PLATING OF FEMORAL SHAFT FRACTURES
A REVIEW OF 15 CASES

D. SELIGSON[1], T. MULIER[2], S. KEIRSBILCK[2], J. BEEN[1]

The objective of this study was to define the role, indications and outcome of plating in femur shaft fractures. All femoral shaft fractures admitted and treated by the authors during a 2-year period were analysed. The authors personally treated a total of 135 femur fractures. Of these 135 fractures, 15 (11%) were treated with primary plating. The femoral fractures were classified as grade I (n = 4), grade III (n = 3), grade IV (n = 4), grade V (n = 3), and grade VII (n = 1) (OTA classification). Three patients sustained open fractures (one grade I and two grade II, Gustilo and Anderson classification). Pelvic (6) or ipsilateral lower extremity injuries (4) occurred in 10 of the 15 patients. A total of 23 body areas were injured, most commonly the chest (n = 10), abdomen (n = 5), head (n = 6) and blood vessels (n = 3). There were no infections reported.Two implant failures were noted.

Femur plating is a useful technique in polytrauma patients for specific indications where intramedullary nailing (IMN) may be contra-indicated or technically not feasible. Although the postoperative morbidity (ARDS, death) in our study seems to be lower after plating than after intramedullary nailing, the rate of complications of fracture healing (30%) is significantly greater with femur plating than with intramedullary nailing (12%).

Keywords : fracture ; femur ; plate fixation ; polytrauma.

Mots-clés : fracture ; fémur ; plaque vissée ; polytraumatisé.

INTRODUCTION

Primary fracture stabilization is recommended in the management of patients with multiple injuries. In general, intramedullary nailing has been favored over other treatment methods for femoral shaft fractures (1, 2, 3, 11, 12). However, intramedullary nailing may be more complicated in certain indications such as concomitant unstable pelvic fractures, spine fractures, pre-existing deformation of the femur, and fracture below or above an arthroplasty. Furthermore, femoral nailing can be associated with a high pulmonary complication rate subsequent to intramedullary instrumentation in severe polytrauma (6, 9, 10, 21). This risk may be greatest in patients with an associated chest injury (6, 10, 12, 14). Nailing may cause risk to the fetus in pregnant women owing to the amount of fluoroscopy, and may produce vascular complications in patients with an associated arterial injury (7, 9, 11, 20). Bone marrow embolism may add to the cerebral insult in patients with severe closed head injury (14, 17).

In 1977 Tscherne and Trentz described several indications for femoral plating including severe compound fractures, multiple-trauma patients requiring multiple procedures, fractures including the proximal or distal third of the femoral shaft, and comminuted fractures with more than six fragments (22). However, since intramedullary nailing

[1] University of Louisville, Department of Orthopedic Surgery, Louisville, Kentucky, USA.

[2] Regional Hospital Heilig Hart, Department of Orthopedic Surgery, Leuven, Belgium.

Correspondence and reprints : Thomas Mulier, Department of Orthopedic Surgery, Regional Hospital Heilig Hart, Naamsestraat 105, 3000 Leuven, Belgium.

has become prevalent, indications for plating have declined (3, 4, 8, 10, 11, 13, 15, 19, 21, 23, 24). We analyzed from January 1992 to December 1993 all femoral fractures treated in one service at the University of Louisville Trauma Center. Intramedullary nailing was not feasible in 15 of the 135 femur shaft fractures (11%) which were therefore treated with femoral plating. The aim of this study was to analyze the local and general complication rate after femoral plating and to define the role of plating.

MATERIAL AND METHODS (Tables I, II)

From January 1, 1992 to December 31, 1993, 135 patients with femoral shaft fractures were admitted to the authors' service at the University of Louisville Trauma Center. The ages of the patients were between 17 and 79 years (mean 34 years).

