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Research Article

Valgus Tibial Osteotomy: Epidemiological, Clinical, Paraclinical, Therapeutic, and Outcome Aspects: About 20 Cases

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Abstract

Introduction: Gonarthrosis is a frequent degenerative pathology, and is particularly incapacitating. Tibial valgization osteotomy (TVO) is a therapeutic option for young, active patients with unicompartmental osteoarthritis of the medial compartment of the knee.

Materials and Methods: We conducted a retrospective descriptive and analytical study over a 5-year period from January 1, 2019 to December 31, 2024.

Results: During our study, 20 cases of tibial valgization osteotomy were recorded out of a total of 2066 admissions (i.e. 0.9%), and we studied the sociodemographic characteristics, diagnostic and evolutionary aspects of these patients. In our study, 70% of patients were female. The mean age of patients was 47.6 years, with extremes of 18 and 64 years. Trauma was the most common risk factor in 30% of cases, 60% of patients were sedentary and 50% had already undergone infiltration. Clinical examination revealed gonalgia, deformity and lameness in 95%, 85% and 80% of cases respectively; bilateral varum knee in 70% of cases, and meniscal syndrome in 5% of cases. The Schuss index was present in 15% of cases, and patients were classified as stage III according to the Ahlbäck and Iwano classifications in 85% of cases each. The approach was the medial Gernez in 85% of cases, the implant was a T-plate in 90% and the surgical treatment was a reduction in 95% of cases. Post-operative follow-up was straightforward in 90% of cases, with the onset of weight-bearing at 45 days in all patients. Phlebitis and stiffness were the most common long-term complications, occurring in 5% of cases. There was a statistically significant association between the intraoperative use of a T-plate and easy post-operative recovery ($p = 0.04$).

Conclusion: OTV remains an effective alternative in the management of medial gonarthrosis, providing pain relief and improved joint functionality. However, multidisciplinary management and rigorous follow-up are required to optimize results and prevent complications.

Keywords: *Tibial Valgization Osteotomy; Department of Orthopaedic Surgery and Traumatology-General Hospital of Reference; Niamey; Niger*

Introduction

Osteotomy is a surgical technique involving the sectioning of a bony segment to modify its alignment in order to rebalance the mechanical stresses experienced by a nearby joint when it is suffering from abnormal stresses [1]. Tibial valgization osteotomy (TVO) is frequently used to correct genu varum and reduce excessive pressure on the medial compartment of the knee, helping to slow the progression of gonarthrosis. Introduced by Jackson and Waugh [2] in 1961, tibial valgization osteotomy is an effective therapeutic approach for the management of varus gonarthrosis and frontoaxial deviations of the genu in children.

An assessment of the prevalence of genu varum and other clinical symptoms, as well as vitamin D status and markers of calcium metabolism in 226 apparently healthy full-time European residents showed a high prevalence of lower-limb deformities at 36% [3]. In Iran, in 2017, the prevalence of knee varum was 8.6% [4]. In Morocco, 115 cases of valgization osteotomy were performed in 2014 [5]. In Burkina Faso, gonarthrosis was associated with varum knee in 52.5% [6]. In Niger, four (04) studies have been carried out, including one in 2018 on 30 cases of valgization osteotomy [7]. Varus deformation of the knee increases stresses in the medial compartment [8]. These stresses are factors in the progression of gonarthrosis [9].

Clinically, pain is the main symptom of gonarthrosis, imperfectly correlated with radiographic stage and involving complex mechanisms [10]. The management of varum knee gonarthrosis may require valgization osteotomy.

Epidemiological, clinical, paraclinical, therapeutic and evolutionary aspects of tibial valgization osteotomy in the department traumatology-orthopedics at the General Reference Hospital of Niamey.

Patients and Methods

This was a retrospective, descriptive and analytical study of 20 cases collected in the traumato-orthopedics department of the General Reference Hospital of Niamey between 2019 and 2024. To carry out this study, we used: a file processing form, including the following details: age, sex, profession; pathological history or defects, etiologies, clinical examination: pain, walking, mobility, deformity, joint effusion; patellofemoral osteoarthritis annexed to medial femorotibial osteoarthritis according to Ahlbäck; treatment instituted: type of anaesthesia, associated gestures, immobilization, incidents, rehabilitation, immediate and secondary complications; radiological assessment carried out. For this study, we selected patients with a minimum follow-up of 2 years and a complete radioclinical work-up. The patients have been evaluated by the IKS score.

