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Received 16 June 2010; accepted in revised form 7 February 2011

Age and Ageing 2011; 40: 436–443
doi: 10.1093/ageing/afr060
Published electronically 26 May 2011

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A systematic review of comprehensive geriatric assessment to improve outcomes for frail older people being rapidly discharged from acute hospital: ‘interface geriatrics’

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Abstract

Background: many frail older people who attend acute hospital settings and who are discharged home within short periods (up to 72 h) have poor outcomes. This review assessed the role of comprehensive geriatric assessment (CGA) for such people.

Methods: standard bibliographic databases were searched for high-quality randomised controlled trials (RCTs) of CGA in this setting. When appropriate, intervention effects were presented as rate ratios with 95% confidence intervals.

Results: five trials of sufficient quality were included. There was no clear evidence of benefit for CGA interventions in this population in terms of mortality [RR 0.92 (95% CI 0.55–1.52)] or readmissions [RR 0.95 (95% CI 0.83–1.08)] or for subsequent institutionalisation, functional ability, quality-of-life or cognition.

Conclusions: there is no clear evidence of benefit for CGA interventions in frail older people being discharged from emergency departments or acute medical units. However, few such trials have been carried out and their overall quality was poor. Further well designed trials are justified.

Keywords: acute care, comprehensive geriatric assessment, frailty, randomised controlled trial, systematic review, elderly

Introduction

As the population ages, health services are faced with the challenge of organising care that best meets the needs of older patients. This applies in all sectors of the health service, including acute care. While there have been many recent advances in providing acute care closer to home, or in community settings, older people remain the major consumers of hospital-based acute care services.

Over the past 10–15 years, most acute hospitals in the UK have developed acute medical units (AMUs) (98% of acute hospitals in one recent survey [1]). In contrast to conventional emergency departments (EDs), which cater for all emergencies in all age groups, AMUs provide rapid assessment and triage of adult patients attending with medical crises. This provides an efficient means of identifying those in need of immediate and urgent care, or facilitating early discharge (e.g. within 72 h) for those patients for whom longer in-patient care is deemed unnecessary. However, half of frail older people discharged home within 72 h from such settings are readmitted and one-third die within a year [2], with the majority of these events occurring in the first 90 days.

Comprehensive geriatric assessment (CGA) and management is usually defined as a ‘multidimensional diagnostic process focussed on determining a frail older person’s medical, psychological and functional capability in order to develop a coordinated and integrated plan for treatment and follow-up’ [3] and can improve outcomes for frail older people [4, 5]. There is robust evidence to support in-hospital CGA delivered in dedicated geriatric units [4, 5], rather than liaison services [6]. There is some evidence to support CGA in the community setting for frail older people [7]. Three systematic reviews to determine the best model of care for sub-acutely ill patients were unable to recommend any one particular model of care over another [8–10]. Several trials have tested CGA in the post-acute care period, for patients who have been hospitalised for many days or weeks and have shown benefits [9, 11, 12]. However, the evidence base regarding services for frail older people discharged rapidly from hospital back into the community has not previously been systematically reviewed [13].

The aim of this systematic review was to examine the evidence for services for older patients who developed a crisis and attended hospital, but who were assessed, treated and discharged, either immediately, or within a short-time period (up to 72 h) from an AMU or ED, a concept for which we have coined the phrase ‘interface geriatrics’.

Methods

The following databases were searched, from inception until September 2009:

- OVID MEDLINE(R) (1966+).
- EMBASE (1980+).
- BNI (1985+).
- HMIC.
- Cochrane Library.
- CINAHL.
- AGEINFO (<http://www.cpa.org.uk/ageinfo/ageinfo2.html>).
- ASSIA: Applied Social Sciences Index and Abstracts.
- The National Research Register (NRR) Archive (<http://portal.nihr.ac.uk/Pages/NRRArchive.aspx>).
- National Information Center on Health Services Research and Health Care Technology (NICHSR) (<http://www.nlm.nih.gov/nichsr/db.html>).
- NHS CRD DARE/HTA/EED (<http://www.crd.york.ac.uk/crdweb/>).

