Management of Infected Proximal Femur after Fracture Fixation

Essay

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بسم الله الرحمن الرحيم

قَالُوا سُبْحَانَكَ لاَ عِلْمَ لَنَا

إِلاَّ مَا عَلَّمْتَنَا إِنَّكَ أَنتَ الْعَلِيمُ الْحَكِيمُ

صدق الله العظيم

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Ahmed Sayed Bakhiet

Contents

List of Abbreviations

ALAC	:	Antibiotic loaded acrylic cements
AP	:	Anteroposterior
BMD	:	Bone mineral density
CRP	:	C-Reactive Protein
CT	:	Computed tomography
DHS	:	Dynamic hip screw
DIAR	:	Debridement, antibiotic and retention
DVT	:	Deep venous thrombosis
ESR	:	Erythrocyte sedimentation Rate
FDG	:	Fluoro – 2deoxy –2– D glucose
FISH	:	Fluorescence in situ hybridization
HA	:	Hip arthroplasty
111In	:	Indium-111
IFM	:	Immunofluorescence microscopy
IL-6	:	Interleukin-6
IMRALC	:	Intramedullary rod with antibiotic loaded cement
MRI	:	Magnetic resonance imaging
MRSA	:	Methicillin Resistance Staph Aureus
NSIPP	:	The National Surgical Infection Prevention Project

List of Abbreviations (Cont.)

PCR	:	Polymerase chain reaction
PET	:	Positron Emission Tomography
PFN	:	Proximal femoral nailing
PMMA	:	Polymethylmethacrylate
PROSTALAC	:	The prosthesis of antibiotic loaded acrylic cement
SMX	:	Sulfamethoxazole
TAD	:	The tip –apex distance
Tc 99m	:	Techentium bone scan
Tc-HIG	:	Human Immunoglobulin G
THA	:	Total hip arthroplasty
TMP	:	Trimethoprim
WBC	:	White blood cells

List of tables

List of Fig.s

List of Fig.s (Cont.)

List of Fig.s (Cont.)

List of Fig.s (Cont.)

Introduction

Proximal femoral fractures are the second most common fractures in patients older than 65 years. Deep infection after osteosynthetic treatment is considered to be one of the major complications with a high rate of mortality. Despite large improvements in implant design and surgical technique, complications in fracture healing are very common. (1)

1.05% 0f proximal femoral fractures developed surgical site infection. 72% of infections occurred in a patient who has sustained intracapsular fractures with the remaining 28% of infections occurring in patients with extacapsular fractures. MRSA was isolated in 47% of the cases. (2)

The pathogenesis of infections associated with fracture fixation devices is related to microorganisms growing in biofilms, which render these infections difficult to treat. These infections are classified according to the implant surgery to: (2)

1- Early (less than 2 weeks)

2- Delayed (from 2 – 10 weeks)

3- Late infections (more than 10 weeks)

Most infections are caused by staphylococci and are acquired during trauma (in penetrating injuries) or subsequent fracture fixation procedure.

There is no routinely used test significant to diagnose infection, so combined investigations are usually needed to accurately diagnose infection. Magnetic resonance imaging (MRI) and computed tomography (CT) scans are used to diagnose infection and plan for surgical treatment. (3)

Aspiration of fluid accumulation provides most accurate specimens for detecting the infecting microorganism and specific antibiotic. (3)

The basic principle of treatment is to do radical debridement until the site is considered aseptic and removal of the implant with use of systemic and local antibiotic appropriate for the microorganisms. Stabilization of the fracture is essential for bone union. [(1), (3), (4), (5)]

Management of intracapsular infection (infected hip arthroplasty) is very difficult, because bacteria form biofilms on the implants which protect the organisms from host immune system and also prevent penetration of the antimicrobial agents. [(6)]

The management based on the stages of infection:

- Treatment of stage I infection (superficial infection) depends on immediate debridement and antibiotics.
- Treatment of stage II and III infection by one stage exchange arthoplasty if no bone loss or two stage exchange arthroplasty .[(7), (8), (9)]

Extracapsular hip infected non union after stabilization with dynamic hip screw is uncommon. Although extracapsular hip fractures occur more often in elderly patients, due to low energy injury such as falling down, and are often associated with medical diseases or compromised immunity, the wound healing process is usually not disturbed. The reported wound infection rate is 0-2.2% .the most common microorganism lead to infection is Oxacillin Resistant Staphylococcus Aureus (ORSA). When deep infection cannot be controlled, internal fixation must be removed with good radically debridement and irrigated with massive normal saline solution. All grossly unhealthy soft tissues and sequestrum were removed. Reinsertion of internal fixation is the best choice. Mixed antibiotic powder and solution should be placed in the tunnel of new lag screw. [(10)]

In treatment of infected intramedullary nail, there are two basic strategies of treatment: the "union first strategy" or "the infection elimination first strategy". If fracture stability

was dependant on the nail, the nail should not be removed prematurely. Some authors prefer reaming to debride the medullary canal and then external fixation and bone grafting when nonunion is present. [11]

The endpoint of the treatment of infected proximal femur after fracture fixation may be either Girdelstone procedure or a second stage arthroplasty. The decision is depend on the response to the treatment, the health status and the functional needs of each individual. [2]

Aim of this study

Discuss different treatment options for infected proximal femoral fracture after fixation as well as to analyze the clinical outcome and quality of life and achieve bone consolidation and avoiding development of chronic osteomyelitis.