Injury, Int. J. Care Injured 46S (2015) S47–S51

Contents lists available at ScienceDirect

Injury

journal homepage: www.elsevier.com/locate/injury

Proximal femoral fractures: Can we improve further surgical treatment pathways?

Henrik Palm [a,*], Jordi Teixidor [b]

[a] Department of Orthopaedic Surgery, Copenhagen University Hospital, Hvidovre, Denmark
[b] Department of Orthopaedic and Trauma Surgery, Hospital Universitari Vall d'Hebron, Universitat Autónoma de Barcleona (UAB), Spain

ARTICLE INFO

Keywords:
Hip fractures
Surgery
Pathway
Guideline
Algorithm
Recommendation
Re-operation

ABSTRACT

Background: In hip fracture surgery, the exact choice of implant often remains somewhat unclear for the individual surgeon, but the growing literature consensus has enabled publication of evidence-based surgical treatment pathways. The aim of this article was to review author pathways and national guidelines for hip fracture surgery and discuss a method for future pathway/guideline implementation and evaluation.
Methods: By a PubMed search in March 2015 six studies of surgical treatment pathways covering all types of proximal femoral fractures with publication after 1995 were identified. Also we searched the homepages of the national heath authorities and national orthopedic societies in West Europe and found 11 national or regional (in case of no national) guidelines including any type of proximal femoral fracture surgery.
Results: Pathway consensus is outspread (internal fixation for un-displaced femoral neck fractures and prosthesis for displaced among the elderly; and sliding hip screw for stabile- and intramedullary nails for unstable- and sub-trochanteric fractures) but they are based on a variety of criteria and definitions – and often leave wide space for the individual surgeons' subjective judgement. Appearing neither exhaustive nor exclusive, most of the pathways seem difficult to evaluate scientifically, which might explain why only very few have been evaluated for compliance, reliability and complications after implementation in an actual clinical setting. We therefore introduce a model for step-wise pathway implementation including proper scientific evaluation.
Conclusions: Surgical treatment pathways for proximal femoral fractures are available in literature and nationally with somewhat evidence based treatment consensus, but the scientific evaluation of the pathways them selves needs to be optimised.

Introduction

The published evidence in the last decades has created some sort of consensus for surgical treatment of proximal femoral fractures. However, in everyday clinical practice, the exact choice of implant often remains somewhat unclear for the individual surgeon, and here easily used evidence-based surgical treatment pathways covering all types of proximal femoral fractures are warranted.

Many articles recommend treatment for some aspects of surgery, but only a few authors have published definite more or less illustrated decision-tree algorithms for surgical treatment of proximal femoral fractures [1–6]. In some West European countries, national guidelines for many aspects of hip fracture treatment have emerged during the last decade, including recommendations for surgical choice of implant [7–17].

To the best of our knowledge a review of the present surgical treatment pathways for proximal femoral fractures has not been presented before. The aim of this article was therefore to present such a review and to discuss the possibilities for future pathway improvements and clinical evaluation. We hypothesised that the pathways would have recommendation similarities due to the emerging surgical consensus in literature, but also expected local assimilations and lack of proper scientific evaluation in an everyday clinical setting.

Materials and methods

We searched PubMed in March 2015 to identify all studies investigating surgical treatment pathways covering proximal femoral fractures. We used the search term: "Hip Fractures/surgery"

* Corresponding author. Tel.: +45 38 62 25 79.
E-mail address: hpalm@dadlnet.dk (H. Palm).

http://dx.doi.org/10.1016/j.injury.2015.08.013
0020–1383/

[Mesh]) AND (Guideline OR Algorithm OR Pathway OR recommendation). All relevant references on the identified articles were also reviewed. 197 relevant studies were identified with publication after 1995. The most common pathway findings were multidisciplinary approach guides, with some recommendations also about the surgical treatment, but not covering all hip fractures. 191 studies were excluded, leaving 6 articles concerning a pathway for the surgical treatment of all types of proximal femoral fractures for further evaluation in this review (Fig. 1) [1–6].

For identifying the national guidelines in West Europe, we searched the homepages of the national heath authorities and national orthopedic societies in Norway, Sweden, Denmark, England, Scotland, Ireland, Germany, Holland, Belgium, Luxembourg, France, Switzerland, Austria, Italy, Spain and Portugal. Eleven identified national (two different societies in Spain) or regional guidelines (two regional as no national one in Italy) included recommendations for surgical choice of implant for any type of proximal femoral fractures and were included into this review [7–17]. Only the latest version of a national guideline was included. Germany and Austria had a united national guideline, but it is covered by an "outdated" heading and thus not included in this study [18].

Results

In total, 6 articles of author pathways [1–6] covering all proximal femoral hip fractures, and 11 national or regional (9 countries) guidelines [7–17] for any type of proximal femoral fracture surgery were identified and are listed in Table 1. The pathway by Mak et al. [5] could be seen as a somewhat update of the one by Chilov et al. [3] but both are included, as they represent two individual articles with in fact different recommendations. Not all countries has guidelines and the extent is different, exemplified by an osteoporosis guide with a few comments on hip fracture surgery in Norway [8], to a very comprehensive and profound guideline covering 664 pages in England [12].

