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Does an integrated care pathway improve processes of care in stroke rehabilitation? A randomized controlled trial

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Abstract

Objective: to evaluate whether integrated care pathways improve the processes of care in stroke rehabilitation.
Design: comparison of processes of care data collected in a randomized controlled trial.
Participants: acute stroke patients undergoing rehabilitation randomized to receive integrated care pathways management ($n=76$) or conventional multidisciplinary care ($n=76$).
Measurements: proportion of patients meeting recommended standards for processes of care using a validated stroke audit tool.
Results: integrated care pathways methodology was associated with higher frequency of stroke specific assessments, notably testing for inattention (84% *versus* 60%; $P=0.015$) and nutritional assessment (74% *versus* 22%, $P<0.001$). Documentation of provision of certain information to patients/carers (89% *versus* 70%; $P=0.024$) and early discharge notification to general practitioners (80% *versus* 45%; $P<0.001$) were also more common in this group. There were no significant differences in the processes of interdisciplinary co-ordination and patient management between the integrated care pathways group and the control group.
Conclusion: integrated care pathways may improve assessment and communication, even in specialist stroke settings.

Keywords: *outcome, pathway, processes, rehabilitation, stroke*

Introduction

A key area of interest in the delivery of stroke care is the extent to which processes of care can affect outcome. Randomized controlled studies and systematic reviews demonstrate that such interventions as early mobilization, co-ordination between disciplines and communication with patients and family reduce eventual disability and institutionalization rates [1, 2]. However, much of the data on the organization of care provided within these studies is superficial, with little information on the components of care provided.

The recent National Sentinel Audit of Stroke in the United Kingdom demonstrated that stroke unit care is associated with more patients receiving desirable interventions compared with patients managed on general wards [3]. The improved outcome seen on stroke units may be related to better processes of care. This relationship has not been investigated.

Integrated care pathways (ICP) are being increasingly used in patient care involving complex multidisciplinary interventions, stroke rehabilitation being a prime example [4, 5]. The ICP charts the order of activities and the nature of relationships between different activities [6]. It provides the interdisciplinary team with prompts to initiate investigations, referrals and treatments at appropriate times [7, 8]. Whether this methodology results in better processes of care for stroke patients is not known.

We have previously reported a randomized controlled trial in which 152 patients were allocated to conventional multidisciplinary care ($n=76$) or to management using

an ICP (n=76) [9]. The study showed no differences in crude outcome measures, such as length of stay or level of disability, between the two groups. It is possible that the outcome measures chosen were insensitive to improvements in the process of care resulting from the ICP. The objective of this study was to determine if ICP-based management improved the quality of care by ensuring that more of the desirable processes were undertaken compared with routine multidisciplinary care.

Methods

Setting

The study was of patients transferred to a stroke rehabilitation unit within two weeks of an acute stroke. The unit had a well-developed multidisciplinary approach to patient care. Two teams of nurses, each led by a senior nurse, cared for patients in one of two bed areas. The two teams worked independently with little cross-over of staff. Their daily planning meetings were held at separate times. Ward patients shared the same medical and therapy teams. Patients were randomly allocated to one of two bed areas on the ward, where they received care led either by the ICP or traditional consultant-led multidisciplinary care. The methods of randomization, blinded allocation and sample size calculation have been described previously [9].

Interventions

The integrated care pathway (ICP)

The ICP was developed by the stroke team and based on extensive literature review, local factors and available expertise. Key interventions, short term goals and their timing were defined in advance and patients' progress charted along the pre-determined pathway. A senior nurse, experienced in all aspects of stroke management, was responsible for implementing the ICP.

Conventional care

Patients were assessed and an individualized management plan designed after initial discussion within the multidisciplinary team. Therapeutic activities, short term goals and the time taken to achieve these goals were discussed in weekly multidisciplinary meetings and determined on the basis of patients' progress. Each discipline was responsible for its own assessments and communication with patients or carers as appropriate.

The study was preceded by a 3-month training period for all staff members in both groups to achieve staff confidence and competence with the new methodology, resolve operational problems and reduce practice bias.

Assessments and data analysis

We collected data on processes of care using the Intercollegiate Stroke Audit Tool developed by the Royal College of Physicians Clinical Effectiveness and Evaluation Unit [11]. This tool is based on standards of service care agreed by different professional colleges and patient organizations in the UK and has been validated in clinical practice. We measured processes of care in the domains of assessment, rehabilitation management, secondary prevention, discharge planning and communication. Additional information was collected on completion of formal neurological assessment and information provision on risk prevention. Case note review of all patients was undertaken by two researchers familiar with the methodology of the National Stroke Audit but blinded to patient allocation and not involved with patient care. Inter-rater reliability was assessed using the kappa statistic by comparing evaluations undertaken independently by both observers in 20 patients randomly selected from both groups.

