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RESULTS OF TIBIAL VALGUS OSTEOTOMY IN THE TREATMENT OF KNEE OSTEOARTHRITIS IN PATIENTS OVER 60 YEARS OLD: ABOUT 62 CASES

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ABSTRACT

Knee arthritis is a frequent pathology in our country. The indications and the therapeutic choice depend on several factors. The high tibial valgus osteotomy has a considerable contribution, in particular for the active young patients with osteoarthritis beginner. In addition it can be extended on depend of age and the evolution stage. The aim of our paper was to evaluate the outcome of the high tibial valgus osteotomy in patients upper than 60 years of age to specify the prognosis factors which can modify the results.

KEYWORDS: Osteoarthritis- Knee- Osteotomy- Tibia.

A) INTRODUCTION

Knee osteoarthritis is a frequent pathology.[1, 14, 18, 20, 26] It is a progressive disease; Untreated, the functional prognosis is poor with joint destruction and consequently a major handicap. The tibial valgus osteotomy is the feature of choice in young subjects with early osteoarthritis.[11, 13, 26]

The management of this pathology is often affected in our country due to the reluctance of patients, their socio-economic conditions and the inadequacy of social security coverage. We are often in front of elderly patients, tares with an advanced stage of osteoarthritis and a significant deformation of the knee. How accurate is the patient's death for retirement age (60) and/or if he has significant angular deformity and advanced osteoarthritis? Is prosthetic replacement the only possible indication? What if this disease was an unfavorable socio-economic condition? This work proposes to make a retrospective study about 62 knees performed in 52 patients aged over 60 years whose main objective is to make an epidemiological, clinical and radiological study in order to evaluate the immediate results and to distance with a minimum follow-up of 5 years, from the tibial valgus osteotomy.

B) MATERIEL AND METHODES

1- Material

Out of a total of 108 files collected for this retrospective study between 2015 and 2022 at the Ibn Sina Hospital in Rabat, 52 were retained, therefore 62 tibial valgus osteotomies and meeting the inclusion criteria (A complete clinical and radiological file and follow-up at least 5 years).

a) Epidemiological data

The average age was 66 1⁄2 years with extremes between 60 and 78 years. The distribution of patients according to age groups found that 46% were over 65 years old. A clear female predominance was noted with 40 women for 12 men. The left side was slightly more affected and only 10 patients were operated on both sides. The socio-economic conditions of patients judged through a pre-established social record in the service were poor in 42% of cases. The particularity of this series of relatively old patients is that it was aimed at a relatively vulnerable and impaired population, 46% of the patients had at least one impairment (Table 1). Obesity was noted in 65% of patients with an average body mass index of 33.

Tab 1: Pathological history of patients in the series.

HTA	19
Diabetes	9
Respiratory	2
Dyslipidemia	3
Ischemic heart desease	2
Hepatobiliary	6
Ulcer	8

b) Clinical data

The duration of evolution of the clinical symptoms of gonarthrosis before its management was on average 8.5 years with extremes of 6 months to 20 years. Gonalgia was the reason for consultation and the most important

functional complaint. The evaluation of the pain was made on subjective criteria in 4 stages. They were most often of mixed type and qualified as major for 92% of patients.

The walking distance was limited between 100 and 500 meters in 72% of cases. Although this parameter testifies to the importance and scalability of knee osteoarthritis, it remains multifactorial, especially for this segment of the elderly population and where defects (cardiovascular, respiratory, neurological, etc.) play a significant role in it.