Results

Our series included 14 women (70%) and 06 men (30%), with an average age of 47.6 years (extremes 18 and 64 years), and 70% bilateral involvement. Clinically, almost all our patients consulted for gonalgia (95%) and genu varum deformity (85%). Genu varum was secondary post-traumatic in 05 cases (25%) and primary in (15%). The preoperative radiological work-up included in all cases a frontal view, a frontal view in schuss, a profile view at 30° flexion, and a pangonogram with bipodal support, on which the HKA angle, the femoral mechanical axis and the tibial mechanical axis were measured. Radiologically, medial femorotibial gonarthrosis was classified according to Ahlback's stages, with Stage III accounting for the majority of cases (85% or 17 cases) (Figure 1). Therapeutically, the majority (85%) of our patients underwent tibial valgus osteotomy by internal addition. Fixation was provided by screw-retained T-plates (90%) or L-plates (10%), although T-plates were more commonly used in simple cases (94.44%) (Figure 2 and 3). There was a statistically significant link between implant type and postoperative follow-up, with a p-value of $p = 0.04$ (Table 1).

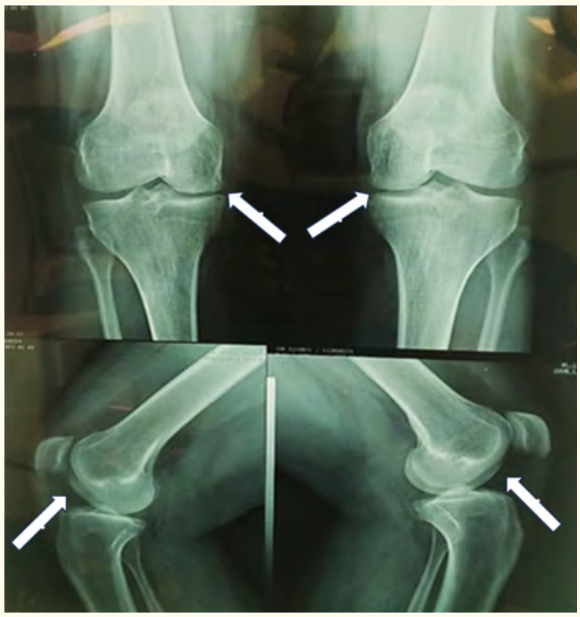

Figure 1: *Photograph of standard knee X-rays of a patient with bilateral gonarthrosis (White arrows).*

Figure 2: *Intraoperative photograph showing T-plate placement during tibial valgus osteotomy in a patient with gonarthrosis.*

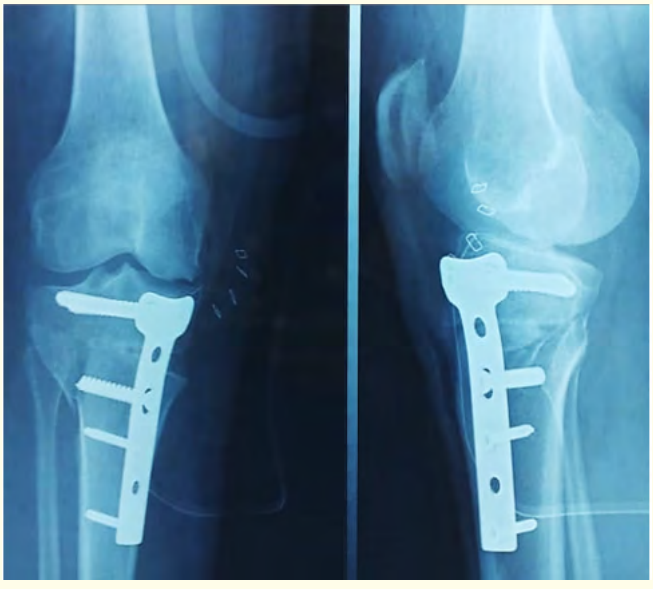

Figure 3: *Photograph of an immediate postoperative standard radiograph of a tibial valgus osteotomy showing the features of the osteotomies with the presence of a T-plate attached to the medial aspect of the proximal end of the right tibia.*

