



Evaluating the impact of the metastatic spinal cord compression coordinator in a regional cancer network: a prospective, non-randomized pilot study

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Background: Extradural metastatic spinal cord compression (MSCC) is a debilitating and potentially irreversible complication of cancer. Delay in treatment could lead to irreversible neurological damage, adverse quality of life and a burden on health care resources. Lack of effective communication between teams has been identified as one of the reasons for delay in treatment. The MSCC coordinator (often a nurse, radiotherapy radiographer or a doctor) is responsible for coordinating the diagnosis and management of patients with MSCC. The role has been shown to streamline service, ensure timely decision-making and improved survival outcomes. However, available data are anecdotal or from limited series presented as abstracts in conferences. In this study, we assessed the impact (time to treatment) of the newly introduced role on the treatment pathway compared to similar period in the preceding year.

Methods: This was a multi-centre, prospective, pilot study carried out in Kent, UK between 1st April to 30th June 2021. Patients were considered eligible if they had magnetic resonance imaging (MRI)-confirmed cauda equina or cord compression. The data prospectively collected include: (I) time from diagnostic imaging to radiotherapy treatment; (II) number of referrals to hospital palliative care (HPC), occupational/physiotherapy (OPH) and community hospice referrals (CHP). A comparative retrospective data for (I) was collected for the same time period in the preceding year. The study outcome assessed was reduction in time from radiological diagnosis of MSCC to receiving radiotherapy.

Results: Fifty-eight patients in 2020 and 24 patients in 2021 were included in the dataset. The MSCC coordinator role (introduced in 2021) led to reduction in the time from imaging to treatment ($P=0.045$). Compared to 2020, there was a shorter mean/median time to treatment, seeing more patients being treated within 24 hours. All hospitals except East Kent Hospitals saw more patients being treated within 24 hours. 7 referrals each made to HPC, OPH and CHP respectively.

Conclusions: Introduction of MSCC coordinator role led to improved time from imaging to radiotherapy treatment. The new service led to engagement with rehabilitative and palliative services. Future work should be done to assess the long-term impact of this role on utilization of support services and patient recovery.

Keywords: Metastatic spinal cord compression (MSCC); radiotherapy; MSCC coordinator; palliative care; quality of life

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Introduction

Background

Metastatic spinal cord compression (MSCC) is a debilitating and potentially irreversible complication of cancer and was first described in 1925 by Spiller as a cause of progressive paraplegia in cancer patients (1,2). The actual incidence of MSCC is unknown but is estimated to be between 5–10% in patients with malignancy (3,4). It can be caused by any solid tumors however, it is more common in cancers that tend to spread to the spine such as breast, prostate and lung (4).

MSCC is caused by metastatic spread to spine either by causing collapse or compression of the vertebral body but also by direct extension of tumor into the vertebral canal. Cord compression initially leads to reversible changes such as oedema, demyelination and venous congestion. If prolonged, however, leads to vascular injury which in turn causes cord necrosis and irreversible damage to spinal cord (5). Magnetic resonance imaging (MRI) is the standard of care modality for investigating MSCC. It should ideally

be performed within 24 hours of presentation as per UK National Institute for Health and Care Excellence (NICE) guidelines (4).

Various prognostic and spinal stability risk factors have been proposed to guide patient selection for surgery and treatment planning. Spinal instability neoplastic score (SINS) (6) is used to identify and assess patients for consideration for surgical intervention. Other scoring systems such as the Tokuhashi score (7) can be used to predict prognosis following MSCC. The goal of treatment in MSCC is multifaceted. It includes pain relief, management of spinal instability, eradication of tumour, reduction of mid-long term neurological deficit, preservation of function and survival benefit.

Standard treatment options for MSCC include either radiotherapy or surgery followed by radiotherapy (6). Surgery is often treatment of choice in patients with unstable spine, single level or oligometastatic disease with good performance status, and requiring tissue sample for disease characterization (8). On the other hand, radiotherapy is preferred in patients who are co-morbid, have widespread disease and due to disease burden have a limited prognosis. A recently emerging and effective treatment is radiosurgery. Under imaging guidance, radiosurgery can deliver a very high dose of radiotherapy to a very small focus with high precision however, there is low level of evidence to show the superiority of stereotactic radiosurgery over conventional fractionated radiation or decompressive surgery in patients with MSCC (9).

