

Reply to: Ethylene Vinyl Alcohol Copolymer as First Hemostatic Liquid Embolic Agent for Non-variceal Upper Gastrointestinal Bleeding Patients: Pros and Cons

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Dear Editor,

It was a great pleasure to read in CVIR the comment of Loffroy et al. [1] on the previously published article from our group on the use of Onyx for the treatment non-variceal upper gastrointestinal bleeding [2]. Firstly, we would like to thank the authors of the meticulous literature overview on the topic and to mention that we highly appreciate their commentary as recognized experts on the area.

We believe that the whole IR and Neuro-IR community is aware of the physical properties of Onyx as an embolic agent since its introduction in the 1990s; therefore, we did not consider necessary describing that in our manuscript [3]. We take on board some of the constructive criticism on the use of the mentioned liquid embolic, and we would like to reply on the raised issues. Firstly, we think that we are all aware that the use of DMSO can lead to severe vascular spasm when used in large quantities and of course we agree that the injection rate should be slow. In our practice, we tend to aspirate approximately 0.5 ml with a dedicated syringe, according to the dead space offered by the microcatheter used, and inject with a rate of approximately 0.5 ml/min and never experienced any problems. We

believe that the 0.2 ml that the authors suggest is applied to microcatheters with very limited dead space. Secondly, the whole injection process lasts between 2 to 5 min and we struggle to define this as “time-consuming,” given that the patients have been intermittently bleeding for days in some cases. We are pleased to hear that the authors of the letter would prefer to use glue as a quicker solution but we believe for the majority of IRs this is considered as less controlled than Onyx. On that note, we need to mention that reflux may more likely occur with use of glue than with the use of Onyx at least in our opinion. We also need to agree that DMSO is indeed volatile and is excreted via respiration and sweat and that the ward has to be advised about this effect, but this is a standard process done by our nurses during the handover. This effect clearly will not influence our clinical decision in choosing an embolic agent. We also have to agree with the last point raised. It is not only DMSO injection but also Onyx injection may lead to minor reactions that follow its infusion: The most commonly reported side effect is a burning sensation as a result of an exothermic reaction that is generated from the contact between Onyx and blood, especially when it is injected rapidly; this is a minor issue, but it should not be underestimated because is an indication of temporary interruption of the embolization procedure. In our series, even due to the critical clinical condition of the patients, deep sedation or general anesthesia was performed in all cases.

Furthermore, we need to mention that our paper is enhancing the use of liquid embolics for the use of upper gastrointestinal bleeding. There is also another disadvantage of Onyx that the authors of the letter did not mention but we believe is worth mentioning at this stage and this is the required “activation time” of Onyx. It is important to

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emphasize that when embolization is decided Onyx has to be prepared from the moment the patient arrives in the department, so very well ahead of the time of embolization. To overcome this problem, novel liquid embolics with similar properties of Onyx but without this necessary time of preparation have been developed but still used in limited series of patients. The most diffusely used is PHIL or “Precipitating Hydrophobic Injectable Liquid” (Microvention Inc. Tustin, CA, USA) that is offering promising results in in vitro and in vivo studies [4–6].

Until we acquire enough experience with this or another novel liquid embolic, we believe that Onyx is the best option and we, the IR community, may currently offer for those patients particularly if we are knowledgeable of its advantages and disadvantages.

Compliance with Ethical Standards

Conflict of interest The authors declare that there is no conflict of interest.

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