Timing of Tourniquet Release: A Prospective Randomized Trial

Thomas Hays, MD; *Warren A. Williams, MD; Ameer Tabaa, MD; Brendan Kosko, BS; Jadyn Pike, BS; Brett Lewellyn, MD*

Purpose: There is thorough clinical research on the benefits and complications of tourniquet use; however, there has been little research evaluating whether releasing the tourniquet before or after skin closure affects patient outcomes. The objective of this study is to determine if tourniquet release before skin closure in upper extremity surgeries leads to decreased complications and/or improved clinical outcomes. We hypothesize there will be similar clinical outcomes and complication rates independent of timing of tourniquet release.

Methods: This study was a prospective, blinded, randomized trial. Patients were randomized into 2 study arms at the time of closure: closure without releasing the tourniquet versus releasing the tourniquet and then closing the skin incision. Demographic, intraoperative, and follow-up data were collected. Outcomes measures included pan and satisfaction scores and Disabilities of the Arm, Shoulder and Hand (DASH) scores.

Results: 214 patients were recruited in the study, with 172 available for follow-up. 107 patients had the tourniquet released prior to closure and 107 patients had the tourniquet released after closure. There were 75 elective and 32 trauma cases in each group. Both groups had similar demographics. There were no intraoperative or immediate postoperative complications requiring intervention. There were no instances of arterial injury after tourniquet release. Of patients who had the tourniquet released prior to closure, 16% required cauterization of light bleeding. Of patients who had tourniquet dropped after closure, none had hematoma formation or significant bleeding requiring intervention. At 2-week follow-up, pain and satisfaction scores were similar and there was no clinically significant difference in QuickDASH (an abbreviated version of the DASH questionnaire) scores between the pre-closure tourniquet release and the post-closure tourniquet release groups (51 vs 44 respectively, $P>0.05$). Within the 2 above-mentioned groups, there were no clinically significant differences in QuickDASH scores when separated into elective and trauma cases (66 vs 54 for pre; 45 vs 40 for post, respectively).

Conclusion: Tourniquet release prior to skin closure resulted in similar clinical outcomes and low complication rates compared to late tourniquet release for upper extremity orthopaedic operations. Orthopaedic upper extremity surgeons should feel confident in their decision to choose when to release the tourniquet, knowing that there are similar outcomes with regard to complications and patient satisfaction.