Introduction and Objectives: Endoprosthetic reconstruction, intramedullary nailing, and open reduction internal fixation (ORIF) are commonly practiced for treatment of metastatic proximal femur fractures. This review aims to summarize current literature to help inform patients about expected outcome and to aid surgical decision making. We asked the following questions: (1) what is the functional outcome after surgery for metastatic proximal femur fractures, and what is the (2) local and (3) systemic complication rate? We compared these between surgical strategies.

Methods: Pubmed, Embase and the Cochrane database were searched for literature, published between 1980 and September 2015. We included 40 studies describing: (1) functional outcome using a standardized instrument, (2) local complications requiring reoperation (overall, deep infection, fixation failure), and (3) all systemic complications. The studies described 58 treatment arms including 2692 metastatic fractures: 23 studies reported on 1461 endoprostheses, 24 studies reported on 1054 intramedullary nails, and 11 studies reported on 233 ORIFs. Functional outcome and systemic complications are narratively reported, random-effects meta-analysis was used to create pooled effect estimates for local complications that required reoperation.

Results: Five studies reported an average Musculoskeletal Tumor Society (MSTS) score ranging from 51 to 74% in 95 patients after endoprosthetic reconstruction; one study reported an average MSTS score of 80% in 24 patients after intramedullary nailing; and one study reported an average MSTS score of 80% in 17 patients after ORIF. Two studies reported a Toronto Extremity Salvage Score of 67 to 71 in 16 patients after endoprosthetic reconstruction. We found a pooled overall reoperation rate of 5.2% (95%CI 2.9 to 8.1%) for endoprostheses, 4.2% (95%CI 2.0 to 6.8%) for intramedullary nails, and 14% (95%CI 7.3 to 22%) for ORIF. The pooled reoperation rate for deep infections was 0.68% (95%CI 0.00 to 2.05%) for endoprostheses, 0.04% (95%CI 0.00 to 0.54%) for intramedullary nails, and 0.00% (95%CI 0.00 to 0.92%) for ORIF. The pooled fixation failure rates requiring reoperation was 0.4% (95%CI 0.0 to 1.3%) for endoprostheses, 2.8% (95%CI 1.1 to 5.0%) for intramedullary nails, and 10% (95%CI 4.3 to 17%) for ORIF. Only 14 studies reported on 54 systemic complications after 16 treatment arms: the rates varied from 1 to 8% after endoprosthetic reconstruction, 0 to 27% after intramedullary nailing, and 0 to 8% after open reduction internal fixation. Deep venous thrombosis (17), pneumonia (9), and pulmonary embolism (6) were most common.

Discussion/Conclusion: All three surgical strategies result in reasonable function on average; however, the wide ranges indicate that both poor and good functional levels are obtained. We found that the overall reoperation rate was comparable for endoprostheses and intramedullary nailing, but was higher for ORIF. Deep infection seems to occur more commonly after endoprosthetic reconstruction, while fixation failure more commonly occurred after intramedullary nailing and ORIF. Our findings could aid surgical decision making and help inform the patient.

Keywords : proximal femur; metastases; metastatic disease; cancer; pathological fracture
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