






The Floating Knee: About 13 Cases and Review of the Literature

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Abstract:

The floating knee is a traumatic pathology which compromises the functional future of the inferior member. This results in a free articulation between the two fracture sites at the level of the same lower limb. The objective of our work is to study the lesional aspects of floating knees, analyze the therapies results and thus assess the postoperative outcome and prognosis of these patients. For that, we conducted a retrospective study including all patients operated for floating knee in the Department of Traumato-Orthopedics of CHU Ibn Sina of Rabat for a period of 21 months from February 2020 to November 2021. The average age of our patients was 29 years old with 92% male predominance. Series had 70.5% stage I of Fraser Classification, 13% type IIa, 11.7% type IIb and 4.8% type IIc, The floating knee was in the context of a severe polytrauma in 14% of cases. Intramedullary nailing was the most adopted method for the femur (72.22%) and the tibia (66.66%).

Keywords: *tibia, femur, knee, fracture, osteosynthesis.*

Introduction

The floating knee is a particular lesional entity described for the first time in 1975 by Blake and McBride. This is the association of a fracture of the femur with an ipsilateral fracture of the tibia (Fraser, Hunter & Waddell, 1978). Fractures are usually diaphyseal but can also involve the hip or ankle. The floating knee occurs most often in young subjects with a male predominance. Road accidents are the most common cause (Hee et al., 2001). Many authors insisted on the frequency of associated lesions, in the context of polytrauma, a consequence of high-energy trauma and on the high risk of complications and heavy functional sequelae.

The aim of this study is to describe the clinical and therapeutic aspects of floating knee in our

context and evaluate the functional prognosis in patients treated in the short, medium and long term (Marco, Rozim & Piedade, 2008).

Materials and Methods

Our study relates the retrospective analysis of the files of 13 patients presenting the association of a femur fracture with a fracture of the ipsilateral tibia, followed and treated in the service of Traumato-Orthopedic of the CHU Ibn Sina of Rabat, over a period of 21 months, from February 2020 to November 2021.

The fractures were classified according to the FRASER Classification.



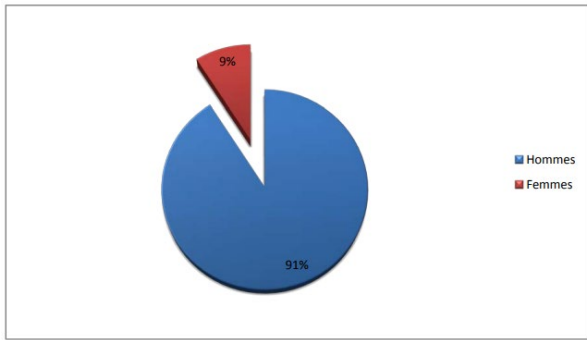


Figure 1. Distribution of Cases by Sex

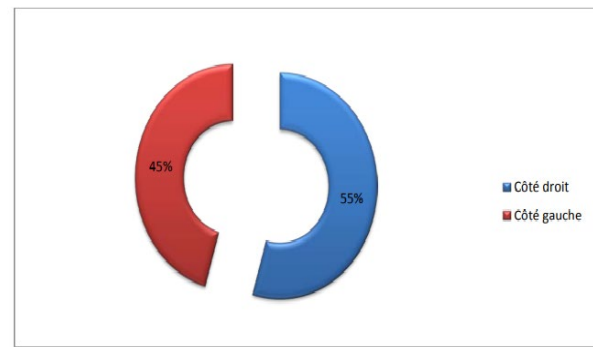


Figure 3. Distribution of Cases According to the Affected Side

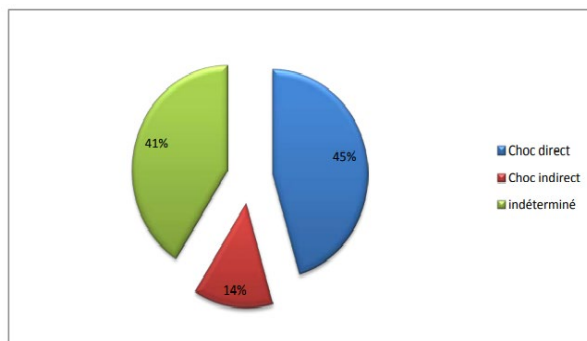


Figure 2. Distribution of Cases by Mechanism

Results

According to FRASER, floating knees are of two types:

- Type I: where the fractures are non-articular.
- Type II: where there is an articular fracture of the knee, femoral and/or tibia
- Type IIa: fracture of the tibial plateaus.
- Type IIb: fracture of the lower end of the femur.
- Type IIc: the two fracture lines are articular.

