**The Efficacy of Endothelial Progenitor Cell Therapy Combined with Local Antibiotics in a Rat Critical-Size Defect Model**

***Ikran Ali, BS****; Stéphane Gagnon, MSc; Kalter Hali, MSc; Graeme Hoit, MD; Richard Magony, BS; Emil H. Schemitsch, MD, FAAOS; Aaron Nauth, MD*
*Keenan Research Centre - St. Michael's Hospital, Toronto, Ontario, CANADA*



**Purpose:** The purpose of this study was to assess the efficacy of endothelial progenitor cell (EPC)-based therapy ± local antibiotics (ABX) in the treatment of bone defects in an animal model. Investigating the combination of EPC therapy and local ABX may lead to an effective single-stage treatment for infected nonunions. We hypothesized that local ABX would not interfere with the bone healing capacity of the EPC therapy.

**Methods:** A 5-mm bone defect was created in the right femur of Fischer 344 rats and subsequently stabilized with a mini-plate and screws. 14 days later, animals received 1 of 3 different treatments (n = 10): (1) no treatment (control), (2) EPCs, and (3) EPCs + local ABX (vancomycin and rifampin). Biweekly radiographs of the operated leg were taken to monitor bone healing progression. All animals were euthanized 10 weeks after surgery.

**Results:** All animals (100%) in the EPC and EPC + ABX groups healed by 10 weeks, whereas none (0%) of the animals in the control group demonstrated union (Figure 1). In addition, superior radiographic scores were observed in the EPC and EPC + ABX groups (mean 7.45 and 7.55, respectively) versus the control group (mean = 2.55). No significant differences were observed in radiographic union rates or radiographic scores between EPC and EPC + ABX groups. However, there were significant differences between control groups versus EPC and EPC + ABX ($P<0.0001$).

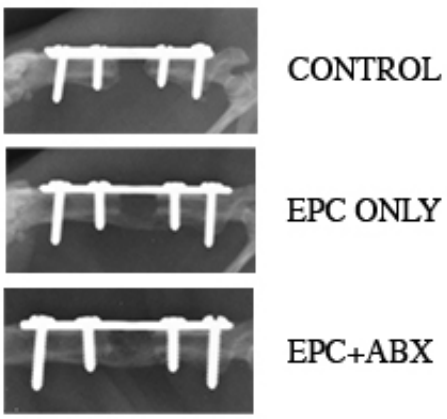

**Figure 1: Representative radiographs**

**Conclusion:** Our results indicate that the addition of local antibiotics (vancomycin and rifampin) does not interfere with the bone healing capacity of the EPCs and can be used in combination to potentially treat infected nonunions.