

The hemodynamic behavior of arterial anastomosis using fibrin sealant: experimental study in swine.

Authors: Rocha EA, de Souza C

Publication Date: 2008

Abstract:

The wide use of biological sealants as a reinforcement for arterial sutures and the small experimental base in literature motivated this study. Our aim was to evaluate the flow, tear pressure, and the need of reinforcement stitches in sutured arteries after a cross-section. This research project complied with the Helsinki convention. The Tissucol (Baxter) fibrin sealant was used in all experiments. The femoral and carotid arteries of 17 swine from the same breed (weighing from 15 to 20 kg) were cross-sectioned after heparinization and subjected to anastomoses using a single continuous plane of 7-0 prolene. We worked with 68 artery samples, 34 in the treatment group and 34 in the control group. For each animal, one carotid and one femoral artery randomly received fibrin sealant with the contralateral side being used as a control. The need and the number of reinforcement stitches were recorded. Ten minutes after protamine infusion, the animals were sacrificed and the arteries were catheterized respecting 1 cm proximal and distal. The arteries were measured and placed on a flow meter to evaluate the flow rate of 10 mL of 0.9% NaCl in a 50 cm high column. The arteries were then subjected to air infusion at increasingly higher pressures (stepwise increases of 25 mm Hg), the grafts were dipped in 0.9% NaCl solution, the first air leakage was observed, and the tear pressure recorded. Data was analyzed with EpiInfo 6 data manager. The external diameters and thickness of the arteries were similar in both the treatment and control group. There was no significant difference between the groups regarding the tear pressure ($P = 0.329$), flow rate ($P = 0.943$), and the number of samples with a tear pressure above 200 mm Hg. However, the sealant reduced the number of reinforcement stitches necessary ($P = 0.029$). We

conclude that fibrin sealant reduces the need of additional stitches; however, it does not change the tear pressure nor significantly reduces the flow.