

Transfusion After Harvesting Bone Graft with RIA: Practice Changes Reduced Transfusion Rate by More Than Half

Lucas S. Marchand, MD; Patrick Kellam, MD; Graham J. DeKeyser, MD; Justin Haller, MD; David L. Rothberg, MD; Thomas F. Higgins, MD
University of Utah, Salt Lake City, UT, United States

Purpose: The reamer-irrigator-aspirator (RIA) device is frequently used as a tool for bone graft harvesting. The initial enthusiasm for using this instrument for bone graft harvest was dampened by significant blood loss and transfusion rates published at 44% at our center, while catastrophic and even fatal blood loss has been reported elsewhere in the literature. However, the RIA device remains an excellent tool to obtain large volumes of biologically active autograft. The aim of this study was to investigate how practice changes in the technical use of the RIA have impacted blood loss.

Methods: We conducted a retrospective chart review of all patients who underwent RIA bone graft harvest over a 12-year study period. The patients were split into two cohorts based upon changes in the technique used to obtain autograft harvest with the RIA device. The traditional cohort (2008-2012) were drawn from the previously published series of the first 5 years harvesting graft with RIA. Given the blood loss concerns, three major changes in RIA harvest technique (reduced power of suction, altered reamer sizing method, and canal suction technique) were developed following that study. The modified cohort (2013-2020) was collected from RIA harvest in the subsequent 7 years. Demographic information, surgical details, preoperative hematocrit (HCT), postoperative HCT, transfusion rates, intraoperative blood loss, reported volume of graft harvested, and iatrogenic fracture were recorded.

Results: In total 201 patients were included in the study with 61 patients in the traditional and 140 patients in the modified cohort. The average age was 51 years (range, 18-97) with 107 males (53%). There was no difference in the demographic data between the two cohorts. The most common indications for graft harvest were femoral nonunion (49%), tibial nonunion (32%), and other nonunions/fusion procedures (19%). No difference was noted between the traditional and modified cohorts in terms of the amount of average graft harvested (54 cc vs 51 cc; $P = 0.34$) or iatrogenic fractures (1 vs 2; $P = 0.91$). However, when comparing the traditional versus modified cohorts, the modified technique demonstrated a lower average blood loss (675 cc vs 500 cc; $P < 0.01$), HCT drop (13.7 vs 9.5; $P < 0.01$), and lower transfusion rate (44% vs 19%; $P = 0.001$).

Conclusion: This series demonstrated a significant improvement in blood loss and transfusion with modified techniques used to obtain autologous bone graft with the RIA device. Importantly, these techniques do not appear to limit bone graft harvest yield and can therefore be efficiently implemented without limiting the utility of the RIA.