Concurrent ipsilateral fractures of the hip and femoral shaft: a meta-analysis of 659 cases

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Authors' objectives
To compare the different methods of treatment for concurrent ipsilateral fractures of the hip and femur.

Searching
Index Medicus was searched from 1970 to 1994, and relevant databases on SilverPlatter from 1983 to June 1995, using the strategy of fractures of femoral neck and trochanteric area concomitant with ipsilateral fractures of the femoral shaft. Reference lists from all publications in English, French and German were examined. Any studies identified prior to 1970 were included, whilst duplicate publications of the same results were excluded.

Study selection
Study designs of evaluations included in the review
Retrospective studies with at least 15 cases with sufficient data on demographic characteristics and mechanisms of injury. No definitions are provided of sufficient data or the characteristics. In addition, studies were only selected where at least 4 cases had been treated by the same methods.

Specific interventions included in the review
The interventions included conservative, ender nails and pins, plate and screws, intramedullary nail, locked intramedullary nail, locked nail (opposite sided) and cephalomedullary nail.

Participants included in the review
Patients with concurrent ipsilateral fractures of the hip and shaft. No other patient characteristics are stated.

Outcomes assessed in the review
The interventions were assessed through a classification of outcomes into 3 categories: excellent or good (combined), fair and poor. Cases that were excellent or good included healed fractures, no malunion, and no reported reduction in function. Fair results included malunion with shortening of greater than 2cm, malrotation of greater than 20 degrees and malalignment of greater than 10 degrees. Cases classified as poor had amputations, persistent nonunion, or need for crutches or walker.

How were decisions on the relevance of primary studies made?
The author does not state how the papers were selected for the review, or how many of the reviewers performed the selection.

Assessment of study quality
Studies were only selected where at least 4 cases had been treated by the same methods The author does not state how the papers were assessed for validity, or how many of the reviewers performed the validity assessment.

Data extraction
The author does not state how the data were extracted for the review, or how many of the reviewers performed the data extraction.

Methods of synthesis
How were the studies combined?
A narrative synthesis was undertaken of the complications associated with the different treatments and their classification into excellent or good (combined), fair and poor, based on outcome.
How were differences between studies investigated?
Comparison of demographic and epidemiological characteristics. The relationship between treatment type and outcomes were tested using the chi-squared test.

Results of the review
Twenty studies (163 cases) were included in the analysis of treatment techniques and outcomes.

Conservative or closed treatment (skeletal traction and spica cast) tended to have high rates of complications due to malunions, compared to open treatment, as reflected in the classification of 10 patients as excellent or good and 5 patients as fair. Ender nails performed poorly compared to other internal fixation devices (5 patients classified as excellent or good, 2 patients as fair and 2 patients as poor), tending to fail to control fractures and malunions resulting in nonunions. Neither conservative treatment or ender nails are used widely.

The use of screw or screw plate fixation appeared effective for ipsilateral fractures, but complication rates for shaft fractures were comparatively high. Reoperations, malunions, nonunions and infections associated with shaft fractures underlie the classification of 8 patients as fair and 9 patients as poor, with 65 patients as excellent or good. Combinations of intramedullary nailing of the femoral shaft and screw or pin fixation of the femoral neck have been used where hip fractures were undiagnosed at nailing. Complications, such as reoperation, malalignments, nonunions, infections and avascular necrosis, show limited significant difference between intramedullary nailing with screw or pin fixation, and plate fixations (62 patients excellent or good, 6 patients fair and 5 patients poor).

Interlocking intramedullary nailing improves rotational stability and prevents shortening of comminuted fractures. Of the 48 patients with interlocking intramedullary nailing, 46 were classified as excellent or good and 2 as fair; the number of fair and poor patients was significantly fewer than for plate fixation (P=0.02) and marginally lower than for unlocked nails (P=0.1). Similarly, reoperations were less with locked nailing than after plate fixation (P=0.08) or unlocked nails (P=0.04). Used obliquely, the locked nail was associated with significantly higher complications (P=0.006) than regular locked nailing and separate hip screws (9 patients excellent or good, 2 patients fair and 2 patients poor). Cephalomedullary nailing, where screws slide in the hole of the nail, provide strength against bending. These second generation nails did not perform significantly differently to first generation locked nails (24 patients excellent or good and 1 patient fair). All forms of locked nails performed significantly better than plate fixation (P=0.004) or unlocked nailing (P=0.04).

Cost information
Whilst a cost-benefit analysis is mentioned, no detail is provided.

Authors’ conclusions
Ipsilateral fractures in the hip and femoral shaft are predominantly due to traffic accidents and mainly occur in young men. Reduction in associated morbidity was associated with early diagnosis and efficient treatment of the shaft fractures. Locked intramedullary nails yielded results that were superior to combinations of plates or unlocked nails and separate hip screws. Cephalomedullary nails gave results equal to those of customary locked nails and separate hip screws. The rate of healing of the hip fracture was above 99%, determined principally by treatment of shaft fractures.

CRD commentary
The review fails to provide the detail necessary for an adequate systematic review, despite being classified by the authors as a meta-analysis. No discussion is provided on the criteria or methods used for assessing the validity and relevance of the primary studies, or the method of extracting data from the studies. Inadequate detail is provided on the characteristics of the participants of the studies, so limited judgement can be made on the differences between the studies and the appropriateness of the synthesis of results.

Statistical analysis using a two-dimensional contingency table and Pearson chi-squared tests are discussed in the Materials and Methods section, but there is limited evidence of these within the results. Similarly, a system of
classifications for treatments, which provides a method of assessing outcome, receives limited discussion. In fact, the analysis relies on a narrative discussion.

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