In this series knee flexion was rarely altered, however an affected knee flexum was noted in 28 knees. This was greater than 15° for 5 knees. On the other hand, 15 knees suffered from associated ligament laxity, it was external lateral peripheral for 80% of them and anterior for the rest. Almost all of the patients had patellofemoral syndrome associated with femoro-tibial involvement.

c) Radiological data

The radiological assessment included for all the patients a standard X-ray of both knees face and profile in load in pre, post-operative, consolidation and follow-up, femoro-patellar incidences and a pangonogram of the two lower limbs pre-operative and at the recoil. According to the Ahlback classification[1] (Table 2), 68% of patients had stage II osteoarthritis, 21% stage 3 and 8% stage IV. The external femoro-tibial compartment was affected in 60% of cases and the femoro-patellar compartment was affected to varying degrees in 79% of cases. The mechanical femoro-tibial angle, which measured the overall varus deformity, was on average 11.3° with extremes of 3° to 24°.

In half of the cases, this angular deformity was greater than 12° varus. The internal tibial angle, which is the intersection between the tibial mechanical axis and the tangent to the tibial plateaus, was on average 84° with extremes of 78° to 87°. The Levigne and Dejour angle, which measures the constitutional varus, was on average 2.9° with extremes of 0 to 10°.

Tab 2: Radiological classification of arthritis of the knee, according to Ahlback.

Ahlbäck grade[7]	Anteroposterior stress radiograph	Lateral radiograph
1	Reduction of joint space	
2	Obliteration of joint space	
3	Tibial plateau attrition <5 mm	Posterior part of plateau intact
4	Attrition 5-10 mm	Attrition extends to posterior margin of the plateau
5	Severe subluxation of the tibia	Anterior subluxation of the tibia >10 mm

2- Methodes

All patients underwent tibial valgus osteotomy by external closure, the aim of which was to obtain angular correction of the axial deformity between 3 and 6° valgus. The operation was performed under locoregional anesthesia for all patients. A fibular osteotomy was associated in 61 cases, it was performed at the 1/3 middle 1/3 distal junction. Only one case of proximal tibiofibular disarticulation was made. A gesture on the femoro-patellar was associated in 79% of cases (release of the lateral patellar wing and/or Maquet effect). Osteosynthesis of the tibial osteotomy was performed using a T-plate in 44 cases, a swan-neck plate blade in 17 cases and only one case of stapling requiring additional cruropedial cast. The duration of hospitalization was on average 6 days during which functional rehabilitation was started from the first day. Weight bearing was authorized on the 45th day, mean time for consolidation of the osteotomy site.

C) RESULTS

1- Clinical results

The results were evaluated with a minimum follow-up of five years. The mean follow-up was 7.22 years with extremes of 5 and 16 years. The evaluation of our results was made according to functional criteria (pain, mobility and instability) by referring to the functional evaluation of the Guépard group[9] (Table 3). Overall, we obtained 70% excellent and good results, 15% average and 16% poor results.

Depending on the radiological stage of osteoarthritis, we found that the evolution of the stage of pain was good in 85% of cases for stages I and II against only 52% for stage III and IV. The study of pain according to the

initial varum shows a significant difference in favor of patients with a global varum less than or equal to 12° and patients with a varus strictly greater than 12°. According to the epiphyseal varus (Levigne), we found a statistically significant difference in favor of the tibia vara compared to the right tibia.

We observed a marked improvement in walking distance in 63% of cases. This improvement was not significant according to the age of the patients. In addition, the difference was statistically significant depending on the existence or not of associated tares in favor of untared patents.

Depending on the presence or absence of signs of preoperative ligament instability, the results were better for the knees which were stable.

Depending on the angular correction, we noted that the result was better with a statistically significant difference for the subjects who had a valgus maintained between 1 and 4° at follow-up with 86% good results. These results change for patients with either varus or overcorrection in valgus of more than 7° at follow-up with respectively 26 and 65% good results.

All of these clinical data ultimately enabled us to measure the duration of satisfaction of the patients in this series after the tibial valgus osteotomy. We obtained an average duration of 5.5 years with extremes between 1 and 14 years.

