ASSESSMENT OF QUALITY OF LIFE IN PATIENTS WITH TIBIAL FRACTURES

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ABSTRACT

Objective: To evaluate the impact of tibial fractures on patient's quality of life. Method: All patients were evaluated by means of a protocol of clinical and epidemiological data. The Johner and Wruhs method was employed to evaluate tibial fractures and the results were compared to those of the SF-36 Health Survey, which was applied by the authors from the sixth month postoperatively. Those methods were applied considering the return of the patients or not to all the activities they used to perform before the accident. Results: We found a statistical significance ($p<0.05$) showed by Mann- Whitney's U-test between the component of SF-36, and return or not to previous activities. Regarding the results of SF-36 and clinical evaluation (Johner and Wruhs), on the Kruskal-Wallis' test, we also found significant correlation. Conclusion: According to the established criteria and based on the results, tibial fractures, even with favorable clinical outcomes, result in a diminished quality of life.

Keywords: *Tibial fractures. Fracture fixation. Intramedullary. Quality of life.*

Citation: *Nascimento OR, Cemin FS, Morais M, Barroco RS, Fujiki EN, Milani C. Assessment of quality of life in patients with tibia fractures. Acta Ortop Bras. [online]. 2009; 17(4):211-4. Available from URL: http://www.scielo.br/aob.*

INTRODUCTION

Tibia accounts for the long bone with the highest prevalence of fractures[1-3], showing the highest number of treatment alternatives.[4-6] As a result of the development of osteosynthesis techniques, making surgical procedures easier and reducing its associated risks, respecting the binomial biology-mechanics and modern increasingly trend to reintegrate patients into society, promoting a swift return to their activities, the bloody approach has occupied a top position in the ranking of orthopaedic doctors' preference.[7,8]

Locked intramedullary nails, in the recent years, have been shown to be of great usefulness, being currently the most disseminated fixation method for tibial shaft fractures.[9-11]

The concept of quality of life had been traditionally delegated to poets and philosophers; however, there is an increasing interest today from doctors and researchers to transform it into a quantitative measurement that could be used in clinical assays and economic models.[12-14] Quality of life is regarded as a very complex term, of difficult definition. According to the World Health Organization, quality of life is "an individual's perception of his/ her position in life, in the context, in the cultural and values system in which he/ she lives and concerning his/ her objectives, expectations, standards and concerns".[15] From an orthopaedic point of view, the end result of treatment concerning union, presence or absence of complications, angle and rotational displacements, shortenings, functional recovery and quality of gait have always been assessed. However, what would be a patient's personal assessment concerning his/ her treatment and results? Has the "Quality of Life", even with a good physical recovery, been impacted? The objective of this study is to demonstrate whether a change of quality of life occurred or not for the patients studied here.

MATERIAL AND METHODS

Our series was constituted of 30 patients, who, after being informed about the development of the study and having signed a Free and Informed Consent Term, were submitted to clinical examination, X-ray studies, application of the Evaluation Protocol and of the SF-36 Questionnaire, applied by the authors as interviews, at the outpatient facilities of the hospitals where surgeries were performed: Hospital IFOR in São Bernardo do Campo, Hospital e Maternidade Dr. Cristóvam da Gama in Santo André, Hospital São Leopoldo in São Paulo, and Hospital Estadual Mário Covas in Santo André. As an inclusion criterion for our study, patients diagnosed with tibial fracture and submitted to surgical treatment with locked intramedullary nail and spinal cord canal milling and access port through patellar ligament and not submitted to dynamization and not using anchor screw ("poller") (surgical method) between January, 1999 and April , 2005, with a minimum follow-up time of six months postoperatively were included. Multiple-trauma and multiple-fractured patients, those with cranial-encephalic trauma (CET) requiring hospitalization at Intensive Care Units (ICU), patients with grade II and II open fractures according to the classification by Gustilo, Gruninger and Davis[16], as well as those who evolved to pseudoarthrosis and serious infections were excluded from the study. The selection was made by assessing the medical

All the authors state no potential conflict of interest concerning this article.

