بسم الله الرحمن الرحيم

تم رفع هذه الرسالة بواسطة / سلوي محمود عقل

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

ملاحظات:
.....
.....
.....
.....
.....

Primary Arthroplasty versus Open Reduction and Internal Fixation of Distal Femur Fractures in Elderly Patients: A Systematic Review

A systematic Review

Submitted for Partial Fulfillment of Master's Degree in Orthopedic Surgery

By

Mahmoud Hassan Mahmoud Ezzat Rezk
M.B.B.CH

Supervised by

Prof. Dr. Wael Samir Osman
Professor of Orthopedic Surgery
Faculty of Medicine - Ain Shams University

Dr. Mostafa Aly Elabd
Lecturer of Orthopedic Surgery
Faculty of Medicine - Ain Shams University

Faculty of Medicine
Ain Shams University
2021

Acknowledgement

First of all, all gratitude is due to ***Allah*** *almighty for blessing this work, until it has reached its end, as a part of his generous help, throughout my life.*

Really I can hardly find the words to express my gratitude ***Prof. Dr/. Wael Samir Osman*** *Professor of Orthopedic Surgery Ain Shams University, for his supervision, continuous help, encouragement throughout this work and tremendous effort he has done in the meticulous revision of the whole work. It is a great honor to work under her guidance and supervision.*

I would like also to express my sincere appreciation and gratitude to ***Dr. Mostafa Aly Elabd*** *Lecturer of Orthopedic Surgery Ain Shams University, for his continuous directions and support throughout the whole work.*

Mahmoud Hassan Rezk

List of Contents

List of Figures

List of Figures

List of Tables

List of Abbreviations

Abb.	Full term

ASA.....*American Society of Anaesthesiologists*

DFF.....*Distal Femur Fracture*

DFR .....*Distal Femur Replacement*

DVT .....*Deep venous thrombosis*

ILN .....*Inter-Locking Nail*

IMNs.....*Intra-Medullary Nails*

ORIF.....*Open Reduction and Internal Fixation*

OTA .....*Orthopaedic Trauma Association*

PRISMA .....*Preferred Reporting Items for Systematic Reviews and Meta-Analyses*

PTA.....*Post-Traumatic Arthritis*

RIN .....*Retrograde Intramedullary Nail*

ROM .....*Range Of Motion*

SSI.....*Surgical Site Infection*

TCP.....*Total Condylar Prosthesis*

TKA.....*Total Knee Arthroplasty*

INTRODUCTION

Distal femur fractures occur in elderly because of the falls in osteoporotic individuals, representing 1% of all fractures and 4-6% of all femoral fractures. They are the second most common type of femoral fracture in the elderly following proximal femoral fractures.[1]

Distal femur fractures management in elderly is challenging because of the poor bone quality, possible pre-existing implants, either knee or hip arthroplasty, and impaired compliance during rehabilitation in mentally and physically restricted patients, besides, the high mortality rates, which is up to 33% after 12 months and 50% after 5 years.[2]

The treatment of distal femur fractures in the elderly can be conservative or operative depending on fracture morphology and patients' characteristics. Fractures can be conservatively managed with plaster casts or braces, as well in patients with increased operative risks or with very low functional demands, especially non-ambulatory patients. However, surgical management is the most widely accepted management for displaced distal femur fractures, with the aim to restore length, alignment and rotation, as well as restoring articular congruence of intra-articular fractures.[3]

Closed, minimally invasive or open reduction and internal fixation (ORIF) with a nail or a plate are the most commonly used techniques.[4] various implants and techniques

for internal fixation of distal femur fractures are available including intramedullary nailing with different distal locking features, lateral locking plates.[5]

The outcome of surgical treatment depends on various factors that includes patient's characteristics, fracture type and the respect of soft tissues which allows preserving the biology of bone healing. Technical difficulties arise from metaphyseal comminution, presence of small articular fragments, also, the presence of osteosynthesis devices or prosthetic implants (hip or knee prosthesis) that is not infrequent in distal femur fractures in elderly patients.[6]

Primary total knee arthroplasty (TKA) is rarely indicated in managing of distal femur fractures. Several clinical trial recommended primary TKA for patients with intra-articular DFFs and pre-existing osteoarthritis or rheumatoid arthritis, severe comminution, or poor bone stock.[7]