All charts and operative logs were examined on these 135 patients to determine date and time of injury, time of admission and operative stabilization. Clinical review was conducted in most of the 135 patients. One hundred twenty patients underwent reamed intramedullary nailing (IMN), 15 patients underwent femoral plating. Mechanism of injury, Injury Severity Scale scores (ISS), general complications (respiratory failure, multiple organ failure (MOF), adult respiratory distress syndrome (ARDS), atelectasis, mortality, time to healing, implant complications, implant exchange, and concomitant ipsilateral or pelvis fractures were reviewed. The mean ISS score in the IMN group was 26 and the mean ISS score in the plating group was 36. Special attention in this study was given to the nine males and six females treated by femur plating.

The mean follow-up in these 15 patients at final review ranged from 13 to 37 months (mean 22 months). The mechanism of injury was a motor vehicle accident in 12 cases and an automobile pedestrian accident in three cases. All 15 patients were polytrauma patients (ISS >18), two had life-threatening vascular injuries (transected aortas), and nine had severe thoracic trauma, (flail chest, lung contusions). There were 39 additional fractures of which nine were tibial fractures. Two patients had a femoral fracture bilaterally, and three had a fracture of the hip associated with the femoral shaft fracture. Ten had concomitant fractures of the same leg. A total of seven open fractures was noted (two femurs, five tibias) in five patients.

Three of the femoral fractures were open, grade I in one case and grade II in two cases (Gustilo and Anderson classification) (9). According to the OTA classification (Fig. 1), four were grade I, three were grade III, four were grade IV, three were grade V, and one was a grade VII femoral fracture (11).

The timing of femur fracture treatment varied from 0 to 12 days. Initial provisional treatment was pin traction in four patients, later followed by compression plating. Immediate plating was performed in eight patients ; in three patients a temporary external fixator was applied and maintained for 1 to 12 days.

Broad plates were used for fixation. Medial cortical continuity was restored to avoid medial defects. Length, axis, and rotation were retained keeping as much as possible the soft tissues and periosteum intact ("biological bridging plate osteosynthesis" without anatomical reduction of small fragments) (13, 15, 21, 23). The plate was placed under tension and medial defects, if present, were bone grafted.

Assessment of the functional results included range of motion, time to union, and presence of bony or soft tissue problems.

RESULTS

Local complications were seen in 7 cases. This included delayed union in three cases (20%), which finally healed and nonunion in four cases (30%) together with implant fracture in two cases (15%). Implant failure was due to nonunion of the fracture. It was noted respectively after six and nine months in two closed femoral fractures, type III and type VII. In these two patients no technical problems were noted peroperatively and weight bearing was allowed as tolerated after 6 weeks. No axial deformities and no unacceptable (more than 1 cm) differences in femoral length were seen. The four nonunions were treated respectively with an intramedullary nail (3 cases) and a supracondylar nail (one case). All the cases healed six to ten months after the second procedure, except one. This patient needed a second exchange nailing (15-mm Klemm and Schellmann nail). After 18 months no sound healing has yet been obtained. A total of 23 body systems were injured, most commonly the head and face (n = 6), chest (n = 10), abdomen (n = 5), and blood vessels (n = 3).

