Comparison of Comminuted Femoral Shaft Fracture Treatment between Locking Compression Plate and Conventional Dynamic Compression Plate Methods: A historical control an interventional study

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Background: *The standard treatment for comminuted femoral shaft fracture is intramedullary nailing. However, an alternative treatment where intramedullary nailing is contraindicated, plating can be performed using either a conventional dynamic compression plate (DCP) or a locking compression plate (LCP).*
Objective: *To compare results of comminuted femoral shaft fracture treatment with locking compression plate and with conventional dynamic compression plate methods.*
Materials and Methods: *A group of 40 patients admitted to Roi Et Hospital in northeastern Thailand between January 2016 and December 2018 were divided equally into 2 groups. The first group was operated on using the conventional dynamic compression plate method; the locking compression plate method was used with the second group. The study compared the rate of bone union (time to healing) and postoperative complications with the two methods.*
Design: *Historical control interventional study.*
Results: *In both DCP and LCP technique average healing rate were 20 weeks. However, more postoperative complications were found with the dynamic compression plate method, e.g., a broken plate was found occurred in 5 patients and malunion was discovered in 2 patients, while the group treated with the locking compression plate method had no broken plates and only one patient with malunion.*
Conclusions: *The locking compression plate method is appropriate for comminuted femoral shaft fracture treatment as it provides a better rate of bone union (healing rate) and fewer postoperative complications than the conventional dynamic compression plate method.*

Keywords: *Femoral Shaft Fracture, Dynamic compression plate, Locking plate, Conventional technique*

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Introduction

Femoral shaft fractures are a common type of injury in a busy trauma unit. There are a variety of methods available for treating a fracture of the femoral shaft, each of which has advantages and disadvantages. Outcomes are largely a function of the surgeon's experience with a particular method of treatment. The standard treatment for femoral shaft fractures is intramedullary nailing; this method is associated with a less than 1% rate of infection or nonunion(1). It is particularly advantageous in certain situations where intramedullary nailing may not be ideal. These may include an associated femoral neck fracture, an associated acetabular fracture, a vascular injury, an associated spinal fracture, young age, and multisystem trauma. However, the intramedullary nailing procedure is technically demanding for the surgeon and entails significant initial expense for the hospital, the latter being an important factor in developing countries(2). The conventional plate treatment method is another suitable option. The conventional plate, first developed in 1969, is still in use. This method provides good results in terms of stability and maintenance of bone length and alignment. However, conventional plating methods are based on the use of an adequate number of anchoring screws to press the plate against the bone with high compressive force which results in the destruction of periosteum and interference with cortical blood flow which can lead to increased rates of infection and delayed healing(3). In order to reduce these impacts, the biologic internal fixation principle was developed which helps maintain the maximum amount of remaining soft tissue in the bone fracture area, e.g., preservation of tissue and removal of tissue from the fracture area with the least affect on the blood vessels(1,4). Technological advances and the increased quality of osteosynthesis materials have resulted in a locking plate technique based on a bone perfusion-saving "no contact" system with cold welding between the screw head and the plate(5). Improved plate models (plate osteosynthesis) reduces pressure between the plate and bone, providing improved periosteal

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perfusion. Locked plate osteosynthesis allows micro-movement within the fracture gap which can increase the formation of calluses and thus improve bony healing of the fracture. The Locking Compression Plate (LCP) is a metal bone plate which increases both axial and angular stability[5]. Stability is affected by the number of screws per fracture fragment. More than 3 screws per fragment does not significantly increase axial stiffness, while more than 4 screws does not significant increase torsional rigidity[1]. Locking plates are commonly used to treat fractures of the spine, osteoporotic fractures and intra-articular fractures. We did not offer LCP fixation for simple diaphyseal fractures in patients with good bone stock, but rather managed them with interfragmentary compression with a dynamic compression plate (DCP)[6]. We felt that a locking compression plate is appropriate for treatment of patients with a comminuted femoral shaft fracture and that it also reduces complications better than using a dynamic compression plate.

