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Original Article

A Royal College of Radiologists National Audit of Radiotherapy in the Treatment of Metastatic Spinal Cord Compression and Implications for the Development of Acute Oncology Services

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Abstract

Aims: To audit the current use of radiotherapy in UK cancer centres for the treatment of metastatic spinal cord compression against national standards that seek to optimise functional and quality of life outcomes.
Materials and methods: A Royal College of Radiologists prospective national audit of patients treated with radiotherapy in UK cancer centres was carried out over a 3 month period between September and December 2008, with a repeat audit carried out in August 2012.
Results: Five hundred and ninety-six cases were received from 42 cancer centres (74%) in 2008, with data from 323 cases received from 52 (90%) centres in 2012. Ninety-three per cent (358) of patients had a diagnostic magnetic resonance imaging scan carried out within 24 h of referral for radiotherapy in 2008 compared with 205 patients (97%) in 2012. One hundred and eleven (32%) good prognosis patients were discussed with spinal surgeons; only 10 good prognosis patients were recorded as proceeding to surgery in 2008. This improved in 2012, with 94 (41% of good prognosis patients recorded as having been discussed with nine proceeding to surgery). Sixty-nine per cent of paraplegic patients in 2008 received multiple fractions of radiotherapy, which was similar to 2012 when 62% received more than a single fraction. A metastatic spinal cord compression co-ordinator was available in just over 50% of cases (164/323) and was involved in patient management in 26% of cases in 2012.
Conclusion: Despite level 1 evidence of the superior functional outcome and survival benefit for surgery, few good prognosis patients were recorded as having been discussed with surgeons and even fewer proceeded to surgery.

Key words: Metastatic spinal cord compression; MSCC; radiotherapy

Introduction

Metastatic spinal cord compression (MSSC) is a debilitating and common complication of cancer, occurring in 5–14% of cancer patients [1]. Studies have consistently shown that MSCC is diagnosed late in the evolution of a compressive lesion. Recovery of mobility is unlikely if paraplegia is already established at diagnosis, necessitating 24 h nursing care and prolonged hospitalisation, often for the remainder of the patient's illness [2–5].

A prospective audit of MSCC reported by Levack *et al.* in 2002 [6] showed that 82% of patients were unable to walk at diagnosis, despite a history of pain for about 3 months and weakness and/or sensory problems for some time (median 20 and 12 days, respectively) before diagnosis. Although patients often reported early warning symptoms, the diagnosis of MSCC was often delayed. An audit of patients treated in Northern Ireland in 2003 confirmed a delay in diagnosis and onward referral to radiotherapy, with only 36% of patients referred for oncology assessment within 24 h of diagnosis of MSCC and 55% of those receiving radiotherapy starting treatment within 24 h of magnetic resonance imaging (MRI) diagnosis [7]. In August 2005, the benefit of direct decompressive surgery followed by post-operative radiotherapy was shown in a randomised phase III study reported by Patchell *et al.* [8]. This study was

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stopped early as significantly more patients in the surgery and postoperative radiotherapy group (84%) compared with the radiotherapy-alone group (57%) were able to walk after treatment ($P = 0.001$). Surgical patients remained ambulant for longer (122 versus 13 days) and of those unable to walk, 62% of the surgical group compared with 19% of the radiotherapy group regained the ability to walk.

Recognising the importance of early diagnosis and treatment to optimise functional outcomes, the Royal College of Radiologists (RCR) published guidelines for the management of MSCC in July 2006. This guidance recommended that the use of radiotherapy in established paraparesis should be restricted to a single fraction, if indicated to improve pain control, as neurological improvement was unlikely [9].

The National Institute for Health and Clinical Excellence (NICE) published guidance for the management of MSCC in November 2008 [10]. There are clear recommendations for timely access to MRI, appropriate surgery and radiotherapy, actively managed by an MSCC co-ordinator. As part of the development and implementation of Acute Oncology Services, cancer networks have been tasked with developing referral and care pathways that optimise outcomes for all patients with MSCC and identify those at high risk of MSCC for early intervention. The current repeat audit aims:

- To continue to benchmark the management of MSCC throughout the UK against national standards and assess if and where improvements have been made throughout the pathway.
- To assess the appropriate use of radiotherapy and hospital resources in accordance with RCR guidance [9].
- To assess critical components of the care pathway for 'good prognosis patients', namely access to prompt MRI, surgical assessment and treatment and fractionated radiotherapy.
- To evaluate the management of 'poor prognosis patients' who should not receive fractionated radiotherapy, which often results in inappropriate hospitalisation in oncology units.
- To engage with the multidisciplinary team, i.e. radiology, spinal and neurosurgeons, palliative care physicians and nurses, physiotherapy and occupational therapy to optimise functional outcome and appropriate care.

Materials and Methods

The original audit collected prospective data on all patients with a diagnosis of MSCC receiving radiotherapy in all UK National Health Service cancer centres for a 3 month period from 15 September 2008 to 14 December 2008, and assessed compliance with the following audit criteria derived from the RCR dose-fractionation guidance published June 2006. Demographic data, including the age and gender of the patient, source of referral, tumour site and site of cord compression, were collected, as was the place of discharge.

- Patients with symptoms suggestive of spinal cord compression should have access to an urgent MRI (within 24 h of presentation and referral for radiotherapy).
- Patients immobile for <24 h or ambulant or performance status 0, 1 or 2 ('good prognosis') should be discussed with neuro/spinal surgeons.
- Radiotherapy, if prescribed, should start within 24 h of diagnosis.
- Fractionated treatment should be prescribed for patients immobile for <24 h or ambulant and performance status 0, 1 or 2.
- Poor prognosis patients, i.e. those with established paraplegia for >24 h should only receive radiotherapy for pain relief.

The repeat audit prospectively collected data for all patients presenting to radiotherapy centres with MSCC between 1 and 31 August 2012 with the intention that these results could inform National Cancer Research Institute (NCRI) meetings later that year. With increasing collaboration with spinal surgical colleagues, further information was requested to allow calculation of the Tokuhashi score. Clinical outcomes at 6 months were requested in the 2012 audit.

A specifically developed web-based data form was constructed using Snap 9 Professional survey software. This was modified for the 2012 audit. The data form was circulated for comment to the RCR Clinical Oncology Audit Committee, the NICE Spinal Working Group and the Society and College of Radiographers and, after revision, piloted in four centres. Clinical oncology audit leads acted as links between the RCR and participating centres. Individual centres were given the opportunity to comment before publication.

Analysis

Data analysis was undertaken using Microsoft Office Excel 2007. Compliance with each of the audit criteria was calculated using percentages with 95% confidence intervals. Cases in which relevant information was unavailable were excluded from these calculations.

Results

In the first audit, data for 596 cases of MSCC were received from 42 of 57 (74%) UK radiotherapy centres. The number of cases received from contributing centres varied from two to 41 (median 11). There were 401 men and 195 women. In the repeat audit, data from 323 cases were received from 52 of 58 (90%) cancer centres; 204 men and 92 women in patients where gender was recorded. An MSCC co-ordinator was available in just over 50% of cases (164/323) and involved in patient management in 26% of cases in 2012.

Figure 1 shows demographic data. Figure 1A describes the distribution of primary sites in the patients with a known previous diagnosis of cancer at presentation. As

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