Prospective Evaluation of Coagulation Changes after Combined Ablative and Reconstructive Breast Surgery

Casey J. Allen, MD; Jonathan P. Meizoso, MD; Gerardo A. Guarch, MD; Mena M. Hanna, MD; Juliet J Ray, MD; Morad Askari, MD; Seth R. Thaller, MD; and Kenneth G. Proctor, PhD

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INTRODUCTION: Patients undergoing combined tumor resection and reconstructive surgery for breast cancer are at high-risk for venous thromboembolism (VTE)[1] yet specific coagulation changes remain unknown in this population. We assess the global hemostatic function of this cohort via rotational thrombo-elastography (ROTEM) in the perioperative period.

MATERIALS AND METHODS: A prospective study of patients undergoing immediate reconstruction following mastectomy for treatment of breast neoplasm was conducted. ROTEM was performed on blood samples taken pre-operatively, on post-operative day 1, and at 1 week follow-up. Clotting time (CT), α-angle (clot kinetics), clot formation time (CFT), maximum clot formation (MCF), and hypercoagulability was determined at each time point. Hypercoagulability was defined by one or more parameters outside the reference range. Data are expressed as M±SD or median(IQR) and compared using a Friedman or Cohrane's Q test, as appropriate. Significance was determined at $p \leq 0.05$.

RESULTS: 37 female patients with age of 54±10 years were included. 31 underwent implant-based reconstruction, 4 autologous reconstructions with free tissue transfer, and 2 oncoplastic reconstruction. Changes in the coagulation parameters during the peri-operative period are shown in Figure 1 and Table 1. Pre-operatively, 19% of patients were hypercoagulable, increasing to 62% by week 1 ($p=0.042$). Following surgery, there were no changes in initial clotting time nor clot kinetics, but MCF increased by week 1 both in value ($p=0.040$) and in overall percentage abnormal ($p=0.030$).

CONCLUSION: Patients undergoing combined tumor resection and reconstructive surgery for breast cancer become more hypercoagulable in the perioperative period. The significant contributor to hypercoagulability is MCF, representing platelet function. With the growing body of knowledge regarding the sustained hypercoagulability in patients at high-risk for VTE[2], anti-platelet therapy may play a role in thromboprophylaxis in this population.

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FIGURE LEGEND:

Figure 1. Percentage (%) of cohort with hypercoagulable abnormalities at peri-operative time-points. *† Denotes statistical significance ($p \leq 0.05$).

Table 1. Longitudinal coagulation values. CT, clotting time; CFT, clot formation time; MCF, maximum clot formation.