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Received in: 01/30/08; approved in: 01/10/09

files obtained at the Medical Files Service (SAME) of each hospital and excluding patients according to the criteria listed above. For the selected Group, the age of the 30 patients at the time of surgery ranged from 14 to 56 years (mean: 36.1; median: 36.5; standard deviation 12.449). Concerning gender, 20 (66.6%) were males and 10 (33.3%) females. Concerning the affected side, there were 19 (63.3%) left tibiae and 11 (36.6%) right tibiae. Concerning bone exposure, there were 21 (70%) closed and 9 (30%) Gustilo, Gruninger e Davis'[16] grade I open fractures. Twenty-seven (90%) patients showed associated fibular fracture and in only 3 (10%) patients, fibula was shown to be intact. An assessment protocol was prepared for patients where epidemiological, clinical and X-ray-related aspects were reviewed, and all patients were submitted to clinical and X-ray tests, according to the method by Johner and Wrus.[17] For quality of life assessment, the *MOS 36-item Short-Form Health Survey* (SF-36) questionnaire by Ware and Sherbourne[18], translated and validated into Portuguese by Ciconelli was used.[19] SF-36 is a generic multi-dimensional tool comprising 36 items divided into eight domains, which can be grouped as two broad components: physical and mental.[20] For the analysis of results, a score is assigned to each question, which, subsequently, is transformed into a 0-100 scale, where zero corresponds to the worst health status and 100 corresponds to the best health status, with each component being assessed separately.[19] For the statistical evaluation, a descriptive analysis was made for all variables of the study. Qualitative analyses were presented as absolute and relative values (percentages) and the quantitative analyses as core and dispersion trend values. Two stratifications were made for analysis. The group was divided into patients returning to their previous activities and patients not returning to their previous activities, and a further division concerning the result of the assessment by the method by Johner and Wruhs.[17] In order to check for the association between qualitative variables and groups, the Chi-Squared test and the Fisher's exact test were applied, adopting a significance level of 5%. In order to compare groups, return to previous activities or not, concerning the domains of the SF-36[18], the non-parametric Mann--Whitney's U-test was employed, because variables didn't present a normal distribution (Kolmogorov-Smirnov's test) and homocedastity (Levene's Test). When the group was stratified by Johner and Wruhs[17] assessment, the Kruskal-Wallis' test was used to compare the three assessments, followed by the multiple-comparison test *Honest Significant Differences* (HSD-tukey).[21,22]

RESULTS

On Chart 1, we present the scores assigned to patients after calculating the results of the Quality of Life-related questionnaire for the eight SF-36 domains.[18]

On Table 1, the distribution of number and percentage of the results of the evaluation by Johner and Wruhs17 method is shown for overall and stratified groups concerning the return status to previous activities, with the result of the Chi-squared test.

On Table 2, a descriptive analysis of the values obtained for SF-36 domains[18] is shown for the overall and stratified group concerning the return to previous activities or not and the result of the Mann-Whitney's U-test.

On Table 3, a descriptive analysis of the values obtained for SF-36 domains[18] stratified for the results achieved by means of the assessment by the method by Johner and Wruhs[17] is presented. The "poor" evaluation (IV) was not considered for having only one patient included (nr. 10) [statistical limitation].

Chart 1 – *Data concerning the results of patients' assessment with the SF-36 questionnaire*

Sequential nr.	Functional Ability	Physical Aspects	Pain	Overall Health Status	Vitality	Social Aspects	Emotional Aspects	Mental Health
1	95	100	84	100	100	100	100	100
2	85	100	84	100	100	100	100	100
3	55	0	31	80	80	62,5	66,6	88
4	80	25	74	90	60	87,5	0	64
5	80	100	62	100	85	100	100	92
6	100	100	100	100	100	100	100	100
7	50	0	31	77	80	75	33,3	60
8	65	0	52	72	80	75	100	80
9	100	100	100	100	100	100	100	100
10	30	0	31	72	50	50	0	64
11	100	100	84	100	100	100	100	100
12	90	100	84	100	100	100	100	100
13	95	100	74	87	100	100	100	100
14	100	100	100	100	100	100	100	100
15	65	0	52	72	70	70	66,6	84
16	65	25	74	92	95	95	100	88
17	75	25	62	87	80	80	33,3	88
18	95	100	84	97	95	95	100	100
19	95	100	100	100	100	100	100	96
20	100	100	84	100	100	100	100	100
21	90	100	84	100	100	100	100	92
22	75	50	74	100	100	100	100	100
23	100	100	100	100	100	100	100	100
24	100	100	100	100	100	100	100	100
25	65	50	52	87	85	75	100	92
26	65	0	52	97	85	100	100	96
27	100	100	84	100	100	100	100	96
28	85	100	74	100	95	100	100	100
29	80	100	62	100	100	100	100	100
30	85	100	72	100	100	100	100	92