The main outcome measure was the proportion of patients receiving recommended interventions as defined in the Intercollegiate Stroke Audit. Secondary outcome measures were compliance with the ICP and time taken to achieve the interventions against the predicted timeframe. The study had 80% power to detect a 20% difference in the proportion of patients meeting assessment, multidisciplinary management, communication and discharge planning standards between the two groups. Results on processes of care were expressed as the proportion of eligible patients in whom the standard for a given process of care had been met. The denominator in these results describes the number of patients in the sample for whom the intervention was relevant. For example, 37 patients in the ICP group and 43 patients in the conventional care group failed the initial swallow screening assessment and thus were referred for speech and language therapy review. Descriptive data were presented and analyzed using the two-sided χ^2 test.

Results

Patients

The study included 152 patients (average age 75 ± 10 years; 51% men) who were allocated to management using the ICP (n=76) or conventional multidisciplinary care (n=76). Their baseline demographic characteristics, stroke severity and disability levels were comparable.

Compliance with interventions

Review of the ICP records in 76 patients managed using this methodology showed good compliance with the care pathway in all domains assessed. Over 80%

of prescribed interventions were completed by all disciplines. However, the time taken to undertake these interventions varied considerably from the ICP in most of the domains assessed. This variation was most marked for occupational therapy and physiotherapy: 63% and 61% respectively of interventions did not occur at the planned time. Over half of the processes involved in discharge planning were delayed, as were one third of medical and nursing interventions. Most variances (68%) were due to patient factors, such as variability in recovery or intercurrent health problems. External factors were responsible for 23% (particularly those concerning discharge planning) and failures in interdisciplinary co-ordination for 9% of variances recorded. Incomplete documentation was seen in 22 (14%) records.

Processes of care

The use of ICP methodology was associated with more patients receiving initial assessments and investigations (Table 1). A full neurological assessment was performed more frequently in the ICP group and a significantly greater proportion of patients in this group were screened for visual or sensory inattention and underwent nutritional assessment. Standardized cognitive testing was undertaken infrequently in either group, with less than a quarter of patients being assessed beyond initial screening for cognitive impairment.

There were no significant differences in the processes of multidisciplinary care and interdisciplinary co-ordination between the two groups (Table 2). Over 90% of the patients in both groups were seen by different members of the multidisciplinary team within the time frames recommended as service standards by the Intercollegiate Stroke Working Party. Social services response within 7 days of referral occurred in over 75% of referred cases in both groups.

Table 1. A comparison of initial nursing and medical assessment between patients randomized to ICP management or conventional care

Process	ICP method	MDT method	*P* value
Neurological assessment	75/76 (99)	60/76 (79)	0.053
Sensation	59/76 (78)	56/76 (74)	0.688
Visual impairments	53/76 (70)	54/76 (71)	0.892
Visual/sensory inattention	42/50 (84)	29/48 (60)	0.015
Communication	71/76 (93)	60/76 (79)	0.156
Clinical localisation of lesion	61/76 (80)	66/76 (87)	0.538
Swallowing assessment	76/76 (100)	71/76 (93)	0.553
Pre-stroke function	76/76 (100)	75/76 (99)	0.908
Cognitive function	44/50 (88)	35/48 (73)	0.122
Standardised cognitive testing	8/50 (16)	11/48 (23)	0.342
Nutritional assessment	49/66 (74)	14/64 (22)	<0.001
Mood	62/76 (82)	64/76 (84)	0.803

ICP, integrated care pathways; MDT, multi-disciplinary team.

There were few differences in patient management and planning of rehabilitation between conventional care and ICP based care (Table 3). In patients in the ICP group, written multidisciplinary goals for basic activities of daily living, were more common, but they were less likely to have goals for higher level of functioning (occupation, leisure). There was also greater awareness of carer needs in the conventional care group.

ICP management was associated with better documentation of discussions on diagnosis, prognosis and follow-up arrangements with patients and carers (Table 4). Discharge notification within 24 h was provided to a significantly higher proportion of general practitioners of patients managed by ICP care.

Inter observer reliability

Kappa values for agreement between the two observers for the 20 sets of double rated records were within the range 0.4–0.6 for 6 items (moderate agreement) 0.6–0.8 for 25 items (good agreement) and over 0.8 for 13 items (very good agreement).

Discussion

ICP methodology was associated with greater uptake of stroke-specific assessments, better documentation of rehabilitation goals and improved communication with patients, carers and primary care physicians. There were no significant improvements in interdisciplinary co-ordination and processes of management or discharge planning in patients managed using the ICP methodology. Conventional care was associated with a higher proportion of patients having goals for higher level functioning and greater awareness of carers' needs. This suggests that although the multidisciplinary processes between the two groups were comparable, there was better documentation and communication in patients managed using the ICP.

