

Note on Hemostatic Devices in Liver Surgery: Reply

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We thank Dr. Di Benedetto and colleagues for their comments as they raise the important issue of hemostatic agents (in particular hemostatic matrices) in the context of liver surgery.

The efficacy of these devices, as an adjuvant to conventional methods of hemostasis for elective control of mild intraoperative bleeding has been demonstrated by randomized controlled trials in various settings, including cardiac and vascular surgery [1, 2]. Despite multiple trials, however, there is no evidence that any of these agents has a meaningful clinical impact in the context of elective liver surgery. A new study has recently been launched (ESSCALIVER study).

There is some convincing evidence, in particular from military trauma patients, that some hemostatic agents are effective at controlling various sources of active bleeding [3]. There are also interesting reports in other clinical settings such as presacral venous bleeding during rectal surgery [4]. Again, however, there is no published experience in liver trauma patients although experimental models suggest their efficacy [5].

These differences may be explained by a problem specific to liver surgery. Hemostatic agents aim to reproduce the last phase of the coagulation cascade by providing a combination of fibrinogen and thrombin, which interact to produce a fibrin clot that will adhere to the source of bleeding. To be effective, they must be applied directly on the source of bleeding and on normal tissue. During hepatectomy,

however, the liver transection surface has frequently undergone extensive coagulation before these agents are applied. The burned tissue tends to hide the precise source of bleeding and to prevent adhesion of the artificial fibrin clot. This may account for their relative ineffectiveness during liver surgery and the fact they did not work in our patients. In addition, hemostatic agents have proven most effective when used in combination with compression.

We therefore do agree with Dr. Di Benedetto that some of these devices are presumably effective, but this technical point should be taken into account when using them.

Conflict of interest The authors declare no conflict of interest.

References

1. Nasso G, Piancone F, Bonifazi R et al (2009) Prospective, randomized clinical trial of the FloSeal matrix sealant in cardiac surgery. *Ann Thorac Surg* 88:1520–1526
2. Weaver FA, Hood DB, Zatina M et al (2002) Gelatin–thrombin-based hemostatic sealant for intraoperative bleeding in vascular surgery. *Ann Vasc Surg* 16:286–293
3. Cox ED, Schreiber MA, McManus J et al (2009) New hemostatic agents in the combat setting. *Transfusion* 49:248S–255S
4. Germanos S, Bolanis I, Saedon M et al (2010) Control of presacral venous bleeding during rectal surgery. *Am J Surg* 200:e33–e35
5. Leixnering M, Reichetseder J, Schultz A et al (2008) Gelatin thrombin granules for hemostasis in a severe traumatic liver and spleen rupture model in swine. *J Trauma* 64:456–461

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