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Updates in the Management of Hip Fractures

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ABSTRACT

Hip fractures are a significant public health concern, particularly in the elderly population. This bibliographic review article provides an in-depth examination of the management of hip fractures, with a focus on epidemiology, clinical importance, theoretical framework, types of injuries, complications, and current management strategies. As the elderly population continues to grow, the management of hip fractures becomes increasingly critical. This review discusses the evolving approaches and evidence-based practices aimed at improving patient outcomes and reducing the burden of hip fractures.

KEYWORDS: Hip fractures, epidemiology, management, complications, elderly population, surgical intervention.

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INTRODUCTION

Hip fractures are a pervasive and critical issue in the field of orthopedics and geriatrics, often with life-changing consequences for those affected. These fractures, primarily afflicting the elderly population, present a significant burden to individuals, families, and healthcare systems. This introduction will explore the epidemiology of hip fractures, highlighting their impact and setting the stage for a comprehensive review of their management, encompassing evolving approaches and evidence-based strategies.

The epidemiology of hip fractures is a matter of profound concern, reflecting both the vulnerability of the aging population and the challenges faced by healthcare providers. Hip fractures predominantly affect older adults, with a marked increase in incidence seen in those over the age of 65. Globally, the aging demographic, often referred to as the "silver tsunami," has made hip fractures a growing public health issue.

The rise in life expectancy, while a testament to advances in healthcare, has paradoxically contributed to the escalating prevalence of hip fractures. With an aging population, the absolute number of hip fractures is projected to increase significantly in the coming years. These fractures often occur due to low-energy trauma, such as a simple fall from standing height. It is not merely the incidence of hip fractures that is concerning, but the associated morbidity and mortality that places immense strain on healthcare resources.

The clinical importance of hip fractures cannot be overstated. They have far-reaching consequences, affecting not only the individual's physical health but also their quality of life and independence. For patients, hip fractures frequently lead to pain, reduced mobility, and a heightened risk of complications. The complications encompass a spectrum of issues, from pressure ulcers and urinary tract infections to potentially fatal conditions such as pulmonary embolism and deep vein thrombosis.

Moreover, the impact of hip fractures extends beyond the patients themselves. Family members often become caregivers, bearing the emotional and logistical burdens of the injury. Healthcare systems face the challenges of hospitalization, rehabilitation, and long-term care for affected individuals. The associated healthcare costs are substantial, reflecting both the direct medical expenses and the broader societal burden.

CLASSIFICATION

These fractures are typically categorized into two primary types:

Intracapsular Hip Fractures: These fractures occur within the hip joint capsule and often involve the femoral neck, which connects the femoral head to the shaft of the femur. Intracapsular fractures may disrupt the blood supply to the femoral head, making them particularly concerning. If not promptly managed, these fractures can lead to avascular necrosis of the femoral head or non-union.

Extracapsular Hip Fractures: These fractures occur outside the hip joint capsule and often involve the trochanteric or subtrochanteric regions of the femur. Extracapsular fractures are generally considered more stable than intracapsular fractures. However, they can still result in significant pain and functional impairment.

Types of Injuries:

Intracapsular Hip Fractures: These fractures are frequently subclassified based on their location within the femoral neck and the degree of displacement. Subcategories may include transcervical, basicervical, and subcapital fractures, each with its unique clinical implications.

Extracapsular Hip Fractures: Extracapsular fractures often involve the trochanteric or subtrochanteric regions and can be further classified by specific anatomical features, such as the presence of intertrochanteric, pertrochanteric, or subtrochanteric components. These classifications help guide treatment decisions based on fracture stability and the patient's overall health.

Complications:

Complications associated with hip fractures are numerous and can significantly impact patient outcomes. Some of the most common complications include:

Avascular Necrosis: This complication is particularly associated with intracapsular hip fractures, primarily when the blood supply to the femoral head is compromised. Avascular necrosis can lead to permanent hip joint dysfunction and require additional surgical intervention.

Non-union: Some hip fractures may fail to heal adequately. Non-union is a condition in which the fracture ends do not unite, often necessitating revision surgery to promote healing.

Deep Vein Thrombosis (DVT): Prolonged immobility following hip fracture increases the risk of DVT, a condition characterized by the formation of blood clots in deep veins, typically in the legs.

Infection: Surgical sites can become infected, leading to significant morbidity and the need for prolonged antibiotic therapy and possible surgical debridement.

Pulmonary Embolism (PE): Patients with hip fractures are at risk of developing PE, a potentially life-threatening condition, due to immobility and the potential formation of DVT.

Pressure Ulcers: Extended periods of bed rest can result in the development of pressure ulcers, adding to the patient's morbidity and requiring additional care.

