

Securing the aorta for organ perfusion in donation after cardiac death donors; novel techniques and a cautionary tale

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In response to the novel technique to secure the aorta in donation after cardiac death, described by Mateo *et al.* [1] in December 2008, we write with a note of caution.

We read with great interest the method of employing commercially available cable ties to secure the aorta, for organ perfusion in DCD donors. The technique aims to create a simple, rapid technique to secure an aortic cannula and thereby minimize the warm ischaemic time. After mobilizing and isolating the aorta in standard fashion, the cable tie is passed around a section of the aorta, proximal to the planned site of arteriotomy. Once the aortotomy is performed and the cannula has been placed in the desired position, the cable tie is tightened to secure the cannula in place.

The benefits of this technique, described by Mateo, seemed clear. It is rapid, secure and simple. It has the added benefit of secure control of atherosclerotic vessels – where nylon ties have been noted to fracture vessel walls.

We decided to undertake a trial of this technique in our current research model assessing the benefits of extra-corporeal membrane oxygenation (ECMO), over combined intra-vascular and -peritoneal cooling in a porcine model of donation-after-cardiac death. In both comparison groups we cannulated the aorta and vena cava at an initial laparotomy. The aortic cannula was employed to administer the ECMO or arterial cooling and flush.

In an alteration to the technique employed by Mateo, we used a commercially available cable tie gun (Fig. 1) to secure the tie and tighten it down. Once the tie had been positioned around the aorta, the tip of the tie was passed through the ratcheted head and the tie loosely tightened down around the vessel. After performing the aortotomy and positioning the cannula, the gun was used to rapidly and securely tighten the cable-tie around the vessel and cannula (Fig. 2). The loose end of the tie can be cut when desired by firing an additional trigger on the gun.

The major drawback of this technique, as we later discovered, is that use of the cable tie gun leads to a loss in tactile feedback. The cable tie can therefore be easily over tightened and constrict the cannula within the aorta. On commencing our ECMO bypass circuit, we immedi-



Figure 1 Commercially available cable-tie gun.

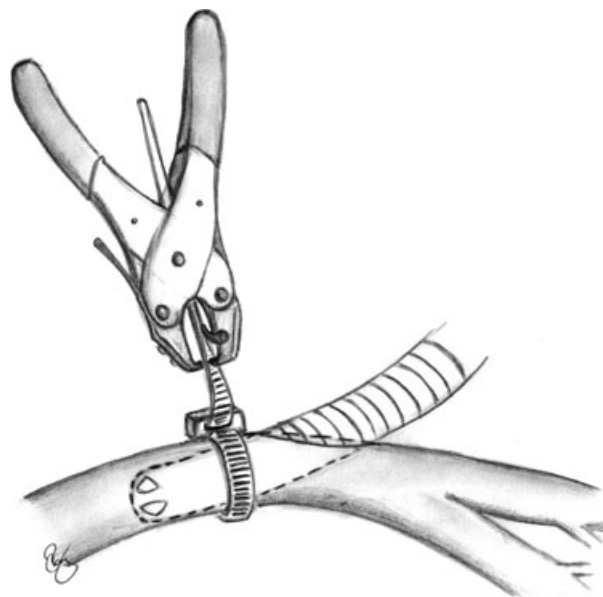


Figure 2 Application of cable-tie to secure the aortic cannula, using a cable-tie gun.



Figure 3 Damaged and partially occluded aortic cannula.

ately noted high pressures in the arterial limb of the circuit and throughout the period of bypass were unable to achieve the desired flow rates, commensurate with tissue perfusion. This consequence was obvious at retrieval when the organs appeared patchy and ill-perfused.

Of particular note, at retrieval there was no external evidence that the cannula had been constricted or

indented by the cable tie, yet on removal from the aorta the cannula was almost completely occluded (Fig. 3). The consequences of this occlusion would be disastrous whether the cannula was used for ECMO, or cold organ perfusion. As such it is our recommendation that commercially available cable tie installation guns should not be used.

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Reference

1. Mateo R, Stapfer M, Almeda J, *et al.* Alternate method to secure the aorta for organ perfusion in donation after cardiac death donors. *Transpl Int* 2008; **21**: 1190.