Materials and Methods

A historical control study was performed with 40 patients with diaphyseal shaft femoral fractures who received treatment at Roi-Et Hospital in northeast Thailand between January 2016 and December 2018. All patients had an acute comminuted femoral diaphysis fracture (fracture between the proximal and lesser trochanter and supracondylar fracture). The Winquist system[7] was used for classification of the fracture patterns. This research was approved by the Roi-et Hospital Ethical Committee.

The patients were carefully examined for associated injuries and diseases. Skin traction was applied before surgery, wounds in the case of open fractures were carefully excised and closed. Blood transfusion was administered when indicated. Patients with associated abdominal injuries or chest injuries are usually transferred to the trauma unit after initial resuscitation. Operations were usually performed between 1 and 15 days after the injury depending on the severity of any associated injuries. The patients were divided into 2 groups. The first group of 20 patients were operated on using a conventional broad dynamic compression plate (Broad DCP). The second group of 20 patients received a locking compression plate (LCP). Traditional operation techniques were used with both groups. The first group of 20 patients, who were operated on before June 2017, received a Broad DCP. After that time, LCP was chosen for the operation. Medial cancellous bone graft was used liberally as an autograft in cases of comminution, medial cortical defect and delayed fracture fixation[1]. However, bone graft was not used in either group in this study.

Inclusion criteria were multiple trauma, neck-shaft femur, acetabulum fracture, spinal fracture, vascular injury, head injury, adolescent and small medullary canal as well as a femoral shaft fracture Winquist classification 3 or 4. Exclusion criteria were a femoral shaft fracture Winquist classification 0, 1, or 2.

The cause of the bone fractures in all 40 patients was traffic accidents. The surgical procedures were performed using a standard lateral approach with a midline incision centered over the fracture. The iliotibial band was divided as was the posterior fascia of the vastus lateralis muscle. The vastus lateralis muscle belly was then elevated above its posterior fascia, and perforating vessels were ligated. Effort was made to minimize soft tissue dissection. The bones were rearranged and anatomical reduction was accomplished using the minimum number of lag screws. Following that, the plate was fixed with four proximal and four distal screws. Following Laurence et al., the common clinical recommendation has been to use four plate screws on either side of a femur fracture[7]. Broad-DCP implants (Pro-Fix Stainless Steel) were used in the first group, while LCP (MDC Titanium) were applied following AO techniques in the second group. Before placing a plate, the physician should be aware of the need to minimize destruction of soft tissue in the area of the fracture site. For all patients, an intravenous prophylactic antibiotic was given before surgery and suction drainage was applied after completion of the operation. Range of motion exercises with continuous passive motion were begun immediately.

Post operatively, the injured leg was rested and elevated to decrease swelling and to facilitate early active movement of the whole lower limb. Mobilization of the affected limb without weight bearing was started a few days post operatively; toe-touch weight bearing was allowed. Patients were allowed to walk without bearing weight using a pair of crutches. In cases of multiple fractures, walking was delayed until sufficient healing had occurred. Patient hip and knee range of movement and radiographic findings were recorded. Radiographic investigations were carried out during the immediate postoperative period, at 4-6 weeks, and at 3, 6 and 9 months post operatively. The patients were restricted to non-weight bearing on the affected extremity until there was clinical and radiographic evidence of bone union.

Outcome scoring was as follows. Excellent: full hip and knee joint movement, powerful quadriceps, no pain, no shortening of the limb, no angulation, no rotation. Good: full hip and knee joint movement, powerful quadriceps, no pain, no shortening of the limb, no angulation, no rotation, intermittent mild pain requiring no medication. Fair: knee flexion not less than 90 degrees, shortening less than 2 cm, 5-10 degrees of angulation or rotation, mild pain. Poor: those falling below the criteria for fair.