The following search terms were used (adapted from previous relevant reviews [3, 8, 13]):

- Acute care/sub-acute care/post-acute care/intermediate care/care continuum/integrated care/progressive care/transitional care (identifies the setting).
- Frail/geriatric assessment/health services for the aged/(geriatric unit or specialist geriatric or acute geriatric).mp./((elder\$ or older or geriatric\$ or aged) adj3 (unit or specialist)).tw./acute care for elder\$.ti./ (acute care adj3 elderly).mp./elder\$ unit\$.ab./geriatric\$ acute care.ab. (identifies the population/process).
- Activities of daily living/cost/cost benefit/cost effectiveness/mortality/health status/length of stay/discharge/readmission/quality of life/satisfaction/carer strain/carer burden (identifies the outcomes).

The search terms were refined for each database, to conform to the appropriate syntax and searching strategy required. We searched for randomised controlled trials (RCTs) only. Studies were selected if they met the following criteria:

- Included participants aged 65+ and.
- Addressed the care of frail older patients discharged rapidly (<72 h) from an acute hospital setting.
- Reported any of the outcomes listed in search term 3 as above, at any time up to 1 year.

Exclusions

- Trials scoring less than a mean of 9/19 on the van Tulder critical appraisal score [14].
- Trials covering condition specific interventions only (stroke, depression, cancer care, COPD, CCF, dementia, intensive care), but trials which included such specific conditions in the context of a broader intervention were eligible.
- Trials relating primarily to psychiatric disorders.
- Trials relating to interventions to reduce hospital use (e.g. hospital at home, sub-acute referral to geriatric day hospitals for admission avoidance).
- Trials relating to children or paediatric care.

The bibliographies from published studies identified from the electronic databases were scanned for references to other eligible studies. The search was re-run in October 2010 and no additional pertinent studies were identified.

The initial studies were screened for eligibility by one reviewer (S.C.) on the basis of the title and/or abstract. All retained studies were assessed by two reviewers using the Van Tulder scale, with scores ranging from 0 (lowest quality) to 19 (highest quality), with the mean score from the two reviewers calculated for each paper; this tool has been used in other similar systematic reviews concerning interventions for frail older people [4, 15]. Trials scoring less than a mean of 9 on the van Tulder critical appraisal score were excluded.

Analysis

Data were abstracted from the original papers by two reviewers (S.P., S.C.), and cross-checked for accuracy.

Dichotomous outcomes were expressed as risk ratios with 95% confidence intervals. We used fixed effects methods to combine the outcomes across studies, except when important heterogeneity was observed. Heterogeneity was quantified with the I^2 statistic, which measures the percentage of variation among studies due to heterogeneity rather than to chance. We considered heterogeneity to be important when I^2 was more than 30%. If it was deemed appropriate to combine studies when there was high heterogeneity, a random effects model was used; where it was not appropriate to combine studies (for example, the intervention being different between trials), results were presented within subgroups. Funnel plots were used to identify possible publication bias. Statistical analyses were carried out using Stata version 9.

Results

In the first stage, 3,399 abstracts were sifted by one reviewer (S.C.), 3,344 of which were not relevant. Fifty-five papers of potential relevance were then assessed in detail by two reviewers (S.C., T.S.). Seven papers met the inclusion criteria, and were graded by two reviewers (S.C., S.P.) (Figure 1).

