Suture-free Tissue Sealing: Fibrin Glue

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The introduction of surgical laparoscopic techniques into gynecology has made it possible to carry out the majority of reconstructive interventions within the tubo-ovarian functional unit and to remove adhesions or endometrial tissue in the vicinity of the internal genitals without having to perform an abdominal section. In the process, the surgical techniques have been optimized by the utilization of lasers, in particular the CO₂ laser, as well as by the continued use of the Nd: YAG contact laser.

A further step towards perfecting surgical laparoscopic techniques has been taken with the use of fibrin glue, which is employed for the following purposes:

1. For the sealing of the edges and surfaces of wounds
2. To attain a local hemostatic effect
3. As an adhesion prophylaxis by covering peritoneal damage

The basic advantages of fibrin glue are its exceptional tissue tolerance, its absorbability, its high elasticity, and its adhesive capacity in a wet environment.

The Technique of Fibrin Sealing

The technique of fibrin sealing is based on the physiologic mechanism of the last phase of blood coagulation. The fibrin glue which we used – Dissucol Duo S – is a two-component glue which is basically made up of highly concentrated human fibrinogen and a highly concentrated thrombin solution. The solidification begins within seconds after application, and fixation is largely completed within a few minutes.

During punctiform application and application on small surfaces, for example, after end-to-end tubal anastomosis, both components are applied with a syringe. The adhesive components can, furthermore, be applied using multichanneled catheters. These catheters are inserted through a 3-mm trocar via a second or third auxiliary puncture near the pubic hair. When larger wound areas are involved the components are sprayed onto the damaged area with the help of CO₂ gas. During laparoscopic application using an additional pumping system one must be especially careful to ensure

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that an intra-abdominal pressure of 12 mm Hg is not exceeded and that CO₂ gas is never applied in a hollow organ, as this could lead to dangerous complications.

The catheter tip should be 2–3 cm from the wound surface. A few seconds after application one can see the fibrin glue turn white and observe its solidification. Too rapid absorption of the fibrin glue is prevented by the addition of an antifibrinolytic agent such as aprotinin.

**Clinical Utilization**

There are two basic fields of application for fibrin glue within the framework of surgical laparoscopy:

- For the adhesion of tissue
- For hemostasis or sealing

The following set of indications result:

1. **Tissue closure**
   - End-to-end anastomosis after laparoscopic refertilization
   - Fimbrial eversion during salpingostomy
   - Salpingotomy due to tubal pregnancies
   - The shaping of ovaries after extirpation of cysts

2. **Sealing and hemostasis**
   - Covering of peritoneal damage
     a) after adhesiolysis
     b) after laser treatment of endometriosis
   - Bleeding peritoneal injuries
   - Artificial perforation of the uterus

**Ad 1: Tissue Closure**

The time interval until absorption of the fibrin glue and completion of the healing procedure is largely dependent upon the thickness of the applied glue; hence, it ought to be applied thinly when wound edges are to be united.

**Laser Laparoscopic Salpingostomy with Fimbrial Eversion**

Salpingostomy of a sactosalpinx can be performed with a laparoscopically applied CO₂ laser beam. Under chromoperturbation pressure the visible or assumed cicatricial lines in the vicinity of the navel of the old scar are opened bloodlessly using the laser; negligible tissue damage is caused. The small fimbrial “lobes” cut in this manner can be everted by application of fibrin glue, thus avoiding a time-consuming and complex eversion suture. Single drops of fibrin glue are applied to the rear of the reconstructed fimbrial “lobes” which are apposed in an everted position until sealed with atraumatic fixation forceps (Fig. 1). If the tubal wall is...