Enhancement of CO<inf>2</inf> laser microvascular anatomoses by fibrin glue.

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Abstract:

Laser-assissted microvascular anastomoses (LAMA) are characterized by low early bursting strength and high aneurysm rates. The effects of fibrin glue on bursting strength (BS), patency, and aneurysm rate of LAMAs were compared to standard suture and laser anastomosis. Rat femoral arteries (0.9-1.1 mm) were anastomosed end-to-end by three methods: (1) conventionally with 8 to 10 interrupted 10-O nylon sutures; (2) 3 stay sutures and CO<inf>2</inf> laser (spot size, 0.275 mm; pulse, 0.2 sec, 80 mW); and (3) cryoprecipitated fibrinogen, 35 mg/cc, crystallized thrombin, CaCl, 20 mg/cc, aprotinin (2000 kIU/cc) applied to weld site in conjunction with laser weld as in (2) above. Patency, aneurysms, and histology were evaluated at 3 weeks, and BS (mm Hg) was measured in six additional vessels at 1 and 24 hr. There was no statistically significant difference in patency rates. Both the suture and fibrin glue groups had significantly higher 1 and 24 hr bursting strengths ($P < 0.05$) and significantly lower aneurysm rates ($P < 0.001$) than standard laser. There was no significant difference in bursting strength between suture and fibrin glue groups. Histology in the fibrin glue group showed medial damage similar to the LAMA and calcification of aneurysmal vessels. Fibrin glue enhancement of LAMAs produces equal patency, higher early bursting strengths, and fewer aneurysms at 3 weeks compared to conventional laser.