SYSTEMATIC REVIEW

Integrated care pathways in stroke management

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Abstract

Background: an organized, goal-defined and time-specified plan of management as envisaged by the integrated care pathway approach can achieve quality outcomes at lower cost. Integrated care pathways may have applications to stroke management because diagnosis is well defined, complex interdisciplinary inputs are required and there is good evidence on best practice.

Method: we reviewed medical, nursing, rehabilitation and health services databases to identify studies on integrated care pathways in stroke management. Criteria for inclusion were: use of a care pathway or similar methods in acute or rehabilitation settings, randomized studies or non-randomized comparisons with concurrent or historical controls and some form of outcome assessment.

Results: we identified six non-randomized studies of acute stroke. One used concurrent controls; the rest used historical controls. Only one study investigated stroke rehabilitation and this used a quasi-randomized controlled design. Five studies in the acute setting demonstrated reduced hospital stay. A reduction in costs of care was reported in all five studies that examined costs. Two studies reported improved uptake of medical interventions. No difference in length of hospital stay, costs or functional status was seen in the rehabilitation study.

Conclusions: integrated care pathway methodology may facilitate quality and cost improvements in stroke care, but evidence is weak and uncertainty exists. Further evidence is needed before implementation in practice.

Keywords: effectiveness, integrated care pathways, rehabilitation, stroke

Introduction

The provision of high-quality stroke care presents several challenges. Co-ordinated care by specialist staff is associated with reductions in mortality, dependence and length of stay [1]. There is increasing pressure to incorporate emerging research evidence into clinical practice and introduce management practices which streamline the process of care to increase effectiveness or produce cost savings. One way of achieving these objectives is to introduce ‘integrated care pathways’, a project network technique, which is gaining increasing popularity in health care delivery.

Project network techniques were first used in the American space programme and then in industry to manage complex processes [2]. This methodology has been extended to patient care involving interdisciplinary interventions because it improves communication and co-ordination without necessarily changing the clinical practice of individual disciplines [3]. It involves the development of a project network diagram, which charts the order of activities and the nature of relationships between different activities that must be completed within a given time. It provides the interdisciplinary team with prompts to initiate certain investigations, referrals and treatments at pre-ordained intervals and checks to ensure that the patient is progressing in the expected manner.

Deviations from the expected path of care are termed variances, which are useful for early identification and resolution of problems affecting outcome or the time required to achieve this outcome. Integrated care pathways are also referred to as care pathways, critical pathways, anticipated pathways of recovery, managed care pathways or practice guidelines in different settings [3–7].

Development of a care pathway is an interdisciplinary task. Steps in its development include formation of a team of appropriate professionals, research to determine current practice and identify evidence for
best practice, and production of a preliminary pathway. This pathway is then implemented in a target group of patients to assess applicability and refine interventions before production of the final agreed pathway.

The success of integrated care pathway methodology depends on the quality of implementation. This has been facilitated by using care pathways with the case management system of health care [8], in which a health care professional designated as the ‘case manager’ oversees the patient’s episode of care using a care pathway as the template for timely provision of appropriate care. This professional is usually an experienced nurse who initiates investigations, requests referrals and prescribes medication within the constraints of the pathway but without need for prior medical consultation [8].

Here, we present a review of the literature on the role of integrated care pathways in stroke management, with emphasis on evidence for their effectiveness and implications for use in clinical practice.

Methods

We searched the MEDLINE, CINAHL, Best Evidence, Cochrane and Ovid Nursing Collection databases from 1966. In view of the variety of names given to care pathways, we searched for the terms ‘case management’, ‘care pathway’, ‘critical path’, ‘management model’ ‘anticipated recovery’ and ‘practice guidelines’. We combined these with the terms ‘stroke or cerebrovascular’. In addition we combined the latter term with the terms ‘pathway or guidelines’ to identify papers with other alternative names for their care pathways. We searched the ACP Journal Club and Evidence Based Medicine databases using the terms ‘pathway’, ‘guidelines’ and ‘stroke or cerebrovascular’. We scrutinized the reference lists of any papers identified in this way for other relevant papers which we might have missed on the initial search.