Definitions of terminology[4] in this report include the following. Clinical union is the period of time for the patient to do full weight bearing without pain in the fracture area. Radiographic union means at least 3 of 4 cortex bones in both AP and lateral views show callus formation. Delayed union is no healing after more than 6 months. Nonunion as a fractured bone that has not completely healed within 9 months and that has not shown progression towards healing over 3 consecutive months on serial radiographs. Malunion means more than 5 degrees of varus or valgus angulation. Implant failure means a broken, bent or withdrawn plate and screws (Table 1).

Results

Data on the two groups, including gender, age, weight, compound fractures, associated injuries, and the duration of the operations were not significantly different. A dynamic compression plate (DCP) was used in the first group while a locking compression plate (LCP) was applied in the second group. Regarding time from the incident to surgery, 12 patients in the DCP plate group (63.2%) were operated on within the first day, while only 7 in the LCP plate surgery group (36.8%) were operated on the first day (Table 2).

The rate of bone healing in the first (DCP) group was between 4 to 6 months for 10 patients (37%) (Figure 1), and the union rate was more than 9 months for 7 patients (87.5%). Of these 7 patients, plate failure requiring an additional surgical procedure to achieve union occurred in 5 patients (Figure 2), and malunion was discovered in another 2 patients. In the second group (LCP), bone union occurred between 4 to 6 months in 17 patients (63%) (Figure 3), and only one patient had bone union after more than 9 months – and that was a malunion.

The two forms of comminuted femoral shaft fracture treatment had statistically significantly different duration of healing time. Time to bone union in the LCP group was significantly less than in the DCP group (p-value = 0.002). (Table 2).

The different forms of comminuted femoral shaft fracture treatment resulted in statistically significantly different rates of complications (p-value = 0.000). There were fewer complications with faster bone union (Table 2).

The different forms of comminuted femoral shaft fracture treatment resulted in significantly different treatment results (p-value = 0.000). In the DCP group, 36% had excellent treatment outcome scores compared 64% in the LCP group (Table 2).

The most frequently reported cause of re-operation was nonunion followed by delayed union and mechanical failure[6,8]. Nonunion remains the most commonly reported cause of failure[3]. In this study, the most common problem was plate failure caused by delayed union together with weight bearing walking before callus was created resulting in a broken plate. If there were a method that supports faster bone union, the incidence of this complication would be reduced[9,10]. Improving plate osteosynthesis or increasing bone stability by using a longer plate or by reducing destruction of blood vessels which nourish the bones in the break area would provide better and faster bone union.

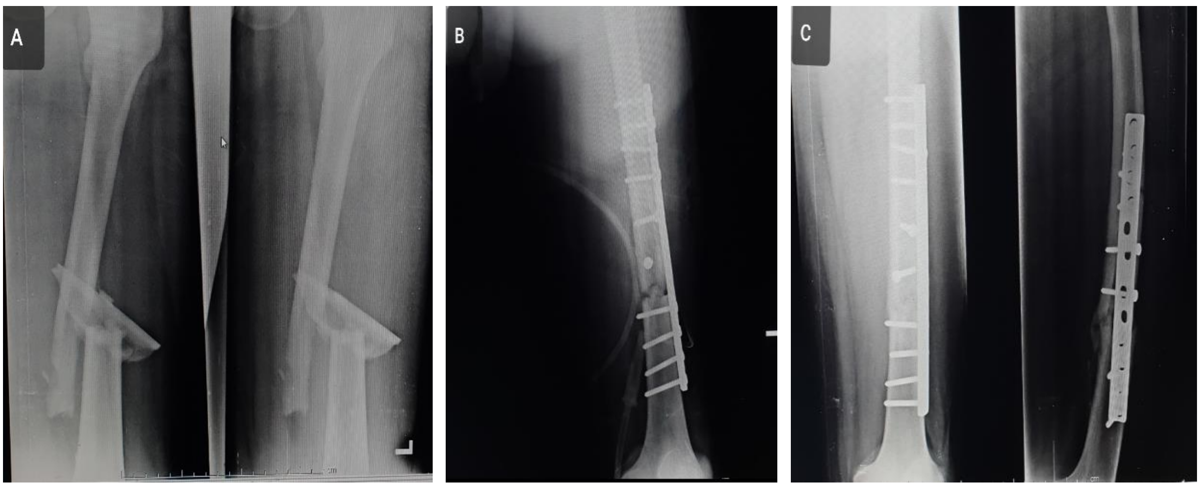
Table 1 Clinical data of 40 fractures of the femoral shaft