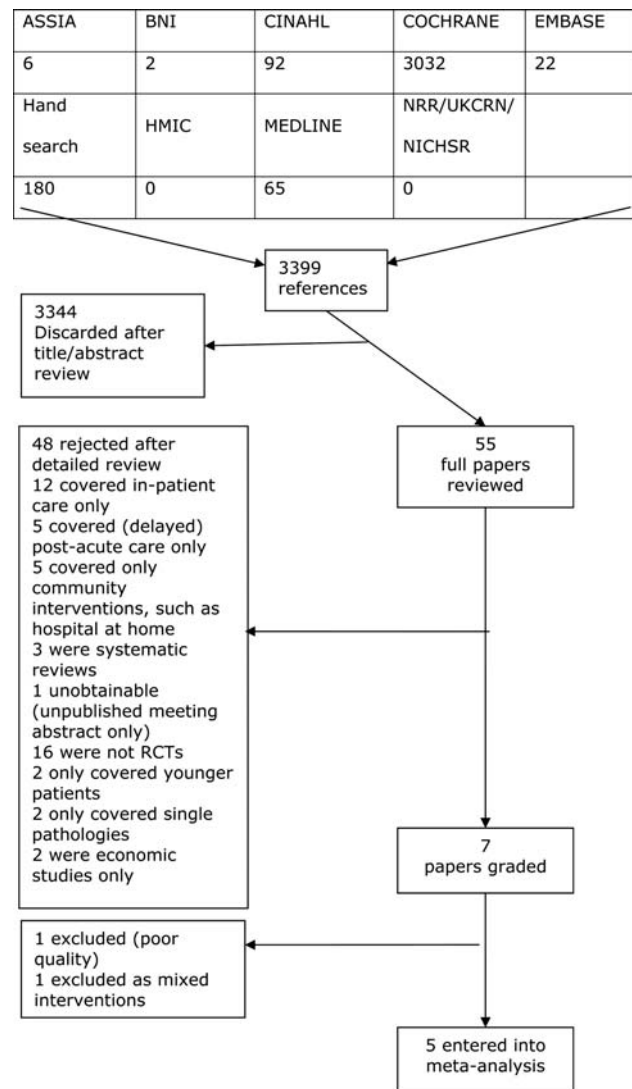


Figure 1. Selection of papers.

The overall quality of the trials was low; one trial scored only 7/19 (Caplan [16]) and was excluded (a sensitivity analysis including the results of this trial did not significantly alter the direction or precision of the estimates presented later). The mean van Tulder score for the remaining trials was 11.8/19. One paper was excluded [17] because relevant outcome data could not be extracted for patients discharged from the ED. No evidence for publication bias was found using funnel plots, but interpretation was difficult because of the small number of studies. The key characteristics of the remaining five trials are summarised in Table 1.

We found no trials evaluating interventions for frail older people being discharged from AMUs as commonly configured in the UK. Two trials related to providing geriatrician-led CGA focussing on falls prevention, for cognitively intact individuals who had attended the ED with falls but were discharged home [18, 19]. In both, the intervention was multifactorial and was provided on a semi-elective basis in the out-patient department or geriatric day

Table 1. Summary data from RCTs addressing care of frail older people at the primary/secondary interface

Author	Design	Mean van Tulder score	Setting	Intervention	Model	Population	Primary outcome	Main results, intervention: control
Davison <i>et al.</i> [18]	RCT	13.5	Two urban EDs	Hospital-based geriatric assessment, and home-based physiotherapy and occupational therapy assessment focussing on falls	Geriatrician led (OPD)	313 cognitively intact men and women over 65 years with a fall or fall-related injury and at least one fall in the preceding year. 159 randomised to intervention and 154 to usual care	Falls over 1 year	12 months Falls 435:1,251 (387:617 excluding outliers) Death 3/159:5/154 Fall-related admission 14/159:17/154
Caplan <i>et al.</i> [22]	RCT	11.5	Urban ED	Hospital or home-based, nurse-led CGA with weekly MDT supported by geriatricians	Nurse led	739 over 75 years. Discharged from ED. Randomised 370 to intervention, 369 to control	Hospital admissions in 30 days	30 days Readmission: 42/370:51/399 18 months Death: 55/370:53/399 Institutionalisation: 32/370:28/399 Admission: 164/370:201/399
McCusker <i>et al.</i> [20]	Pseudo-RCT	11	Four urban EDs	Brief, standardised geriatric nursing assessment in ED with geriatrician or emergency physician input as required, followed by referrals to the community services/GPs	Nurse led	10,826 attended ED; 7,921 assessed for eligibility, 5,766 excluded; 426 eligible (high ISAR score) and 388 consented 178 intervention, 210 control	Primary care physician and ED use over 30 days	30 days Death: 1/166:1/179 Return ED visit: 58/166:48/179
Mion <i>et al.</i> [21]	RCT	12.5	Two urban EDs	CGA led by an advanced practice nurse specialising in geriatrics, liaison with emergency staff, referral to community services as appropriate and short-term case management	Nurse led	2,815 screened, 987 eligible, 650 enrolled, 450 randomised, 226 intervention: 224 control	Death, repeat ED use, hospitalisation, nursing home transfer, at 120 days	30 days Death: 4/326:2/324 Return ED visit: 66/326:49/324 Institutionalisation: 2/326:9/324 Return ED visit: 46/326:46/324 120 days Death: 9/326:10/324 Return ED visit: 121/326:128/324 Institutionalisation: 91/326:87/324
Close <i>et al.</i> [19]	RCT	10.5	Urban ED	Geriatrician led, day hospital delivered CGA and single OT home visit. Day hospital referral for MDT if required.	Geriatrician led (OPD)	Over 65 years presenting with a fall to A&E. 1,031 screened. 397 randomised. Intervention 184: control 213.	Falls over 1 year	12 months Cumulative number of falls 183:510 Death: 19/184:27/213 Institutionalisation: 18/184:18/213 Hospital admission: 69/184:97/213