Table 1

	Age/ Sex	Mode of injury	Femur Fracture OTA	Type of Fractures	Orthopedic Fixation	ISS	Associated Injuries	Time to Union
Case 1	18/F	MVA	5	L femur open grade II L bimalleolar ankle grade II L tibial plateau pelvis fracture	femoral pin broad plate (4 days)	42 25+9+9	femoral artery laceration lung contusion closed head injury	11 months
Case 2	44/M	PED	7	R femur R tibial plateau grade II open L proximal tibia grade I open	external fixation broad plate (12 days)	36 16+16+4	stomach perforation calf laceration > 5 cm	nonunion IM nailing 9 months healed 16 months
Case 3	22/M	MVA	4	R femur fracture dislocation pelvis	external fixation broad plate (8 days)	50 25+16+9	aorta transection devascularized small bowel colon rupture subcapsular renal rupture	6 months
Case 4	44/F	MVA	3	L femur + L fem. neck open pelvis L Monteggia L humerus neck	broad plate (3 days)	42 16+16+9	pulmonary contusion cardiac contusion head injury	delayed union IM nailing 4 months healed 10 months
Case 5	40/M	MVA	1	L femur L tibia open grade II double L forearm	pin traction broad plate (3 days)	34 16+9+9	pulmonary contusion closed head injury	pseudoarthrosis IM nailing 6 months Klemm nail 15 months
Case 6	36/F	MVA	3	L femur and L fem. neck R femur L ulna L humerus pelvis T11	external fixation broad plate on L broad plate on R (12 hours)	34 16+9+9	spleen rupture T11 fracture	nonunion L femur (8 months) GSH nail union 14 months
Case 7	36/F	MVA	1	R femur L ankle	broad plate (12 hours)	27 9+9+9	pulmonary contusion closed head injury	union 10 months
Case 8	76/M	MVA	4	L femur fracture	broad plate (9 hours)	27 9+9+9	Lefort 2 fracture fracture base skull	union 14 months
Case 9	19/F	PED	1	L femur L acetabulum pelvis	broad plate on L (24 hours)	34 16+9+9	pneumothorax L1 burst fracture	union 9 months
Case 10	29/F	PED	5	R femur R acetabulum pelvis	broad plate on R (24 hours)	34 16+9+9	hemothorax burst fracture T12 renal subcapsular injury	union 18 months
Case 11	34/M	MVA	5	L femur shaft grade 1 open L tibia open grade 1 L patella	broad plate (24 hours)	50 25+16+9	aorta transection (thoracic) bilateral flail chest pulmonary contusion closed head injury	union 20 months
Case 12	18/F	MVA	3	R femur L patella L tibia pelvis	pin traction broad plate (48 hours)	41 16+16+9	flail chest multilobular pulmonary contusion closed head injury	union 6 months
Case 13	35/M	MVA	4	R femur 7 rib fractures	broad plate (12 hours)	27 9+9+9	pulmonary contusion closed head injury	delayed union 5 months bone stimulator
Case 14	36/M	MVA	4	L femur R tibia open grade I	broad plate (24 hours)	27 9+9+9	3 rib fractures	union 13 months
Case 15	41/M	MVA	1	R femur + R fem. neck	broad plate (48 hours)	27 9+9+9	hemothorax spleen rupture	union 10 months

Table II. — Distribution of injuries

1. Chest		
serial rib injuries (> 3)		7
hemothorax		2
pneumothorax		1
lung contusion	unilateral	3
	bilateral	2
aortic rupture		2
2. Abdominal		
splenic rupture		3
stomach perforation		1
colon and small bowel perforation		1
3. Orthopedic		
acetabulum		2
pelvis fracture	stable	2
	unstable	5
upper limb fractures		5
tibia ipsilateral		4
contralateral		3

No patients died postoperatively. General complications were encountered in two patients. These patients developed ARDS with respiratory deterioration, mechanical ventilation for four days, paO_2/FiO_2 of less than 200 for at least 5 consecutive days, and chest radiograms showing diffuse interstitial infiltrates. In these cases the ISS severity was in the lethal range (42 and 52).

There were two deaths in the 120 IMN patients (1.6%). Both deaths occurred in patients undergoing IMN at less than 24 hours but were not temporally related to the IMN. One patient died from a severe closed head injury ; the second patient from massive intrathoracic haemorrhage nine days postoperatively. Ten patients appeared to have suffered pulmonary deterioration temporally related to the timing of fracture fixation the first 48 hours after fixation (fat embolism 2, atelectasis 4, fluid overload with pulmonary contusion 4). Three patients in the IMN group had worsening of their head injury.It remains impossible to prove that this deterioration was related to the IMN procedure.

Two representative cases are presented.