Rationale and knowledge gap

One of the factors which affects outcome in MSCC is presence or absence of neurological features prior to treatment (7). Delay in treatment can lead to irreversible neurological damage, subsequent adverse quality of life and burden on health care resources (10). Patients with loss of neurological function for more than 24 hours are unlikely to show improvement and hence not typically offered surgery unless spinal stabilisation is required for pain relief (4). Several studies based on patient experience highlighted the importance of effective communication between teams as one of the main reasons of delay in effective management (4).

Highlight box

Key findings

- Introduction of MSCC coordinator role led to improved time from imaging to radiotherapy treatment.

What is known and what is new?

- MSCC coordinator role has been previously shown to streamline service, ensure timely decision-making and improve survival outcomes, and is recommended by NICE UK. However, most of the available data are anecdotal or from limited series presented as abstracts in conferences.
- So far, there has been no reported study comparing the outcomes before and after the introduction of this service. This pilot study compared outcomes before and after the introduction of the MSCC coordinator role in 2020 and 2021 respectively.

What is the implication, and what should change now?

- First, our study demonstrates the impact of the MSCC coordinator role and highlights that the benefit remains the same in small centres compared to larger ones. Second, most hospitals reduced their waiting time after the introduction of the MSCC coordinator, and are more likely to meet national standards for time from imaging to MSCC treatment (≤ 24 hours).

It has been established in previous studies that incidence of MSCC referrals tend to trend towards a Friday peak (11), however, early care referrals and quicker treatment decisions could lead to a reversal in Friday peak (12,13). This was also confirmed by a large regional, multi-centre retrospective study in the UK presented at American Society of Clinical Oncology (ASCO) 2020 (13). Hospitals which had 7-day acute oncology service and radiology reporting along with a single point of referral (e.g., similar to MSCC coordinator role) had a quicker treatment turnaround and uniform referrals across the week (14). NICE recommends every secondary or tertiary care centre should have an identified lead healthcare professional for MSCC. They will be responsible for implementing the care pathway and coordinating the diagnosis and appropriate management of patients with known or suspected MSCC (4). The MSCC coordinator has been shown to streamline service, ensure timely decision-making and improved survival outcomes (15,16). Recent work from a tertiary centre and a regional cancer network in the UK recommends district general hospitals (DGHs) should consider appointing an MSCC coordinator when designing their service in line with NICE recommendations (14). So far, available evidence is anecdotal or from limited series presented as abstracts in conferences. Hence, this study set out to fill this knowledge gap.

Objective

In this pilot study, data from four DGHs in Kent, UK were analysed to assess the pattern of MSCC referrals. The aim of the study was to assess the impact of the newly introduced role of the MSCC coordinator on the MSCC diagnostic and treatment pathway. The objective of the study was to compare the time from imaging to radiotherapy before and after the introduction of the MSCC coordinator. The hypothesis of this study was that the time from imaging to radiotherapy is shorter for patients with MSCC in 2021 than in 2020. Furthermore, changes in occupational therapy, physiotherapy, hospital palliative and community palliative care referrals were assessed as these have been shown to have positive impact on maintenance and recovery of neurological function as well as symptom control (17,18). We present this article in accordance with the TREND reporting checklist (available at <https://apm.amegroups.com/article/view/10.21037/apm-22-1102/rc>).

Methods

The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The study was approved by ethics board of Quality Improvement Project (QIP) (No. 190) and individual consent for this retrospective analysis was waived.

This was a prospective, pilot study and was part of a QIP carried out between April 2020 and August 2021 in Kent, UK. This was done in line with local data governance regulations and ethical approval (QIP approval number 190). Informed consent was not sought as this study involves no more than minimal risks to subjects as described in waiver of informed consent 45CFR 46.116 (19,20). Cancer care in the Kent region is provided under the umbrella of the Kent Oncology Centre (KOC). This includes four main hospital trusts namely (I) Maidstone and Tunbridge Wells NHS Trust (MTW), (II) Dartford and Gravesham NHS Trust (DVH), (III) Medway NHS Foundation Trust (MMH), and (IV) East Kent Hospitals University NHS Foundation Trust (EKH). Data was collected from the local cancer electronic database Kent Oncology Management System (KOMS) and picture archiving and communication system (PACS).