Tableau 4 : Critères d'évaluation fonctionnelle du groupe Guépard [9]

Résultat Global	Douleur	Mobilité en flexion	Instabilité
Excellent - Très bon	Aucune	≥ 110	Aucune
Bon	Légère	90 - 109	Modérée
Moyen	Modérée	60 - 89	Importante
Mauvais	Permanente	<60	Permanente
Un flexum compris entre 10° et 20° pénalise le patient d'un niveau et un flexum supérieur à 20° le pénalise de deux niveaux			

2- Radiological results

Radiologically, tibial valgus osteotomy stabilized osteoarthritic lesions of the internal femoro-tibial compartment in 71% of cases. The reappearance of the joint line was noted in 17% of cases for Ahlback stage III and IV knees. In addition, radiological worsening of the lesions was noted in 11% of cases for the internal femoro-tibial compartment, in 37% of cases for the external femoro-tibial compartment and in 40% of cases for the femoro-tibial compartment. patellar.

Preoperatively, we had a series with an average varum of 11.3° with extremes of 3 to 24°. At the last follow-up, 76% of our patients had a valgus with an average of 1.25° of valgus. We noted 11 patients who had a hypercorrection greater than 6° and 15 patients who presented a residual varum varying between 3 and 22°.

3- Complications

Two intraoperative incidents were noted, a type of fracture of the proximal tibial epiphysis, which evolved well. We deplored a case of sural phlebitis which progressed well under anticoagulant treatment, a case of superficial skin infection and a case of secondary infection which progressed well after removal of the material. Belatedly we deplored 5 cases of pseudarthrosis of the site of the fibular osteotomy which was slightly painful in only 2 cases, one case of sepsis 4 years after surgery and one case of intra-articular protrusion of a screw.

D) DISCUSSION

The tibial valgus osteotomy is a therapeutic tool of great importance in the treatment of knee osteoarthritis. It is practically the indication of choice, with some exceptions in internal femorotibial osteoarthritis in young subjects.[23, 26, 29] Some authors had noted a deterioration in functional results with age, making it a real failure factor.[20, 27] Langlais[24], notes that age is considered an indirect factor of failure because osteoarthritis for these subjects is relatively advanced. For Levigne[26], Coventry[7] and Keene[23], advanced age does not contraindicate tibial valgus osteotomy provided that the osteoarthritis is not advanced enough, the angular deformity is slight and good angular correction. Regardless of age, tibial valgus osteotomy can improve

pain by creating favorable biomechanical conditions.[9] The result on pain is all the better as the subject suffers more.[6, 23, 24] However, the effect of osteotomy on pain wears out over time.[7, 14]

Before indicating a tibial valgus osteotomy, it is essential, according to the majority of authors, to look for ligament laxity, which constitutes a limiting factor for the practice of conservative treatment due to a recurrence of deformation.[8, 14, 35] In our series, we noted 15 cases of ligament instability, including 12 external frontal ones. At the last follow-up we noted in this group 53% of good results. For Descamps[11], external laxity greater than 10° on stress images is a contraindication to osteotomy. On the other hand, some authors attribute a stabilizing role to the osteotomy.[12, 14, 20] Without taking into account the age factor, we compared our results with those of the literature (Table 5). through these results we can say that the results of tibial valgus osteotomy for subjects over 60 are satisfactory given the hindsight of our series compared to the rest of the literature, which is long, and the vulnerability neerability of the age group.

Table 4: Overall clinical result of our series and of the different series in the literature.

Série	Number of knees	% Good results	A decline
Our serie	72	70%	5 - 15
Decamps [34]	44	86%	1 - 8
Coventry [29]	58	67,5%	10
Insall [62]	83	85%	5
Goutalier [45]	93	90%	5
Levigne [79]	66	69%	1 – 6
Jemaa [66]	80	42,5ù	2 - 6

The advanced stages of osteoarthritis (III, IV and V) are considered as a contraindication to the practice of a conservative treatment such as tibial valgus osteotomy and this because of fairly advanced wear, retractions in concavity and distension in the external ligament compartment source of both lack of correction and recurrence of the deformity.[11] For other authors, although the best results are obtained for the less advanced stages, tibial valgus osteotomy retains a place in the therapeutic arsenal of advanced stages of osteoarthritis with variable rates of good results. . Even more, osteotomy found a preponderant place for patients with fairly advanced knee osteoarthritis with a poor socioeconomic status, which contraindicated prosthetic replacement.[4] This indication takes an important place in the therapeutic indication in our society.

