

Use of fibrin glue to protect tissue during CO2 laser surgery.

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Abstract:

OBJECTIVE: Accidental injury of tissues during CO2 laser irradiation can lead to serious morbidity, especially during ear, nose, and throat, neurosurgical, and plastic-reconstructive procedures. This experimental study describes a new technique in which vital structures are coated with a thin layer of fibrin glue to protect them from accidental CO2 laser irradiation.

STUDY DESIGN/MATERIALS AND METHODS: The femoral neurovascular bundles (femoral artery, vein, and nerve) of 12 rats were exposed. On one side the bundle was coated with fibrin glue, which is a biological two-component glue consisting of fibrinogen solution and thrombin. Upon application, an elastic mass on the neurovascular bundle was formed. The contralateral neurovascular bundle was left uncoated. Subsequently both bundles were subjected to CO2 laser irradiation at different powers (5, 7, and 9 W), with an irradiation time of 0.1 seconds. Light microscopy was performed at 30 minutes and 2 days after surgery.

RESULTS: No macroscopic visible hemorrhages occurred during laser irradiation in the glue-coated bundle. Light microscopic evaluation revealed an undamaged neurovascular bundle without any signs of thermal damage. In the uncoated bundles intraoperative hemorrhages resulting from laser energy occurred in all specimens. Furthermore, severe thermal damage was present in arteries, veins, and nerves.

CONCLUSIONS: Intraoperative coating with fibrin glue can serve as a shield to protect vital

structures such as arteries, veins, and nerves from accidental CO2 laser exposure.