Comparison of surgical outcomes between bioabsorbable and metal screw fixation for distal tibial physeal fracture in children and adolescent

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INTRODUCTION:
Metal screws for fixation often necessitate a second surgery for removal, posing challenges in orthopedic care, which adds to treatment costs, introduces potential complications, and increases the psychological burden on patients. In pediatric cases, the need for repetitive general anesthesia during the second operation heightens the risk of neurotoxicity, creating an unsatisfactory experience for both the patients and their parents. We aimed to compare the surgical outcomes between bioabsorbable and metal screw fixation for distal tibial physeal fracture in children and adolescents, in the radiographic and clinical aspects. Additionally, we sought to compare the length of hospital study and medical cost between the two groups.
METHODS: Consecutive 67 children and adolescents who underwent open reduction and internal fixation using metal or bioabsorbable screws for the distal tibia physeal fracture were included. All patients underwent preoperative radiographs, three-dimensional computed tomography scans, and postoperative follow-up teleradiogram. Patients were divided into metal (N=40) and bioabsorbable groups (N=27). We compared the surgical outcomes between the two groups in terms of clinical and radiographic outcomes, length of hospital stays, and medical cost.
RESULTS:
Follow-up duration were significantly longer in the metal group than that in the bioabsorbable group. There was no significant difference in the incidence of growth arrest after surgery and the scores of the Oxford Ankle and Foot Questionnaire between the two groups. However, the total hospital stay was significantly longer in the metal group (5.2 ± 4.8 days) compared to the absorbable group (2.6 ± 0.5 days). Medical costs were significantly higher in the absorbable group than in the metal group with a difference of 397 US dollars.
DISCUSSION AND CONCLUSION: The use of bioabsorbable screws exhibited therapeutic effects equivalent to that of metal screws for pediatric distal tibia physeal fractures regarding clinical and radiological outcomes. Moreover, it had the advantage of avoiding the need for repeated general anesthesia and secondary operation for implant removal. Therefore, the use of bioabsorbable screws may be a favorable surgical option for treating pediatric fractures.