LET'S GET THINGS CLEAR:
CELOPHANE AND AMEROID CONSTRUCTORS EXPOSED
Geraldine B Hunt BVSc, MVetClinStud, PhD, FACVSc
University of California, Davis, California

Key Points

• Just because it is called “Cello” does not mean that it is cellophane.
• Shunt attenuation using ameroid constrictors cannot be adequately evaluated with CT.
• The in vitro behavior of different slow occlusion devices is yet to be determined.

Cellophane bands and ameroid constrictors have been used extensively for slow attenuation of congenital portosystemic shunts in dogs.1,2 Despite this fact, and the existence of research studies following placement around systemic and visceral blood vessels3,4, there is still scant information about the exact behavior of these products when placed around a portosystemic shunt. Computed tomography is useful for preoperative evaluation of shunts, and studies are underway to evaluate postoperative outcomes. It is possible to evaluate shunt closure following cellophane banding using CT, however, the ameroid constrictors’ metal sheath causes major artifact, making it virtually impossible to assess what is happening to the shunt and when. It is also becoming evident that “cellophane” from different sources is not the same material and may not have the same effect in vivo. Cellophane has become a common-usage word to describe clear film manufactured from anything from cellulose to polypropylene and polyethylene. Published and anecdotal reports suggest that surgeons in different centers may be experiencing different results following “cellophane” placement and this is probably due at least in part to the behavior of different materials in vivo.4,7 It is also not clear whether the inflammatory response to implantation of these materials is a result of the material itself, or other chemicals used in the production process. In order to answer some of the questions emerging about these commonly-used slow attenuation techniques, we undertook two studies. The first was to evaluate the postoperative behavior of a new type of ameroid constrictor that does not create CT artifact, and the second was to evaluate “cellophane” from different sources to determine whether it was the same product, and whether its handling characteristics were affected by wetting with 0.9% saline, and the sterilization method used. We were particularly interested in the likelihood of cellophane tearing during placement, and whether it maintained enough strength to withstand the tensile forces that might be generated across the shunt vessel wall.

Preliminary results show that clear film differs in its microscopic, handling and mechanical characteristics even when packaged by the same company under the same label. Many products containing “Cello” as part of their trade name are actually synthetic polymers. True cellulose-derived film is anisotrophic and its strength varies by 50% depending on whether the strip is cut parallel or perpendicular to the fiber orientation. Wetting in 0.9% saline reduces the maximum strength by 52%. Plasma sterilization with hydrogen peroxide reduces tensile strength to 75% of normal, and wetting with 0.9% further reduces the strength to 15% of normal. Autoclaving imparts some protection against the combined effects of sterilization and wetting, making cellophane stiffer and stronger, presumably by reorganization of the cellulose molecules.

Preliminary results following CT of the plastic ameroid constrictors indicate that they are capable of causing complete shunt attenuation. The internal diameter of the ameroid ring often changed by only 1 mm, supporting previous findings in vitro and in research animals that shunt occlusion actually resulted from perivascular fibrosis, thrombosis or both.3,7
References: