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A prospective patient-focused evaluation of the tolerance and acceptability of a stereotactic radiosurgery procedure

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ABSTRACT

Stereotactic radiosurgery (SRS) is a frequently used non-surgical procedure to treat benign and malignant brain lesions. Few studies have focused on patient perceptions of SRS. The aims of this patient-focused study were to assess patient experiences of SRS, and changes in patient-reported symptoms over 12 weeks post-SRS. Using the 6-point Likert Scoring Scale in a diary-format for a less discriminatory evaluation, patients self-reported presence or absence, and severity of physical and psychological symptoms within 24 h, 1-week, and 12-weeks post-SRS. Non-parametric repeated measures ANOVA was used to evaluate changes in symptoms. Of the 748 recruited patients, 690 returned the first diary (92%), while 564 patients returned all three diaries for matched responses analysis (82%). Three-quarters of 690 patients reported receiving clear verbal explanations and printed material prior to their procedure, and 99% reported the clinical team were 'very supportive' or gave 'wonderful care'. Fatigue (82%) and headaches (65%) were the most frequently reported symptoms within 24-h post-SRS. Over 12 weeks, patients reported significant reductions in headache, nausea, fatigue, anxiety and tension ($p < 0.001$); loss of balance and concentration significantly increased by 12-weeks post-SRS ($p < 0.001$). Some patients attributed symptoms such as fatigue or headaches to the demands of the procedure day. Findings of this study reflect the need to further research patients' physical and psychological symptoms post-SRS, which may differ from the clinicians' perception of the effects of treatment.

1. Introduction

Stereotactic radiosurgery (SRS) was introduced in the late 1970's to treat certain brain tumours (benign and malignant), arteriovenous malformations (AVMs), and trigeminal neuralgia (TN), revolutionising treatment for these lesions. SRS delivers highly-focused radiation at higher doses, which may have greater biological effect than multiple small doses per-fraction, as in conventional treatment, to eloquent areas of the brain in close proximity to critical structures such as the optic chiasm and brain stem [1]. SRS also offers the advantage of convenience, delivering treatment in a single fraction, and, where appropriate, treatment of multiple targets at once, such as brain metastases. SRS can provide an alternative treatment option to surgery, which carries with it risk of incomplete resection and/or post-surgical neurological deficits, potentially leading to reduced quality of daily living, affecting the ranking for, or of, quality of life (QoL). As the target volume in SRS is usually small (<3 cm in diameter), the likelihood of significant side effects is low. For example; hair loss is infrequent with SRS, but common with conventional treatment such as whole-brain irradiation [2]. However, neurological deficits can still occur, leading to recognition of dose sensitive structures such as the optic nerves and chiasm, as well as the volume of adjacent brain receiving intermediate dose in the context of treating AVMs. Also, the application of a head-ring to the skull can lead to soft tissue injury, or bleeding to the underlying scalp/skin, however, is usually of short duration.

Several studies have investigated both early and late effects of SRS, including nausea, vomiting, headaches, alopecia, and neuropathy [3–7]. However, little is known of the patient perspective of SRS. In 2005, Menkes et al. reported on the physical and emotional experiences in 12 patients undergoing SRS in a qualitative study conducted with a series of semi-structured interviews before, during, and after SRS [8]. The authors in that study found that patients experienced a state of dichotomies, with "health and normality on one hand, illness and disability on the other", and highlighted the need to adequately inform and support patients emotionally during SRS.

In 2004, due to the paucity of literature on SRS from the patients' perspective, researchers at the Department of Radiation

