ORIGINAL PROF-496

AN APRAISAL OF THE TOKUHASHI SCORING SYSTEM IN MALIGNANT SPINAL CORD COMPRESSION

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INTRODUCTION

The frequency with which spinal metastasis present to spinal surgeons is increasing. A logical approach needs to be taken both in justifying surgery for the individual, and in deciding on which operation to be carried out.

The vertebral body typically is affected first in malignant disease, although the initial radiographic finding often will be the destruction of the pedicle. This is because 30-50% of the vertebral body must be destroyed before any changes can be recognized radiologically. In contrast minimal lysis of pedicular bone can be appreciated because the cortex of the pedicle tends to be involved early. It has been demonstrated that more than 70% of patients (Harrington)[3] who die from cancer have evidence of vertebral metastases that are visible on careful postmortem examination.

According to Harring[3]ton 75% of vertebral metastasis originate from breast, prostate, renal and thyroid tumors. Neurological compromise as a sign of spinal canal involvement suggests advanced stage of metastatic disease. As many as 5% of patients with systemic cancer will develop spinal cord compression.

Maclean and Weinstein[5], and Gleason's group have taken the view that secondaries occurring in different parts of the vertebral body should be treated with different operations. Loblaw[4] recently reviewed the literature in a structured and systematic fashion. He used the Canadian task force method of assessment of medical evidence, and not surprisingly found that there was little grade 1 evidence; that is from prospective randomized trails. Evidence about surgical treatment was usually retrospective and involved small numbers. However he made a case for surgical treatment where there was no previous cancer known, where the area had been previously maximally

irradiated, when clinical deterioration occurred during irradiation, and where there was instability or bony compression.

With recent advances in oncological management, patients are surviving longer, and the frequency with which spinal metastasis present to the spinal surgeon is increasing. For the surgeon involved in treating individual patients, it may be less than easy to decide which strategy to adopt. The available options include steroids; surgery; surgery or radiotherapy and radiotherapy alone.

Until recently, aggressive surgery for spinal metastasis has been advocated. However, the published results have fallen short of expectations. Tokuhashi has proposed using a preoperative prognostic score to determine which patients should be treated with excisional surgery, and which would be more suitable for palliation. He based this scoring system on 64 patients who had undergone surgery; evaluating their data retrospectively. The Tokuhashi score consists of six parameters, each rated between 0 and 2 (with zero signifying the worst prognosis),that are used to measure the severity of disorder (table 1)

Table 1: Tokuhashi's parameters

	Score
General condition (performance status)	
Poor	0
Moderate	1
Good	2
Number of extraspinal bone metastasis	
$\geq$3	0
1-2	1
0	2
Number of metastasis in the vertebral body	
$\geq$3	0
1-2	1
0	2
Metastasis to major internal organs	
unremovable	0
removable	1
no metastasis	2
Primary site of cancer	
lung, stomach	0
kidney, liver, uterus, other, unidentified	1
thyroid, prostate, rectum, breast	2
Spinal cord palsy	
Complete	0
incomplete	1
none	2

Tokuhashi proposed that surgery to excise the metastasis should be performed when the score is nine or more. Palliative surgery should be performed when the score is five or less. Consideration must be given to patient's potential survival.

Our study was designed to establish whether published criteria associated with good prognosis following surgery accurately predicts prognosis in patients who presented with malignant cord compression but who had not been selected for surgery.

PATIENTS AND METHODS

The Scottish Cord Compression Audit was funded by the Scottish office to record referral, diagnosis, management quality of life in patients with MSCC. 322 patients entered the study between 1998 and March 1999. Data was independently and prospectively collected on all patients who had malignant cord or cauda equina compression in three major Scottish centres (Edinburgh, Glasgow and Aberdeen)

This data was interrogated for the six parameters of Tokuhashi;

* General condition
* Number of extraspinal bone metastasis
* Number of metastasis in the vertebral body
* Metastasis to major internal organs
* Primary site of cancer
* Spinal cord involvement

The statistical analysis was carried out using Prism's Graphpad software. The survival analyses were using kaplan-Meier survival curves.

RESULTS

The male:female ratio was 2:1. In our series the three most common primary pathologies were lung (20.7%),prostate (19.3%) and breast (17%). (Table 2)

Table 2Primary pathologies

Histology	No of patients
Lung	58
Prostate	55
Breast	49
Kidney	19
Bone	17
Unknown	15
Myeloma	8
NHL	8
Oesophagus	8
Rectum	8
Bowel	6
Melanoma	3

The most common treatment other than steroids (93.7%) was radiotherapy (85.8%).About a quarter were referred for surgical opinion, but only 19 patients (6.8%) actually had surgery. 70.8% of the metastasis were thoracic, with 22.2% in the lumber region.

