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**DDAVP AND POSTOPERATIVE BLOOD LOSS IN PATIENTS UNDERGOING CARDIAC SURGERY WITH CARDIOPULMONARY BYPASS**

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**Introduction:** Although the coagulopathy associated with cardiac surgery is generally attributed to multifactorial effects of cardiopulmonary bypass (CPB) on the hemostatic system, qualitative defects in platelet function are most frequently singled out as the primary mechanism underlying excessive hemorrhage after cardiac surgery. Desmopressin (DDAVP) is a vasopressin analogue which improves hemostasis in patients with certain congenital or acquired disorders of platelet function. This study seeks to determine the efficacy of DDAVP in reducing bleeding and transfusion requirements in patients with defects in shear-mediated platelet function.

**Methods:** After IRB approval, 34 informed and consenting patients scheduled for elective cardiac surgery with CPB were enrolled in this investigation. Exclusion criteria included preoperative coumadin, history of symptomatic cerebrovascular disease, uncontrolled hypertension, alcoholism, renal (creatinine >2.0) or hepatic insufficiency, and pre-existing disorders of thrombosis and hemostasis. Blood samples were collected from a radial arterial line at 3 designated periods: (1) 5 min. after placement of the arterial line (pre-op) (2) 10 minutes after termination of CPB (post-CPB) (3) 2 hours after CPB (post-op). Blood samples were assessed at these time points using the PFA-100® (Dade Behring) which tests shear mediated platelet aggregation in a test cartridge containing ADP. Patients exhibiting shear-mediated platelet dysfunction [(PFA-100® ADP) closing time >120 sec] or an increase in baseline value >20% were randomized to receive either placebo or DDAVP (0.3 ug/kg over 30 minutes) immediately following protamine administration. Chest tube drainage and blood product use were recorded for the first 24 hours. Patients with a HCT of >30 g/dL were not transfused perioperatively. Patients with a HCT of 20-30 g/dL were transfused at the discretion of the surgeon and anesthesiologist who were both blinded to study drug administration.

**Results:** Of 34 patients assessed, 25 exhibited shear-mediated platelet dysfunction in the perioperative setting; of this patient group, 8 were selected to receive DDAVP and 17 received placebo. Normal platelet subjects showed a decrease of 11.39% (SD 22.39) from immediately post-CPB to post-op closing times, compared with a decrease of 13.10% (SD 17.72) and 34.27% (SD 17.98) in placebo and DDAVP-receiving abnormal patient groups,

respectively (Table 1). Tukey's studentized range (HSD) comparison of percentage change for both patient groups with platelet dysfunction from post-CPB to post-op shows that these values are statistically different. Mean chest tube drainage (Table 2) in platelet-dysfunction patients receiving placebo was 1089.24 mL (SD 1006.11) over a 24 hour period; mean drainage in patients receiving DDAVP was 873.75 (SD 350.02), though comparison of the two groups is not yet statistically significant at the present sample size (see below). Mean packed RBC usage in our placebo group was 508.82 mL (SD 598.24), and DDAVP patients required a mean of 156.25 mL (SD 289.63); blood usage between groups trends towards statistical significance (p = .1302).

Table 1.	% CT change from post-CPB to post-op
Normal group (9)	-11.39 (22.39)
Plt dysfxn - placebo (17)	-13.1 (17.72)
Plt dysfxn - DDAVP (8)	-34.27 (17.98)

Table 2.	Mean chest tube drainage (mL)	Mean pRBC (mL)
Normal group (9)	Not evaluated	Not evaluated
Plt dysfxn - placebo (17)	1089.24 (1006.11)	508.82 (598.24)
Plt dysfxn - DDAVP (8)	873.75 (350.02)	156.25 (289.63)

**Discussion:** The significant decrease in post-CPB platelet clotting times of DDAVP patients in comparison to that of other patient groups suggests that DDAVP is effective at reducing the negative effects of shear-mediated platelet function. Although a statistically significant difference in chest tube drainage and pRBC usage has yet to be achieved, our promising early data suggests that a larger sample will provide clinical relevance to our laboratory findings. For the chest tube drainage comparison, a sample size of 97 in each group will have 80% power to detect a difference in means of 216.00 (1089 compared to 873) assuming that the common standard deviation is 600, using a two group t-test with a 0.050 one-sided significance level. For the RBC comparison, a sample size of 21 in each group will have 80% power to detect a difference in means of 352 (508.000 compared to 156) assuming that the common standard deviation is 450, using a two group t-test with a 0.050 one-sided significance level. It is our hope that a larger sample size will confirm our early trend toward a significant reduction in chest tube drainage and blood product usage in patients with a defect in shear-mediated platelet dysfunction who receive desmopressin.