Ortho-geriatric care models and outcomes in hip fracture patients: a systematic review and meta-analysis
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CRD summary
This review concluded that collaboration between orthopaedic surgeons and geriatricians could improve mortality after hip fracture. This conclusion reflects the evidence presented, but was mainly based on data for routine geriatric consultation and the applicability of the findings to other models of care is uncertain.

Authors' objectives
To assess whether models of care involving collaboration between orthopaedic surgeons and geriatricians improved outcomes for patients following hip fracture.

Searching
The authors searched MEDLINE, CINAHL, EMBASE and Cochrane Central Register of Controlled Trials (CENTRAL) for studies published between 1992 and July 2012. Search terms were reported. Reference lists of review articles were scanned to identify additional studies.

Study selection
Studies were eligible if they compared a multidisciplinary approach to in-patient hip fracture management (involving collaboration between an orthopaedic surgeon and a geriatrician) with usual care. Usual care was defined as medical or geriatric consultation at the request of the surgeon. The outcomes of interest were in-hospital or long-term (six to 12 months) mortality, length of hospital stay and time to surgery. Studies focusing on rehabilitation or care after discharge were excluded, as were those not published in English or Spanish.

The mean age of patients in the included studies ranged from 75 to 86.8 years. Study settings and interventions were not described.

Two reviewers independently selected studies for inclusion; disagreements were resolved by discussion or by consulting a third reviewer.

Assessment of study quality
Study quality was graded as good, fair or poor based on the criteria of the US Preventative Services Task Force. The authors did not state how many reviewers assessed quality.

Data extraction
Data were extracted to calculate relative risks for dichotomous outcomes, and standardised mean differences for continuous outcomes, both with associated 95% confidence intervals. Where studies did not report continuous outcomes as the mean and standard deviation, these were estimated following the guidelines of the Cochrane Collaboration.

The authors did not state how many reviewers extracted the data.

Methods of synthesis
The data were pooled by meta-analysis using a random-effects model. A minimum of three studies reporting an outcome were required for meta-analysis. Heterogeneity was quantified using I². Publication bias was investigated in funnel plots and analysed statistically using the methods of Peter and Egger.

Subgroup analysis was used to investigate three models of multidisciplinary care: routine geriatric consultation; care on geriatric wards with the orthopaedic surgeon acting as a consultant; and shared care on an orthopaedic ward, but with the geriatrician as an integral part of the team.
Results of the review
Eighteen studies (9,096 participants) were included: eight were randomised controlled trials, four were prospective cohorts with retrospective controls, and six were retrospective chart reviews. Ten studies evaluated routine geriatric consultation, three evaluated geriatric wards and five evaluated shared care on orthopaedic wards. Seven studies were rated good quality and 11 were rated fair quality.

Compared with usual care, multidisciplinary care significantly reduced in-hospital mortality by 40% (RR 0.60, 95% CI 0.43 to 0.84; $I^2=28\%$) and long-term mortality by 17% (RR 0.83, 95% CI 0.74 to 0.94; $I^2=0$). There was a small but statistically significant difference in length of stay (SMD -0.25, 95% CI -0.44 to -0.05; $I^2=96\%$).

Routine geriatric consultation significantly reduced in-hospital (RR 0.51, 95% CI 0.38 to 0.69; $I^2=0$) and long-term (RR 0.78, 95% CI 0.65 to 0.95; $I^2=0$) mortality, but not length of stay. Data for the other two models were limited (details in the paper).

Evidence of possible publication bias was found for length of stay.

Authors’ conclusions
Collaboration between orthopaedic surgeons and geriatricians could improve mortality after hip fracture.

CRD commentary
The review question and inclusion criteria were clear. Broad inclusion criteria for study design increased the available evidence, but potentially increased the risk of selection and other bias affecting the review. The search covered a range of relevant sources, but language restrictions mean that some relevant studies could have been omitted. Review methods were variably reported, but it seems unlikely that reviewer error and bias influenced the findings.

Study quality was assessed using standard criteria, but detailed results were not reported, making it difficult to assess the risk of bias, but the authors reported that study quality was good or fair. Limited study details were reported, making it difficult to assess the generalisability of the findings to the UK. Meta-analysis was performed, using standard methods, with subgroup analyses to investigate different models. Statistical heterogeneity was high for length of stay, which also showed evidence of publication bias, casting doubt on the reliability of the meta-analysis for this outcome.

The authors’ conclusion of a beneficial effect on mortality reflects the evidence presented and appears to be reliable, but limitations in the evidence and the review suggest some uncertainty about the magnitude of the effect. Most of the studies in the meta-analyses involved routine geriatric consultation and the findings may not be generalisable to other models of care. The authors’ suggestions for further research seem appropriate.

Implications of the review for practice and research
Practice: The authors stated that geriatric consultation as needed should be avoided in favour of scheduled consultation or shared care for older patients with hip fracture.

Research: The authors stated that research was needed to compare different models of multidisciplinary care and to evaluate outcomes such as function, quality of life and patient and physician satisfaction. Future studies should improve the standardisation of outcome reporting.

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