Variable	Group		Total
	DCP	LCP	
Number of patients	20	20	40
Sex. Male	15 (53.6%)	13 (46.4%)	28 (100%)
Age 0-20	9 (50%)	9 (50%)	18 (100%)
Smoker yes	8 (44.4)	10 (55.6)	18 (100)
Winquist classification Type 3	13 (61.9%)	8 (38.1%)	21 (100%)
Fracture type - closed	16 (48.9%)	17 (51.1%)	33 (100%)
Time to surgery within 24 hrs.[10]	12 (63.2%)	7 (36.8%)	19 (100%)
Time to discharge (day) 1-10 day	17 (58.6%)	12 (41.4%)	29 (100%)
Time to union 4-6 (months)	10 (37%)	17 (63%)	27 (100%)
Outcome score excellent (n) %	9 (36%)	16 (64%)	25 (100%)
Complication (n) % no complication	13 (40.6%)	19 (59.4%)	32 (100%)

Table 2 The comparison of comminuted femoral shaft fractures treatment results

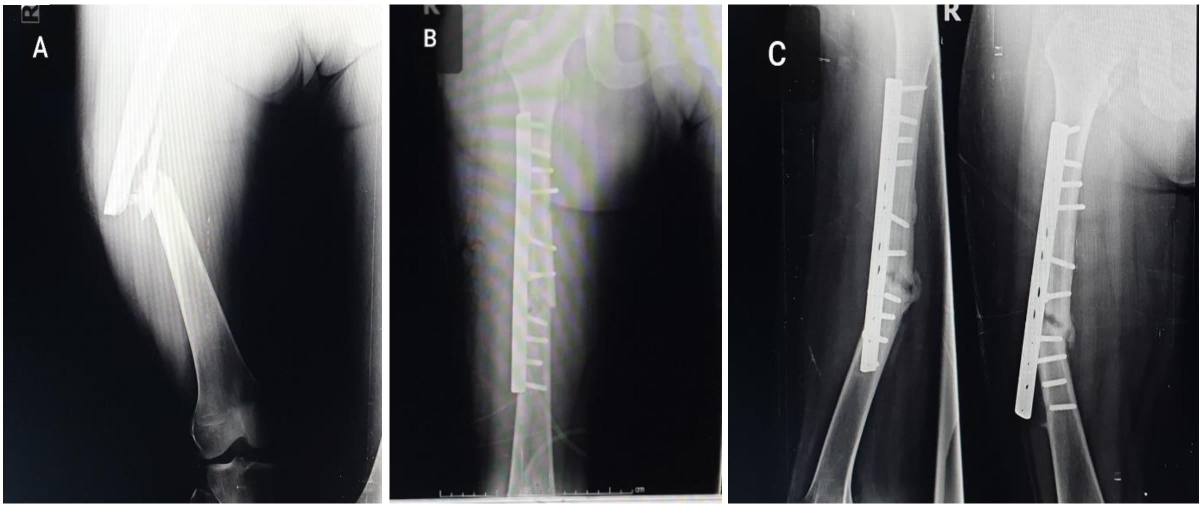
Variable	**Group**		**Total**	**p-value**
Implant used	**DCP**	**LCP**		
Time to union[11] (months)				
4	3 (27.3%)	8 (72.7%)	11 (100%)	
5	5 (38.5%)	8 (61.5%)	13 (100%)	
6	2 (66.7%)	2 (33.3%)	6 (100%)	0.002**
7	2 (50.0%)	2 (50.0%)	4 (100%)	
8	1 (100%)	0 (0%)	2 (100%)	
> 9	7 (100%)	0 (0%)	4 (100%)	
Outcome score (n) %				
excellent	9 (36%)	16 (64%)	25 (100%)	0.000**
Good	4 (57.1%)	3 (42.9%)	7 (100%)	
Poor	7 (87.5%)	1 (%12.5)	8 (100%)	
Complication (n) %				
None	13 (40.6%)	19 (59.4%)	32 (%)	0.000**
Malunion	2 (66.7%)	1 (33.3%)	3 (%)	
Failure plate	5 (100%)	0 (0%)	5 (100%)	

