INTRODUCTION: Tranexamic acid (TXA) is an inexpensive medication that has been increasingly used in orthopaedic surgery to decrease blood loss. The ability of TXA to improve arthroscopic visualization and allow for reduction in pump pressure is unknown. The purpose of this study was to determine the effect of intravenous TXA on change in pump pressure and visualization during arthroscopic shoulder arthroscopy.

METHODS: This was a single-center, three surgeon, prospective, randomized, double-blind controlled trial. Patients with full-thickness rotator cuff tears indicated for operative repair were prospectively enrolled. Patients were randomized by a random number generator on the morning of surgery to either the cases group (receive 1 gram of IV TXA preoperatively) or the control group (no TXA). All patients underwent shoulder arthroscopy using saline irrigation fluid with 3 ml epinephrine injected into the first 1000 milliliter (mL) saline bag, while all subsequent fluid was without epinephrine. The patient and surgeon were blinded and the anesthesia team was unblinded. All cases were performed in the beach chair position. The arthroscopic fluid pump was initially set to 20 mmHg and was increased at the discretion of the surgeon. Outcome variables including total operative time, final pump pressure, number of increases in pump pressure, total amount of irrigation fluid utilized, blood pressure, and anesthesia medical interventions for blood pressure were recorded. Additionally, visualization as measured by a visual analog scale (VAS) and survey was completed by the operative surgeon at the end of the case. Postoperative VAS pain scores were obtained via telephone at 24 hours after surgery. The primary aim of this study was to investigate the effect that IV TXA has on change in pump pressure ($\Delta P$) during shoulder arthroscopy, with a change in pump pressure of 15 mmHg set as a threshold for clinical significance.

RESULTS: Ninety-two patients that were prospectively enrolled completed the study. There were 48 patients randomized to the TXA group (mean age, 60.5 ± 9.89) and 44 patients (mean age, 59.0 ± 7.91) in the control group with no significant difference in mean age ($P = 0.406$) or other demographic variables. No significant differences were found between the TXA group and the control group regarding any measure of pump pressure including the final arthroscopic fluid pump pressure (44.7 ± 7.95 vs. 41.8 ±8.89, $P = 0.108$), the mean change in pump pressure (20.9 ± 10.5 vs. 20.6 ± 10.2, $P = 0.864$), or the number of times a change in pump pressure was required (1.7 ± 0.9 vs. 1.7 ± 0.8, $P = 0.909$). The reasons for change in pump pressure either due to bleeding or insufficient insufflation were not significantly different between the two groups at each incremental interval in pump pressure between 20 mmHg and 60 mmHg ($P >0.05$). Overall visualization as assessed by the VAS completed by the surgeon at the end of the case was also not significantly different between the TXA group and the control group (7.2 ± 1.9 vs. 7.7 ± 1.6, $P = 0.164$). Furthermore, there were no significant differences in the number of times patients required blood pressure adjustment by the anesthesiologist during the case ($P = 0.343$), or the range of mean arterial pressure throughout the case ($P > 0.05$). Operative efficiency as represented by total time from initial incision to final skin closure (75.8 min. ± 24.9 min. vs. 76.7 min. ± 31.2 min.; $P = 0.883$) and total irrigation fluid used (9,674 mL ± 5,234 mL vs. 10,862 mL ± 7,131 mL $P = 0.380$) was also similar between the groups. Lastly, no significant difference existed between the TXA and control groups regarding postoperative pain scores assessed by VAS pain scale (4.16 ± 2.02 vs. 4.05 ± 1.97, $P = 0.804$) at 24 hours after surgery.

DISCUSSION AND CONCLUSION: The use of IV TXA demonstrated no measurable improvement in surgeon ability to maintain a lower pump pressure during arthroscopic rotator cuff repair. Additionally, there was no measurable improvement in arthroscopic visualization or early pain scores. There does not appear to be substantial benefit to routine use of TXA in arthroscopic rotator cuff surgery.