Perioperative moxifloxacin treatment in rats subjected to deep hypothermic circulatory arrest: reduction in cerebral inflammation but without improvement in cognitive performance.

Abstract:
Moxifloxacin reduces infectious complications after cerebral damage, such as ischemia and stroke. This study investigated whether moxifloxacin treatment influences cerebral inflammation and improves cognitive outcome after cardiopulmonary bypass with deep hypothermic circulatory arrest in rats. Rats were randomly assigned to deep hypothermic circulatory arrest (n = 40), sham operation (n = 40), and untreated control (n = 20) groups. Deep hypothermic circulatory arrest and sham groups were equally subdivided into moxifloxacin and placebo subgroups, receiving 6 × 100 mg/kg moxifloxacin or saline solution every 2 hours intraperitoneally. Hippocampal tumor necrosis factor α, nuclear factor ?B, cyclooxygenase 2, and macrophages were assessed immunohistochemically. Histologic outcome was determined with hematoxylin and eosin. Neurologic outcome was assessed preoperatively and postoperatively. Cognitive performance was tested with the modified hole board test for 14 postoperative days. On postoperative day 14, deep hypothermic circulatory arrest moxifloxacin group was lower than deep hypothermic circulatory arrest placebo group in hippocampal neurons positive for tumor necrosis factor α (1.33, 0.73-2.37, vs 4.10, 2.42-18.67), nuclear factor ?B (3.03, 1.33-5.20, vs 9.32, 2.53-24.14), and cyclooxygenase 2 (3.16, 0.68-6.04, vs...
8.07, 3.27-19.91) and also had fewer macrophages than all other groups (72, 60-90, vs deep hypothermic circulatory arrest placebo 128, 76-203, sham moxifloxacin 89, 48-96, and sham placebo 81, 47-87). On postoperative day 14, both deep hypothermic circulatory arrest groups showed impaired motor, cognitive, and histologic outcomes relative to sham-operated groups, with no difference between deep hypothermic circulatory arrest subgroups. Moxifloxacin transiently reduces cerebral inflammatory reaction, but without impact on neurologic function, histologic outcome, or long-term cognitive performance.