Case 3

This 22-year-old patient was hypotensive on admission, had a cardiac arrest in the emergency room and was resuscitated. His injuries included an aortic (thoracic) transection, mesenteric bleeding, sigmoid colon rupture, femur fracture, pelvic fracture, ipsilateral tibia plateau fracture, haemothorax, left lower lobe atelectasis, and a subcapsular renal rupture. His ISS was 50 (25+16+9). After exploratory laparotomy, a thoracotomy with repair of the aortic transection (with interposition graft), small bowel resection, and repair of the sigmoid colon was performed. He was intubated for eight days with repeated bronchoscopies and aggressive thoracic toilet. His chest problems slowly resolved. His femoral fracture was treated initially with a Hoffmann external fixator and on the eighth postinjury day a 12-hole broad bone plate was placed. This fracture healed uneventfully (union at six months).

Case 11

This patient was a 50-year-old male with an ISS of 50 (25+16+9). His lesions included a transected aortic arch distal to the subclavian artery, open fractures of femur and knee, closed pelvis fracture, and severe facial fractures.

He underwent immediate repair of his transected aortic arch, and irrigation and traction treatment of the open fractures. A broad plate was applied on the first postinjury day to his open femur fracture. Disseminated intravascular coagulation subsequently developed combined with decreased saturation. This corrected slowly over the following six days. Union of the femoral fracture was delayed, but was finally obtained at 20 months.

DISCUSSION

The indication for operative treatment of femoral shaft fractures is now generally accepted (1-4, 7-12, 13, 17, 18, 20). Primary stabilization of femoral fractures in patients with multiple injuries is believed to reduce the incidence of complications. Intramedullary nailing is frequently employed to stabilize these fractures (1, 2, 3, 4, 6, 11, 12, 18, 19).

However, it is our opinion that in certain circumstances patients with femoral shaft fractures should undergo plate fixation. The aim of this study was to

retrospectively evaluate the role of plating in femoral shaft fractures. Therefore, we analyzed 135 consecutive shaft fractures treated during a two-year period on our trauma service. Fifteen of these were not managed with intramedullary nailing and were treated with open reduction, plate fixation, and primary bone grafting. Special attention was given to the indications for plate fixation in these patients.

Treatment by intramedullary nailing on a fracture table is not suitable in patients with unstable pelvis and spine fractures or ipsilateral fractures of the femoral shaft associated with fractures of the proximal or distal femur (8, 10, 23). Positioning on the fracture table of the unstable pelvis or spine fracture may be difficult or associated with significant complications. Use of a single method for treatment of two adjacent fractures (femur neck-shaft) is technically difficult. Seven of our 15 cases had associated pelvic fractures (six unstable, one stable) and were treated with a broad plate without specific intraoperative and postoperative problems, except for one patient who developed a pseudarthrosis. This seemed to be related to the severity of the injury (open grade 2, OTA classification grade VII). Three patients had a concomitant femoral shaft and neck fracture ; two healed uneventfully after applying a plate to the shaft and compression screws to the femoral neck. The possibility of femur nailing without a fracture table would allow some, but not all, of these cases to be managed differently.

Fracture management in patients with arterial injury requiring vascular repair consists in open reduction, vascular repair, stabilization of the fracture, and protection of the vascular repair with plating or external fixation. In a previous study at the University of Louisville, of 72 compound fractures associated with a vascular injury, stabilization was achieved in 58 % of the patients with external fixation and in 10 % with open reduction and plating. The treatment method in that series was influenced more by the open fracture than by the associated vascular injury (20). According to that study, fracture stabilization, if it can be done expeditiously, has priority over vascular repair because reduction maneuvers might tear the anastomosis. It should be done in a time frame that does not significantly increase ischemic damage (7, 20). DiChristina *et al.* reviewed 13 femur fractures with femoral or popliteal injuries in blunt trauma and found that plate fixation followed by vasculair repair was the most effective method if it could be done quickly (7).One must stress the risk of such a policy because such a sequence may lead in numerous cases to severe sequelae, as many surgeons will feel compelled to fix the bone first even when they have reached the extreme limits of warm ischemia. Vascular repair should have priority over fracture fixation in such cases.