Understanding the theoretical framework of hip fractures, including their types and potential complications, is essential for healthcare providers and researchers alike. By comprehending the intricacies of these fractures, the medical community can develop more effective strategies for their management and prevention.

Figure 1. Hip fracture

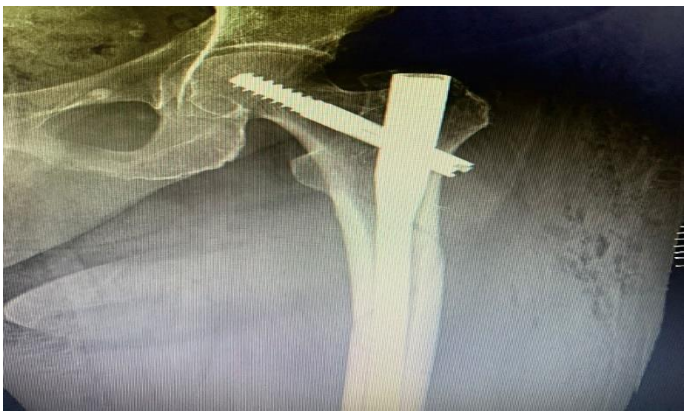

Figure 2. Osteosynthesis performed with a centromedullary nail

DISCUSSION

Hip fractures, particularly in the elderly population, are a complex medical issue requiring a multidimensional approach to improve outcomes. In this section, we discuss the evolving strategies and management techniques, with a specific emphasis on advancements in the management of hip fractures.

Dynamic hip screw (DHS)

The dynamic hip screw (DHS) with a side plate is a commonly used orthopedic implant for the treatment of hip fractures, particularly intertrochanteric and subtrochanteric fractures. This device plays a vital role in the management of hip fractures, offering stability and support during the healing process.

Components of Dynamic Hip Screw with Side Plate:

Dynamic Hip Screw (DHS): The central component of the device, the DHS, consists of a specially designed screw. This screw has a dynamic feature that allows controlled sliding within the barrel of the plate. The dynamic function allows for compression and stabilization of the fracture site during weight-bearing, which is crucial for the healing process.

Side Plate: The side plate is attached to the femoral shaft and provides a stable structure for the DHS screw. It typically has holes for screws that secure it to the femur. The side plate can come in various sizes to accommodate different patient anatomies and fracture patterns.

Advantages of Dynamic Hip Screw with Side Plate:

Stability: The dynamic hip screw with side plate offers stable fixation, preventing excessive movement of the fracture fragments. The sliding feature of the screw allows for controlled compression and promotes fracture healing.

Minimized Complications: This device is associated with lower rates of complications such as non-union and implant failure compared to some other fixation methods. The sliding motion of the screw accommodates changes in load and minimizes stress at the fracture site.

Early Mobilization: Early weight-bearing and mobilization can often be initiated in patients treated with a dynamic hip screw, which is beneficial for overall patient recovery and functional outcomes.

Reduction of Implant-Related Pain: The controlled sliding mechanism reduces the risk of painful impingement between the screw and the bone, which can occur with some other fixation methods.

Versatility: Dynamic hip screws with side plates come in various sizes and configurations, allowing orthopedic surgeons to choose the most appropriate implant for the patient's specific fracture pattern and anatomy.

Surgical Technique:

The surgical procedure for the placement of a dynamic hip screw with side plate typically involves an open reduction of the fracture, followed by the implantation of the side plate on the lateral aspect of the femur. The DHS screw is inserted through the plate into the femoral head, and its position can be adjusted to achieve the desired compression and stability. Additional screws may be used to secure the side plate to the femur, providing further fixation.

Intramedullary nailing (IM nailing)

Intramedullary nailing (IM nailing) is a surgical technique that can be used for the treatment of certain types of hip fractures, specifically those involving the femoral neck or intertrochanteric region. This method offers an alternative to other surgical procedures, such as dynamic hip screw (DHS) fixation, and is particularly advantageous in certain clinical scenarios. Here's an overview of intramedullary nailing in the context of hip fractures:

Indications for Intramedullary Nailing in Hip Fractures:

Intertrochanteric Fractures: Intramedullary nailing is a well-established treatment option for intertrochanteric fractures, which occur just below the femoral neck. These fractures often affect older adults and are typically classified as stable or unstable based on fracture patterns. Intramedullary nails can effectively stabilize both stable and unstable intertrochanteric fractures.

Subtrochanteric Fractures: In some cases, intramedullary nailing can be used for subtrochanteric fractures, which occur just below the intertrochanteric region. These fractures are often challenging to manage due to the biomechanical forces acting on the femur in this area. Intramedullary nailing can provide stable fixation in subtrochanteric fractures.