For Dejour[10], concomitant damage to the external femorotibial compartment is a contraindication to performing a tibial valgus osteotomy. Goutalier[13] found, in a series of 93 knees, that involvement of the lateral femoro-tibial is not a contraindication to the practice of conservative treatment provided that the involvement is not very advanced. Holden[19] as well as Keene and Dyreby[22] found no correlation between the extent of osteoarthritic lesions and their results. In our series, 58% of cases had concomitant osteoarthritis of the external compartment, however, at follow-up we obtained 60% of good results.

Another particularity relating to this age group reported by the majority of authors[3, 13, 17, 28] is the frequent association of a patellofemoral osteoarthritis component. In our series, 79% of patients presented with associated patellofemoral osteoarthritis to varying degrees. The practice of a procedure associated with tibial valgus osteotomy for patellofemoral decompression is widely debated in the literature.[12, 17, 18, 32] Blanchard[3], in a series of 250 cases, observed that patent femoro-patellar lesions, even functionally not very troublesome, seem to justify patellar decompression in addition to the realignment osteotomy. Mascard[28], concludes that the benefits of this decompression gesture only appear late. Furthermore, N'guyen et al.[31], in a comparative retrospective study between tibial valgus osteotomy alone and associated with a Maquet effect, concluded that there was no statistically significant difference between these two procedures. In our study, we observed at the last follow-up a better functional result for patients who had an associated procedure on the patellofemoral bone. On the other hand, the discussion concerns the fact of associating a procedure on the femoro-patellar or opting instead for a prosthetic replacement. For Goutalier[13], the association of patellofemoral osteoarthritis with femoro-tibial osteoarthritis only leads to arthroplasty if it is extremely advanced. Bauer[2] does not consider the existence of patellofemoral osteoarthritis as a contraindication to valgus osteotomy. However, they specify that in certain advanced forms, arthroplasty may become necessary.

Another prognostic factor that was not without importance is the angular correction. Most of the studies found that a frontal correction which was maintained between 3 and 6° of valgus is correlated with a good functional and radiological result. Goutalier[13] and Hernigou[18] report that all patients whose valgus remained between 3 and 6° remained relieved without radiological deterioration beyond 10 years. And noting that a postoperative valgus of more than 6° would be likely to deteriorate the external compartment and lead to a poor result. Recurrence of varus would be more frequent in the event of a correction of less than 3° of valgus. Simurda[32] finds 87% good results when the

correction at the last follow-up was greater than 6°, whereas this rate drops to 37% when the correction was less than 5° valgus. For Insall[20], Vainionpaa[33] and Coventry[7] the ideal correction is 10°. They consider that it is beyond this value that the degradation of the external compartment can occur and that the deformation can cause aesthetic discomfort. Levigne[26] finds satisfactory results with a valgus between 1 and 4°. He also thinks that there is no ideal mechanical femoro-tibial angle and that the ideal correction must take into account the constitutional tibial varus. In our series, patients with valgus at the last follow-up had a percentage of good results of 82%.

E) CONCLUSION

Age is not a limiting factor in the therapeutic choice and the tibial valgus osteotomy retains a prominent place in the therapeutic arsenal for knee osteoarthritis on the genu-varum, ensuring clinical improvement in the short and medium term. term. Moreover, the only guarantee of a good lasting result is the meticulous analysis of the functional impairment, the clinic, the radiological parameters and finally an adequate technique once the indication of a tibial valgus osteotomy has been retained.

CONSENT

The patients have given their informed consent for the case to be published.

Competing Interests

The authors declare no competing interest.

Authors 'Contributions

All authors have read and agreed to the final version of this manuscript and have equally contributed to its content and to the management of the manuscript.

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