Decompressive surgery for malignant spinal cord compression (MSCC) in the era of effective systemic therapies: impact on overall survival and functional outcome

Sabrina CT Wong[1], Barry KY Chan[1], Tai Chung Lam[2], Kenny YH Kwan[3]

[1] Faculty of Medicine, The University of Hong Kong, Hong Kong
[2] Department of Clinical Oncology, Queen Mary Hospital, Hong Kong
[3] Department of Orthopaedics & Traumatology, Queen Mary Hospital, Hong Kong

Introduction & objectives

The only randomized controlled trial by Patchell et al. (2005) showed that decompressive surgery followed by radiotherapy (RT) for malignant spinal cord compression (MSCC) was superior to RT alone in ambulatory function. In the past decade novel systemic anticancer treatments have achieved high disease response rate. This study aims to evaluate if decompressive surgery combined with highly effective systemic anti-cancer treatment is superior in overall survival (OS) for MSCC than systemic treatment alone.

Materials and methods

A consecutive cohort of 259 patients with high-grade MSCC between January 2008 and December 2018 was retrospectively identified from Queen Mary Hospital. Inclusion criteria were patients with MSCC established by magnetic resonance imaging (MRI) spine; compression of grade 2 or above according to the Epidural Spinal Cord Compression (ESCC) classification. Exclusion criteria were patients with hematological malignancy; intra-medullary or intra-mural tumour.

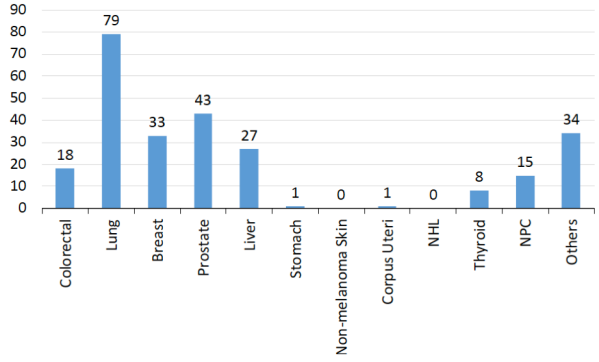
Patients were stratified into two groups according to their druggability:

1) patients with **highly effective systemic anticancer treatment options** (ER-positive breast cancer, HER2- positive breast cancer, EGFR mutation-positive lung cancer, ALK-positive lung cancer, ROS1-positive lung cancer, prostate cancer)
2) patients without druggable target.

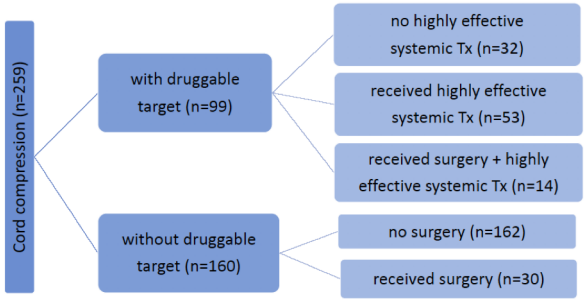
Demographic data, overall survival and patients' ambulatory status were recorded. Data was analyzed using univariate and multivariate Cox regression models to determine clinical predictors of survival. Kaplan-Meier log survival curves were plotted for variables stratified by whether patients received spinal decompressive surgery.

Results

Distribution of cancer types among the studied patients



Treatment arms among the studied patients



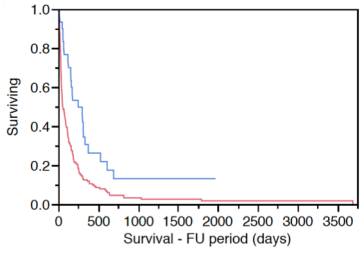
Results (continued)

Multivariate analysis for overall survival

	Risk Ratio	p-value	95% Confidence interval
Gender (Male)	0.65	p < 0.0027	0.49 – 0.86
Pre-treatment ASIA score (D-E)	1.37	p < 0.026	1.04 – 1.84
Received highly effective systemic Tx	2.48	p < 0.001	1.79 – 3.48
Received surgery	1.98	p < 0.001	1.40 – 2.89

Survival analysis (**without** druggable target)

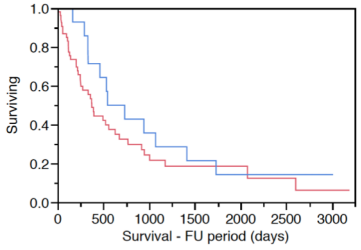
	Median time of survival (days)	5th Percentile time of survival (days)	95th Percentile time of survival (days)	1-year survival rate
No surgery	55	41	88	**13.7%**
Received surgery	246	152	332	**34.4%**



log-rank test p = **0.004**

Survival analysis (**with** druggable target)

	Median time of survival (days)	5th Percentile time of survival (days)	95th Percentile time of survival (days)	1-year survival rate
Received highly effective systemic Tx only	372	246	629	**35.5%**
Received highly effective systemic Tx + surgery	639	329	1412	**58.9%**



log-rank test p = **0.2522**

Conclusion

(1) In tumours **without** highly effective systemic anticancer treatment options: surgical decompression was associated with longer overall survival for MSCC patients in this local cohort (p = 0.004)

(2) However, in tumors **with** highly effective systemic anticancer treatment options, namely EGFR / ALK / ROS-1 targeted therapies for lung cancers, anti-HER2 therapies for breast cancer, hormonal therapies for breast and prostate cancer, **there may be less overall survival benefit in adding decompressive surgery** (p=0.2522)

(3) This highlight the importance of collaborative management of MSCC between spinal surgeons and oncologists.