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Impact of Echo Evaluation on the Day After and One Week After VA Creation on Primary Patency at 90 Days

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Case Study : Objective In Vascular Access (VA) assessment, key indicators include brachial artery flow volume (FV) and peripheral resistance index (RI) measured through echocardiography. This study explores the relationship between echo evaluations performed the day after and one week after VA creation and Vascular Access Interventional Therapy (VAIVT). Methods VA evaluation was conducted using echocardiography on the day following the procedure and one week later, spanning from June 2018 to November 2023. A total of 315 subjects (216 males, 99 females) underwent echo assessments after arteriovenous fistula creation. Logistic regression analyzed the data, with 90-day primary patency as the dependent variable. Independent variables included age, gender, diabetes status, and echo-derived measurements: FV, RI, end-diastolic velocity (EDV), and anastomotic outflow vessel diameter. The study investigated associations between echo evaluations post-VA creation and VAIVT. Results The logistic regression model for echo evaluation the day after VA creation yielded significant results ($p<0.01$), with an AIC of 256 and an ROC curve area of 0.83. The key variable influencing VAIVT presence was the diameter of the anastomotic outflow vessel (odds ratio: 0.361, $p<0.0004$). Similarly, the logistic regression model for echo evaluation one week after VA creation was significant ($p<0.01$), with an AIC of 239 and an ROC curve area of 0.844. Variables affecting VAIVT presence were FV (odds ratio: 0.993, $p<0.001$) and the diameter of the anastomotic outflow vessel (odds ratio: 0.456, $p<0.007$). Conclusion This study concludes that the logistic regression model utilizing echo data one week after VA creation demonstrates superior predictive performance, as indicated by AIC and AUC from ROC curves.