Reports which described the effects of introducing a care pathway for the management of acute stroke or rehabilitation in any setting were eligible. We included papers if outcome following the introduction of the pathway was assessed and compared with control data. The control data could be obtained either prospectively by a randomized method or from historical controls treated on the unit before introduction of the pathway. This strategy was necessary because of the paucity of well-designed randomized controlled studies. The key outcome measures were length of stay, cost of episode, functional outcome (such as Functional Independence Measure or Barthel index), discharge destination and uptake of investigations or interventions deemed relevant to patient care. The pathway had to include a plan for medical and nursing interventions and instructions on access to other members of the interdisciplinary team as a minimum requirement.

Results

In the search we identified 12 papers on the use of integrated care pathways in stroke management [9–20]. Four described methods of developing and implementing pathways in stroke care but did not measure outcome or undertake comparisons with controls [9–12]. One paper with a small sample size (n = 32) described a care pathway managed either by primary nurses or a case manager in two unmatched groups of patients [13]. The seven papers listed in Table 1 met the predetermined criteria for inclusion in the review [14–20]. There were no reports on care pathways to manage stroke outside hospital.

Table 1. Papers identified following literature search

<table>
<thead>
<tr>
<th>Author</th>
<th>Setting</th>
<th>Type of pathway</th>
<th>Controls</th>
<th>Length of stay</th>
<th>Resource use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anon., 1998 [14]</td>
<td>Acute</td>
<td>5-day ‘cross unit’ pathway</td>
<td>Historical</td>
<td>1.6 days</td>
<td>Not analysed</td>
</tr>
<tr>
<td>Bowen &amp; Yaste, 1994 [15]</td>
<td>Acute</td>
<td>Protocol including emergency department algorithm,</td>
<td>Historical and</td>
<td>From 6.7 to 5.5 days</td>
<td>32%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>‘critical path’ and admission orders</td>
<td>concurrent—not</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>randomized</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Odderson &amp; McKenna, 1993 [16]</td>
<td>Acute</td>
<td>Admission orders, swallow screen, referrals to other disciplines</td>
<td>Historical</td>
<td>From 10.9 to 7.3 days</td>
<td>14.6%</td>
</tr>
<tr>
<td>Ross et al., 1997 [17]</td>
<td>Acute</td>
<td>Medical algorithm</td>
<td>Historical</td>
<td>From 7.5 to 6.3 days</td>
<td>15%</td>
</tr>
<tr>
<td>Summers &amp; Soper, 1998 [18]</td>
<td>Acute</td>
<td>Care path introduced on new stroke unit</td>
<td>Historical</td>
<td>—</td>
<td>Yes</td>
</tr>
<tr>
<td>Wentworth &amp; Atkinson, 1996 [19]</td>
<td>Acute</td>
<td>Path developed around standing stroke orders</td>
<td>Historical</td>
<td>From 7.0 to 4.6 days</td>
<td>23%</td>
</tr>
<tr>
<td>Falconer et al., 1993 [20]</td>
<td>Rehabilitation</td>
<td>Critical path managed by trained team</td>
<td>Concurrent, randomized</td>
<td>None: 55.6 (15.5) days vs 32.5 (15.4) days in controls</td>
<td>None</td>
</tr>
</tbody>
</table>
Acute stroke

Six papers describe the effect of introducing integrated care pathways in acute stroke care [14–19]. Patients were admitted to acute units for the initial medical management and investigation before being transferred to rehabilitation facilities or discharged home. A non-randomized controlled design was used in one study [15]; the others compare outcomes with historical controls on the unit before introduction of the integrated care pathway. Two integrated care pathways were biased towards medical care and focus on investigations (computerized tomography scanning, carotid Dopplers) and interventions (prescription of aspirin, deep vein thrombosis prophylaxis, swallow screening) [15, 17]. The other four papers describe a more integrated multidisciplinary approach with less of a medical bias [14, 16, 18, 19]. Only one study includes times for social work review [16].

The main effect of integrated care pathway management is to reduce length of hospital stay for the acute episode compared with historical or concurrent controls. The largest reduction (36%) is reported by Wentworth and Atkinson: their length of stay decreased from 7 to 4.6 days, with the greatest reductions occurring in the fourth year of introduction of the care pathway in patient care [19]. Five papers report a cost analysis, showing a reduction in costs for the acute episode of between 14 and 32% [15, 16, 18, 19]. Two papers report improved uptake of medical interventions [15, 17]. Bowen and Yaste [15] demonstrated an increased frequency of carotid Doppler examinations and deep vein thrombosis prophylaxis. Ross et al. [17] reported improvement in the speed with which investigations are undertaken, but the total number of tests performed did not increase.