Primary total knee arthroplasty (TKA) for the treatment of distal femur fractures in the elderly had advantages over internal fixation for the patient and economic advantages for health care providers. Acute arthroplasty has the theoretical advantage of elimination of fracture healing issues, early mobilization, and immediate weight bearing, shorter duration of hospital stay postoperatively, however, it requires a highly skilled expert surgeon, availability of prosthesis. Theoretically, there is fear of loosening of the component, periprosthetic fractures.[8]

Aim of the Work

The purpose of this systematic review is to evaluate the outcome & complications of primary arthroplasty versus open reduction and internal fixation of fractures in distal femur in elderly patients.

DISTAL FEMUR FRACTURE (DFF) IN ELDERLY

Distal femur fractures (DFF) involve the distal one third of the femur, consisting of the region between the diaphyseal-metaphyseal junction and the articular surface of the femoral condyles. [9]

The terminology of distal femur has no standard definition in the literature. It is described to resemble the distal 9 cm of the femur by **Albert MJ**., where it's defined by **Coon MS, & Best BJ** as the region from the metaphyseal-diaphyseal junction to the articular surface of the knee, involving approximately the distal 15 cm of the femur.

These fractures occur in the terminal part of the femur. In elderly patients who sustain distal femoral fractures from minor trauma, such as a simple fall, severe osteopenia and preexisting osteoarthritis may complicate management.[10]

A Fracture that occurs at the distal end of the femur, which includes the femoral condyles and the metaphysis. Most common types of distal femur fractures are transverse fractures, comminuted fractures, Intra-articular fractures. [11]

Relevant anatomy

The femur shaft is cylindrically shaped and broadens into two curved condyles distally, separated by an intercondylar groove which articulates with the patella and an intercondylar notch that has the origin of the cruciate ligaments. The medial condyle is more convex, extending more distally than the lateral femoral condyle, creating the apparent anatomic valgus of the knee that measures approximately 8(variation range from 5 to 12). [12]

The lateral condyle is broader and does not extend as far distally. On lateral views, the anterior half of the condyles is aligned with the femoral shaft while the posterior half protrudes posterior to the posterior cortex of the shaft. When viewing the distal femur end on (i.e., guns' eye view), the condyles form a trapezoid that is wider posteriorly than anteriorly, with an angle of inclination of the medial surface of approximately 25 and an angle of inclination of 10 on the lateral surface. On average, a line bisecting the epicondyles (epicondylar axis) is in 3 of external rotation compared to a line bisecting the posterior axis of the condyles (posterior condylar axis).[4]

The knee joint should be parallel to the ground during ambulation. Radiographs of the contralateral limb are often the best way to define the limb axis of each person and are particularly useful for preoperative planning. The deforming

forces acting on a distal third femur fracture include the gastrocnemius which produces an apex posterior deformity at the fracture site in the sagittal plane, while the quadriceps and hamstring insertion cause shortening of the lower extremity in the axial plane. [13]

Epidemiology

Distal femur fractures account for less than 1% of all fractures.[14]

Distal femur fractures account for 4-6% of fragility fractures of the femur, with an overall annual incidence of 4,5/100.000 in the general population. About 50% of these fractures affect patients over 70 years of age, being a relevant cause of morbidity and mortality in the geriatric population.[3] With incidence among females is 60.5 percent.[15]

Etiology

Elderly patients present typically after low-energy mechanisms, such as ground level-falls. Elderly patients often present with significant co-morbidities impacting their operability, recovery, and survival. As the population ages, the treatment of these complex fractures has correlated with poor outcomes. [16]

Radiological assessment

Radiographs

- Radiographs of the entire extremity, including the joints proximal and distal to the suspected injury, should be obtained when patients are hemodynamically stable to characterize the injury. Traction views can help with characterizing the fracture pattern; however, this is very painful for the patient, and pain control is necessary before any manipulation. Radiographs of the adjacent joints help to obtain imaging of entire femur to rule out associated injuries. Contralateral femur films may be considered for pre-operative planning and templating. [17]

- Hoffa fracture is intra-articular distal femoral fracture in the coronal plane, 38% incidence, seen on the lateral view, missed in up to 31% of cases (Figure 1).[17]

Figure (1): AP and lateral radiographs of Hoffa fracture.[18]