Advantages of Intramedullary Nailing in Hip Fractures:

Stability: Intramedullary nailing provides excellent stability by directly addressing the fracture site within the medullary canal of the femur. This stability is critical for promoting fracture healing.

Minimal Soft Tissue Disruption: The surgical approach for intramedullary nailing typically involves a smaller incision compared to some other techniques, resulting in less soft tissue disruption. This can reduce the risk of infection and improve the overall recovery process.

Early Weight-Bearing: Depending on the fracture type and patient factors, individuals treated with intramedullary nails for hip fractures can often begin weight-bearing and ambulation earlier than with some other fixation methods. Early mobilization can be particularly beneficial for elderly patients.

Alignment Maintenance: Intramedullary nailing helps maintain proper alignment of the bone fragments, reducing the risk of malunion. This is especially crucial in hip fractures to ensure proper hip joint function.

Surgical Technique:

The surgical technique for intramedullary nailing in hip fractures typically involves the following steps:

Incision: A small incision is made over the greater trochanter of the femur to access the proximal femur and the medullary canal.

Fracture Reduction: The bone fragments are carefully aligned and reduced to restore proper anatomical alignment.

Nail Insertion: The intramedullary nail is inserted into the medullary canal of the femur. The nail is then advanced to traverse the fracture site and stabilize the fracture.

Locking Screws: In some cases, additional locking screws may be inserted through predetermined holes in the nail to secure it in place and provide further stability.

Closure: The incision is closed with sutures or staples.

Outcome and Recovery:

Patients who undergo intramedullary nailing for hip fractures may experience a relatively quicker recovery compared to some other surgical techniques. The early weight-bearing and stability provided by the nail can contribute to improved functional outcomes and reduced complications.

Multidisciplinary Care:

The management of hip fractures has shifted towards a multidisciplinary approach, recognizing the importance of holistic patient care. This approach involves close

collaboration between various healthcare professionals, including orthopedic surgeons, anesthesiologists, geriatricians, nurses, physiotherapists, and social workers. The primary goal is to address not only the fracture but also the broader health and social needs of the patient.

Orthogeriatric care has gained prominence, highlighting the role of geriatricians in optimizing the care of elderly patients with hip fractures. Comprehensive preoperative medical assessment and optimization are crucial components of this approach, focusing on the management of comorbid conditions and medication review.

Enhanced Surgical Techniques:

Advancements in surgical techniques have broadened the options available for hip fracture management. Traditional approaches such as hip arthroplasty and internal fixation remain important, but innovations have led to the adoption of minimally invasive procedures. For example, intramedullary nailing is increasingly employed for certain hip fractures. These minimally invasive techniques aim to reduce surgical trauma, minimize blood loss, and expedite recovery.

The choice of surgical intervention is guided by various factors, including the type of fracture, patient age, overall health, and surgeon expertise. Individualized treatment decisions are becoming increasingly prevalent, with a focus on tailoring the approach to the specific needs of each patient.

Perioperative Protocols:

The development and implementation of perioperative protocols have played a pivotal role in enhancing the management of hip fractures. These protocols encompass optimized anesthesia strategies, pain management, and early mobilization.

Optimized Anesthesia: The selection of anesthesia plays a significant role in postoperative outcomes. Regional anesthesia, such as spinal anesthesia, is often preferred over general anesthesia due to its potential for faster recovery, reduced postoperative pain, and lower risks associated with general anesthesia.

Pain Management: Effective pain management is a cornerstone of hip fracture care. Multimodal pain management approaches are commonly used, involving a combination of non-opioid medications and regional anesthesia techniques. These strategies not only alleviate pain but also minimize opioid-related side effects.

Early Mobilization: Early mobilization and physical therapy are integral to hip fracture management. Encouraging patients to initiate mobility as soon as possible after surgery helps prevent complications such as deep vein thrombosis and pressure ulcers. Early rehabilitation is vital for restoring functional independence.

Falls Prevention:

Preventing hip fractures is as critical as their management. Comprehensive falls prevention programs, especially tailored to the elderly population, have been developed to identify individuals at risk of falling and intervene proactively. These programs often include home safety assessments, exercise and balance training, medication review to reduce fall risks, and visual aids to improve awareness.

Falls prevention strategies not only reduce the incidence of hip fractures but also enhance the overall health and quality of life of the elderly population. Preventive measures are a cornerstone of public health initiatives aimed at reducing the burden of hip fractures.

CONCLUSION

In conclusion, the management of hip fractures has evolved to embrace a multidisciplinary approach, enhanced surgical techniques, perioperative optimization, and falls prevention strategies. These advancements are aimed at improving patient outcomes, reducing complications, and alleviating the overall healthcare burden of hip fractures. As the elderly population continues to expand, the pursuit of evidence-based practices and innovative strategies remains pivotal in optimizing the care of patients with hip fractures.

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