

## **Abstract:**

**Background:** The US military has prioritized battlefield hemorrhage control. Researchers credit tourniquet use, and a novel trauma care training program, with saving 1000-2000 lives in Iraq and Afghanistan. The Stop the Bleed campaign translates these lessons learned to the public. This is the first analysis of the potential impact of this newfound knowledge about tourniquet use for extremity fatal vascular access hemorrhage in a civilian population. Fatal vascular access hemorrhage includes bleeding from arteriovenous fistulas and grafts used for hemodialysis and central venous catheters.

**Methods:** This is a retrospective study of decedent records. We selected Maryland death records from 2002-2017 using the following search terms: “graft,” “shunt,” “fistula,” “dialysis,” and “central venous catheter.” The records were analyzed for potential survivability with a checklist of military criteria modified for a civilian population. Suicides were excluded. Two reviewers independently classified the deaths as either potentially survivable or non-survivable, and a third reviewer broke ties.

**Results:** There were 111 deaths included in the final analysis. Ninety-two of the 111 decedents had potentially survivable extremity fatal vascular access hemorrhage. The remaining 19 records were excluded, because they did not have extremity hemorrhage. Zero decedents had hemorrhage deemed to be non-survivable with prompt tourniquet application.

**Conclusion:** This study identified 92 Maryland extremity fatal vascular access hemorrhage decedents who potentially could have survived with tourniquet use—an average of 6 per year. These results suggest the need for further epidemiology investigation, as well as exploration of the risks and benefits of teaching and equipping vascular access patients and their caregivers to use tourniquets for life-threatening bleeding.

## **Reference:**

Goolsby C, Rojas LE, Andersen M, Charlton N, Tilley L, Pasley J, Rasmussen TE, Levy MJ. Potentially survivable fatal vascular access hemorrhage with tourniquet use: A post-mortem analysis. *J Am Coll Emerg Physicians Open*. 2020 Aug 17;1(6):1224-1229. doi: 10.1002/emp2.12201. PMID: 33392527; PMCID: PMC7771778.

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