Controversy remains about which method of fixation should be used (and when) in patients with the combination of multiple bone fractures and chest trauma. In most studies early intramedullary nailing was found to prevent pulmonary complications regardless of the type of injury distribution (1, 2, 3, 4, 6, 11, 18, 19). Bosse *et al.*, state that the use of intramedullary nailing with reaming for acute stabilization of fractures of the femur in multiply injured patients who have a thoracic injury without a major comorbid disease does not appear to increase the occurence of ARDS, pulmonary embolism, failure of multiple organs, pneumonia, or death (4). Carlson *et al.* reported the same results in their retrospective study : they did not find any increase of pulmonary morbidity in chest-injured patients after reamed intramedullary femoral fixation (6).

However, several authors have reported recently that severe pulmonary complications (ARDS) may develop following primary intramedullary nailing in patients with multiple injuries and preexistent chest trauma. The intramedullary nailing procedure is in part a predisposing factor for ARDS (16). Some authors suggest that in such cases femoral nailing should be delayed or performed without reaming (16, 22).

The issue of whether early intramedullary reaming is harmful in the polytrauma patient with a closed head injury is hard to determine. Reynolds *et al.* detected in a group of 105 polytrauma patients with a closed head injury and a femoral shaft fracture, 11 patients who suffered adverse consequences associated temporarily with intramedullary

reaming (18). Bone marrow embolism may add to the cerebral insult of these patients. For this reason, femoral plating rather than intramedullary nailing may be the preferred treatment. On the other hand, the retrospective study of McKee *et al.* suggests that a femoral fracture in a patient with a concomitant head injury does not increase mortality or neurologic disability, and supports the continued early intramedullary nailing of femoral fractures for these patients (14).

Other indications for femoral plating stated in the literature but not encountered in our study are pregnancy, comminuted fractures with more than six fragments (22), severely deformed femoral shafts, and fractures below arthroplasties (8, 11, 13). In these situations plating can be the preferred treatment.

The incidence of local complications including delayed union and nonunion (30%) was much higher in our series than in other series (5, 8, 13, 23, 24) with primary femoral plating (between 5 and 12%) and higher than after intramedullary nailing in our remaining 120 patients treated for femoral shaft fractures during that period (12%) (8, 18). Operative technique (15, 22) was satisfactory with primary bone grafting and bridging osteosynthesis. The senior author (DS) performed all of the femur platings. This higher complication rate can be partially attributed to the severity of injury since most of the patients in our series were polytrauma patients with severe femur fractures in which an excellent or uncomplicated outcome could not be expected.

As noted by Johnson, application of a compression plate to the femoral shaft can also be considered as a temporary technique for early fracture stabilization and can be exchanged for a permanent stabilization such as an intramedullary nail (11). This can be performed after enough time has passed to allow for revascularization of the femoral cortex.

Recently Wenda *et al.* (23) reported on minimally invasive bridging plate fixation in femoral shaft fractures, using a surgical technique in which the plate is inserted through isolated distal and proximal incisions.In his series all 17 fractures healed, three after bone grafting. Minimally invasive bridging plate fixation may be technically more difficult but it has advantages in terms of vascularity and bone healing .Clinical studies support the superiority of biological and bridging plating compared with traditional plating (23).

CONCLUSION

Plating of femoral shaft fractures is indicated in patients with concomitant spine, pelvic, or ipsilateral femoral neck fractures and in polytrauma patients with severe chest problems or closed head injuries.

No permanent general complications were noted in these critically injured patients and the perioperative morbidity and mortality was found to be lower in the plating group compared with the intramedullary nailing group. However, there was a high rate (30%) of disturbed fracture healing.