** The statistical significance > 0.01



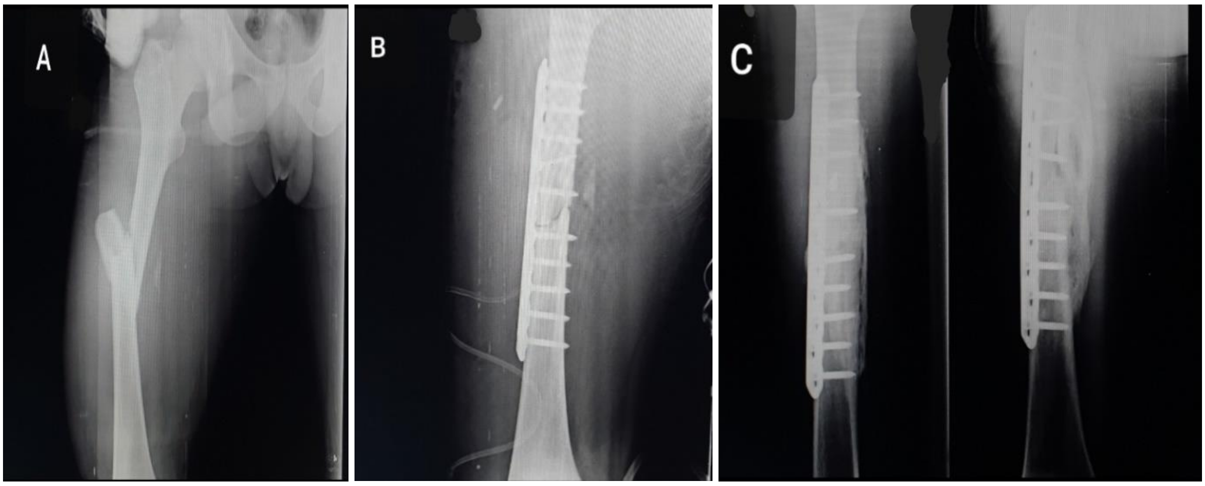
A B C

Fig. 1 (A) 46 year old man sustained a motorcycle accident with femoral shaft fracture Winquist IV.
(B) The fracture was stabilized with a 12 hole broad DCP.
(C) Radiograph of the fracture after 6 months showed complete callus bridging of the fracture.



A B C

Fig. 2 (A) 30 year old man sustained a motorcycle accident with femoral shaft fracture Winquist III.
(B) The fracture was stabilized with a 12 hole broad DCP.
(C) Radiograph showed non-union with a broken screw after 9 months. Reoperation was required.



A B C

Fig. 3 (A) 29 year old man sustained a motorcycle accident with femoral shaft fracture Winquist IV.
(B) The fracture was stabilized with an 11 hole LCP.
(C) Radiograph after 4 months showed complete callus bridging of the fracture.

