Infections in Metal Fixation Devices Used for Pediatric Fracture Management: Future Implications for Degradable Magnesium Implant Application

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Introduction
Magnesium which is a degradable metal implant is being presently investigated for the treatment of fractures in animal models. The aim of this study was to investigate the rate of infection when employing contemporary non-degradable implants in pediatric fractures and to determine if magnesium implants presently being developed require delivery of prophylactics attached to the implants to overcome this complication.

Materials and Methods
A review of 30 prospective and retrospective studies, involving 1905 fractures and published within the last 10 years, was conducted with the aim of producing an estimation of infections after application of metal fixation devices in pediatric fracture management. 10 studies involving external fixation, 10 studies involving plating and 14 studies involving intramedullary fixation were sourced. The studies involved fractures of the femur, tibia and upper limb and were conducted in institutions worldwide.

Results
Of the 405 fractures treated with external fixation, 114 pin tract infections, 1 case of toxic shock syndrome and 2 cases of osteomyelitis were recorded. However, of the 241 fractures treated with plating, 5 superficial infections and 1 case of osteomyelitis was recorded. Furthermore, of the 1259 fractures treated with intramedullary fixation, 12 superficial infections, 10 deep infections, 2 cases of osteomyelitis, 1 case of septic arthritis, 3 skin infections and 3 non-descript infections were recorded. In addition, 10 cases of bursitis were also recorded within the intramedullary fixation cases.

The more serious complications (deep infection, osteomyelitis, septic arthritis and septic shock) were observed in 0.39% of fractures of the femur treated with external fixation, 1.82% of fractures of the tibia treated with external fixation, 1.14% of fractures of the upper limb treated with plating, 1.99% of fractures of the femur treated with intramedullary fixation, 0.16% of fractures of the upper limb treated with intramedullary fixation and 1.67% of fractures of the tibia treated with intramedullary fixation.

Discussion and Conclusions
The extremely low rate of infection in the treatment of pediatric fractures when non-degradable intramedullary implants were employed provides data to the fact that delivery of prophylactics attached to present experimental degradable magnesium implants are not necessary. Although, there is a comparatively higher rate of infection when external fixation with pins was utilized, the application of degradable magnesium implants as pins for external fixation is not envisaged.

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Disclosures
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