REFERENCES

1. Behrman S. W., Fabian T. C., Kudsk K. A. *et al.* Improved outcome with femur fractures : Early versus delayed fixation. J. Trauma, 1990, 30, 792-798.
2. Bone L., Buchholz R. The management of fractures in the patient with multiple trauma. J. Bone Joint Surg., 1986, 68-A, 945-952.
3. Bone L. B., Johnson K. D., Weigelt J. *et al.* Early versus delayed stabilization of fractures. A prospective randomized study. J. Bone Joint Surg., 1989, 71-A, 336-340.
4. Bosse M. J., MacKenzie E. J., Riemer B. L. *et al.* Adult respiratory distress syndrome, pneumonia, and mortality following thoracic injury and a femoral fracture treated either with intramedullary nailing with reaming or with a plate. A comparative study. J. Bone Joint Surg., 1997, 79-A, 799-809.
5. Burri C., Lob G. Die Plattenosteosynthese am Femurschaft. Unfallheilkunde, 1982, 158, 117-124.
6. Carlson D. A., Rodman G. H., Kaehr D., Hage J., Misinski M. Femur fractures in chest-injured patients : is reaming contraindicated ? J. Orthop. Trauma, 1998, 12, 164-168.
7. DiChristina D. G., Riemer B. L., Butterfield S. L., Burke C. J., Herron M. K., Phillips D. J. Femur fractures with femoral or popliteal artery injuries in blunt trauma. J. Orthop. Trauma, 1994, 8, 494-503.
8. Essadki D. Les complications mécaniques aseptiques des fractures de la diaphyse fémorale traitées par plaque vissée. Acta Orthop. Belgica, 2000, 66, 6-12.
9. Gustilo R. B., Anderson J. T. Prevention of infection in the treatment of one thousand and twenty five open fractures

of long bones. Retrospective and prospective analysis. J. Bone Joint Surg., 1976, 58-A, 453-464.
10. Heitemeyer U., Hierholzer G. Indikation zur überbrückenden Plattenosteosynthese komplexer Femurschaftfrakturen. Akt. Traumatol., 1991, 21, 173-182.
11. Johnson K. D. Femoral shaft fractures. In : Browner B.D., Jupiter J. B., Levine A. M., Trafton P. G. (eds). Skeletal Trauma. W.B. Saunders, 1992, Vol 2, pp. 1588-1590.
12. Johnson K. D., Cadambi A., Seibert B. Incidence of adult respiratory distress syndrome in patients with multiple musculoskeletal injuries. Effect of early operative stabilization of fractures. J. Trauma, 1985, 25, 375-384.
13. Lüscher J. N., Ruedi T., Allgöwer. Erfahrungen mit der Plattenosteosynthese bei 131 Femurschafttrümmerfrakturen. Helv. Chir. Acta, 1978, 45, 39-43.
14. McKee M. D., Schemitsch E. H., Vincent L. O., Sullivan I., Yoo D. The effect of a femoral fracture on concomitant closed head injury in patients with multiple injuries. J. Trauma, 1997, 42, 1041-1045.
15. Müller M. E., Allgöwer, Schneider R., Willenegger H. Manual der Osteosynthese. Springer-Verlag, Berlin-Heidelberg-New York, 1977, pp 350-353
16. Pape H. C., Dwenger A., Regel G. *et al.* Pulmonary damage due to intramedullary femoral nailing in severe trauma in sheep : Is there an effect from different nailing methods ? J. Trauma, 1992, 33, 574-581.
17. Perren S.M. Physical and biological aspects of fracture healing with special reference to internal fixation. Clin. Orthop., 1979, 138, 175-183.
18. Reynolds M.A., Richardson J.D., Spain D.A., Seligson D., Wilson M.A., Miller F.B. Is the timing of fracture fixation important for the patient with multiple trauma ? Ann. Surg., 1995, 222, 470-479.
19. Schemitsch E., Jain R., Turchin D. *et al.* Pulmonary effects of fixation of a fracture with a plate compared with intramedullary nailing, J. Bone Joint Surg, 1997, 79-A, 984-996.
20. Seligson D., Ostermann P. A. W., Henry S. L., Wolley T. The management of open fractures associated with arterial injury requiring vascular repair. J. Trauma, 1994, 37, 938-940.
21. Thielemann F. W., Blersch E., Holz U. Die Plattenosteosynthese der Femurschaft Fraktur unter beachtung biologischer Gesichtspunkte. Unfallchirurg, 1988, 91, 389-394.
22. Tscherne H., Trentz O. Operationstechnik und Ergebnisse bei Mehrfragment- und Trümmerbrüchen des Femurschaftes : Sammel-studie. Unfallheilkunde, 1977, 80, 221-230.
23. Wenda K., Runkel M., Degreif J.Minimally invasive plate fixation in femoral shaft fractures. Injury, 1997, 28, 13-19.
24. Willenegger H. Verplattung und Marknagelung bei Femur und Tibia Schaftfrakturen : Pathophysiologische Grundlagen. Chirurg, 1975, 46, 145-149.