	CAS N 1	CAS N 2	CAS N 3	CAS N 4	CAS N 5	CAS N 6	CAS N 7	CAS N 8	CAS N 9	CAS N 10	CAS N 11	CAS N 12	CAS N 13
NUMERO D'ORDRE	1712	1486	402	2339	1768	2020	1528	110	632	505	147	546	1169
NUMERO D'ENTRER	11560	8836	2349	14059	12349	15381	13222	728	3456	3298	941	3678	10982
AGE	25 ANS	35ANS	50 ANS	40 ANS	40 ANS	80 ans	33 ans	41ans	19	37 ans	36 ans	26 ans	48 ans
LE SEXE	masculin	Femme	masculin	masculin	masculin	femme	masculin	masculin	masculin	masculin	masculin	masculin	masculin
MECANISME	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT	direct	direct	DIRECT	INDIRECT	DIRECT	INDET	DIRECT	DIRECT
COTE ATTENT	Droit	Droit	Droit	Gauche	Gauche	Droit	Gauche	Gauche	Gauche	Gauche	Droit	Gauche	Droit
ETIOLOGIE	AVP	AVP	AVP	AVP	AVP	AVP	AVP	AVP	AVP	AVP	AVP	AVP	VOITU
O,C FEMUR	I	I	III	Fermé	I	Fermé	Fermé	ii	Fermé	Fermé	Fermé	Fermé	II
TIBIA	Fermé	fermé	III	Fermé	Fermé	I	Fermé	ii	Fermé	Fermé	Fermé	I	Fermé
LES COMPLICATIONS	RAS	RAS	Lésion de l'art poplitée	RAS	RAS	RAS	RAS	RAS	RAS	RAS	RAS	RAS	RAS
LESIONS ASSOCIES MI	RAS	RAS		RAS	RAS	RAS	Fr de la mall int	Fr du femur controlat	RAS	RAS	RAS	RAS	Une fr pértroca
LESIONS ASSOCIES A DISTANCE	Fr du cubitus droit	RAS	Fracture de la mall ext	RAS	RAS	RAS	RAS	RAS	RAS	RAS	Un hematome Du scalp-	RAS	RAS
SEIGE FEMUR	EI	Diaphyse	EI	Diaphyse	Diaphyse	EI	diaphyse	EI	Diaphyse	Diaphyse	Diaphyse	Diaphyse	Diaphys
TIBIA	Diaphyse	Diaphyse	ES	Diaphyse	Diaphyse	EI	diaphyse	ES	Diaphyse	Diaphyse	Diaphyse	Diaphyse	Diaphys
TYPE DE FRASER	IIb	I	IIc	I	I	IIa	I	IIc	I	I	I	I	I
DELAI OPERATOIRE	2 jours	15 jours	1 jour	2 jours	10 jours	4 jours	2 jours	10 jours	20 jours	12 jours	5 jours	10 jours	10 jours
TECH FEMUR	PV	ECM	ECM	ECM	PV	ECM	FE	ECM	ECM	ECM	PV	ECM	ECM
OPERA TIBIA	ECM	ECM	FE	ECM	PV	ECM	FE	ECM	ECM	ECM	FE	ECM	ECM
COMPLICTIONS			AMPUTATION			raidteur du genou							Cal vicieux et raidteur du genou
RESULTATS FONCTI	BON	Excellent	Pauvre	Excellent	Excellent	Bon	Excellent	Pauvre	Excellent	Excell	Excellent	Bon	Bon

