Use of fibrin sealant as a hemostatic agent in expanded polytetrafluoroethylene graft placement surgery.

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Abstract:

BACKGROUND: The low thrombogenicity, porosity, and limited elasticity of expanded polytetrafluoroethylene (ePTFE) vascular grafts, although beneficial, may exacerbate the problem of suture-line bleeding at vascular anastomoses and consequently lead to increased operating times. The overall objective of this prospective, randomized, controlled, subject-blinded, multicenter phase 2 study was to evaluate the efficacy and safety of a fibrin sealant containing 500 IU/mL thrombin and synthetic aprotinin (FS; marketed in the United States under the name TISSEEL) for hemostasis in subjects undergoing vascular surgery and receiving prosthetic ePTFE vascular grafts.

METHODS: FS was compared with manual compression with surgical gauze pads, a standard of care for hemostasis in vascular surgery. Two FS polymerization/setting times (60 and 120 seconds) were investigated to evaluate influence on the efficacy results. Patients undergoing ePTFE graft placement surgery (N = 73) who experienced bleeding that required treatment after surgical hemostasis were randomized to be treated with FS with clamps opened at 60 seconds (FS-60; N = 26), with FS with clamps opened at 120 seconds (FS-120; N = 24), or with manual compression with surgical gauze pads (control; N = 23). The proportion of subjects achieving hemostasis at 4 minutes (primary endpoint) as well as at 6 and 10 minutes (secondary endpoints) in the three treatment groups was analyzed using logistic regression analysis, taking into account gender, age, type of intervention, severity of bleeding, systolic blood pressure, diastolic blood pressure, heparin coating

of the ePTFE graft, and platelet inhibitors.

RESULTS: There were substantial differences in the proportion of subjects who achieved hemostasis at the study suture line at 4 minutes from treatment application between FS-120 (62.5%) and control (34.8%) groups (a 79.6% relative improvement). Logistic regression analyses found a statistically significant treatment effect at the 10% level in the odds ratio (OR) of achieving hemostasis at 4 minutes between the FS-120 and control groups (OR = 3.98, p = 0.0991). Furthermore, it has been shown that the perioperative administration of platelet inhibitors significantly influences (OR = 3.89, p = 0.0607) hemostasis rates at the primary endpoint. No statistically significant treatment effects were found for the other factors. Logistic regression analyses performed on the secondary endpoints demonstrated a significant treatment effect of achieving hemostasis at 6 minutes (OR = 9.92, p = 0.0225) and at 10 minutes (OR = 6.70, p = 0.0708) between the FS-120 and control groups. Statistically significant effects in the logistic regression analyses were found at the 10% level in the OR of achieving hemostasis at 6 and 10 minutes, respectively, for the following factors: FS-120 versus control group (OR = 9.92; p = 0.0225 and OR = 6.70; p = 0.0708, respectively), type of intervention (OR = 0.3; p = 0.0775 and OR = 0.25; p = 0.0402, respectively), and heparin coating of the ePTFE prosthesis (OR = 4.83; p = 0.0413 and OR = 3.65; p = 0.0911, respectively). FS was safe and well-tolerated, as indicated by the lack of any related serious adverse events.

CONCLUSION: The findings from this phase 2 study support the strong safety profile of FS and suggest that it is an efficacious hemostatic agent in ePTFE graft placement surgery, as well as a useful tool in peripheral vascular surgery applications.