Comparing organised inpatient stroke care models

An evidence summary based on the following systematic review: Langhorne_P, Ramachandra_S. Organised inpatient (stroke unit) care for stroke: network meta-analysis. *Cochrane Database of Systematic Reviews* 2020, Issue 4. Art. No.: CD000197.DOI: 10.1002/14651858.CD000197.pub4.

Key words: organised stroke care; models of care; stroke; rehabilitation; commentary

Key points

- Inpatient care on dedicated stroke wards had better outcomes (death and dependency) than on general wards
- Improved outcomes were also found for rehabilitation wards
- Inpatient mobile stroke teams made no difference to outcomes compared to general wards
- Outcomes were not impacted by age, gender, stroke severity or type/duration of follow-up
- There are gaps and areas of weakness in the evidence, notably in relation to subjective experiences and patient views
- This review tells us about the impact of Organised Stroke Care (OSC) compared to a general ward, and some limited findings about the different models of OSC. It does not explain the reasons for the differences in outcomes.

Introduction

Organised stroke care (OSC) is organised, multi-disciplinary care focussed upon the treatment of stroke, delivered by staff with a special interest in stroke or rehabilitation, with a programme of education, development and carers will be routinely involved in the rehabilitation process

(Stroke Unit Trialists' Collaboration. 1997) . There are several models of OSC. These are stroke wards where a multidisciplinary team treat exclusively people who have had a stroke (Langhorne and Ramachandra 2020). These include acute stroke units, rehabilitation stroke units and comprehensive stroke units. A mixed rehabilitation ward is where a specialist multidisciplinary team provide rehabilitation but not exclusively caring for people with stroke. A mobile stroke team is where a multidisciplinary team provide rehabilitation in a range of clinical settings. A general medical ward is where care is undertaken on a specific acute medical or neurological ward but not necessarily provided by a multidisciplinary team.

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This commentary examines an updated Cochrane review. The original review aimed to describe the characteristics of organised, multidisciplinary OSC, compare its effects upon patient outcomes with other forms of care (on general wards), and assess whether the outcomes were evident across different patient groups and types of service (Stroke Unit Trialists' Collaboration. 2007). The update considered whether the findings required amendment following the publication of data from more recent trials, and used network meta-analysis to further compare different models of service provision (Langhorne and Ramachandra 2020).

Aim of commentary

This commentary aims to critically appraise the methods used within the review by Langhorne and Ramachandra (2020) and expand upon the findings in the context of clinical practice.

Methods

An updated multi-database search was carried out in April 2019 (Cochrane Stroke Group Trials Register; Cochrane Central Register of Controlled Trials, Cochrane Library, MEDLINE Ovid;

Embase Ovid; Cumulative Index to Nursing and Allied Health Literature). Seven trial registries were searched to identify further published, unpublished, and ongoing trials. Additional studies and data were identified though citation tracking of included studies, checking reference lists of relevant articles, and contacting trialists. Only randomised controlled clinical trials (RCTs) comparing organised inpatient stroke unit care with an alternative service (typically contemporary conventional care), including comparing different types of organised inpatient (stroke unit) care for people with stroke who are admitted to hospital were included.

The primary outcome was poor outcome (death or dependency: modified Rankin score 3 to 5; or requiring institutional care) at the end of follow-up. Secondary outcomes included death, institutional care, dependency, subjective health status, satisfaction, and length of stay. Direct (pairwise) comparisons were conducted to compare organised inpatient (stroke unit) care with an alternative service.

Eligibility, bias (Cochrane's 'Risk of bias' tool) (Higgins et al 2021) and quality were assessed by two review authors, using the Grading of Recommendations, Assessment, Development and Evaluations (GRADE) framework (Guyatt et al. 2011). A network meta-analysis was used to compare the relative effect of different care models. General ward care was compared with different models of OSC (stroke unit; mobile stroke team; rehabilitation ward). This enabled comparison of the impacts of multiple models of OSC, by using both direct comparisons of interventions within RCTs and indirect comparisons across trials, reducing the need for multiple lengthy and expensive RCTs.

Findings

The review included 29 trials (5902 participants) comparing organised inpatient (stroke unit) care with an alternative service. Twenty trials (4127 participants) compared organised (stroke unit)

care with a general ward, six trials (982 participants) compared two different forms of organised (stroke unit) care, and three trials (793 participants) compared more than one model of care delivery.

Compared with the alternative service, organised inpatient (stroke unit) care was associated with improved outcomes at the end of follow-up, including reduced poor outcomes (GRADE: Moderate), institutional care or dependency (GRADE: Moderate) and death or dependency (GRADE: Moderate). There was no evidence that organised stroke unit care resulted in longer hospital stays.