SAMENVATTING

D. SELIGSON, T. MULIER, S. KEIRSBILCK, J. BEEN. Plaatosteosynthese bij femurschachtfracturen.

Het doel van deze studie was de rol, indicaties en resultaten van plaatostseosynthese bij femurschachtfracturen te omschrijven, gezien de controverse welke hierover bestaat.
Gedurende twee jaar werden hiervoor alle behandelde femurschachtfracturen (135) van de dienst geanalyseerd. Vijftien hiervan werden initieel behandeld met plaatosteosynthese ; de overige 120 met intramedullaire nageling.
De vijftien femurschachtfracturen met plaatosteosynthese werden geclassificeerd als graad I (n = 4), graad III (n = 3), graad IV (n = 4), graad V (n = 3) en graad VII (n = 1) (OTA-classificatie). In drie van de vijftien gevallen betrof het een openfractuur (één graad I en twee graad II, Gustilo en Anderson classificatie). Bij tien van de vijftien werd nog een geassocieerd pelvisch (6) of ipsilaterale onderste lidmaat-trauma (4) vastgesteld.
Plaatosteosynthese bij femurschachtfracturen blijkt nog zijn plaats te kunnen behouden daar waar intramedullaire nageling gecontra-indiceerd of niet mogelijk is. Alhoewel de postoperatieve morbiditeit (ARDS, overlijden) lager blijkt te zijn bij plaatosteosynthese, is de complicatiegraad betreffende de fractuurgenezing groter (30% vs 12%).

RÉSUMÉ

D. SELIGSON, T. MULIER, S. KEIRSBILCK, J. BEEN. Ostéosynthèse par plaque vissée des fractures de la diaphyse fémorale : revue de 15 cas.

Les indications et les résultats de l'ostéosynthèse par plaque vissée dans les fractures de la diaphyse fémorale restent controversés ; nous avons voulu étudier ce problème de façon plus approfondie. Nous avons analysé tous les dossiers (135) de fractures de la diaphyse fémorale traitées dans notre service d'urgences pendant 2 ans. Parmis ces cas, 15 ont été traités par ostéosynthèse par plaque vissée ; les 120 autres ont subi un enclouage intramédullaire.
Les quinze fractures traitées par plaque ont été rangées par degrés selon la classification OTA : degré I (n = 4), degré III (n = 3), degré IV (n = 4), degré V (n = 3) et degré VII (n = 1). Trois fractures étaient ouvertes (un cas de degré I et deux cas de degré II selon la classification

de Gustilo et Anderson). Il existait dans six cas un traumatisme associé du bassin et dans quatre cas un traumatisme de la jambe du même côté.

L'ostéosynthèse par plaque vissée des fractures de la diaphyse fémorale reste indiquée quand l'ostéosynthèse intramédullaire n'est pas possible ou paraît contre-indiquée. Le taux de morbidité postopératoire est plus bas après ostéosynthèse par plaque vissée mais le risque de troubles de la consolidation est plus élevé.