# Current blood transfusion practice in trauma centers feasible but wastes scarce plasma

July 15 2013

Researchers at St. Michael's Hospital are asking questions about the practice of automatically transfusing large amounts of blood and blood products to trauma patients with major bleeding.

Trauma patients were resuscitated primarily with blood until the second part of the 20th century when the practice was modified so that blood transfusions were given only after lab tests suggested they were needed. The idea of resuscitating primarily with blood was revived after U.S. military physicians in Iraq and Afghanistan reported in 2007 that this practice was associated with dramatic drops in mortality.

Hemorrhaging, coupled with poor blood clotting, remains one of the leading causes of preventable death after trauma, and blood-based resuscitation was quickly adopted in both military and civilian trauma centres Many researchers, however, questioned this practice and raised concerns about the risks of transfusing patients who may not need blood.

Researchers led by Dr. Sandro Rizoli, the new trauma director of St. Michael's, published today in the *Canadian Medical Association Journal* the results of the first prospective study comparing blood-based resuscitation vs. conventional resuscitation and found higher rates of complications in the former group with no statistical difference in mortality rates.

Trauma patients, by the very nature of their injuries, bleed a lot and often receive large amounts of blood. Physicians have known since 2003

that one-quarter of trauma patients do not clot well, which worsens their blood loss and increases their already high risk of dying at least three times. Until then, the conventional practice to resuscitate trauma patients was to give them saline or water intravenously and give blood transfusions only when a blood test diagnosed a coagulation defect. U.S. military physicians postulated in 2007 that it made more sense to give blood preemptively to everyone rather than wait to see whether the patient was the one in four with poor clotting and was at risk of dying while waiting for the test results. Since blood banks no longer store whole blood, patients are given equal parts of red blood cells, plasma and platelets, a formula known as 1:1:1.

All research studies so far looking at the effectiveness of 1:1:1 have been retrospective, where researchers go back and look at patient records to see what happened. They also have other limitations known as statistical bias where it is not clear whether the intervention (giving plasma) was making patients live longer, or whether they were getting the intervention because they were already living long enough for the plasma to be thawed (plasma takes 20 minutes to be ready for use). Once thawed, plasma must be used within 24 hours or discarded at a cost of about $500 a unit, so hospitals are reluctant to keep large amounts of thawed plasma on hand.

Dr. Rizoli led a randomized control trial at Sunnybrook Health Sciences Centre in Toronto comparing 1:1:1 and previous standards of care (using saline and-or water while waiting for lab tests). He said that while the study was small and showed no statistical difference between the two practices, it showed more wastage of blood and more respiratory complications on the 1:1:1 patients, proving that researchers could – and should – do more clinical trials in this area. He is already part of a larger study taking place in 12 centres.

Dr. Rizoli noted that even a small study did not duplicate the significant

drop in mortality rates found in other retrospective studies. This is important because of the high cost of blood products and the potential waste if they're not used. For example, Type AB is the universal donor for blood plasma, but it's also the rarest blood type, found in only four per cent of people. Hospitals generally thaw four units of plasma at a time, and if they're not used, they have to be discarded.

There is also strong scientific evidence that patients who avoid transfusions – or have fewer of them – have fewer complications, faster recoveries and shorter hospital stays.

St. Michael's has long been a leader in blood research and blood conservation. In 1998, St. Michael's became one of the first hospitals in Canada to implement a blood conservation program. The Ontario Transfusion Coordinators (ONTraC) program administered through St. Michael's sets the standard in the province for patient blood management. St. Michael's has also created a Centre of Excellence for Patient Blood Management, the first of its kind in Canada and a global leader in patient care and in training and educating health care professionals.

Dr. Rizoli was recently appointed for a five-year term as the St. Michael's Hospital-University of Toronto Endowed Chair in Trauma Research. This research was funded by the Canadian Forces Health Services, Defense Research and Development Canada, the National Blood Foundation and the American Association of Blood Banks.

**More information:** www.cmaj.ca/lookup/doi/10.1503/cmaj.121986

Provided by Canadian Medical Association Journal