

# Inpatient Neuro-Oncological Rehabilitation: One Unit's Experience

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## BACKGROUND

Advances in cancer treatment have improved survival, resulting in greater numbers of cancer patients living with functional impairments, including those with primary or secondary neurological cancers. There are many potential deterrents for considering inpatient rehabilitation for this patient group, with concerns over futility and medical instability<sup>1,2</sup>.

Current evidence for the effectiveness of inpatient cancer rehabilitation is limited although a trend suggests that functional gains made by patients with brain tumours are comparable to non-neoplastic conditions<sup>3,4</sup>. We describe our experience in developing a pathway for inpatient neuro-oncological rehabilitation.

## METHODS

A retrospective review of inpatient neuro-oncological admissions at the Neurorehabilitation department in Astley Ainslie Hospital from 2009–2017 was performed comparing length of stay, changes in United Kingdom Functional Independence Measure + Functional Assessment Measure (UK FIM+FAM) scores, outcome and survival between benign and malignant groups. No absolute exclusion criteria for admission and admission is based on assessment of medical stability, rehabilitation potential and person-centred goal setting.

## RESULTS

120 patients were admitted (40% malignant diagnosis), of whom 90 completed their rehabilitation, 27 transferred to another facility, 2 died and 1 self-discharged. Figure 1 illustrates the patients in their diagnostic sub-groups. Of the transfers, 67% were patients with a malignant diagnosis.

89% of patients with benign diagnosis and 29% of patients with malignant diagnosis survived 1 year beyond discharge. Median survival for the malignant group (n=48, n=7 still alive) was 3.2 months (95%CI 2.0–8.4), with survival up to 40.4 months (Figure 2). Length of stay (median: 45 vs 44 days, p=0.19) and admission UK FIM+FAM (median: 128 vs 138, p=0.23) were not significantly different between the two groups; but UK FIM+FAM efficiency is lower in patients with malignant diagnosis (median: 0.29 vs 0.10, p=0.03). (Figure 3).

Boxplots comparing UK FIM+FAM Scores between Diagnoses

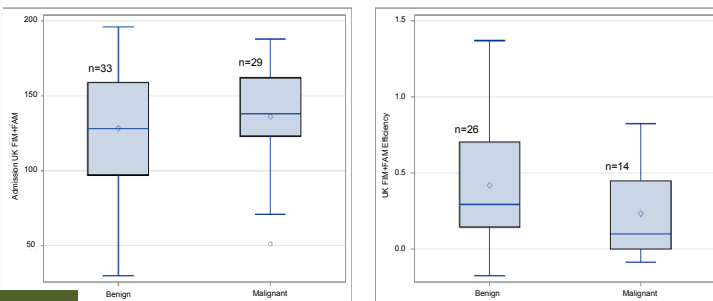


Figure 3

## Potential Deterrents to Inpatient Rehabilitation

- Haematological compromise
- Frailty
- Potential for tumour recurrence
- Potential for tumour progression
- Osseous fragility
- Reduced therapy tolerance
- Unrealistic patient expectations
- Admitting team apprehension

Cancer Admissions (n=120)

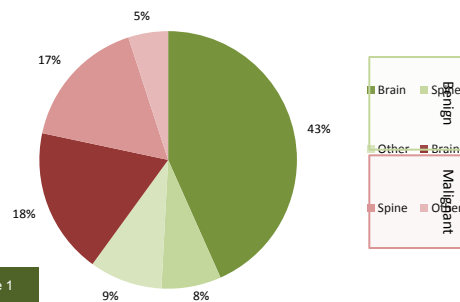


Figure 1

## Commonly Encountered Conditions

- Brain – Meningioma (37% of benign), Glioblastoma (55% of malignant)
- Spine – Ependyoma (22% of benign), Metastatic (85% of malignant)
- Other – Paraneoplastic syndromes, Neuropathies, Deconditioning
- 10 haematological cancers – 1 bone marrow transplant patient

Kaplan-Meier Curve for Patients with Malignant Diagnosis

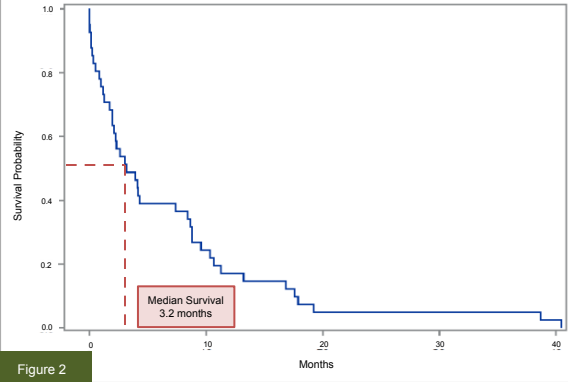


Figure 2

## DISCUSSION

Length of stay is comparable between patients with benign and malignant diagnoses. However, UK FIM+FAM efficiency is significantly lower in the malignant group. This is to be interpreted with caution due to the small sample size for UK FIM+FAM data. One of the reasons may be that admission UK FIM+FAM scores is trending higher in the malignant group, suggesting a potential ceiling effect. Another potential confounder is the higher proportion of malignancy in the spinal group compared with the other groups (Figure 1). Since the potential for functional recovery in these patients is fairly limited, this may further skew the results. Goal attainment scaling may be more appropriate in the context of cancer rehabilitation.

### Outcomes

23% of all admitted patients were transferred to acute settings and not re-admitted for rehabilitation; of these 67% were patients with malignancy. Causes for transfers included acute deterioration, disease progression and treatment complications. There were no delays in transferring patients back to acute services. Certain risk factors have been implicated in literature for acute transfers, including a lower functional status, elevated creatinine, reduced albumin and the presence of indwelling tubes<sup>5</sup>. A more structured patient selection process may be the answer to improving outcomes in this patient group.

### Transfers and Patient Selection

### Survival and other Measures

Median survival following discharge was 3.2 months in patients with malignancy. This raises the question as to whether inpatient rehabilitation is appropriate, particularly if functional gain is limited; or whether psychological adjustment is a positive outcome that justifies this. Though usually justified from the patient perspective, another concern is if this is the most appropriate use of resources. Patient-reported outcomes measures and goal attainment will be important to evaluate in this context. Early discharge supported by specialised rehabilitation teams may be a possible alternative for patients with malignancy.

A major challenge faced admitting patients with malignancy is expectation management. While oncology deals with prognostication and survival, this may not necessarily involve discussions around functional impairment and rehabilitation potential. This had led to issues around unrealistic expectations for rehabilitation even before admission. This begs the question if rehabilitation services should be involved with psychological adjustment and expectation management earlier at diagnosis, although this may not be appropriate in all patients. Other considerations for inpatient neuro-oncological rehabilitation include (1) realistic goal setting, (2) planning for disease progression and (3) clear pathways with oncology and palliative care services.

### Expectation Management and other Considerations

## CONCLUSION

In developing neuro-oncological rehabilitation services, the potential deterrents did not appear significant, but there remain questions about what impact inpatient rehabilitation has on remaining quality of life, especially for patients with malignant disease.

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