

Outcome Of Plate And Screw Fixation In Femoral Shaft Fracture at Sanjiwani Hospital Gianyar in 2021

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DOI: 10.29303/jku.v12i3.992

Article Info

Received : September 2, 2023

Revised : September 23, 2023

Accepted : September 30, 2023

Abstract: Femoral shaft fracture that reported the one year mortality rate post trauma is still high around 10-20% and it is a challenge in orthopedics. Surgical therapy in the orthopedic field has been highly developed in the treatment of femoral shaft fractures. Gold standard therapies that have been used for femoral shaft fractures is intramedullary nail but the ORIF PS method is still often used especially in hospitals that have inadequate health facilities by considering several risk factors and complications that can occur during the perioperative. This study is a retrospective descriptive study that aims to identify the outcome of plate and screw fixation in femoral shaft fracture at Sanjiwani General Hospital Gianyar in 2021. Medical record, surgical procedure, and outpatient control reports were reviewed to collect pre-, intra-, and postoperative details by identifying data on complications that occur in patients with open and closed femoral shaft fractures who had performed ORIF PS at Sanjiwani General Hospital in January 2021 - December 2021. All obtained data analysed using SPSS statistics 22 software. A total of 12 patients were included in this study. Major complications were represented by perioperative bleeding (33%), residual pain (8%), no complication of implant failure, deep infection, minor infection such as superficial infection and impaired wound healing in this study. In this study was concluded that the most common femoral shaft fracture complication that performed ORIF PS is perioperative bleeding pain and other complications are very rare due to several factors

Keywords: Open reduction internal fixation; Femoral shaft fracture; Complication; Human and medicine

Citation: Widhiarma, I.P.S.F., Susila, R.B. (2023). Outcome of plate and screw fixation in femoral shaft fracture at Sanjiwani Hospital Gianyar In 2021. *Jurnal Kedokteran Unram*, DOI: 10.29303/jku.v12i3.992

Introduction

Femoral shaft fracture is the most common lower extremity fractures treated by an orthopedic. (Apley & Solomon, 2018) These fractures are often displaced and difficult to reduce due to muscle contraction. Fracture configurations that can occur as spiral, transverse, oblique, segmental or comminuted according to the

mechanism of injury. (Apley & Solomon, 2018) (Thomson, 2010) (Salter, 1999) Fractures are most common in adults with the most common mechanism being the presence of high energy trauma. In the world, femoral shaft fractures occurred on average 10-21 per 100,000 per year and 2% are open fractures with the most occurring in men around 15-35 years old and the incidence increases in women after the age of 60 years.

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(Apley & Solomon, 2018) (Trompeter & Newman, 2013) (Gansslen et al., 2014).

Treatment of femoral shaft fractures can be treated by operatively or non operatively. Non operative procedures that can be performed by traction, bracing and spica cast. Operative procedures that can be performed include plate and screw fixation, intramedullary nail and external fixation. Intramedullary nail is treatment of choice in patients with femoral shaft fractures due to the high union rate with minimal complications. Various authors were said intramedullary nail had a cure rate of 82%-100%. (Hamahashi et al., 2019) (Testa et al., 2019) (Shin et al., 2020) There are studies stating that intramedullary nail is more effective than external fixation because it can cause infection under the screw and stiffness in the knee joint. Plate fixation has a higher risk of infection, slow union, implant failure, scarring of the quadriceps muscle, requiring more extensive surgery, and bleeding more frequently than intramedullary nails. (Hamahashi et al., 2019) (Shin et al., 2020) In addition, it is also better in controlling the length of the femur and rotation without causing the risk of tissue devitalization. Disadvantages of intramedullary nail are longer operation duration, heat necrosis and pudendal nerve palsy but pudendal nerve palsy can be prevented by reducing the pressure during traction. The successful management femoral shaft fractures requires a long time and the patient's contribution to undergoing physiotherapy. (Neumann et al., 2015) (Fan et al., 2022)

Several studies have revealed that there are more severe complications caused in femoral shaft fracture who underwent open reduction internal fixation with plate and screw (ORIF PS) than intramedullary nails and also considering that intramedullary nails is the gold standard in operative of patients with femoral shaft fractures. The aims of this study is examining the characteristics of femoral shaft fracture which treated by ORIF PS at the Sanjiwani Hospital by looking at the various complications that could arise such as residual pain, perioperative bleeding, infection, implant failure.

Materials and Methods

This study was designed as a descriptive retrospective study. Medical record, surgical procedure, and outpatient control reports were reviewed to collect pre-, intra-, and postoperative details by identifying data on complications that occur in patients with open and closed femoral shaft fractures who have performed ORIF PS at Sanjiwani General Hospital for the period January 2021 - December 2021. The sample in this study was obtained by total sampling method as many as 12

patients. The inclusion criteria in this study were all patients with femoral shaft fractures over 18 years who had ORIF PS. Exclusion criteria were proximal or distal fractures of the femur.

Result

In this study, there were 12 samples with a diagnosed of femoral shaft fracture that were definitively treated by ORIF PS. Based on Table 1, patient characteristics are divided by age, sex, type of fracture and fracture site. On the age group, the 18-59 years old group has highest number (58%) with 7 samples, while the >59 years old has the least number of this case (9%) with 1 samples. Most of samples were male with 7 samples (58%) and the female as much as 5 samples (42%). Based on data, closed femoral shaft fractures as many as 10 samples (83%) while 2 samples (17%) had open femoral shaft fractures. In this study, all surgical method that used in this study was ORIF PS as many as 12 samples (100%) and no intramedullary nail due to C Arm Radiography could not function. In this study also divided patients who experienced perioperative complications into major and minor complications which seen in Table 2. The most major complications in this study as many as perioperative bleeding were 4 samples (33%) and residual pain were 1 samples (8%) and there were no patients had complications such as deep infection, malunion, implant failure and minor complication

Table 1. Patient Characteristics.