Implant Type	Postoperative follow-up		P = 0,04
	Complicated	Simple	Total
L-Plates	1 (50.00%)	1 (5.56%)	2
T-Plates	1 (50.00%)	17 (94.44%)	18
Total	2 (100.00%)	18 (100.00%)	20

Table 1: *Impact of implant type on postoperative follow-up.*

Figure 4: *Postoperative photograph of skin closure over a redon drain of a valgus tibial osteotomy (Red arrow).*

Weight-bearing was allowed from postoperative day 45, and functional rehabilitation was started on postoperative day 2. Outcome evaluation was based on the subjective satisfaction index and the IKS score. We obtained: very good results in 75% of cases and good results in 25% of cases.

Discussion

Epidemiologically, arthritic varus knee is predominantly female, with a mean age of onset of 47.6 years in our series, in line with the literature [7,11]. Age plays a prognostic role in tibial valgus osteotomies. In the same vein, Flecher., *et al*. [12] and Naudie [13] found that age over 50 years was a risk factor for failure. Genu varum was secondary post-traumatic in 05 cases (25%) and primitive in (15%). The same observation was made by Hazime R [11], i.e. 90.00%. Clinically, gonalgia was the main reason for consultation in our study (present in 95% of our patients). This can be explained by the fact that our study concerns gonarthrosis that are no longer controllable by anti-pain treatments. This result is comparable to those of Souna BS., *et al*. [7], who reported that 100% of these patients had gonitis. Radiologically, the majority of cases were of advanced gonarthrosis: Stage III constituted the majority of cases, with a percentage of 85% (17 cases). Much lower proportions were reported by Souna BS., *et al*. [7], i.e. 36.6%. On the other hand, Mekkaoui Nour [14] reported a predominance of stage II with 70%. The total absence of stage I and II in our series could be explained by the fact that patients only accept osteotomy when they notice a marked deterioration in their degree of autonomy. The operative technique most commonly used in our series is Tibial Valgization Osteotomy by internal opening (85.00%), with much lower proportions reported by Souna BS., *et al*. [7] and Hazime R [11] with 16, 17 and 17% respectively. The advantage of this technique is that it does not require a procedure on the fibula, enabling a more anatomical, precise and reliable correction in both the frontal and sagittal planes. In our series, the T-plate osteotomy (90%) was the most common, which is perfectly in line with the literature, with 100% in J.- Bové [15]. T-plates were widely used in simple suites (94.44%). A statistically significant association was observed between implant type and operative follow-up ($p = 0.04$). The stability offered by T-plates could lead to better bone consolidation and fewer complications, such as loss of correction or infection. This underlines the importance of choosing the right osteosynthesis material to ensure optimal fixation and minimize postoperative risks. The advantage of this technique is that it does not require surgery on the fibula, enabling a more anatomical, precise and reliable correction in both the frontal and sagittal planes. In our series, we noted 75% very good results. Our results are comparable to those of Bouharras., *et al*. [16]. Rahmi., *et al*. [17], who reported 74% and 88% good and very good results respectively. According to Huten., *et al*. tibial osteotomy provides a functional result that allows total arthroplasty to be postponed by 10 to 15 years in 75 to 85% of cases [18].

Conclusion

Tibial valgus osteotomy (TVO) is a surgical technique commonly used in the treatment of early varus gonarthrosis and axial knee deformities. An analysis of patients' socio-demographic, clinical and therapeutic characteristics shows that this procedure offers significant benefits in terms of functional improvement and reduction of joint pain. Our results confirm that valgization osteotomy is an effective treatment option, particularly in young, active patients, to delay the need for total knee arthroplasty. Finally, this study highlights the need for a multidisciplinary approach involving orthopaedic surgeons, rehabilitation specialists and physiotherapists to improve patient management and ensure optimal long-term functional results.

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