Discussion

The average time to union in this series was 20 weeks in both groups (range 16-32 weeks) which is similar to finding of other studies. However, fracture related complications in this study were high (in the DCP group, 35% consisting of 5 cases of implant failure and 2 cases of malunion. That complication rate is toward the high end of the 15-40% reported by other authors(1). The relatively high complication rate in this study might be explained by the use of short Broad DC plates, inadequate surgical techniques, full weight bearing before callus formation, and the fact that cancellous bone grafting was not used in cases of comminuted medial cortical defects. Reports indicate that routine use of bone grafting of the medial shaft can dramatically reduce the incidence of plate fatigue fractures(12). The LCP group had a complication rate of only 5%, consisting of one case of malunion. That complication rate is low compared to the DCP group.

According to Farouk(13), the blood supply to long bones arises from three sources: the periosteal, metaphyseal, and nutrient arteries. The nutrient arteries, usually arising from the second perforating artery, represent the chef source of blood supply to the inner two-third of the cortex as well as the periosteal supply to the outer third of the cortex. Periosteal circulation is derived from the surrounding muscles and is supplied by the perforating arteries. Conventional plate osteosynthesis dissection revealed that the perforating arteries were ligated near nutrient arteries from which the vastus lateralis had been elevated. Denudation of the individual fragments and exposure of the fracture zone subsequently led to increased rates of infection and nonunion as well as delayed healing. It is evident that new fixation devices are needed to improve the outcomes of this type of injury(13,14). The development of both surgical methods and better implant forms are needed to promote faster bone healing and to reduce subsequent complications, especially implant failures. Many risk factors have been identified including diabetes, smoking, compound fracture, greater body mass index, and greater length of the implant(5,6). In order to improve outcomes, it is necessary to comprehend the principles of biology and biomechanics related to fracture healing and fracture fixation(8).

In addition, there are various patterns of comminuted femoral shaft fracture treatment. The treatment method that has become the standard is the intramedullary nailing method; however, many concerns remain. For example, the procedure of interlocking intramedullary nailing is considered technically difficult and requires special instrumentation and equipment, e.g., an image intensifier and a fracture table. In addition to a skilled surgeon, an unscrubbed experienced medical staff is mandatory. Additionally, a multiply injured patients may be put into an unfavorable position on the fracture table. Physicians in many hospitals prefer to insert the plate into fracture shaft of the femur rather than using nails. Furthermore, the problem of lack of instrumentation makes this method difficult to apply. Moreover, it has also been found that excessive reaming of the small medullary canal (especially in the area which is narrower than 8 mm.) can result in thermal necrosis and severe osteomyelitis(1).

Inserting a conventional plate is another option. Traditional plating of a long bone fracture provides excellent stability and maintains both length and alignment(9). Although the biomechanics of plate fixation are less stable than intramedullary nailing, the mechanical stability is sufficient for bone healing. Traditional open reduction of a femoral shaft fracture is associated with delayed union rates of up to 49%, infection rates of 28%, and an incidence of nonunion of 23%(2). In response, plate osteosynthesis has been developed using a bridging plate with the minimally invasive plate osteosynthesis (MIPO) technique. This indirect reduction method requires less soft tissue dissection and preserves the fracture hematoma and blood supply to bone fragments, resulting in undisturbed blood supply and rapid callus bone healing(15). MIPO provides good results; however, the surgeon must have sufficient expertise to arrange the bone using a fluoroscope. According to Enes M, the average radiation exposure duration is 84 seconds (range 30-152 seconds), and there is also a problem of malalignment(9). Micheorl Zlowodzki et al. reported 24% anterior translation of the proximal fragment with the MIPO technique, resulting in interference with the quadriceps muscle which decreases knee movement(2). According to research of T. Apivathakakul(15), the MIPO technique results in bone healing for in 21 weeks, 9% malunion and 6% bone shortening. Krettek etal.reported Limb Length discrepancy (LLD) occurred in 8% of femoral shaft fractures treated with submuscular plating. Malalignment in MIPO technique is more complication than conventional open reduction. In all cases, the treatment goal is to obtain the appropriate alignment rotation length and minimize limb length discrepancy(1). In order to reduce malalignment problems, the locking compression plate was developed based on the internal fixator principle that the plate must not be attached to the bones so the vascular blood supply will not be interrupted, allowing faster bone union(13-15). It combines the principles of conventional plate ostheosynthesis for direct anatomical reduction with those of bridging plate osteosynthesis. This malalignment problem will not seen in locking plate. In addition, LCP is readily available in general hospitals and is convenient to use without fracture table preparation so physicians do not have to wait for the operating room to be prepared. Thus patients will receive the benefits of faster operations, decreased length of hospital stay and elimination of the need for a fluoroscope while increasing comfort levels for surgical assistants and the operating team.

