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"Reverse CPR" Performed on Back Could Better Restore Blood Flow

A pilot study of the first proposed major change in decades to cardiopulmonary resuscitation (CPR) suggests that performing the maneuver while patients are on their stomachs offers far better restoration of blood flow and blood pressure than the standard practice of keeping patients on their backs. The feasibility study of so-called reverse CPR, conducted by researchers at Johns Hopkins and Columbia universities, appears in the June issue of the journal *Resuscitation*.

CPR in the prone position was tested at Columbia Presbyterian Medical Center on six critically ill patients already in intensive care units whose hearts had stopped, and who had failed to respond to standard CPR for at least a half-hour.

Toward the end of this period, an additional 15 minutes of standard CPR was performed with blood pressure monitoring. Then, turning the patients over and adding reverse CPR for 15 minutes, doctors were able to increase average systolic blood pressure (the upper number in blood pressure measures) from 48 mmHg to 72 mmHg. The new approach also improved average arterial blood flow pressure from 32 mmHg to 46 mmHg. Although none of the patients survived, the researchers say the results demonstrate a compelling need for further investigation of reverse CPR's likely benefits to many patients.

"This is not a mandate to change current CPR practice, but it does raise interesting possibilities for continuing research," says Myron L. Weisfeldt, M.D., a cardiologist, co-author of the study and chairman of the Department of Medicine at Johns Hopkins, who participated in the research while chairman of medicine at Columbia. "It's widely recognized that while CPR is important in saving lives from cardiac arrest, the amount of blood flow provided is very low."

Although mouth-to-mouth ventilation is a key feature of bystander CPR - that performed outside the hospital setting - it is frequently not performed at all or done poorly. There is a possibility that ventilation may be improved in the prone position, but this has not yet been studied, Weisfeldt says.

He notes that the study adds credence to already published scattered case reports of the value to patients resuscitated with reverse CPR when their hearts stopped during surgery.

While patients were given reverse CPR in the study, a 10-pound sandbag was placed underneath their lower chest to provide a counter-force to compressions being performed on their backs. Patients' heads also were turned to the side while a respiratory therapist delivered oxygen through a bag. During CPR performed outside a medical facility, the same counter-force effect could be obtained using a book, a rock or a piece of folded-up clothing, Weisfeldt says.

Working from the back, Weisfeldt says, offers two advantages. First, it provides a larger

area for manual compressions, while the sandbag buttressing the chest and abdomen helps push blood through the vessels. Second, it allows for more forceful compressions than the more fragile, easily damaged chest and rib cage area.

Weisfeldt points out that several aspects of care are more difficult when patients are prone, including brain activity tests, physical exams, breathing tube insertions and placement of central lines in blood vessels. "The standard monitoring and treatment tools of the ICU present significant barriers to reverse CPR right now," he says, "but even so, each patient in our study was turned over by only a few people in less than a minute. We believe that this approach is more likely to prove valuable in the community setting before arrival of the EMS system than in the ICU environment where the study was performed."

Co-authors of the study were Sean P. Mazer, Diane Bai, Carol Cardinale, Cecilia Ma, Robert R. Sciacca, David Chong and LeRoy E. Rabbani of Columbia, and Rohit Arora of the University of Medicine and Dentistry of New Jersey (UMDNJ), Newark.

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Mazer, Sean P., et al, "Reverse CPR: A Pilot Study of CPR in the Prone Position," Resuscitation, June 2003, Vol. 57, Issue 3, pages 279-285.

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