Table 1 – *Distribution of the number and percentage of the assessment by Johner and Wruhs's method (1983) for the overall and stratified group for return to previous activities or not*

	Overall	Returned	Didn't Return	p
Assessment by Johner and Wruhs' method	Nr (%)	Nr (%)	Nr (%)	
Excellent	11 (36.7)	11 (73.3)	-	p < 0.001*
Good	12 (40)	4 (26.7)	8 (53.3)	
Fair	6 (20)	-	6 (40)	
Poor	1 (3.3)	-	1 (6.7)	

p was obtained by means of the Chi-squared test between the group retuning to previous activities and the one that did not

Table 2 – *Descriptive analysis of SF-36 domains for overall and stratified group for return to previous activities*

	Overall	Returned	Didn't Return	P
Nr of patients	30	15	15	-
Functional Ability				
μ ± sd	82.17 ± 18.04	95.33 ± 6.39	69.00 ± 16.16	p < 0.001*
minimum-maximum	30 – 100	80 -100	30 –95	
Physical Aspects				
μ ± sd	69.17 ± 42.89	100 ± 0	38.33 ± 42.11	p < 0.001*
minimum-maximum	0 – 100	100 - 100	0 – 100	
Pain				
μ ± sd	73.3 ± 20.97	86.4 ± 11.71	60.33 ± 20.25	p < 0.001*
minimum-maximum	31 – 100	62 - 100	31 – 100	
Overall Health Status				
μ ± sd	93.67 ± 9.77	98.93 ± 3.39	88.40 ± 11.25	p < 0.002*
minimum-maximum	72 – 100	87 - 100	72 – 100	
Vitality				
μ ± sd	91.33 ± 13.25	98.66 ± 3.99	84.00 ± 15.25	p < 0.001*
minimum-maximum	50 – 100	85 - 100	50 – 100	
Social aspects				
μ ± sd	92.91 ± 13.40	100 ± 0	85.83 ± 16.27	p < 0.001*
minimum-maximum	50 – 100	100 -100	50 – 100	
Emotional Aspects				
μ ± sd	86.67 ± 29.82	100 ± 0	73.32 ± 38.22	p < 0.008*
minimum-maximum	0 – 100	100 - 100	0 – 100	
Mental Health				
μ ± sd	92.40 ± 11.52	98.13 ± 3.33	86.67 ± 13.91	p < 0.003*
minimum-maximum	60 – 100	92 - 100	60 – 100	

μ=mean; sd=standard deviation. P was obtained by means of the Mann-Whitney's U-test between the group returning to previous activities and the one that did not.

Table 3 – *Descriptive analysis of SF-36 domains stratified for assessment by Johner and Wruhs' method*

	Excellent	Good	Fair	P
Nr of patients	11	12	06	-
Functional Ability				
μ ± sd	97.27 ± 5.17	79.17 ± 14.11	69.17 ± 11.14	p < 0.001*
minimum-maximum	85 - 100	50 - 95	55 - 85	
Physical Aspects				
μ ± sd	100 ± 0	68.75 ± 41.46	25 ± 38.73	p < 0.002*
minimum-maximum	100 - 100	0 - 100	0 - 100	
Pain				
μ ± sd	90.18 ± 10.01	68.42.4 ± 18.71	59.5 ± 17.64	p < 0.002*
minimum-maximum	72 - 100	31 - 100	31 – 74	
Overall Health Status				
μ ± sd	100 ± 0	92.25 ± 10.04	88.5 ± 10.62	p < 0.004*
minimum-maximum	100 - 100	72 - 100	72 - 100	
Vitality				
μ ± sd	100 ± 0	91.25 ± 10.69	82.5 ± 12.94	p < 0.001*
minimum-maximum	100 - 100	70 - 100	60 - 95	
Social aspects				
μ ± sd	100 ± 0	92.71 ± 11.25	87.5 ± 15.81	p < 0.05*
minimum-maximum	100 - 100	75 - 100	62.4 - 100	
Emotional Aspects				
μ ± sd	100 ± 0	86.10 ± 26.45	77.77 ± 40.37	p = 0.15
minimum-maximum	100 - 100	33.3 - 100	0 - 100	
Mental Health				
μ ± sd	98.18 ± 3.28	92.67 ± 11.67	86 ± 12.84	p < 0.05*
minimum-maximum	92 - 100	60 - 100	60 - 100	