Improved outcomes were also observed in mixed rehabilitation wards when compared with general wards for reduced poor outcomes, death or dependency and death or institutional care (GRADE: Low). However, there was no strong evidence of benefits for death rates and length of stay (GRADE: Low).

For every 100 patients who received stroke unit care, there were two additional survivors, six more people living at home, and a further six more people living independently, when compared with other forms of in-hospital stroke care. These outcomes were observed across patients regardless of age, initial stroke severity, stroke type and duration of follow-up (GRADE: Moderate). However, there was little difference in the patient outcomes of those treated by mobile hospital stroke teams for poor outcome, death rates, death or institutional care and death or dependency compared to general medical ward care (GRADE: Low).

Commentary

This fifth update of this review reflects a continued interest in the impact of organised stroke care over the last three decades. We used the AMSTAR critical appraisal tool for systematic reviews to consider the quality of the review (Shea et al. 2017). This appraisal indicated the

systematic review provides an accurate and comprehensive summary of the results of the available studies that address the question of interest. We were, however, were unable to establish whether the protocol was registered, and the authors do not appear to have reported whether they explored the funding sources for the included studies.

The review identified that there is moderate quality evidence that organised stroke care is associated with a range of important improved patient outcomes, including death and dependency. The evidence was considered to be of moderate, rather than high quality because the trials, although generally well-designed, conducted and reported, were not truly 'blind'; though the impact of 'blinding' upon death rates could be expected to be minimal (in this review, where trials which did not unequivocally blind outcome assessment were excluded from the analysis, this had very little effect on the risks of a poor outcome).

However, evidence on the subjective experience of care was of very poor quality; and none was provided from patient perspectives. Included trials used assessed carer satisfaction (recorded on a Likert scale or as responses to statements). In considering outcomes after serious stroke, Patient Reported Outcome Measures (PROMS) would often be inappropriate since the outcomes of death or high dependency are usually not reportable by patients. In considering the quality of care, rather than outcome in such cases, the perspective of family members of the quality of care received should be considered a priority. Some studies included in the review did however, include patient subjective health status (measured using tools including the Nottingham Health Profile, EuroQol, and Short Form-36), indicating that some patients are able to share their perspectives.

Evidence about impact of OSC on length of hospital stay was limited and of poor quality. The evidence identified also failed to consider the efforts and costs (such as staffing, and service organisation resources) involved in delivering OSC compared to standard care, which is required in order to evaluate the health economic impact of OSC. These are significant gaps in the research, and highlight the need for more definitive, high-quality evidence, which should include

patient experiences as well as health economic considerations. This research may take the form of a double-blind mixed method cost effectiveness RCT. Since the included studies were conducted, targets have been set for staffing and therapy time in UK stroke units, but national audit data indicates that these targets are often not met (Intercollegiate Stroke Working Party, 2019).

The evidence base examined several types of OSC. Moderate quality evidence suggested that organised inpatient (stroke unit) care was associated with better outcomes (poor outcome, death, death or institution and death or dependency) compared to alternative service (contemporary conventional care).

Evidence of the impact of mixed rehabilitation wards was of moderate quality and volume and suggested improved outcomes (poor outcomes, death or dependency and death or institutional care) when compared with general wards, but these benefits were not as great as those associated with a stroke ward. This indicates that where possible, care should be provided on a dedicated stroke ward; and if that is not available then a mixed rehabilitation ward would be preferable to a general care ward.

The more limited evidence surrounding mobile stroke teams suggested that this model of OSC was associated with poorer outcomes. This highlights the need for:

- more definitive research on the impact of stroke units (though true blinding [participants and assessors] in such trials is challenging)
- more robust research on the impacts of other models of OSC, such as mobile stroke units and newer 'hub and spoke' models
- research which will facilitate the identification and understanding of the factors which lead to these differences.

Conclusion

'Given the benefits of organised stroke care for patient outcomes, it is important that patients are cared for in such a unit from admission to discharge after a stroke. In some UK settings this is difficult to achieve due to pressure on inpatient services, yet OSU care achieves better clinical outcomes without apparent increase in length of stay.

Key remaining questions that future research should address:

- What characteristics of a stroke unit make it work?
- What is the role and importance of the physical space?
- How do the multi-disciplinary teams interact both in relation to the care of individual patients, and in developing and delivering the service as a whole?
- What is it about each model that makes the difference? For example, care in general wards does not entail routine multidisciplinary input; might this be what makes the difference?
- What role might the physical space within which OSC is located play in facilitating these benefits?

This report is independent research funded by the National Institute for Health Research Applied Research Collaboration North West Coast (ARC NWC). The views expressed in this publication are those of the author(s) and not necessarily those of the National Institute for Health Research, the NHS or the Department of Health and Social Care

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