Sample

Data were prospectively collected from 1st April to 30th June 2021. Comparative retrospective data were collected for the period between 1st April to 30th June 2020. This was to compare the impact of the various interventions introduced at the commencement of the prospective study in 2021. The data prospectively collected include: (I) time from diagnostic spine imaging to radiotherapy treatment, and (II) number of hospital palliative care (HPC), occupational/physiotherapy (OPH) and community hospice referrals (CHP). The eligibility criteria for this study are described in *Table 1*.

Study interventions

The role of MSCC coordinator was introduced into the MSCC pathway across the region on the 1st April 2021. This role was carried out by two consultant radiographers in the two radiotherapy centres in the region. One MSCC coordinator was based at Maidstone and Tunbridge Wells NHS Trust covering referrals for west Kent region while the second coordinator was based at East Kent Hospitals

Table 1 Eligibility criteria for MSCC study

Inclusion criteria
MRI-confirmed cauda equina or cord compression
Imaging done due to suspicion of cauda equina or cord compression
Incidental finding on imaging done for routine monitoring
Exclusion criteria
Impending (but not confirmed) cauda equina or cord compression
Imaging done for other indications such as bone or soft tissue metastases
MSCC, metastatic spinal cord compression; MRI, magnetic resonance imaging.

University NHS Foundation trust. The main role of the coordinators was to triage MSCC referral phone calls and emails. They ensured patient treatment was commenced as soon as a diagnosis is established by liaising with various multi-disciplinary team members required to expedite emergency radiotherapy treatment.

A number of other key interventions were introduced:

- ❖ A dedicated MSCC referral phone number and email address were set up by the information technology (IT) department at the regional hub in Maidstone Hospital.
- ❖ The local and regional referral pathways were modified to include the new contact number and email.
- ❖ Numerous virtual meetings were held between acute oncology services, palliative care team, medical and clinical oncology teams to encourage uptake and compliance.
- ❖ The new contact number was listed on the local Induction mobile phone app (21) (mainly used by junior doctors and nurses).
- ❖ The media and communications teams of the four Hospital trusts helped with publicity of the new changes in the referral pathway via their trust intranet and newsletters.

Study outcomes

The primary outcome measure was to assess whether these interventions will lead to reduced time from radiological diagnosis of MSCC to receiving radiotherapy. Secondary

outcomes included number of HPC, OPH and CHPs, where appropriate, as a result of introduction of these interventions.

Statistical analyses

Shapiro-Wilk was used to assess normality of data and unpaired *T*-test to compare referral numbers between 2020 vs. 2021. Mann-Whitney U test was used to analyse the datasets. Python package (SciPy) version 1.8.0 was used. Analyses was carried out on an individual patient level. $P \leq 0.05$ was considered significant. *P* values were reported to 2 decimal places.

Results

The descriptive statistics of the patients in each time period, as well as their times from MSCC confirmatory imaging to treatment, are summarized in *Table 2* below. The most common malignancy subtypes in the 2020 collection period are urological, whereas in the 2021 it was lung. In both periods, the majority of the radiotherapy treatments were performed with emergency intent, with the rest being palliative. There were no adverse events or unintended side effects reported during the study.

In an exploratory analysis, following the introduction of the MSCC coordinator role regionally, there was a significant reduction in the median time from imaging to treatment in the management MSCC patients ($P=0.045$). In comparison to the 2020 period [median time 2 days (95% CI: 1–4 days)], there was a shorter median time to treatment in 2021 median time 1 day (95% CI: 1–2 days), with more patients being treated within 24 hours as per NICE guidelines.

Differences within hospitals

Most hospitals reduced their waiting times following the introduction of MSCC coordinators. In terms of proportion of patients being treated within 24 hours, only East Kent Hospitals saw a reduction in how many patients were seen within the target; all other hospitals saw an increase in the same metric. However, it should be noted that many hospitals have had small sample sizes in the collection period following intervention, making this analysis less likely to be truly representative for them. East Kent only had 1 patient in the period following intervention, and so the deterioration may be due to chance. This is demonstrated in *Table 3*. Four patients in the pre-intervention phase and 7