It is known that for patients with risk factors for delayed healing and nonunion there is an increased chance of implant failure. Open fracture, DM and smoking were also found to increase the risk of implant failure; these factors also have the potential to slow the healing process. Factors which negatively influence a patient’s immune response include advanced age, diabetes, malignancy, rheumatoid disease, NSAID use, and steroid use. Fracture-specific factors that limit bone healing include those that impede the bony blood supply and/or increase the risk of infection, e.g., watershed areas in open fractures, diaphyseal regions of long bones and severe soft tissue injury(3). Greater BMI has also been found to be a risk factor for implant failure. Heavier patients are likely to stress their implants to a greater degree than lighter patients. The association of younger age with increased risk of reoperation to promote union is less clear; it may be related to over direct force and had seen multiple injury. Shorter plate length has been associated with failure but that can be minimized by relatively minor technical modifications[13,17].

Limitations of this study include the small sample size, the result of a lack of patients who matched the inclusion criteria during the study period. Future studies should include a larger number of samples. Other potentially important risk factors were not studied in this research. For example, age, gender, smoking, open fracture, BMI, and length of implant are useful in developing a prognosis, including the potential for complications such as nonunion, a broken plate or malunion. These factors should be studied further.

Conclusions

DCP is not appropriate for comminuted femoral shaft fractures. Locking compression plates should be used in situations in which intramedullary nailing cannot be applied. Locking compression plates should be used not only in osteoporosis fractures and intra-articular fractures conditions, but also in comminuted femoral shaft fractures as well.