The improvements in assessment and communication are important benefits of ICP management. Poor assessment and communication have been blamed for failures in stroke care resulting in worse outcome and dissatisfaction with care [12, 13]. Improvements in these areas have the potential to produce better overall satisfaction with care for stroke patients [14]. This is recognized as an important measure of global outcome in stroke patients [15]. Indeed, the more traditional outcome measures such as mortality, dependence or length of hospital stay may be insensitive to changes in the quality of care brought about by interventions such as ICPs, the main aim of which is to produce improvements in quality of care [16, 17]. Measures such as processes of care or quality of life may be more appropriate for judging such interventions [18]. Interestingly, we have previously reported that patients

Table 2. A comparison of the processes of multidisciplinary co-ordination and care between patients randomized to ICP management or conventional care

	ICP method	MDT method	*P* value
Specialist stroke care within 7 days	76/76 (100)	76/76 (100)	1.000
Speech therapy assessment			
Swallow within 72 h	35/37 (95)	41/43 (95)	0.654
Speech within 7 days	26/26 (100)	28/28 (100)	1.000
Physiotherapy assessment within 72 h	76/76 (100)	76/76 (100)	1.000
Occupational therapy assessment within 7 days	76/76 (100)	76/76 (100)	1.000
Social work assessment within 7 days	55/73 (75)	54/69 (78)	0.617

ICP, integrated care pathways; MDT, multi-disciplinary team.

Table 3. A comparison of the processes of management planning between patients randomized to ICP management or conventional care

	ICP method	MDT method	*P* value
Written evidence of MDT goals	75/76 (98)	56/76 (74)	<0.001
Goals for higher level functioning	7/61 (11)	25/59 (42)	<0.001
Plan for mood disturbance	8/27 (30)	10/24 (42)	0.379
Plan for pressure sore prevention	76/76 (100)	76/76 (100)	1.000
Plan to promote continence	38/39 (97)	33/36 (92)	0.600
Plan to treat hypertension	39/42 (93)	44/47 (94)	0.524
Aspirin prescribed for infarction	60/61 (98)	64/64 (100)	0.898
Anticoagulation prescribed for AF	7/12 (58)	10/14 (71)	0.276
Assessment of living conditions	76/76 (100)	76/76 (100)	1.000
Access to accommodation	76/76 (100)	76/76 (100)	1.000
Home visit performed	68/68 (100)	63/64 (98)	0.901
Carers' needs assessed separately	28/64 (44)	43/66 (65)	0.021
Carers' needs for skill training assessed	28/64 (44)	43/66 (65)	0.021

AF, atrial fibrillation; ICP, integrated care pathways; MDT, multi-disciplinary team.

Table 4. A comparison of the processes of communication with patients and carers between patients randomized to ICP management or conventional care

	ICP method	MDT method	*P* value
Documentation of information provided on			
Diagnosis and prognosis	67/76 (88)	55/76 (72)	0.106
Risk factor modification	72/76 (95)	68/76 (89)	0.628
Discharge planning	76/76 (100)	76/76 (100)	1.000
Statutory support on discharge	62/68 (91)	54/64 (84)	0.231
Follow up arrangements	68/76 (89)	53/76 (70)	0.024
Notification to GP within 24 h of discharge	61/76 (80)	34/76 (45)	<0.001
Functional status in discharge note	74/74 (100)	75/75 (100)	1.000

ICP, integrated care pathways; MDT, multi-disciplinary team.

managed using the ICP method had lower quality of life scores [9].

This study has limitations inherent to any pragmatic rehabilitation trial. The higher reported rate of appropriate interventions in the ICP group may have been a consequence of better documentation and similar interventions may not have been recorded adequately in the conventional multidisciplinary group [19]. Blinding of allocation in some patients may have been unmasked by an inadvertent disclosure of assignment in the medical notes. Inter-observer bias was unlikely, however, because the kappa value for double-rated records was higher than reported in previous studies [20]. The piloting of the ICP methodology before evaluation in this study enabled us to define differences from conventional multidisciplinary care. It also reduced error due to practice effects or staff preference. This training period did not produce significant changes in the activity of the conventional care group. We evaluated compliance with ICP interventions to ensure that any difference (or lack of difference)

observed was not due to poor implementation of ICP methodology. The use of different teams of nurses in different ward areas to implement the two different strategies minimized crossover of interventions.

Stroke rehabilitation units already feature specialized multidisciplinary input, which reduces the need for additional information, planning or co-ordination that an ICP may offer [21]. Our previously reported trial showed no benefit in terms of length of stay, mortality or institutionalisation related to use of the ICP [9]. ICPs may nevertheless produce benefits in improving the quality of care by facilitating better documentation, assessment and communication with patients and general practitioners. Their potential to improve outcomes of stroke in non-specialized wards is clear, but remains unproven.

Key points

- Processes of care are a marker for quality care in stroke rehabilitation.
- The recent National Sentinel Audit revealed sub-optimal uptake of desired care processes in the UK.
- Use of an integrated care pathway can improve uptake of desired care processes, even in a specialised setting.

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