Table 2 Descriptive statistics of patients for each time period

Variable	2020	2021	P value
Collection period (1 st April to 30 th June for both years), n			
Number of patients in dataset	58	24	
Number of patients with Imaging or treatment dates missing	18	4	0.31
Number of patients in final dataset	40	20	
Primary diagnosis, n (%)			0.39
Type of malignancy			
Urological	13 (32.5)	3 (15.0)	
Breast	4 (10.0)	4 (20.0)	
Haematological	3 (7.5)	3 (15.0)	
Lung	8 (20.0)	5 (25.0)	
Skin	1 (2.5)	0 (0.0)	
Lower GI	4 (10.0)	0 (0.0)	
Upper GI	1 (2.5)	2 (10.0)	
Other	6 (15.0)	3 (15.0)	
Treatment intent			0.47
Emergency	31 (77.5)	13 (75.0)	
Palliative	9 (22.5)	7 (25.0)	
Imaging to treatment times			
Number of patients treated in 1 day or less, n (%)	15 (37.5)	13 (65.0)	0.02
Median time to treat (days) [95% CI]	2 [1–4]	1 [1–2]	0.04
Mean time to treat (days)	3.88	2.15	
Longest time to treat (days)	23	11	
GI, gastrointestinal.			

patients in the post-intervention phase had missing data for their hospital, so were not included in this analysis.

In a further exploratory analysis, median time from imaging to treatment reduced in all hospital trusts except for DVH. DVH was also the only hospital trust where a patient in the post intervention period had to wait longer than the patient with the longest wait in the pre-collection period. The delay in treatment in this patient was due to need for repeated communication between the tertiary neurosurgical centre in London and the local hospital in Kent. Due to the complexity of this case, it had to be discussed in the weekly neuro-oncology multi-disciplinary team meeting which usually happens on a Friday. During this waiting period the patient was commenced on high dose steroids (dexamethasone) and analgesia. In comparison, all other hospital trusts reduced their maximum waiting time. This is demonstrated in *Figure 1*.

During the pilot period, there were 7 referrals each made to: (I) HPC, (II) physiotherapy and occupational health and (III) hospice palliative care teams respectively. *Figure 2* shows MRI scan of a patient treated in the new pathway with good response and with preservation of function.

Discussion

Key findings

This pilot study compared time between confirmation of MSCC on imaging to radiotherapy treatment before and after the introduction of the MSCC coordinator role in 2020 and 2021 respectively. Our analysis showed a 1-day median time between imaging and radiotherapy (mean 2.8 days, range, 0–10 days) in 2021, compared to a median time of 2 days (mean 4.1 days, range, 0–22 days), $P=0.04$ in 2020.

Table 3 Distribution of patients treated within 1 day before and after intervention

Hospital	Before intervention		Following intervention	
	Number of patients	Proportion treated within 1 day	Number of patients	Proportion treated within 1 day
DVH	4	25%	2	50%
EK	12	42%	1	0%
MMH	7	14%	2	50%
MTW	13	54%	8	87%

DVH, Dartford and Gravesham NHS Trust; EK, East Kent; MMH, Medway NHS Foundation Trust; MTW, Maidstone and Tunbridge Wells NHS Trust.

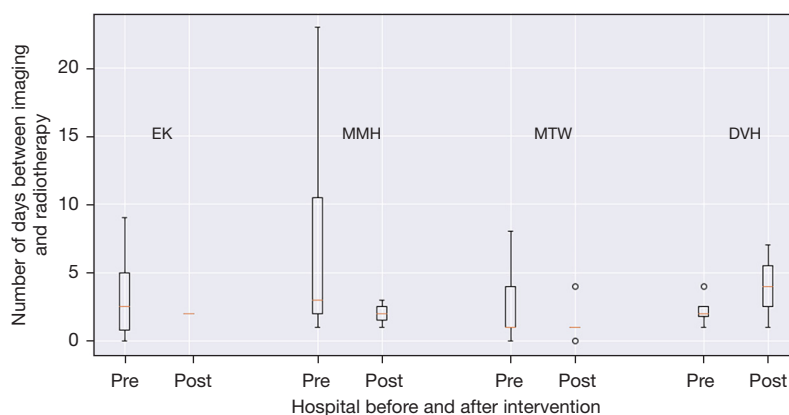


Figure 1 Time to treatment before and after MSCC coordinator intervention. MSCC, metastatic spinal cord compression; EK, East Kent; MMH, Medway NHS Foundation Trust; MTW, Maidstone and Tunbridge Wells NHS Trust; DVH, Dartford and Gravesham NHS Trust.