References

1. Zlowodzki M, Vogt D, Cole PA, Kregor PJ. Plating of femoral shaft fractures: open reduction and internal fixation versus submuscular fixation. J Trauma. 2007; 63(5): 1061-5.
2. Ogunlade SO, Alonge T, Omololu B, Ifesanya A, Nottidge T, Diete-Spiff T. Plating of femoral shaft fractures:the experience in an African teaching hospital. Eur J Trauma Emerg Surg. 2007; 6(33): 613-618.
3. Koso RE, Terhoeve C, Steen RG, Zura R. Healing, nonunion, and re-operation after internal fixation of diaphyseal and distal femoral fractures: a systematic review and meta-analysis. Int Orthop. 2018; 42(11): 2675-83.
4. Ebraheim NA, Buchanan GS1, Liu X, Cooper ME, Peters N, Hessey JA, et al. Treatment of distal femur nonunion following internal fixation with a lateral locking plate. Orthop Surg. 2016; 8(3): 323-30.
5. Neumann H, Stadler A, Heuer H, Auerswald M, Gille J, Schulz AP, et al. Complications during removal of conventional versus locked compression plate: is there a difference? . Int Orthop. 2017; 41(8): 1513-9.
6. Kumar A, Gupta H, Yadav CS, Khan SA, Rastogi S. Role of locking plates in treatment of difficult ununited fracture: a clinical study. Chin J Traumatol. 2013; 16(1): 22-6.
7. Rozbruch SR, Müller U, Gautier E, Ganz R. The evolution of femoral shaft plating technique. Clin Orthop Relat Res. 1998; (354): 195-208.
8. Viberg B, Rasmussen KMV, Overgaard S, Rogmark C. Poor relation between biomechanical and cliniical studies for the proximal femoral locking compression plate. Acta Orthop. 2017; 88(4): 427-33.
9. Kanlic EM, Anglen JO, Smith DG, Morgan SJ, Pesántez RF. Advantages of submuscular bridge plating for complex pediatric femur fractures. Clin Orthop Relat Res. 2004; (426): 244-51.
10. Heitemeyer U, Kemper F, Hierholzer G, Haines J. Severely comminuted femoral shaft fracture: Treatment by briding-plate osteosynthesis. Arch Orthop Trauma Surg. 1987; 106(5): 327-30.
11. Shah MD, Kapoor CS, Soni RJ, Patwa JJ, Golwala PP. Evaluation of outcome of proximal femur locking compression plate (PFLCP) in unstable proximal femur fractures. J Clin Orthop Trauma. 2017; 8(4): 308-12.
12. Farouk O, Krettek C, Miclau T, Schandelmaier P, Guy P, Tscherne H. Minimally invasive plate osteosynthesis: does percutaneous plating disrupt femoral blood supply less than the traditional technique?. J Orthop Trauma. 1999; 13(6): 401-6.
13. Wenda K, Runkel M, Degreif J, Rudig L. Minimally invasive plate fixation in femoral shaft fractures. Injury. 1997; 28 Suppl 1: A13-9.
14. Apivatthakakul T, Chiewcharntanakit S. Minimally invasive plate osteosynthesis (MIPO) in the treatment of the femoral shaft fracture where intramedullary nailing is not indicated. Int Orthop. 2009; 33(4): 1119-26.
15. Geissler WB, Powell TE, Blickenstaff KR, Savoie FH. Compression plating of acute femoral shafts fractures. Orthopedics. 1995; 18(7): 655-60.
16. Sommer C. Biomechanics and clinical application principles of locking plates. Suomen orthopedia ja traumatologia. 2006; 29: 20-4.
17. Oboirien M, Agbo SP, Ajibove LO. Evaluation of locked plate in the osteosynthesis of fractures in osteoporosis bones. Ann Afr Med. 2017; 16(3): 127-30.

การเปรียบเทียบผลการรักษากระดูกต้นขาส่วนกลางหักแบบหลายชิ้นระหว่าง Locking compression plate กับ Conventional dynamic compression plate

ธวัชชัย อมรมรกต, พบ

วัตถุประสงค์: เพื่อศึกษาเปรียบเทียบผลการรักษาของกระดูกต้นขาส่วนกลางหักแบบหลายชิ้นระหว่างการผ่าตัด Locking compression plate กับ Conventional dynamic compression plate

ผู้ป่วยและวิธีการ: กลุ่มผู้ป่วย 40 คน แบ่งเป็น 2 กลุ่ม เท่าๆกัน เข้ารับการรักษาระหว่างช่วงมกราคม 2559 - ธันวาคม 2561 กลุ่มแรกผ่าตัดโดยวิธีการใช้ Conventional dynamic compression plate และอีกกลุ่มผ่าตัดโดยใช้ Locking compression plate โดยศึกษาเปรียบเทียบด้านอัตราการติดของกระดูกและภาวะแทรกซ้อนหลังผ่าตัดของทั้ง 2 วิธี

ผลการศึกษา: กลุ่มที่ใช้ Dynamic compression plate มีภาวะแทรกซ้อน เช่น การเกิดเหล็กหักจำนวน 5 ราย ภาวะกระดูกติดผิดรูปจำนวน 2 ราย ซึ่งมากกว่ากลุ่มที่ใช้ Locking compression plate ที่มีเพียงกระดูกติดผิดรูปเพียงรายเดียว

สรุป: Locking compression plate เป็นอีกทางเลือกหนึ่งที่เหมาะจะใช้ในการรักษาผู้ป่วยกระดูกต้นขาส่วนกลางหักแบบหลายชิ้น เพราะมีอัตราการติดกระดูกที่ดีกว่า และเกิดภาวะแทรกซ้อนน้อยลงกว่าเมื่อเทียบกับ conventional dynamic compressional plate