Mortality from Tibial Shaft Fractures in the Elderly – A Retrospective Multicentre Study of Management Outcomes

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INTRODUCTION: The mortality rate of tibial shaft fractures in the elderly is reported to be as high as 27 %, comparable to that of hip fractures. However, there is no current consensus on their management. Operative treatment allows for earlier mobilisation and reduces potential complications of non-weight bearing; however, it carries surgical and anaesthetic risks for this co-morbid cohort. The main objective of this study was to assess whether there is a difference in the 1-year mortality between operative and non-operative management of tibial shaft fractures in the elderly.

METHODS:

A multi-centre study was conducted, collating data from 6-trusts across England. Data was collected retrospectively, covering a 5-year period from January 2017 to December 2021. The study included all patients aged 65 and over with diaphyseal tibial fractures (AO42). Patients with non-acute (>3 weeks), periprosthetic, pathological, or multiple lower limb fractures were excluded. Logistic regression analysis was used to identify the effect of non-operative management on 1-year mortality and symptomatic non-union while adjusting for Age, Sex, ASA, Smoking, and Pre-Injury mobility. Multi-Linear Regression Model was used to evaluate the effect of management on length of stay after adjusting for the same covariates.

RESULTS:

A total of 171 patients were identified, comprising 38% males and 62% females. Of these, 59.65% were managed operatively, while 40.35% were managed non-operatively. The median age was 82 (IQR 75-89) years in the non-operative group vs. 74.5 (IQR 70-82) in the operative group $p= 0.002$, r= 0.23.

The 1-year mortality in the entire cohort was 23.5 %. Mortality was higher in the non-operative group 39.34% vs. 13.04% in the operative group $p< 0.001$. The regression model showed that non-operative management was the second highest independent predictor of 1-year mortality with coefficient B=1.4, $p= 0.012$, following wheelchair pre-injury mobility coefficient B=2.89, $p= 0.004$.

The median Length of Stay was 8 days (IQR 2-18.5) in the non-operative group vs. 8.5 (IQR 5-17) in the operative group *p=0.87*. The MLR model showed that the length of stay wasn't predicted by the management modality after adjusting for covariates (B=0, p=0.97).

Non-union was higher in the non-operative group 21.74% vs. 6.25% in the operative group, $p< 0.001$. A logistic regression model showed that smoking and nonoperative treatment were significant in predicting non-union, with coefficients B=2.35 and 2.04, and p-values of 0.10 and 0.15, respectively.

DISCUSSION AND CONCLUSION:

This study showed that non-operatively treated tibial shaft fractures in the elderly have a significantly higher non-union and 1-year mortality rate with an equivalent Length of Stay. The 1-year mortality rate in this study was 23.5%, which aligns with previous reports that noted a mortality rate of 27%. The effect of management options on the mortality of tibial shaft fractures in the elderly had not been previously investigated in the literature. These results recommend that elderly patients with this injury should be managed in an expedited manner similar to hip fractures to allow early mobility.

Elderly patients lose independence following such injuries, and prolonged immobilisation can have detrimental effects on them. The main aim of managing fractures in this age group focuses on early mobilisation, as non-weight bearing has negative impacts on their health. Additionally, implementing partial weight bearing in this age group is challenging due to balance and cognitive problems. Conversely, allowing full weight bearing after non-operative treatment could increase the non-union rate. Therefore, guidelines need to be clearer and more specific in the management of these patients to strike a balance between promoting early mobility and minimising the risk of non-union.

Whilst we appreciate that this study is retrospective, an adequate sample size was included to present a comprehensive analysis, and all demographics were accounted for in comparing the outcomes between operative and non-operative treatment.

In conclusion, non-operative treatment of tibial shaft fractures in the elderly is associated with increased non-union and mortality. Hence, we recommend managing these fractures with an expedited approach and a multidisciplinary team involving orthogeriatrics, with a focus on early mobilisation to optimise outcomes.