Three out of 4 participating hospitals reduced their waiting times following the introduction of the MSCC coordinator. The median time in days between the cohorts pre- and post-intervention were 2.5 *vs.* 2 days in EKH, 1 *vs.* 1 day in MTW, 3 *vs.* 2 days in MMH, 2 *vs.* 4 days in DVH.

Strengths and limitations

Our findings need to be interpreted in light of some inevitable methodological constraints. This prospective pilot study was conducted across a small patient cohort. Although we used the data from four hospital trusts in Kent, UK, this pilot study collected data from only limited number of patients ($n=24$) recruited in the first three months post-intervention. This could have led to less-representative results, for instance in Dartford and Gravesham NHS Trust, which had four patients in the initial period but only two in the post-intervention phase. Furthermore, the number of patients included in the 2021 ($n=20$) and 2020 ($n=40$) cohorts were different because we only included the patients referred through the MSCC coordinator pathway in order to evaluate the impact of this new role and to compare study outcomes for similar time period for both years. The time between symptom onset to confirmation of MSCC on imaging could not be evaluated. Though it might be possible to measure the time between presentation and investigations/imaging, it is more complex to determine the onset of symptoms reliably, especially in patients who were incidentally diagnosed with MSCC on interval CT scans. Another reason is due to high incidence of low back pain (one third of general population) (22), this might delay symptom awareness and subsequent

presentation by cancer patients (4,22). Furthermore, several patients with MSCC do not have symptoms at the onset of their condition, leading to delays in investigations and subsequent diagnosis.

Despite these methodological limitations, our results have important implications for clinical practice. First, our study demonstrates the impact of the MSCC coordinator role and highlights that there is no significant difference between different centres, with the benefit remaining the same in small centres compared to larger ones (15). Second, most hospitals reduced their waiting time after the introduction of the MSCC coordination, which means the centres involved in this study are more likely to meet national standards for time from imaging to MSCC treatment (≤ 24 hours) as a result of this intervention.

Comparison with similar research

The MSCC coordinator role has been previously shown to streamline service, ensure timely decision-making and improve survival outcomes, and is recommended by NICE UK (4). However, most of the available data are anecdotal or from limited series presented as abstracts in conferences. So far, there has been no reported study comparing the outcomes before and after the introduction of this service. Our study represents the first prospective data, albeit pilot study demonstrating the impact of the coordinator on MSCC pathway across a regional cancer network in the UK. The introduction of the service led to improved radiotherapy treatment times and improved engagement with critical medical support services to improve patient care and recovery.

