

Summary

Periprosthetic osteolysis remains the leading complication of total hip arthroplasty. It often results in aseptic loosening of the implant with a requirement for a revision surgery. Wear-generated particulate debris is the main cause of initiating this destructive process. The most important cellular target for wear debris is a macrophage, which responds to particle challenge by activating proinflammatory signals, which contribute to increased bone resorption. The activation of the RANKL/RANK/OPG system is considered to be a likely cause of periprosthetic osteolysis leading to implant failure. The aim of this study was to examine the possible correlation between the clinical extent of osteolysis, the number of wear particles and the expression of the osteoclastic mediator RANKL in the tissues around aseptically loosened cemented and non-cemented total hip replacements. Periprosthetic tissues were harvested from 59 patients undergoing revision hip replacement for aseptic loosening. We had observed RANKL-positive cells in 23 of our 59 patients, their presence was noted predominantly in tissues with a loosened cemented endoprosthesis. We have shown that RANKL is present only in the tissues with a large amount of wear debris and predominantly in the cases involving lacunar type of osteolysis.

Key words: periprosthetic osteolysis, RANKL, wear debris, granuloma