally, I believe that as surgeons we must manage each patient as if they were a member of our family: Is this what I would recommend to either my mother or my father were they in a similar situation?...or should we just let them go home and live their final days with a different kind of peace?

In this paper I read about a large number of patients treated aggressively with surgery for incurable diseases,
most of whom did not live long afterward, some of whom maintained ambulation skills, some who regained the ability to walk, some who did not, and some who lost that ability despite best efforts…but at what value, what price in that same big picture from 10,000 feet?

Reference


Response

We agree that the management of patients with metastatic epidural spinal cord compression is challenging. The difficulty is largely attributable to their widely variable presentations, with many different symptoms, comorbidities, adjuvant therapies, and tumor histologies. Some patients are otherwise healthy, while others, as Dr. Hadley pointed out, have severe systemic illness with limited physiological reserves. Consequently, a standardized management plan can hardly encompass these diverse patients.

In recent years, an increasing number of studies has supported surgical decompression for patients with metastatic cord compression.1–3 Chief among these is the trial of Patchell et al.,3 in which patients were randomly assigned to receive combined surgery and radiotherapy or radiotherapy alone. In this study, the surgically treated group had significantly more patients who were able to walk, and retained the ability to walk for a longer duration than the group receiving only radiotherapy.2 This study has guided current management for patients with metastatic disease in order to maximize preservation of ambulatory function. However, it is unclear which patients are better surgical candidates. Previous studies have grouped patients with metastatic disease of different histological types all into the same study population. Patients with different primary tumors likely have different survival rates and outcomes, but these differences remain largely unknown. The main goal of our retrospective study was to analyze and compare the outcomes for patients with metastatic disease of different histological types (lung, breast, prostate, kidney, and GI cancers and melanoma) in order to guide future prospective studies and ultimately develop targeted surgical management of different primary cancers.

Our study shows that an overwhelming majority of patients retained their ability to walk following surgical decompression. In some cases, the ability to walk was regained for those who were unable to ambulate prior to surgery. Patients with breast or kidney cancer and some patients with melanoma had prolonged survival, with median duration of survival of more than 18 months. Patients with lung, prostate, and GI primary cancers, however, had median survival times of less than 6 months. This knowledge may provide insight into which patients may better benefit from aggressive decompression and instrumented fixation, and which patients may benefit from more conservative therapy. It should be noted, however, that ambulation can be preserved in the overwhelming majority of patients. This ability for surgery to prolong ambulation, however, should be taken in context with other factors, including survival and health status.

We conducted this retrospective study in order to clarify these possible prognostic indicators. Although this was not a controlled trial, it may still shed light on surgical outcomes in this challenging group of patients and improve their future care. We agree that in spite of these findings, patients should always be approached as individuals, with individual prognoses, attitudes, and expectations. Like Dr. Hadley, we often struggle to find the best treatment for a given patient. We empathize with the patient he describes, who lived longer due to aggressive surgery, but continued to suffer. It remains extremely difficult to counsel patients who are dying of systemic disease and facing paralysis. Even individuals without such a progressively debilitating condition (like many of our current readers) would understand the hope for an intervention that could preserve ambulation, despite a lack of survival benefit. This has been our experience with many patients facing these circumstances, and provides the driving force for our continued work in this field. (DOI: 10.3171/2009.2.SPINE0981)

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