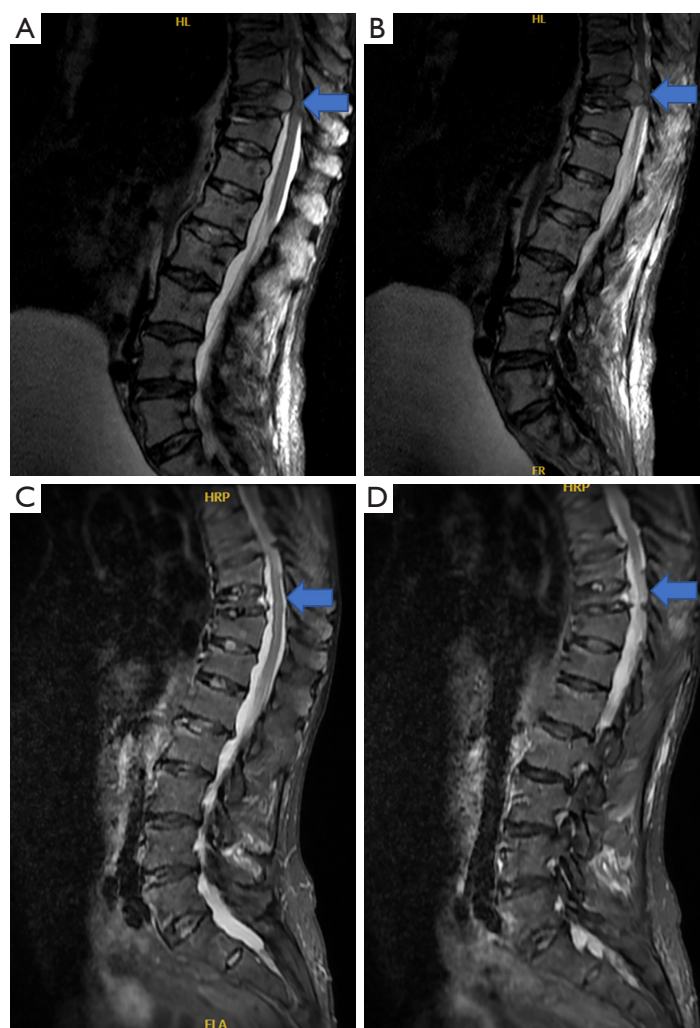


Figure 2 Patient with MSCC before and after palliative radiotherapy. Pre- (A,B) and post-treatment (C,D) MRI of a patient with multiple myeloma treated urgently as an inpatient with 8 Gy in 1# to T10 vertebra (covering T9-T11). (C,D) were taken 3 weeks later. Patient went on to have chemotherapy and stem cell transplant and now in remission. Blue arrows: site of metastatic deposit. MSCC, metastatic spinal cord compression; MRI, magnetic resonance imaging.

Explanations of findings

The longest time to treatment was substantially reduced from 23 to 11 days since the introduction of the new role. Additionally, the percentage of patients treated within 24 hours significantly increased, with a figure of 37% *vs.* 65% ($P=0.044$) after the introduction of this role, which is critical to achieving the best possible neurological and functional outcomes for patients (4). Furthermore, during the pilot period from 1st April to 30th June 2021, there were 7 referrals each made to (I) HPC, (II) physiotherapy and

occupational health and (III) hospice palliative care teams respectively.

Following treatment for MSCC, many patients are often discharged to their primary cancer care team, community palliative care, or hospice. Therefore, accessing clinical follow-up data on patients discharged to the community palliative or hospice teams was challenging. In addition, some people had moved out of area to be closer to relatives for rehabilitation or end-of-life care. Therefore, we were unable to assess survival outcomes in this study.

Implications and actions needed

Obstacles such as availability of funding, awareness of this service by new staff members during induction and training have to be resolved. This will be quite crucial for the wider adoption of the service. Furthermore, the service needs to be expanded to allow direct access referral from the community healthcare teams for patients who are diagnosed by general practitioners or community allied healthcare professionals. Adequate funding will ensure availability of cross-cover MSCC coordinator staff to support the service during annual or sick leave. This will help ensure continuity and maintain standard of care.

In future, it will be key to perform a contemporaneous comparison between 2021 subgroups that went through the MSCC coordinator versus those who did not, to further evaluate the impact of the new intervention. Further periodic data collection is required in order to assess the long-term impact of these interventions on the MSCC pathway across the region. Evaluation of the pathway for complex neurosurgical referrals to tertiary centres needs to be carried out to further reduce waiting times and expedite treatment decisions. Embedding these new changes across the region for every new generation of junior doctors and trainees is required to ensure sustained impact and improvement in quality of care across the region. Finally, the health economic impact and detailed patient-reported outcomes should be investigated and may be part of future prospective studies based on our initial findings.

Conclusions

Our study showed that the introduction of a MSCC coordinator role led to improved time from imaging to referral for radiotherapy treatment. The new service led to engagement with rehabilitative and palliative services. Future work should be done to assess the long-term impact of this role on utilization of support services and patient recovery.

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References

1. Spiller W. Rapidly progressive paralysis associated with carcinoma. *Arch Neurol Psychiatr* 1925;13:471-7.
2. Loblaw DA, Laperriere NJ, Mackillop WJ. A population-based study of malignant spinal cord compression in

