Diagnosis and Rehabilitation pediatrics femur Fracture by Radiography and Physiotherapy

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● Received:09/12/2023. ● Accepted: 22/01/2024.

■ **Abstract:**

Femur fractures in children are a common injury that can result from accidents or trauma.

The femur is the largest bone in the body and a fracture of this bone can be serious. Children are more prone to hip fractures because their bones are still growing and are not as strong as those of adults.

In this study, a femur fracture was found in an 8-year-old girl at Tobruk Medical Center. Then the diagnosis was made by radiotherapy (X-rays, magnetic resonance imaging, and computed tomography). The operation was performed under radiography by (C-arm fluoroscopy), where the fracture was fixed with a plate. Finally, after the fracture healed, the patient was rehabilitated by physiotherapy to recover in the least time and return to normal daily activity.

The role of physiotherapy is important for daily resumption of activity and full recovery in a short time after the fracture. More studies are needed to confirm these results.

● **Keywords:** femur fracture, physical therapy, radioraphic, Tobruk.

■ **المستخلص:**

تعتبر كسور الفخذ عند الأطفال من الإصابات الشائعة التي يمكن أن تنتج عن الحوادث أو الصدمات.

عظم الفخذ هو أكبر عظمة في الجسم ويمكن أن يكون كسر هذا العظم خطيرًا. الأطفال أكثر عرضة لكسور عظام الفخذ لأن عظامهم لا تزال تنمو وليست قوية مثل عظام البالغين.

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في هذه الدراسة ، تم العثور على كسر في عظم الفخذ لدى فتاة تبلغ من العمر 8 سنوات في مركز طبرق الطبي. تم التشخيص عن طريق العلاج الإشعاعي (الأشعة السينية ، التصوير بالرنين المغناطيسي ، التصوير المقطعي المحوسب) اجريت العملية تحت التصوير الشعاعي بواسطة (C-arm fluoroscopy) حيث تم تثبيت الكسر بصفيحة معدنية. أخيرًا بعد التئام الكسر، تم إعادة تأهيل المريض عن طريق العلاج الطبيعي للتعافي في أقل وقت والعودة إلى النشاط اليومي الطبيعي.

دور العلاج الطبيعي مهم لإعادة النشاط اليومي والشفاء التام في وقت قصير بعد الكسر. هناك حاجة لمزيد من الدراسات لتأكيد هذه النتائج.

● **الكلمات المفتاحية:** كسر عظم الفخذ، العلاج طبيعي، التصوير الاشعاعي، طبرق.

■ Introduction

Femoral fractures in children are classified into different types based on the location and severity of the fracture. These include diaphyseal fractures, which occur in the middle of the femur, and supracondylar fractures, which occur just above the knee.

Incidence of distal femur fractures is approximately 37 per 100,000 person-years.1 Typically, distal femur fractures are caused by a high-energy injury mechanism in young men or a low-energy mechanism in elderly women.2Managing these fractures can be a challenging task. Most surgeons agree that distal femur fractures need to be treated operatively to achieve optimal patient outcomes. The articular fracture component is usually treated with open reduction and internal lag screw fixation or external tension wire fixation (Zlowodzki, M., et al. 2006).

distal femur in the immature skeleton is divided into the metaphysis, physis, and epiphysis. The epiphysis consists of two condyles, which articulate with the tibial plateau, forming a trochlear-type joint. In the anterior metaphyseal-epiphyseal area, we find a groove between two protrusions that form the femoro-patellar canal. (Peterson, H. A. 2007)

Femur fractures and associated injuries remain a major cause of morbidity in children. Predictors of femur fractures change with age; however, the risk is generally higher among children who live in the areas with lower

socioeconomic indicators

Femur fractures in pediatrics can be caused by:Trauma the most common cause of femur fractures in children is trauma, such as a fall from a height, a car accident, child abuse: Unfortunately, femur fractures in children can also be caused by physical abuse, such as shaking or hitting, which can result in a non-accidental injury, Bone weakness: Some children may have underlying conditions that weaken their bones, such as osteogenesis imperfecta or rickets, which can make them more prone to fractures, Cancer: Rarely, femur fractures in children can be caused by bone tumors, such as osteosarcoma or Ewing's sarcoma, Infection: such as osteomyelitis, which can weaken the bone and make it more prone to fracture.