μ=mean; sd=standard deviation. P was obtained by means of the Kruskal-Wallis test stratified for results of the assessment by Johner and Wruhs' method

DISCUSSION

In our study, we assessed patients with tibial fractures submitted to surgical treatment with locked intramedullary nail, which is currently regarded as the "gold standard" for treating most tibial fractures.[11,23,24]

By reviewing the results of the assessment by the method by Johner and Wruhs[17], stratified for return to previous activities or not, we found an association between the groups described on Table 1 and the results, since all patients with excellent results returned to their previous activities, all patients with results scored as fair and poor did not return to their previous activities, and, among the 12 (100%) who scored good from a clinical point of view, 8 (66.6%) did not return to previous activities (extreme activities) and 4 (33.3%) did ($p<0.001$). Also by the method described by Johner and Wruhs[17], by comparing results, we found excellent outcomes in 11 patients (36.6%), good in 12 (40%), fair in 6 (20%) and poor in 1 (3.3%).

In the last decade, one of the greatest developments in the field of health has been the recognition of the importance of patient's opinion concerning his/ her disease, as well as the quality monitoring of employed therapeutic measures.[25] Therefore, the best way to judge them is not the frequency in which a medical service is provided to a patient, but how close the achieved results are to critical goals of extending life, relieve pain, restore function and prevent disabilities.[26-28]

In the quality of life evaluation, two approaches were used: one to assess SF-36 domains[18] stratified to evaluate patients by the method of Johner and Wruhs[17] (Table 1), being excellent (Group I), Good (Group II), Fair (Group III), excluding Poor evaluation (Group IV) for counting on only one patient. By means of the Mann-Whitney's U-test, we could find a significant difference between both studied groups concerning their scores (Table 2). Considering these data, we can see a significant association between the scores of each assessed question and the groups, because it shows us that the patients who returned to their previous activities achieved significantly higher scores than those who didn't return to previous activities. In our literature search, we didn't find any authors discussing the matter. On the second approach, we compared a generic tool - the SF-36[18] - to a specific tool, the method by Johner and Wruhs[17] (Table 3), and we found a

significant association by the non-parametric Kruskal-Wallis' test for Physical component domains (Functional Ability, Physical Aspects, Pain, and Overall Health Status) where a proportionality exists between clinical assessment and SF-36 scores.[18] (Table 3) Concerning Mental component domains (Vitality, Social Aspects, Emotional Aspects, and Mental Health), by the same test, we found a significant difference for items Vitality, Social Aspects and Mental Health; however, there was no statistical difference for Emotional Aspects [(p=0.15) (Table 3)], which, in our opinion, does not invalidate the fact that the tibial fracture has also caused an impact on the mental component. Emotional Aspects have been defined as being assessed by measuring the emotional challenges restricting labor activities, social life and daily life activities. Thus, this item could be impaired by answers, for addressing, as other items of the Mental Component, subjective questions that could present variable answers according to the personality and momentum of each patient. Although the patients included in our study, being assessed by the method of Johner and Wruhs[17] have shown good results from a clinical (orthopaedic) perspective and following our inclusion and exclusion criteria, when we evaluated the answers to the SF-36[18] questionnaire, we found that tibial fractures treated with locked intramedullary nail has yielded a "worsening of the quality of life" of patients. Because the assessed group was homogenous for gender and age, and all fractures showed union, better results could be expected when the quality of life of these patients was measured. Could other factors have influenced these results? According to Filan[29], the "Labor withdrawal and Benefit" system (corresponding to our Caixa- INSS) would contribute to a delayed return to labor activities, and could save millions of dollars if it had an incentive program to encourage a swift return to work, obviously without damages to a good treatment outcome. We don't have enough data in our study to allow comments on this subject.

CONCLUSION

Tibial fractures, even with good clinical evolution after treatment, according to the criteria established hereon, causes a worsening of the quality of life of these patients.

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