

A new biological mesh for cut surface hemostasis in liver transplantation using technical variants

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Abstract: The use of a novel biological mesh for surface hemostasis is described in pediatric liver transplantation with alternative techniques. The putative benefits of TachoSil® are discussed, particularly in the context of children with impaired coagulation, including fulminant hepatic failure.

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Pediatric liver transplantation frequently requires the use of technical variants, including reduced-size or split liver grafts from deceased donors, as well as of left hepatic segments from living donors (1). In such instances, hemorrhage from liver cut surfaces may be encountered, particularly with grafts from deceased donor, where a precise hemostasis could not be performed during the *ex vivo* procedure. The use of hemostatic stitches, vascular clips, and argon beam coagulator might not be sufficient to control surface bleeding, with accordingly the need for blood transfusion and sometimes surgical re-exploration.

We report the use of a novel resorbable, biological mesh as adjuvant hemostatic treatment, which might provide a particular benefit in pediatric liver transplantation recipients. TachoSil® (Nycomed, Brussels, Belgium) is a sponge consisting of an equine collagen fleece patch carrying human fibrinogen (5.5 mg/cm²) and human thrombin (2.0 UI/cm²). Contained in an aseptic packing, the wet sponge is tailored with scissors to fit the appropriate size of the cut surface with approximately 1 cm overflow (Fig. 1a). It is then briefly humidified with saline at body temperature. The liver cut surface should be carefully cleaned and dried, to avoid presence

of blood clots which may lead to suboptimal adhesion of the device to the surface to be treated. The mesh is then applied with a five-min mild compression using an additional wet sponge, to allow local activation of the coagulation cascade (Fig. 1b). The sponge is then removed and the mesh left in place. No attempt should be performed to remove it.

In a preliminary experience, TachoSil® has been used in four cases of pediatric liver transplantation for biliary atresia, in February–March 2007. Two children received maternal left segmental liver graft, whereas the other two patients received a reduced-size cadaver left lobe. The median age at the transplantation was of 16 months (range: 9–22). In each case, Tachosil® was applied on the liver cut surface before abdominal closure as a final hemostatic measure and left in place. It provided almost perfect hemostasis in every instance. Only one unit of red blood cells was transfused in these children. No patient required surgical re-operation for hemorrhage. No subsequent infectious or other complication could be related to the use of the mesh.

The quality of hemostasis in liver transplantation is multifactorial, depending on INR and platelet count values before transplant, early

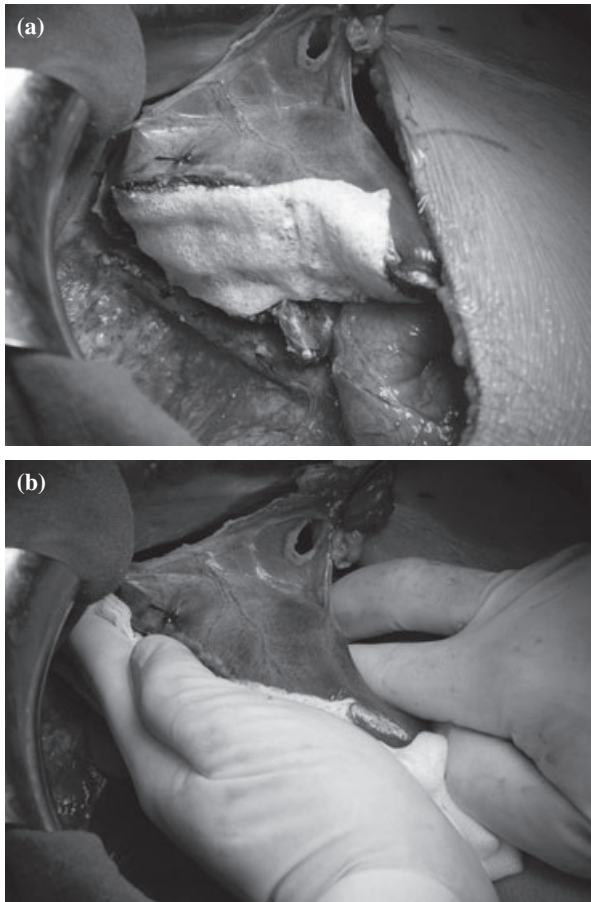


Fig. 1. (a) Application of resorbable, human fibrinogen, and thrombin-carrying collagen mesh for cut surface hemostasis in pediatric liver transplantation. (b) A mild, five-min compression is carried out to optimize adherence to liver cut surface and activation of the coagulation cascade.

graft function, as well as surgical parameters including the need to use alternative techniques. When compared with classical surface hemostatic agents, TachoSil® provides an efficient, physiological alternative for controlling surface oozing, a strategy particularly sound in children with

impaired coagulation because of liver insufficiency (2). We suggest herein that the use of TachoSil® may contribute to reduce the incidence of re-operation for secondary hemorrhage, an occurrence which was encountered in 5% of our pediatric liver transplantation series with technical variants despite the use of conventional hemostatic means (R. Reding, unpublished results). Some authors suggested that it may also play a role in the reduction of post-surgical fluid production after elective liver resections (3, 4). At our center, considering this encouraging experience in liver transplantation, TachoSil® has also been successfully used for cut surface hemostasis after partial hepatectomy and partial splenectomy in children (5).

In conclusion, TachoSil® represents a useful tool in the surgical armamentarium for cut surface hemostasis, provided its efficiency and adverse events are fully explored within a larger, prospective evaluation in this setting. Particularly, the incidence of secondary adhesions related to TachoSil® as well as its cost impact will require further analysis.

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