The specific cause of a femur fracture in a child will depend on a range of factors, including the child's age, medical history, and the circumstances surrounding the injury (Rewers, A., et al. 2005).

Symptoms of femoral fractures in children include pain, swelling, bruising, and an inability to bear weight on the affected leg. Treatment typically involves immobilization of the affected leg using a cast or brace. In some cases, surgery may be necessary to realign the broken bones and stabilize the fracture (Narayanan, U. G., et al. 2004).

Complications of femoral fractures in children can include delayed healing, deformity, and growth disturbances. Early diagnosis and prompt treatment are important to prevent long-term complications and ensure a full recovery (Duffy, S., et al. 2021).

Diagnosis femur fracture by radiography X-rays: The simplest way to see , X-rays provide the easiest, quickest, and cheapest option. The X-ray is at least going to be a direct (Souliman, S. I., et al .2022).

Also during surgery can use radiographic the device that is used to stabilize the bone under X-rays is the transparent imaging device or the portable transparent device (C-arm fluoroscopy). This device is also used in orthopedic surgery, vascular and neurological diseases, and advanced X-ray diagnostics (Van Wieren, R. T. 2011). Groover, M. T., et al. 2019).

The treatment for a femur fracture in a child will depend on the type

and severity of the fracture, as well as the child's age, overall health, and other individual factors (Kuremsky,M. A., & Frick, S. L. 2007). In general, treatment options for femur fractures include:

Casting or splinting: For less severe fractures, a cast or splint may be applied to immobilize the affected leg and allow the bone to heal. This method is more commonly used in younger children whose bones are still growing.

Traction: In some cases, a device called a traction may be used to gently pull the leg bones apart and align them properly before casting or surgery (Sponseller, P. D. 2002).

Surgery: For more complex or severe fractures, surgery may be necessary to realign the broken bones and stabilize them with pins, plates, or screws. This is more commonly used in older children or adolescents (Flynn, J. M., & Schwend, R. M. 2004).

Rehabilitation: Following treatment, a child will typically need a period of rehabilitation to regain strength and mobility in the affected leg. This may include physical therapy exercises and other forms of rehabilitation to help the child regain full function of their leg physcal therapy play imprtant role after fracture (Souliman, S. I., et al. 2022).

The treatment plan for a femur fracture in a child will be developed by a healthcare professional, such as an orthopedic surgeon, and will be tailored to the specific needs of the child and the severity of their injury Flynn, J. M., & Schwend, R. M. 2004). Prevention of femoral fractures in children can be achieved by promoting safety measures such as using car seats and seat belts, wearing protective gear during sports activities, and childproofing the home to prevent falls.

Aim of study

Aim of this study invistegate femur fracture in child and role radiographic to diagnosis and help surgon during the operation and role physical therapy to return ro daily activity after surgery and rehabilitation

Material and methods

In this study investigates about case with fracture distal 1/3 right femur for girl 8 years old in medical Tobruk centre diagnosis was made by radiotherapy

(X-rays, magnetic resonance imaging, and computed tomography).

Surgical procedures under General anaesthesia aseptic conditions open induct fixation by plate 7 holes 3 distal and 4 proximal unseat back slab.

The operation was performed under radiography by (C-arm fluoroscopy) as shown in fig 1, where the fracture was fixed with a plate**.**

Figure. 1 C-arm fluoroscopy

C-arm is a scanner capacitor: The name is derived from the C-shaped arm used to connect the X-ray source and the X-ray detector to each other. C-arms have radiographic capabilities, although they are primarily used for intraoperative fluoroscopic imaging during surgical, orthopedic, and emergency care procedures.