ED, emergency department; CGA, comprehensive geriatric assessment; OPD, out-patients' department; MDT, multi-disciplinary team; OT, occupational therapy.

hospital. Three trials used rapid-access, nurse-led, geriatrician-supported comprehensive assessment and management of older people seen in an ED but discharged to their own homes [20–22].

Mortality

All five trials reported mortality at final follow-up, which varied in length between trials (one reported at 1 month, one at 4 months, two at 12 months and one at 18 months). There was no significant difference in mortality at final follow-up when combining data for the five trials— $n = 2,474$, risk ratio 0.92 (95% CI 0.55–1.52) (Figure 2).

Mortality at 1 month was only reported in two trials (McCusker, Mion) involving 995 patients—overall risk ratio 1.61 (95% CI 0.37–6.94) for mortality at 1 month.

Institutionalisation

Three of the five trials reported institutionalisation at final follow-up for a total of 1,816 individuals, again with differing follow-up periods (Mion—4 months, Close—12 months, Caplan—18 months) (Figure 3).

There was significant heterogeneity ($I^2 64\%$), and it was felt inappropriate to combine all three trials using a random effects model—the Mion and Caplan trials were predominantly nurse-led CGA and the Close trial was

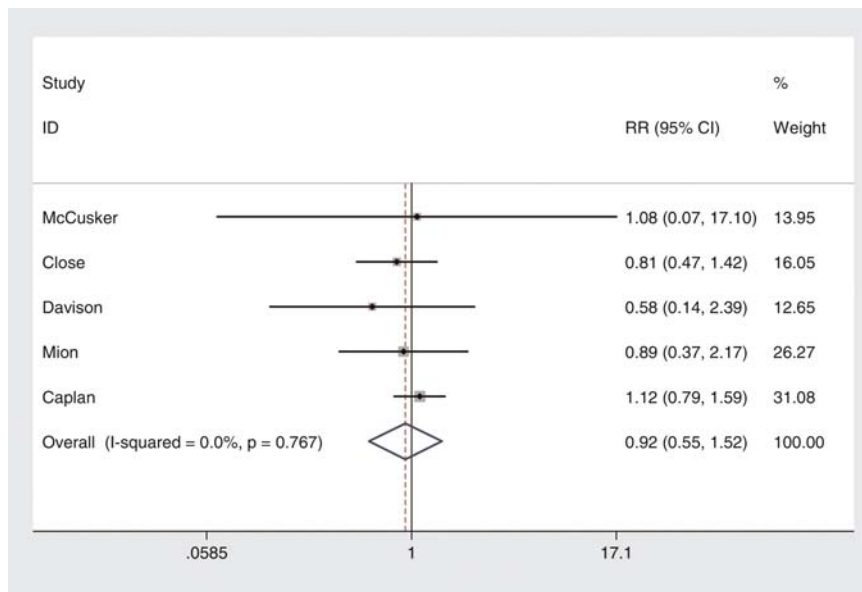


Figure 2. Mortality at final follow-up for CGA interventions in patients being discharged from urgent care settings.