- Ontario. *Clin Oncol (R Coll Radiol)* 2003;15:211-7.
3. Bach F, Larsen BH, Rohde K, et al. Metastatic spinal cord compression. Occurrence, symptoms, clinical presentations and prognosis in 398 patients with spinal cord compression. *Acta Neurochir (Wien)* 1990;107:37-43.
 4. Metastatic spinal cord compression. Available online: <https://www.nice.org.uk/guidance/cg75/evidence/cg75-metastatic-spinal-cord-compression-full-guideline-2> (Accessed 21st Dec, 2022)
 5. Robson P. Metastatic spinal cord compression: a rare but important complication of cancer. *Clin Med (Lond)* 2014;14:542-5.
 6. Fisher CG, DiPaola CP, Ryken TC, et al. A novel classification system for spinal instability in neoplastic disease: an evidence-based approach and expert consensus from the Spine Oncology Study Group. *Spine (Phila Pa 1976)* 2010;35:E1221-9.
 7. Tokuhashi Y, Matsuzaki H, Oda H, et al. A revised scoring system for preoperative evaluation of metastatic spine tumor prognosis. *Spine (Phila Pa 1976)* 2005;30:2186-91.
 8. Loblaw A, George KJ, Misra V. Surgical and Radiotherapeutic Management of Malignant Extradural Spinal Cord Compression. *Clin Oncol (R Coll Radiol)* 2020;32:745-52.
 9. Boussios S, Cooke D, Hayward C, et al. Metastatic Spinal Cord Compression: Unraveling the Diagnostic and Therapeutic Challenges. *Anticancer Res* 2018;38:4987-97.
 10. Shah S, Kutka M, Lees K, et al. Management of Metastatic Spinal Cord Compression in Secondary Care: A Practice Reflection from Medway Maritime Hospital, Kent, UK. *J Pers Med* 2021;11:110.
 11. Koiter E, Poortmans P, Cloin B. Always on a Friday: referral pattern for metastatic spinal cord compression. *Radiother Oncol* 2013;107:259-60.
 12. Kinnaid W, Adeleke S, Lin R, et al. Radiotherapy Referral Patterns for Metastatic Spinal Cord Compression. *Clin Oncol (R Coll Radiol)* 2020;32:545.
 13. Adeleke SM, Kinnaid W, Lin R, et al. 394P Reversing the trend of Friday peak for metastatic spinal cord compression referrals. *Ann Oncol* 2020;31:S408.
 14. Adeleke S, Hakim R, Dean L, et al. Reversing the Friday peak in metastatic cord compression referrals: Not as simple as previously thought? *J Clin Oncol* 2021;39:e14050.
 15. Richards L, Misra V, Verma R, et al. Metastatic Spinal Cord Compression (MSCC) – Collaborative Work between the Tertiary Cancer Centre and the Specialist Spinal Centre Since the Introduction of the MSCC Coordinator Service Has Seen a Marked Increase in Surgical Rates, with 20% of Patients Who Presented with MSCC in the First 24 Months Having Spinal Surgery. This Has Resulted in Improved Survival Rates for MSCC Patients in Greater Manchester and Cheshire. *Spine J* 2017;17:S30-1.
 16. Richards L, Misra V, Shanahan C. O-9 The development of a centralized metastatic spinal cord compression coordinator service. *BMJ Supportive & Palliative Care* 2019;9:A3-4.
 17. Eriks IE, Angenot EL, Lankhorst GJ. Epidural metastatic spinal cord compression: functional outcome and survival after inpatient rehabilitation. *Spinal Cord* 2004;42:235-9.
 18. Ruff RL, Adamson VW, Ruff SS, et al. Directed rehabilitation reduces pain and depression while increasing independence and satisfaction with life for patients with paraplegia due to epidural metastatic spinal cord compression. *J Rehabil Res Dev* 2007;44:1-10.
 19. IRB Waiver or Alteration of Informed Consent for Clinical Investigations Involving No More Than Minimal Risk to Human Subjects. Guidance for Sponsors, Investigators, and Institutional Review Boards. Available online: <https://www.fda.gov/files/about%20fda/published/IRB-Waiver-or-Alteration-of-Informed-Consent-for-Clinical-Investigations-Involving-No-More-Than-Minimal-Risk-to-Human-Subjects---Printer-Friendly.pdf> (Accessed 21st Dec 2022)
 20. 2018 Requirements (2018 Common Rule). Available online: <https://www.hhs.gov/ohrp/regulations-and-policy/regulations/45-cfr-46/revised-common-rule-regulatory-text/index.html#46.116> (Accessed 21st Dec 2022)
 21. Induction healthcare software. Available online: <https://app.induction-app.com> (Accessed on 21st Dec 2022)
 22. Low back pain and sciatica in over 16s: assessment and management. Available online: <https://www.nice.org.uk/guidance/NG59> (Accessed 21st Dec 2022)

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