Review: evidence from individually randomised trials shows that hip protectors do not reduce hip fractures in elderly people

Parker MJ, Gillespie LD, Gillespie WJ. Hip protectors for preventing hip fractures in the elderly. *Cochrane Database Syst Rev* 2004;(3):CD001255.

Q Do hip pads or protectors worn about the hip reduce the risk of hip fracture in elderly people?

METHODS

Data sources: Cochrane Musculoskeletal Injuries Group trials register (February 2004), Cochrane Central Register of Controlled trials (Issue 1, 2004), Medline (1966 to February 2004), EMBASE/Excerpta Medica (1988 to week 8, 2004), CINAHL (1982 to February 2004); reference lists of relevant articles; and contact with trialists. Ongoing trials were identified in the National Research Register and Current Controlled Trials (both accessed February 2004).

Study selection and assessment: randomised controlled trials (RCTs) or quasi-RCTs that compared hip protectors with no hip protectors for reducing the incidence of hip fracture in elderly people living in the community or in institutional care. Methodological quality of individual studies was assessed based on 10 aspects of methodology (eg, method of randomisation, allocation concealment, and minimum follow up of 12 mo), yielding a maximum score of 12.

Outcomes: hip fractures, pelvic fractures, other fractures, mortality, adherence, and complications.

MAIN RESULTS

14 RCTs (n = 11 018, mean age 78–86 y) met the selection criteria. All trials used protective hip pads placed in the region of the greater trochanter; pads were usually fixed or sewn into special underwear. Most hip protectors had an energy shunting design. Mean methods score was 8 out of 12.

9 trials used individual randomisation (mean methods score 9), and 5 used cluster randomisation (mean methods score 7). Data from cluster RCTs were not pooled with data from individually randomised trials because neither intraclass correlation coefficients nor individual patient data were available.

An uncorrected exploratory analysis of cluster RCTs seems to support the effectiveness of hip protectors for preventing hip fractures (5 trials, n = 4316; 2.7% *v* 6.4%, relative risk reduction 60%, 95% CI 45 to 71). However, meta-analysis of 8 individually randomised trials (using a fixed effects model) found no difference between those assigned to use and non-use of hip protectors for hip fractures, pelvic fractures, other fractures, or mortality (table).

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13 trials reported on adherence using a variety of measures; estimates ranged from 24–70%. Adverse effects reported primarily related to skin irritation.

CONCLUSIONS

Data from studies using individual randomisation indicate that hip protectors do not reduce hip fractures, pelvic fractures, other fractures, or mortality in elderly people living in residential care or in the community. Exploratory analyses of studies using cluster randomisation suggest that hip protectors may reduce hip fractures.

Commentary

The systematic review by Parker *et al* raises important questions about the effectiveness of programmes that provide older people with hip protectors. An earlier version of this review concluded that hip protectors were effective, but this was based on relatively weak evidence primarily from poorly designed cluster RCTs.[1] More recent evidence includes several individually randomised trials, leading to the overall conclusion that no evidence of effectiveness exists.

Cluster randomised trials are quite appropriate for interventions such as this. It could be that increased vigilance resulting from the use of protectors could "contaminate" control patients in an institution where randomisation is at the level of the individual and thus mask a true effect. Such contamination is unlikely to occur in the community, and so this cannot entirely explain the different conclusions.

Poor patient adherence with hip protectors was noted in most studies and is discussed by Parker *et al*. However, the point estimate of effect for hip fracture is small and shows a slight risk *increase*, and so low power and diluted effect, although possible, are unlikely to explain the findings.

Evidence-based practice demands that practitioners be prepared to reappraise their beliefs in light of new evidence. Because there is some laboratory evidence suggesting benefits of hip protector use[2] and some weak clinical evidence in this review of the benefits of protector use in institutions, it seems premature to advise individuals who wish to use hip protectors to stop. However, other than in these circumstances, given the lack of evidence of effect and the existence of evidence that hip protectors are not generally acceptable to clients, there seems little to justify their use outside of properly designed research programmes. Practitioners would do better to concentrate their efforts on implementing interventions known to prevent falls.[3]

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1 Parker MJ, Gillespie LD, Gillespie WJ. *Cochrane Database Syst Rev* 2001;(2):CD001255.
2 Lauritzen JB, Askegaard V. *Dan Med Bull* 1992;**39**:91–3.
3 Gillespie LD, Gillespie WJ, Robertson MC, *et al*. *Cochrane Database Syst Rev* 2003;(4):CD000340.

Hip protectors *v* no hip protectors in elderly people living in the community or in institutional care (data from individually randomised trials only)*

Outcomes	Number of trials (n)	Hip protectors	No hip protectors	RRI (95% CI)
Hip fractures	8 (6561)	3.8%	3.4%	4% (−34 to 20)
Pelvic fractures	7 (6490)	0.8%	0.7%	4% (−69 to 46)
Mortality	5 (5576)	13%	12%	5% (−9 to 18)
				RRR (CI)
Other fractures	7 (6490)	5.4%	6.8%	15% (−5 to 30)

*Abbreviations defined in glossary; RRI, RRR, and CI calculated from data in article.

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