The main presenting feature was pain. 93.3% of patients with malignant spinal cord compression (MSCC) described back or neck pain, 81.8% described root pain.

Bladder problems were encountered in 58.3% of patients.

The individual characteristics of the patients in the three main pathologies is shown in table 3.

Table 3 Individual characteristics of the patients

	Lung	Prostate	Breast
Age	66	71	63
Sex M/F	1.9:1	Male	Female
%Receiving Radiotherapy	91.2	89.1	87.2
%Receiving chemotherapy	5.3	0	8.3
Average Tokuhashi score	4.5	6	5.7

Survival analysis for individual pathology

When we looked at the effect of histology on survival, grouping lung and a few patients with stomach cancer together (as the Tokuhashi scoring demands) we found this to be associated with significantly longer survival than the other types of primary lumped together (P=0.2% level).

If we concentrate on the main three groups only i.e., Lung, Breast and Prostate, and look at their survivals, then the difference becomes more obvious (p=0.06%) This is shown as a survival curve in figure 1.

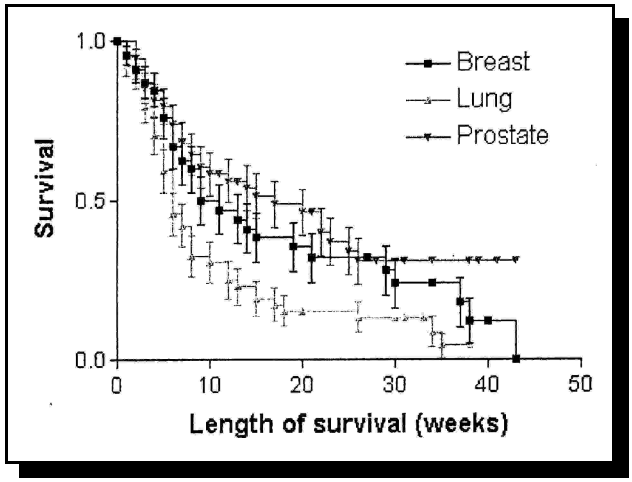

Figure 1 : Survival curve for three main pathologies

Survival analysis for age

The influence of age on survival is shown in figure 2. Although this suggests that younger patients have a prolonged survival, this was not shown to be statistically significant.(p=0.1532)

This is possible because of the group of women with breast cancer, where the trend may be reversed.

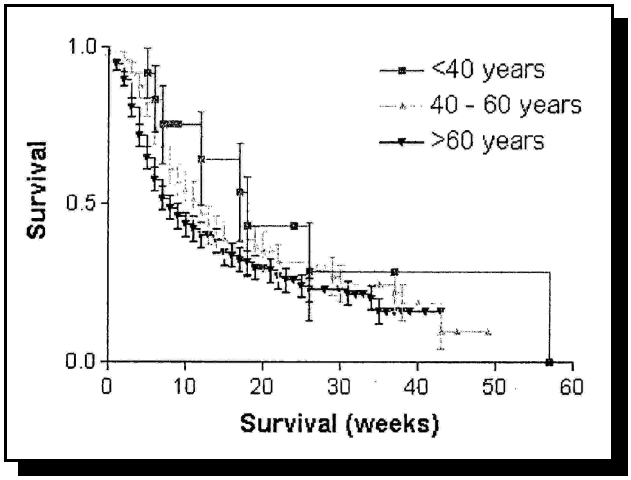

Figure 2: Survival curve for three main pathologies

DISCUSSION

The primary site was most commonly lung (20.7%), prostate (19.3%) and breast (17%) with a wide variety of others. The most common treatment other than steroids was radiotherapy (86%). About a quarter were referred for surgical treatment, but few (7%) underwent operation.

The Tokuhashi scores were reasonably spread except for the upper range; this probably represents the fact that this population is not selected for surgery, although somewhat selected in that patients were in a tertiary referral center. Roughly half the patients were in the group not expected to survive more than three months, and half in the somewhat better group.

A Tokuhashi score of 6 or more was associated with

longer survival, but was statistically significant at P=3% only.

Increasing age may be associated with longer survival, but this is not significant.

The Tokuhashi score does help predict better and worse outcome groups, based on a score of 6 or more versus less than 6. However the more powerful prediction comes from knowing what the underlying primary is.

Lung cancer has a particularly poor prognosis, so spinal surgery needs to be used particularly cautiously if at all.

Tokuhashi when describing his scoring system in 1990 admitted that it was 'tentative.' We feel that the weighting for histology needs to be changed to account for the particularly poor prognosis of patients with lung cancer.

REFERENCES:

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The past is only dead thing

that smells sweet

Walter Scot