Odderson and McKenna [16] reported a reduced frequency of complications such as aspiration pneumonia (reduced by 63%) and urinary tract infections (reduced by 38%) but these did not achieve statistical significance. This is the only study which includes a specific requirement to undertake a swallow screen within 24 h of admission. None of the studies show an improvement in functional outcome or an increase in the proportion of patients being discharged home from the acute unit following the introduction of the integrated care pathway.

Stroke rehabilitation

Only one study evaluated integrated care pathway methodology in stroke rehabilitation [20]. A multidisciplinary integrated care pathway was used with well defined medical, nursing and therapy interventions at designated time points which were specified in advance. Patients up to 120 days after acute onset were included. Randomization was subject to referral patterns as well as bed availability, resulting in imbalance between the intervention (n = 53) and control limbs (n = 68). The main outcome measures (length of stay, hospital charges and functional status) showed no differences between the integrated care pathway and the control group (Table 1). There were no differences in motor and cognitive scores or patient satisfaction scales between the two groups.

Discussion

The interdisciplinary nature of stroke management in acute and rehabilitation phases is well suited to care pathway methodology. Despite the firm evidence on the benefits of co-ordinated care [1], the National Sentinel Audit of Stroke Care has shown deficiencies in clinical assessment, rapidity of and access to investigations, acute management, and provision of information to patients and relatives across the United Kingdom [21]. Recent studies have shown the advantages of early initiation of therapy [22] and increased intensity of therapy input [23, 24] in improving outcome in stroke patients, but these are not widely implemented in practice. Since the main expense of stroke care is the ‘hotel cost’ associated with inpatient care, any saving on length of stay will have important resource implications. Although integrated care pathways can address these issues, the important question is whether evidence supports their widespread implementation.

The quality of evidence is limited by methodological problems in published studies. Most studies have been undertaken in small samples of patients and may not be generalizable. Nearly all are open to bias because of the historical nature of comparisons, lack of randomization and the possibility of observer preferences in reporting outcome. The development of pathways has been described in great detail, but little information is provided on their implementation, which may have affected outcome. The number of variances from the pathway and the number of patients showing such variances have not been described, and it is not clear how these were dealt with in the analysis of data.

Care pathways for the acute phase are relatively easy to produce and are exemplified by the algorithmic style of the studies [15, 17, 19]. Most acute studies have not used clinically relevant measures (such as mortality, prevention of complications and successful implementation of secondary prevention interventions) but concentrated on cost issues, such as completeness of investigations and reductions in the length of stay. These pathways are geared towards earlier transfer of the patients out of the acute unit, and eventual outcome in terms of residual disability or destination of discharge has not been evaluated. It is also not known whether the improved efficiency of care on the acute unit eventually leads to an overall reduction in hospital stay, or whether the costs of care are merely transferred from the acute to rehabilitation settings.
It is even harder to draw conclusions on the use of pathways in rehabilitation. The only reported study took patients up to 3 months after their stroke, a time at which most of the gains produced by early, effective and co-ordinated multidisciplinary care would have occurred [20]. The inherent assumption in integrated care pathway methodology, that care can be standardized, may not be true for stroke rehabilitation. Many of the therapy inputs need to be individualized and can vary between patients and even within patients from day to day. Interdisciplinary practice is well-established on rehabilitation units, and integrated care pathways may make little further contribution. Outcome of stroke rehabilitation is not only determined by the processes of care but also influenced by external factors, such as patient/carer expectations and services provided by other agencies that may not share the priorities or timescales of the treating unit. Against this background, the integrated care pathway process may be seen as time-consuming but contributing little to changing team focus or priorities, which will continue to be dictated by patient need and professional assessments.

There is considerable enthusiasm to introduce management techniques from non-stroke settings into stroke management to improve quality of care and reduce costs of services provided [25]. Although the theoretical advantages of such methods are clear, the benefits may be less than expected because of patient variability, pre-existing practice or dependence on external factors. Our review of the literature suggests that integrated care pathway methodology may have a role in stroke management but the evidence is weak and there is much uncertainty. Further randomized controlled trials are needed before implementation of this technique in stroke patients.

References


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