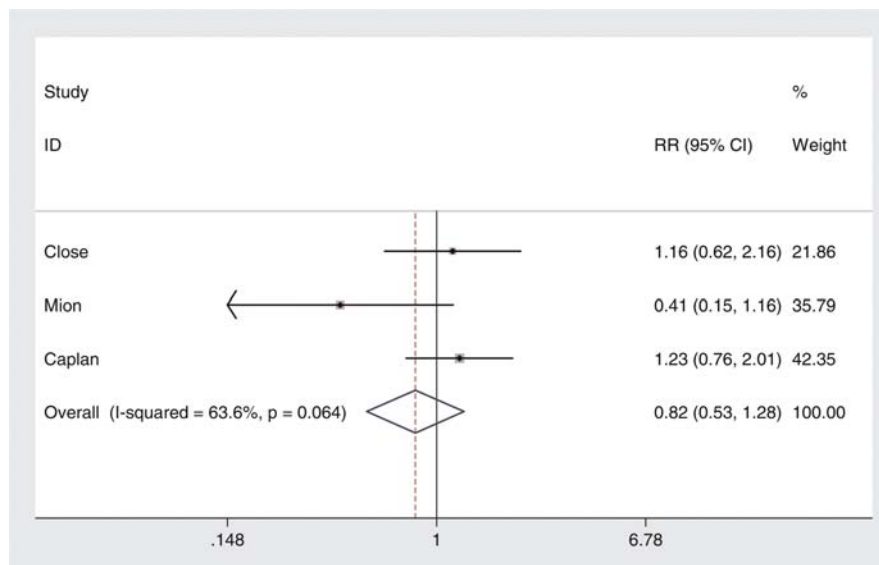


Figure 3. Institutionalisation at final follow-up for CGA interventions in patients being discharged from urgent care settings.

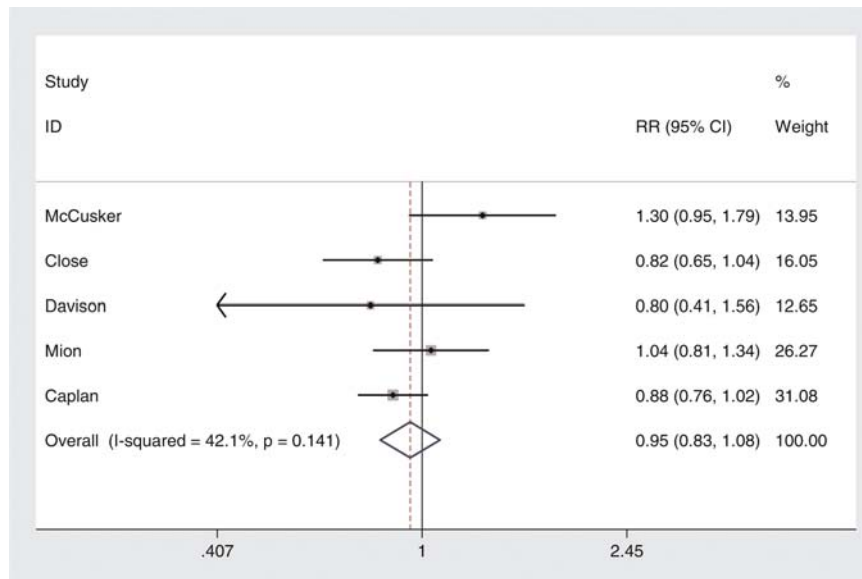


Figure 4. Readmissions at final follow-up for CGA interventions in patients being discharged from urgent care settings.

predominantly geriatrician-led CGA. In the Mion and Caplan trials, there was a clinically meaningful, but statistically non-significant trend towards reduced institutionalisation at final follow-up [risk ratio 0.75 (95% CI 0.44–1.29)]. In the Close trial, there was a non-statistically significant trend towards increased institutionalisation [risk ratio 1.16 (95% CI 0.62–2.16)].

