



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكرو فيلم

بسم الله الرحمن الرحيم



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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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One-stage versus Two-stage Protocol in Management of Infected Nonunited Fracture Femur

Thesis

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالَ

لَسْبَّانَكَ لَا عِلْمَ لَنَا
إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ
الْعَلِيمُ الْعَظِيمُ

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List of Abbreviations

| Abb. | Full term |
|--------------|--|
| ASA..... | American Society of Anesthesiologists |
| BMI..... | Body Mass Index |
| CBC | Complete blood count |
| CI | Confidence Interval |
| CRP..... | C-reactive Protein |
| CT | Computed Tomography scan |
| ESR..... | Erythrocytes Sedimentation Rate |
| FDG | F18-Fluorodeoxyglucose |
| HA..... | Hydroxyapatite |
| IM | Intra-Muscular |
| IQR | Interquartile range |
| LRS | Limb Reconstruction System |
| MBC..... | Minimal bactericidal concentration |
| MIC | Minimal inhibiting concentration |
| MRI..... | Magnetic Resonance Imaging |
| NSAID | Nonsteroidal antiinflammatory drug. |
| NUSS..... | Non-Union Scoring System |
| PCR | Polymerase Chain Reaction |
| PET..... | Positron Emission Tomography |
| PMMA | Polymethylmethacrylate |
| PTI..... | Pin tract infection |
| RCT..... | Randomized Controlled Trial |
| RI | Radionuclide Imaging |
| RTA..... | Road Traffic accidents |
| RT-PCR | Reverse Transcriptase Polymerase Chain Reaction |
| SC | Subcutaneous |
| SD | Standard Deviation |
| WBC | White Blood Cell count |

INTRODUCTION

The incidence of complex fracture non-unions are increased due to increased road traffic accidents and increased open fractures. These patients are usually operated upon several times for stabilization and to eradicate infection, which in turn produces scarring of the soft tissues and devitalization of any surviving bone. They present with indolent infection. ⁽¹⁾

Infected non-united fracture is a formidable complication to treat. It is a complex problem with considerable morbidity and can threaten the life and limb of the patient. There is considerable social, financial, physical, and psychological impact on the patient. ⁽¹⁾

Treatment of infected non-united fractures is technically demanding, prolonged, and needs a team. The presence of implants promotes both adherence of microbes and biofilm formation, and it adversely affects phagocytosis, thereby facilitating development of infection. ⁽²⁾

Bone gap and active infection are the crucial factors relating to treatment and prognosis. Infected non-united fractures and segmental bone defects demand treatment methods that offer control of infection and provide stability to the bone to promote union. ⁽²⁾

There are two schools of thought in the treatment of infected non-united fractures, the ‘union-first’ strategy and the

‘infection-elimination first’ strategy. The first strategy aims at achieving union first and then dealing with the problem of infection as the problem presents itself. This approach does not aim at eradication of infection as the main objective. The second strategy aims at elimination of infection as the first and major objective and bone union as the next objective. ⁽³⁾

Conventional methods for treating septic non-union of the fracture femur includes external fixation, debridement, sequestrectomies. ⁽³⁾

The patient with an unhealed, infected femoral fracture has two problems: osteomyelitis and a fracture of a major, weight-bearing bone that usually has not responded to treatment. Despite major advances in fixation techniques, soft-tissue management, and antibiotic therapy, septic non-union or delayed union after femoral fracture is a persistent and serious problem, may resulting in amputation.' High-speed motor vehicle travel, the continuing popularity of motorcycles, and mechanization of the workplace will continue to cause high-energy injuries and assure us of a future caseload of infected, nonunited fractures. ⁽⁴⁾

The Ilizarov technique has been used for the last 20 years in the management of septic non-union of long bones. This method uses fine wires inserted percutaneously which are attached and tensioned to provide a strong frame construct. It

permits the use of compression, distraction, bone lengthening and deformity correction. ⁽⁵⁾

The majority of femoral non-unions can be treated successfully by internal fixation. However, a septic non-union of the fracture femur can prove a difficult problem. This can be compounded by bone loss, deformity or failure of previous internal fixation. ⁽⁶⁾

The treatment of bone infections after intramedullary nailing usually includes a series of different surgical procedures such as removal of metalwork, radical bony debridement, deep tissue sampling, and elimination of dead space and insertion of local antibiotic delivery systems. This is followed by the application of the Ilizarov external fixator. Furthermore, local or free soft tissue transfers are employed to cover any soft tissue defect. The Ilizarov method addresses all the above problems simultaneously and offers a good solution for infected non-unions. The stability of the construct permits weight bearing and joint mobilisation. Furthermore, bone defects can be filled by a corticotomy and bone transport. The control of infection is achieved by radical debridement of the bone ends. ⁽⁶⁾

Local and host environment particularly favorable to infection like the initial open type IIIA fracture, comminution, bone loss, presence of a metallic implant, and insulin-dependent diabetes, respectively. These factors make successful treatment of this infected non-united fractures in one stage very