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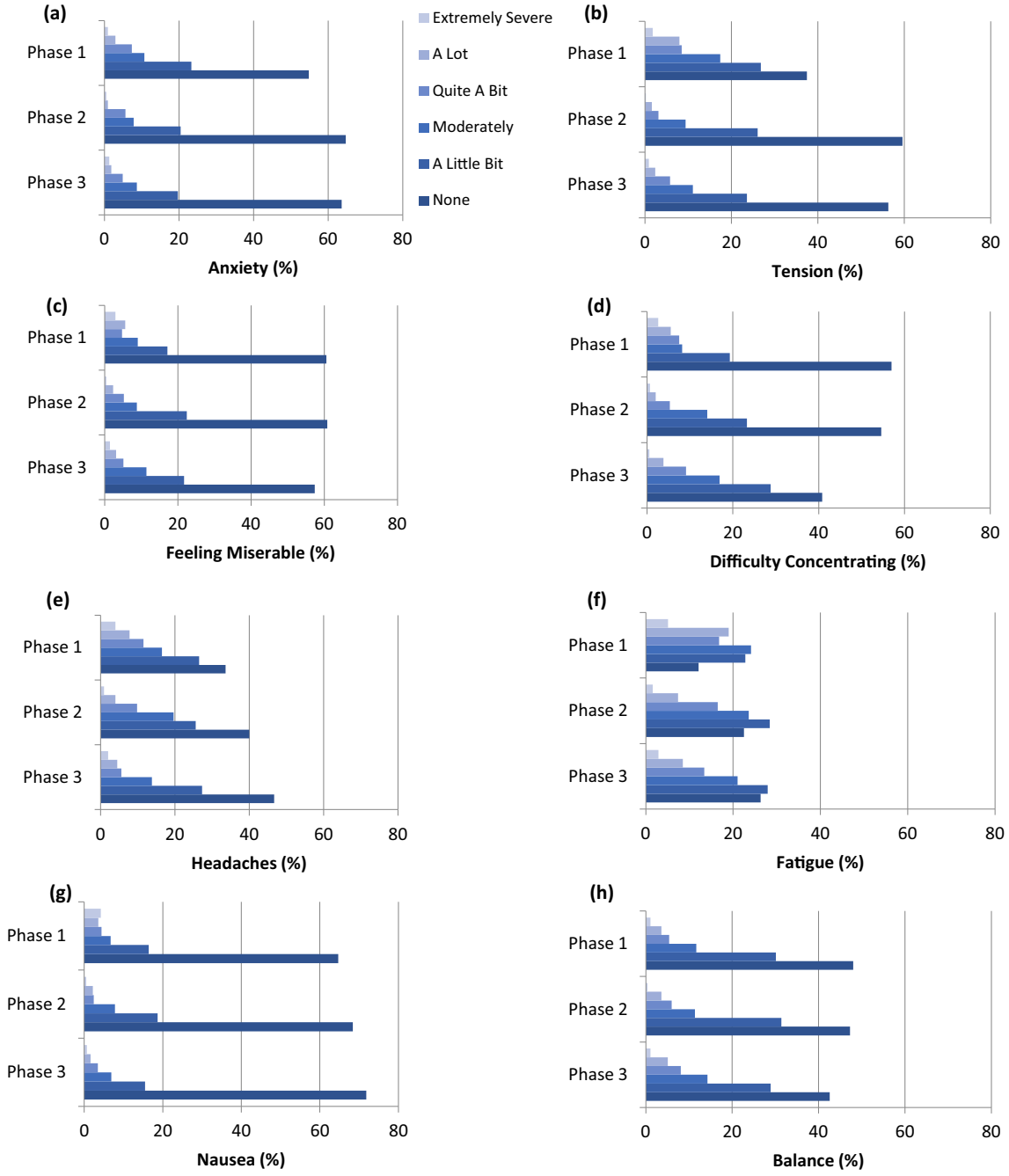

Fig. 1. Changes in severity of patient-reported psychological (a–d) and physical (e–h) symptoms over the study period.

Oncology, Prince of Wales Hospital (POWH) conducted a telephone survey of 100 patients previously treated with SRS at this institution. Patients were asked about their experiences of SRS, including side effects, and identified a number of physical and emotional responses to their treatment, most of which were not conveyed to their Oncologist, as they felt their doctor "would be too busy", or "they did not want to appear to be complaining about their treatment". As a result, this study was developed and ratified in 2005, to investigate symptoms experienced within 24 h, 1-week and 12-weeks post-SRS, with the aim to gain insight into the patients' perspective and experience of SRS, and to understand the changing presence and severity of patient-reported symptoms up to 12-weeks post-SRS.

2. Materials and methods

2.1. Recruitment and eligibility criteria

This prospective study was approved by the local institutional review board (South Eastern Sydney Local Health District Human Research Ethics Committee (SESLHD) – HREC Number 04/116). Patients were eligible if they were referred to the POWH Cancer Centre for SRS treatment for newly diagnosed benign or malignant brain lesions. Inclusion-criteria were age $\geq$14 years, cognitively unimpaired, and able to independently complete the diaries. Exclusion-criteria were; if they had previous SRS, had pre-existing co-morbidities rendering them unsuitable for SRS, demen-