Functional outcomes

Only one trial reported function (Close), using the Barthel score at 12 months of follow-up for 397 patients. The standardised mean difference on the 20-point Barthel score was 0.41 (95% CI 0.21–0.61) in favour of the intervention. This is of doubtful clinical importance.

Quality-of-life

The quality-of-life was only reported in one trial (Mion). At 4 months there was a mean difference of 0.2 (95% CI –1.9–2.3) in the physical component of the SF36, and 0.6 (95% CI –1.3–2.5) difference in the mental component of the SF36—both in favour of the intervention, although these differences are not clinically meaningful.

Cognition

One trial (Davison) reported cognition at 12 months, using the Mini-Mental State Examination. The mean difference (on a 30-point scale) was 0.5 (95% CI –0.3–1.2) in favour of the control group; this is unlikely to be clinically important.

Readmissions

All of the trials reported readmissions as an outcome, over variable periods of time. Over the full follow-up period for each the five trials ($n = 2,474$), there was no significant difference in readmissions comparing control to intervention groups [risk ratio 0.95 (95% CI 0.83–1.08)] (Figure 4). However, I^2 was 42% indicating some heterogeneity in the trials.

An analysis by intervention type revealed that the predominantly nurse-led interventions (Caplan, McCusker and Mion, $n = 1,764$) gave a risk ratio for readmission of 1.01 (95% CI 0.89–1.15), whereas the predominantly geriatrician-led intervention trials ($n = 710$) gave a risk ratio for readmission of 0.81 (95% CI 0.59–1.12).

Three trials reported readmissions at 1 month (Caplan, McCusker and Mion), involving 1,764 patients. There was no overall difference in readmissions comparing the intervention against the control groups—risk ratio 1.0 (95% CI 0.8–1.3), I^2 34%.

Discussion

This systematic review analysed the results from RCTs which addressed care for frail older people being discharged within 72 h from acute hospital settings or EDs. Two broad models of care to improve outcomes in this group have been evaluated, and both are forms of CGA—nurse-led CGA and geriatrician-led CGA. The interpretation is complicated by the fact that the geriatrician-led service was focused on a single clinical syndrome (falls), while the nurse-led services were not condition specific.

The evidence base was small (five studies) and not all studies reported all outcomes. The confidence intervals for all our outcomes of interest were wide enough to be compatible with clinically important benefit and harm. The

advantage of this review is that it was systematic and only considered robust trial evidence. The main limitation of this review is that information that might be less robust, but nevertheless illuminating, was excluded. Interpretations from the data presented should be cautious given the small number of trials evaluated and high heterogeneity documented.

Although the evidence in favour of CGA in general is overwhelming [4, 5, 7–10, 23], we found no firm evidence that any form of CGA in this setting and to this group has any effect on mortality, long-term institutionalisation, subsequent use of acute care, physical function, quality-of-life or cognition. Given this uncertainty, we cannot claim to have identified any particular model of care which realises the benefits of CGA in acute, short-term inpatient care settings. This is important because there has been recent growth in the use of AMUs for adult patients of all ages, and including frail older people. These units provide short-term acute care and are generally not provided with systematic or specific care pathways for frail older people. Nevertheless, frail older people form a significant component of their clientele. Clearly this implies that the development of interventions aiming to improve the outcomes of patients discharged rapidly from AMUs are justified, including their evaluation in further well-conducted randomised trials with cost-effectiveness analyses.

Key points

- Frail older people discharged from acute hospitals within 72 h have poor outcomes.
 - CGA can improve outcomes for frail older people in acute care settings.
 - Few trials have evaluated the role of CGA in frail older people being discharged rapidly from acute care settings.
 - The evidence from existing trials of CGA in frail older people at the acute-community interface is uncertain.
 - Further well-designed trials of CGA in frail older people at the acute-community interface are justified.
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Conflicts of interest

None declared.

Funding

This article presents independent research commissioned by the National Institute for Health Research (NIHR) under its Programme Grants for Applied Research funding scheme (RP-PG-0407-10147). The views expressed in this article are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health.

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- Received 8 December 2010; accepted in revised form 28 March 2011**