Pathway consensus is outspread for some overall surgical recommendations, which are, as expected, characterised by the same published evidence of clinical implant studies. When mentioned, the pathway goal is to reduce cost of social and economical burdens; this by optimise the choice of implant and thereby reduce the reoperation rate [14,16,17] and also to achieve allowance of immediate full weight bearing [12,14–17]. The necessity for experienced surgeons is not commonly emphasised [6,7,10–12]. Implant choice is based on fracture classification, but with great variance also on other patient characteristics. All pathways divide into intra- or extra-capsular fractures [1–17].

Among the intra-capsular fractures, all seem to recommend internal fixation (IF) in undisplaced femoral neck fractures (U-FNF), and to some extend prosthesis for displaced femoral neck fractures (D-FNF) in elderly patients. Here, some pathways divide by chronological age (varying from 60 to 80 years), while other underline the use of patients' physiological/biological age or just divide into groups of old and young, in which some suggests open reduction [1,14,15,17]. Other factors are highly variably taken into account, such as perioperative mortality-risk, co-morbidity and cognitive status, fracture comminution and/or posterior tilt – and in case of surgical delay, arthritis, pathological bone, failed IF, intact cognitive function and/or among the mobile younger patients, a total hip replacement is often recommended [12–17]. Also arguments are for the anterolateral approach[7,12] and cementation in the oldest [7,10–17]. For fracture classification, the dichotomized Garden with U-FNF (Garden Stage I–II) [19] and D-FNF (Garden Stage III–IV) [19] is wide-spread, but some add that the vertical Pauwels type 3 [20] is insufficiently treated with parallel implants and should be given a SHS ± a cannulated screw [6,9].

Among the extra-capsular fractures, a sliding hip screw (SHS) is recommended for the stable fractures (often defined as AO/OTA

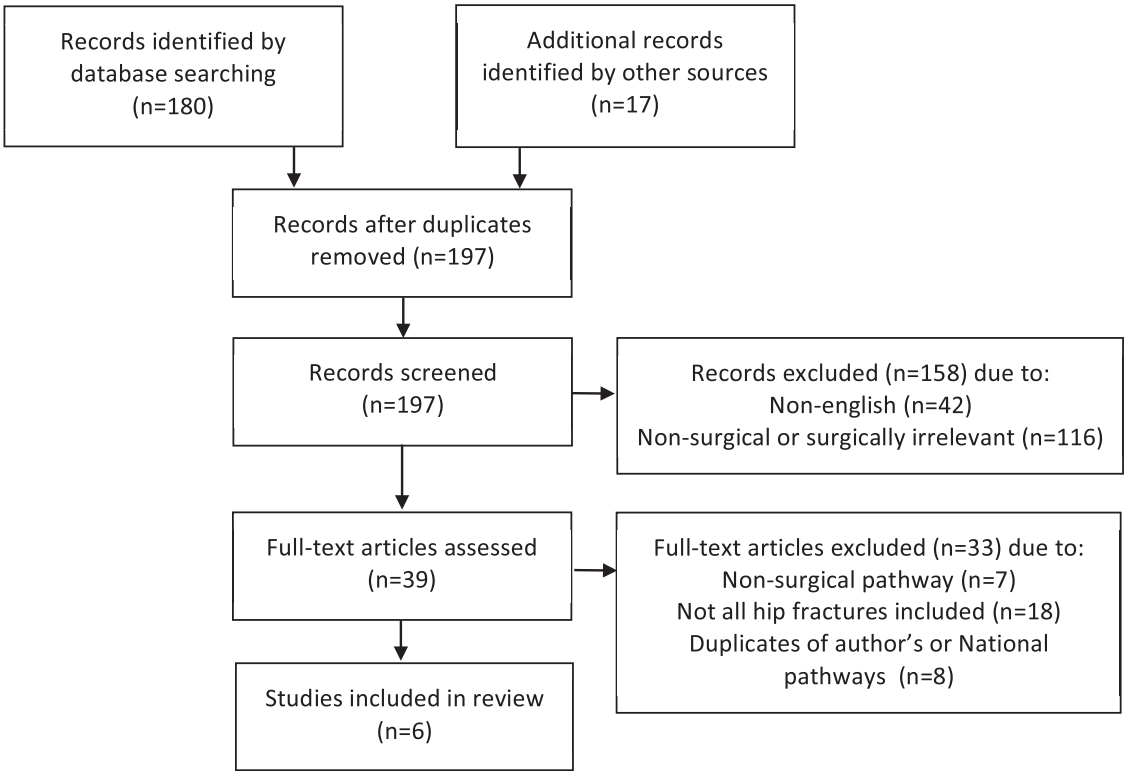

Fig. 1. PRISMA flowchart of identified author surgical pathways covering all proximal femoral fractures.