

A Four Year Study of Complex Fractures around the Knee in Laquintinie Hospital of Douala

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Abstract

Introduction: Complex fractures around the knee are really challenging. They are caused by a direct high-energy mechanism and can be either opened or closed. The main objective of this work was to do a preliminary study of these injuries in our setting.

Materials and Methods: This was a prospective and descriptive study carried out from January 2010 to December 2013, in the orthopaedics and traumatology service of the Laquintinie hospital in Douala. Were included, all patients with around knee fractures, classified 33-A3, 33-C, 41-A3 or 41-C according to the Swiss orthopaedic association (OA) classification.

Results: We had 18 male patients. No female. All were victims of road traffic accidents involving at least one motorbike. The average time of occurrence of the accident was 11 pm. Seventeen lesions were opened with a predominance of the types 1 and 2 of Gustillo and Anderson's classification. AO Type 33-C3 (5 cases) were more frequent on the femur, while AO type 41-A3 (4 cases) dominate the tibia fractures. Seven patients presented floating knees (above and below knee fractures). The most common associated injury was the patella fracture (2 cases).

Twelve patients including 6 floating knees were treated surgically. Condylar blade plate (7 cases) was the most used at the distal femur whereas in the proximal tibia it was the OA plate (6 cases); four cases were treated conservatively and two fractures were complicated by complex vascular injury imposing amputation at the thigh level.

Discussion: Our study showed that these lesions were not rare; they represented around 2.5% of serious injuries observed during highway accidents caused by the two-wheeled vehicles in our milieu. We had complex lesions in terms of anatomoclinical, therapeutic and functional aspects.

Conclusion: Complex fractures around the knee are becoming frequent in our milieu. They are caused by motorbikes and are difficult to treat.

Keywords: Knee; Fractures types; Treatment

Introduction

Complex fractures occurring around the knee are very challenging. They are more frequently observed [1-3] in road traffic accidents involving motorbike. The main objective of this preliminary study was to contribute to the study of these lesions in our environment in terms of anatomoclinical and therapeutic aspects.

Materials and Methods

We carried out a 4 years prospective and descriptive study from January 2010 to December 2013, in the orthopaedic and traumatology service of Laquintinie hospital in Douala. Were included, all patients with around knee fractures, classified 33-A3, 33-C, 41-A3 or 41-C according to AO classification. On admission, all the patients had front and lateral views of the involved thigh, knee and leg. We used the AO classification for fractures types and Gustillo and Anderson classification for open fractures.

Results

We had 18 male patients. No female. The mean age was 22 (18-48) years. All were victims of road traffic accidents involving two motorbikes in 3 cases, one motorbike and a car in 10 cases and a motorbike alone in 5 cases. The average time of occurrence of the accident was 11 pm (8 pm-4 am). The right side was the most affected (12 cases). Five lesion were closed and seventeen lesions were opened with a predominance of the types 1 and 2 of Gustillo and Anderson's classification. Type 33-C3 (5 cases) were more frequent on the femur, while type 41-A3 (4 cases)

dominate the tibia fractures. Seven patients presented floating knees (above and below knee fractures). The most common associated injury was the fracture of the patella (2 cases).

Twelve patients including 6 floating knees were treated surgically. The delay between admission and surgery was 14 (1-28) days. While waiting an initial debridement and closure was done for open lesions followed by a posterior cast immobilisation. Condylar blade plate (7 cases) was the most used at the distal femur whereas in the proximal tibia it was the AO plate (6 cases); four cases were treated conservatively and two fractures were complicated by complex vascular injury imposing amputation at the thigh level. The Tables 1-4 summarize fractures types and involved bones, and the Figures 1-5 describe some therapeutic aspects. In addition to these osteosynthesis, we did autolog spongius iliac bone graft for 3 patients with 33-C3 lesions and cortico-spongius iliac bone graft for 2 patients with 41-C2 fractures, during initial surgery.

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Received August 31, 2015; **Accepted** October 19, 2015; **Published** October 27, 2015

Citation: Mohamadou AS, Faustin AT, Gustave TJ, Richard NP, Alphonse B (2015) A Four Year Study of Complex Fractures around the Knee in Laquintinie Hospital of Douala. J Trauma Treat 4: 268. doi:[10.4172/2167-1222.1000268](https://doi.org/10.4172/2167-1222.1000268)

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Types	1	2	3A	3B	3C
Number	8	3	4	0	2

Table 1: Open fractures distribution according to Gustillo and Anderson's classification types.