Patient Characteristics	N (%)
Age	
<18	4 (33%)
18-59	7 (58%)
>59	1 (9%)
Gender	
Male	7 (58%)
Female	5 (42%)
Type of fracture	
Open fracture	2 (17%)
Close fracture	10 (83%)
Operation Method	
ORIF P/S	12 (100%)
Intramedullary nail	0 (0%)

Table 2. Perioperative Complications.

Complications	N (%)
Major Complications	
Residual Pain	1 (8%)
Deep infection	0 (0%)
Malunion	0 (0%)
Implant failure	0 (0%)

Perdarahan perioperative	4 (33%)
Minor Complications	
Superficial infection	0 (0%)
Impaired Wound Healing	0 (0%)

Discussion

In the current era, the incidence of injury especially fractures is one of the focuses of health problems in the orthopedic which if not treated quickly and appropriately can lead to high disability rates. Based on world data, femur fractures have increased by 23.5%, from 150,565 in 2002 to 185,979 in 2017. (Apley & Solomon, 2018) (Trompeter & Newman, 2013)

In this study, it was found that there were 12 cases of femoral shaft fracture that had been carried out by ORIF PS at the Sanjiwani General Hospital, Gianyar in 2021 with an average of 7 males (58%). This is in accordance with research conducted by Riswanda et al. at Dr. Soetomo Hospital who found that the majority of femoral shaft fractures occurred in male by 72%. (Noorisa et al., 2017) The results of this study are also similar to the study by Tasya et al. who conducted research at Haji Adam Malik Hospital that majority of femoral shaft fractures occurred in male (77.9%). This is because in male more often caused by accidents while women are most often over the age of 60 years due to risk factors in the form of osteoporosis. (Tasya & Rahmadhany, 2022)

Based on the age found that femoral shaft fractures occurred in 18-59 years old with 7 peoples (58%). This is in line with research conducted by Riswanda et al. in the DR. Soetomo Hospital who said that the average age of 15-24 years old was 36% because those in productive age do activities outside and in old age bones usually have osteoporosis. (Noorisa et al., 2017) This is also in accordance with the research conducted by Tasya et al. at Haji Adam Malik General Hospital Medan which show that it most often occurred at the age of 18-60 years by 80.8%. (Tasya & Rahmadhany, 2022)

The most common type of fracture in this study was closed fracture with 10 people (83%). This result is similar with research conducted by Tasya et al. at Haji Adam Malik General Hospital Medan which stated that 67.3% had a closed fracture. This is because the femur has a strong and thick muscle layer structure. This is also in line with research conducted by Riswanda et al. at the DR. Soetomo Hospital who said that the average closed fracture was 71%. (Noorisa et al., 2017) (Tasya & Rahmadhany, 2022)

This study found that there was residual pain in 1 person (8%). This is not much different from the research conducted by Shan et al. which stated that in their study were found 2 people (5.7%) of residual pain due to implants that stimulated the fascia. The pain is getting less during the healing period and after the implant has been removed. (Fan et al., 2022)

Complications such as superficial or deep infection were not found because sterilization of both tools and operators was did very well at the Sanjiwani General Hospital Gianyar and also because prophylactic antibiotics such as ceftriaxone were given to all patients who performed by ORIF PS during preoperative and postoperative. This is in accordance with a study conducted by Gansslen et al which stated that the risk level of infection in post ORIF PS femoral fracture patients was around 2%. Bad sterilization of operators, tools and prophylactic antibiotics are not given can also increased the incidence of infection but this risk can be reduced by giving prophylactic antibiotics such as ceftriaxone so that research and theory are appropriate due to administering prophylactic antibiotics in the form of ceftriaxone to reduce the risk of infection. (Gansslen et al., 2014)

There were no complications of malunion after ORIF PS in all patient with femoral shaft fractures at the Sanjiwani Hospital, Gianyar. This is in accordance with a study conducted by Gansslen which stated that the level of malunion was very low after ORIF PS around 0-29% and in this study also said that there was a fairly high union rate of 98.4%. (Gansslen et al., 2014)

Implant failure was not found after ORIF PS was performed. This result is similar with a study conducted by Gansslen et al. who said that the incidence of implant failure and the rate of re-operation was very rare around 0-23% caused by several risk factors that influence the incidence of implant failure such as increasing age, increasing of body mass index, smoking and mismatch of implant length to fracture length. (Gansslen et al., 2014)

There were 4 patients (33%) who required postoperative transfusion in this study. This is in accordance with the research of et al who conducted by Nagra et al which every patient during and after the ORIF PS transfusion whole blood unit 450 mls which gave an increase of 1 g/dl in hemoglobin and checked Hb after 72 hours postoperatively. Kajja et al also identified perioperative blood loss as influenced by 2 things, namely the use of diathermy and the type of fracture. The use of diathermy can significantly reduce peri-operative blood loss and

comminuted fracture has a high risk of blood loss. (Nagra et al., 2016)

Conclusion

The conclusion in this study that the most common femoral shaft fracture complication is perioperative bleeding. Residual pain and other complications are very rare due to several factors such as age, smoking, body mass index, sterilization rate, fracture site, fracture type and prophylactic antibiotics.

Acknowledgements

The authors thank to the colleagues at Sanjiwani General Hospital Gianyar for their cooperation and understanding.

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