Figure 4. Summary table representing the results of our study on floating knees

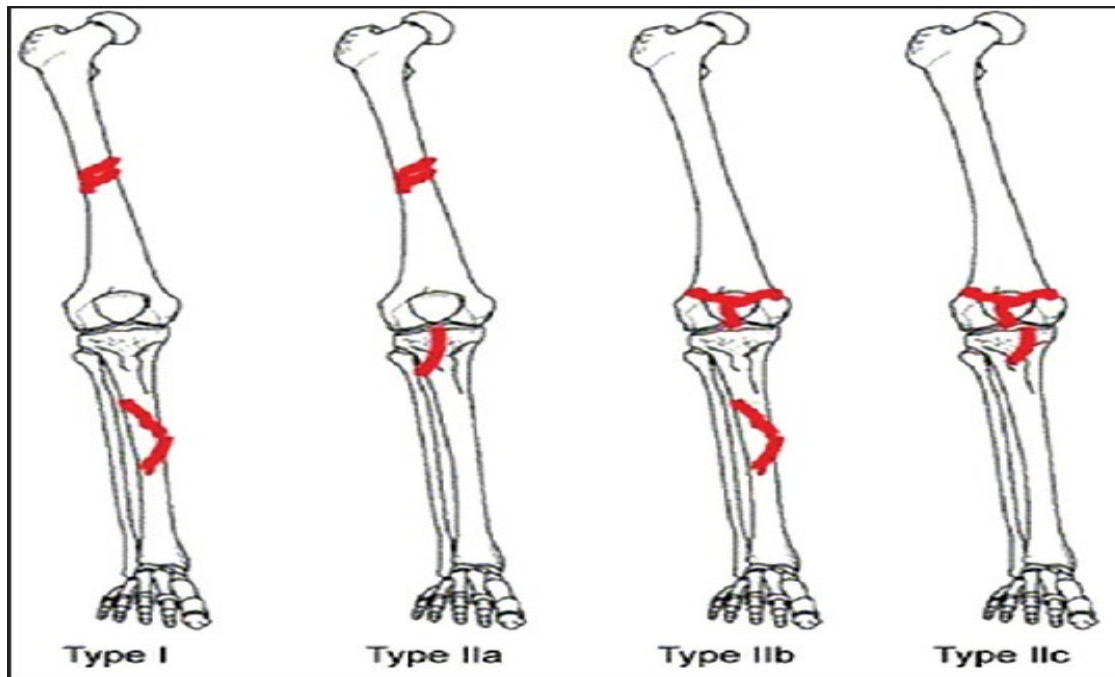


Figure 5. Fraser Classification

Results and Discussion

Floating knee can occur at any age with predominance for the young male subject in the majority of series in the literature this who joins our series (Piétu et al., 2007). Public road accidents represent the etiology of the floating knee in 91.66% of cases of our series as well as in all the series of other authors (Rethnam, Yesupalan & Nair, 2007).

The rate of skin opening exceeds half of the cases in most cases series as well as our study series and it is observed that open fractures predominate at the level of the tibia compared to the femur, and this is explained by the fact that at the tibial level, the bone is located under the skin at the level of the antero-medial leg face. The majority of authors report the occurrence of floating knee in the polytrauma framework in more than 20% of cases notably 46.1% at Zrig et al. (2008) and 32.2% at Karlstrom et al. (1977) with an average ISS score that remains high which shows the seriousness of this trauma.

Radiologically, Fraser type I is the more reported in the majority of the literature series. Intramedullary nailing remains the most widely used therapeutic means in all series. The

complications most reported are infection, malunion, joint stiffness and pseudarthrosis. For our functional results, they are consistent with those of the literature with predominance of excellent and good results in all studies, moreover, open fractures and Fraser stage II fracture remains of unfortunate prognosis with from acceptable to poor results.

The surgical therapeutic methods used in the treatment of ipsilateral fractures of the leg and femur are based on intramedullary nailing, external fixation in the case of an open fracture or the use of screw plates (Hung et al., 2007). The intramedullary nailing which was proposed by KUNCHTER in 1940, is based on the contention of the fracture from the medullary canal:

Open nailing: the opening of the fracture site allows reduction and possibly additional stabilization of the site, but the disadvantage is the risk of infection which is increased.

Closed nailing is the method of choice, it consists of osteosynthesis by a nail placed on the neutral axis of the bone, its introduction after reaming the medullary cavity. Its advantages are numerous, namely the respect of the periosteal

vascularization, the respect of the hematoma fracture but also the aesthetic interest, the size of the incisions being reduced and especially the reduction of post-operative infections.



Figure 6. Floating Knee of Our First Patient



Figure 7. Profile X-Ray of a floating knee



Figure 8. Orthopedic Table for Femur Fracture



Figure 9. Tibia nailing

Conclusion

Our retrospective study is composed of 13 patients, allowed us to notice a clear predominance in the young male subject. The incidence of this fracture association increases with the frequency of public road accident, it is the consequence of violent trauma as evidenced by the frequency of associated lesions and open fractures.

The floating knee summarizes and illustrates the difficulties of traumatology and poses specific problems.



Figure 10. Osteosynthesis of a floating knee

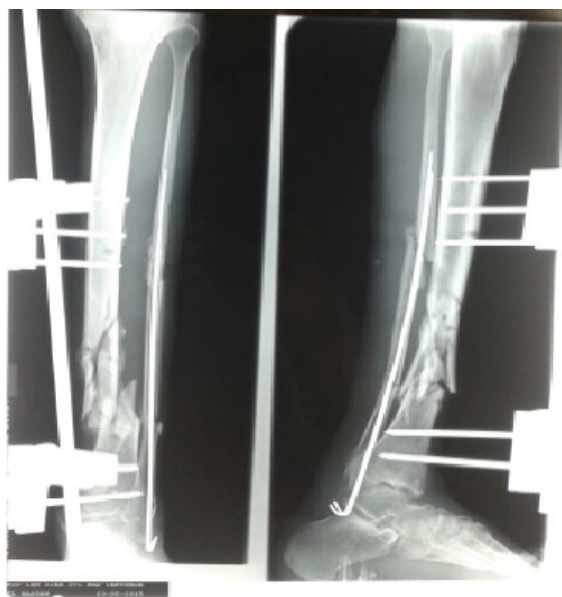


Figure 11. External osteosynthesis for an open tibial fracture

A comprehensive and long-term care of polyfractured patients, and this from the emergency stage. The analysis of all the results, confirmed for us the crucial role of surgery in the treatment of this entity, because of its encouraging results and its many advantages.

Osteosynthesis provides solid and stable support after anatomical reduction, and allows early rehabilitation leading to complete joint and muscle recovery, while avoiding disabling complications.

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