Bone	Femur alone	Tibia alone	Femur and tibia (Floating knee)
Number	6	5	7

Table 2: Bones fractured.

Bone \ Type	Type			
	A3	C1	C2	C3
Femur (33)	4	2	2	5
Tibia (41)	4	3	3	2

Table 3: Fracture type distribution according to the Swiss orthopaedic association's classification.

Treatment options	Condylar Blade Plate	AO Plate for Proximal Tibia	Knee Arthrodesis	Thigh Amputation	External Fixator
Number	7	6	1	2	2

Table 4: Treatments options used.

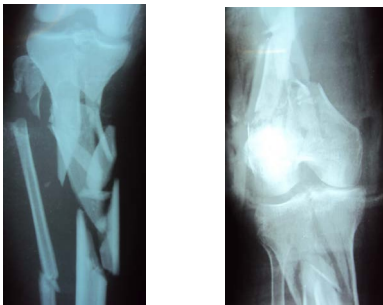


Figure 1: Type 33-C3 and 41-C2 fractures.



Figure 2: Type 33-C2 fracture and plating.



Figure 3: Open type 33-A3 fracture and external fixator.



Figure 4: Plating for a floating knee.



Figure 5: Floating knee and patella fracture.

Discussion

Complex fractures occurring around the knee are more and more frequent and are caused by high velocity traumatism [1-3]. Mortorbikes are the most involved [1,3]. In our study, they were involved in all the cases. The knee is traumatised by the motorbike, by the car coming on the opposite site, or by the road in case of a fall. These lesions account for 2,5% of injuries seen after motorbike accidents in our milieu. The male sex is the most involved, mostly aged 30 years or less [3]. Patients are sometimes polytraumatised [1-3]. Open fractures are frequent in these cases: 20-40% in one publication [3] against 77% in our study. The proximal femoral fragment would tear the muscle and skin around the supra patellar fold. Patellar fractures are the most common associated lesions [3]. We had 2 cases. Popliteal artery injuries are seen in less than 10% of cases [3]. They are due to compression or tearing by bone fragments. We did 2 thigh amputation as initial surgery because of associated important distal crush injury. Comminutive distal femoral fractures represented 20-28 % of all fractures of this bone [1]. The surgical treatment should be carried early enough to permit functional restitution. Our patients were operated after a mean delay of 14 (1-28) days. Distal femoral condylar plate is the most used for the femur [4,5] whereas the AO plate for proximal tibia is the most used for the tibia [3]. We used this two options for most of our cases. Other therapeutic options include the distal femoral condylar screw, retrograde femoral nailing, AO condylar plating, Judet's plate just to name these few [3,6]. External fixation is used for open or too comminutive fractures [3]. In our study, we used a bi-planar tibio-tibial Hoffman II external fixator for two 41-A3 fractures. Orthopaedic continuous trans-osseous traction followed by casting is also an option, if surgery is not possible. We did it in 4 cases. Functional results rely on anatomic reduction [3].

The main complications include: knee stiffness, misalignment and

pseudarthrosis. We avoided this latter with bone grafts during initial surgery. The use of tibio-tibial fixator and/or internal osteosynthesis permitted physiotherapy against the stiffness that started with the posterior cast immobilisation. Concerning infection, we avoided it through initial debridement and immediate closure of the 15 over 17 open fractures. The latter 2 were crushed Gustillo III C and were amputated on arrival. The open injuries patients received intra-venous cefuroxime and metronidazole for 24 hours. The amputated and the Gustillo III A received intra-venous cefuroxime, metronidazole and gentamycin for 5 days. Infections around the traction and external fixation pins healed only with wound dressing. Anti-tetanus serum was given to all open fractures. An anti-tetanus vaccine dose was given to those incompletely vaccinated and to the amputated. We gave 5000 International Units of enoxaparin subcutaneously on a daily basis to all patients during full immobilisation period.

Conclusion

Complex fractures around the knee are more and more frequent in our milieu because of the rapidly increasing number of motorbikes and

the related accidents. The surgery when indicated, should in such cases be carry out as early as possible to avoid knee stiffness. Early bone graft when indicated, would avoid a 2 stages surgery.

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