Symptoms

pain, swelling, bruising, and an inability to bear weight on the affected leg..

Treatment

Medication:

These medications were given after the surgery to relivee pain, reduce fever, and relieve inflammation.

paracetamol 500mg I.V 1* 2 (commonly used medicine that can help treat pain and reduce a high temperature (fever)

recephin 500mg I.V 1* 2 (cephalosporin antibiotic used to treat many kinds of bacterial infections, including severe)

flagyl 200mg I.V 1* 3(is an antibiotic and antiprotozoal medication. It is used either alone or with other antibiotics to treat pelvic inflammatory disease

ibuorofen syp (is used to relieve pain, fever, and inflammation.)

Measurments muscle power and ROM pre-Physiotherapy

Muscles power in thigh region is Grade 2

ROM in little stiff in hip and knee joint

physical therapy

For two months

Massage using olive oil and coconut oil to moisturize and stimulate the heat of the muscles and hand (for10 minute per day)

Passive exercise to increase rang of motion for knee joint and hip joint to reduce stiff (10 minut totally per day)

By flexion and extension for hip , knee joint and ankle to strength whole muscles of the thigh and leg

Active exercise by made patient do daily activity like Use parallel bar to gait training and walker

Strength muscles by resistance **(15 sscond repeat for 5 minut**

Measurments muscle power and ROM post-Physiotherapy

Normal muscles and joint

Results And Discussion

In this study investigates about case with fracture distal 1/3 right femur for girl 8 years old in medical Tobruk centre whereas The bone was successfully stabilized using a special device under full X-ray guidance and after a period of time, the child was rehabilitated using physical therapy, which played a significant role in returning the child to daily activities after the bone had healed. The child was able to walk after a period of treatment.

Most common causes was trauma and low density of bone due to low vitamine D deficiency and calcium, Physical therapy play important role to rehabilitate after fracture and return patient to daily activity, Radiographic is very important to diagnosis and in addition to performed under radiography by (C-arm fluoroscopy).

Rewers, A., *et al.*(2005) Most common cause of femur fractures in children is trauma and bone weekness (Rewers, A., *At al.2005*). This agreement with this study whereas in this case trauma and low bone denisty.

Flynn, J. M., *At el* (2007). For more complex or severe fractures, surgery may be necessary to realign the broken bones and stabilize them with pins,

plates, or screws(Flynn, J. M., *At el2007*). agree with our study this way that had used with case.

Physiotherapy played an important role for patients to recover and return to normal life in the least time, physiotherapists followed patients until full recovery by providing them with advice and following up on the rehabilitation program, Patients were satisfied with the physcial therapy and confirmed that they are more comfortable after the physiotherapy (Souliman, S. I., *et al .2022*). this agreement with this study whereas After physiotherapy, we noticed a significant improvement in the child's condition during a short period.

Radiographic important for diagnosis and can use under surgery by C-arm fluoroscopy to do it in perfect and "To reduce the rate of failure and error. This agree with this study

Groover, M. T., *et al.*(2019) c-arm fluoroscopy this device can use during surgery to fix fracture perfectly (Groover, M. T., *et al.2019*) also in this study had used this device during surgery.

■ Conclusion

We conclude from our study on fracture of femur in children where it was noted that most of the injuries were a result of truma, falls, or low denisty of bone

Through this study, werecommend maintaining proper nutrition, exercising and avoiding all wrong practices that may lead to fall or overthrow. Physiotherapy played an important role in recovering patients

Radiographic is imprtant and Easier and cheaper to diagnosis fracture and the operation can be performed under radiographicby using a C-arm to ensure better results . Further studies are required to confirm these findings.

■ Acknowledgement

We would like to thank everyone help in performing this work.

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