Time to surgery affects wound healing of bimalleolar and trimalleolar ankle fractures

Yi Guo, Yuxi Guan[1], Nelson Negron[1], Qiyun Jennifer Jiang[1], Chaiyaporn Kulsakdinun[2]
[1]Orthopedic, [2]Montefiore Orthopedics

INTRODUCTION: Ankle fractures are very common. Most unstable ankle fractures require surgical intervention in order to obtain better clinical outcomes. However, there is still conflicting evidence about the implications of time to surgery on post-operative wound complications. In this study, we investigated if early or delayed surgery results in difference in wound complications in patients who underwent surgical intervention for ankle fracture.

METHODS:

A retrospective review of 238 ankle fracture cases treated with open reduction and internal fixation (ORIF) from October 28, 2016, through May 12, 2022 was completed at our institution. Patients were divided into 4 groups based on the time to surgery. In group 1, surgery was performed within a week. In group 2, surgery was in 2ndweek. In group 3, surgery was in 3rd week. In group 4, surgery was after 3 weeks. Wound complications including minor wound complication and wound infection were investigated. The other factors including BMI, cigarette smoking, diabetes, etc. were investigated as well to avoid confounding bias. Data was analyzed using STATA to perform Student t-test, Chi square test and fisher test, etc.

RESULTS: 238 patients with ankle fracture were analyzed including lateral malleolar fracture 106 cases, bimalleolar fracture 51 cases, trimalleolar fracture 55 cases, other type of fracture 26 cases. Mean age 44.5 years old (range 16-86). Mean BMI 30.8 (range 15.8-53.5). 16.8% patients were cigarette smokers. 18.1% patients had diabetes. 36 patients accepted surgery within 1 week (group 1). 96 patients accepted surgery in 2nd week (group 2). 71 patients accepted surgery in 3rd week (group 3). 35 accepted surgery after 3 weeks (group 4). For BMI, smoking, and diabetes, no significant difference among 4 groups. The rate of minor wound complications in group 1, 2, 3 and 4 was 13.8%, 12.5%, 8.5% and 0%. The rate of wound infection in group 1, 2, 3 and 4 was 5.6%, 3.1%, 1.4% and 0%. In term of minor wound complication, there was significant decrease in group 4, as compared with group 1 and group 2 ($p<0.05$). Otherwise, no significant difference although the overall trend for both minor wound complication and wound infection decreased over time. However, when we stratified the patients into minor surgery (lateral malleolar fracture) and major surgery (bimalleolar and trimalleolar fracture), and group patients into early surgery group (within 2 weeks) and delayed surgery group (after 2 weeks), interestingly, for patients with major surgery, minor wound complication rate significantly decreased in the delayed surgery group (2.2% in delayed surgery group vs 14.5% in early surgery group, $p<0.05$), while no significant difference in minor surgery group. Wound infection rate also decreased in delayed surgery group in patients with major surgery. But the difference is not significant.

DISCUSSION AND CONCLUSION: Delayed surgery for patients with bimalleolar fracture or trimalleolar fracture resulted in decreased minor wound complication rate. For patients with only lateral malleolar fracture, no significant difference in wound complication no mater surgery is done early or late.