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## Transplant Patient Outcomes After Trauma Better Than Expected

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In the largest study of its kind, physicians from the Department of Surgery at the University of Maryland School of Medicine and the R Adams Cowley Shock Trauma Center at the University of Maryland Medical Center (UMMC) have determined that outcomes for traumatic injury in patients with organ transplants are not worse than for non-transplanted patients, despite common presumptions among physicians. The findings, published in the June 2013 issue of *The Journal of Trauma and Acute Care Surgery*, also show that transplanted organs are rarely injured in traumatic events.

"Trauma teams should be encouraged that patients with prior organ transplants don't do worse after injury, and that the transplanted organ (also known as a graft) is infrequently injured after trauma; however, our study did show that there may be an increased risk of graft rejection after trauma," says the study's lead author, Joseph R. Scalea, M.D., a surgeon at the University of Maryland Medical Center. "We recommend that patients be assessed by a transplant surgeon as soon as possible, and graft function should be closely followed by a transplant team during hospitalization and after discharge from the trauma center."

The study analyzed patients with prior organ transplants who were admitted to Shock Trauma from 2007-2011. Fifty patients with previous solid-organ transplants were admitted for traumatic injury during the period. The outcomes of these patients were compared with more than 13,000 non-transplanted patients admitted during the same period.

One patient was admitted with a direct injury to a transplanted organ; three others had questionable graft injuries which did not affect organ function.

In the months following trauma, a percentage of the transplant group went on to develop organ rejection. Long-term graft outcomes were followed at different institutions, but data for 41 transplant patients followed at the University of Maryland Medical Center (82 percent of study patients) showed seven patients (17 percent) with acute organ rejection within six months of admission for trauma.

Transplant recipients, whose immune systems are already suppressed to prevent organ rejection, are presumed to be at greater risk of infection from traumatic injury; however, this was not observed in the current study.

Severe trauma activates nearly all components of the immune system, triggering a series of responses that lead to inflammation, which can limit tissue damage and promotes repair and healing. Typical signs of inflammatory response include pain, swelling, heat, redness and/or loss of function. The University of Maryland research team's findings offer insight into the pathophysiology of the inflammatory responses following traumatic injury. Too much inflammation can cause entire organ systems to shut down, whereas not enough inflammation may prohibit a patient from developing the appropriate response to an injury or infection. The study authors posit that immunosuppression in the transplant patients may have led to abnormal inflammatory responses after trauma and may explain why these patients fared better than expected.

White blood cells play a key role in mounting a defense against injury and disease. The researchers used the white blood cell count in patients as an indicator of the inflammatory response: a higher white blood cell count signals a more severe inflammatory response. Transplanted patients had significantly lower white blood cell counts upon admission to Shock Trauma than non-transplant patients, possibly indicating a diminished inflammatory response, according to the researchers.

"One of the possibilities this study raises, but does not prove, is that immunosuppressive medications – intended to prevent graft rejection after transplant – may play a role in reducing trauma-related inflammation," says Dr. Scalea. "The medications used to treat transplant patients work to control rejection by suppressing lymphocyte and cytokine responses. Because these same responses are naturally triggered following trauma, the anti-rejection medications may have also blunted the inflammatory responses typically seen in trauma patients," he adds.

"This study could be critical in helping trauma centers make treatment decisions for previous transplant patients based on how the body's inflammatory responses work immediately following traumatic injury," says the study's senior author, Thomas M. Scalea, M.D., Physician-in-Chief, R Adams Cowley Shock Trauma Center, and the Francis X. Kelly Distinguished Professor of Trauma Surgery at the University of Maryland School of Medicine. "Our priority now is to apply the dual clinical expertise of Shock Trauma and the Division of Transplantation in order to better understand inflammatory responses in all patients – not just those who have received organ transplants."

Few reports have examined trauma outcomes in transplant recipients. The University of Maryland is uniquely positioned to evaluate organ damage from traumatic injury because it is home to leading programs in both trauma and transplantation. Shock Trauma sees more than 8,600 patients annually; UMMC's transplant program performed more than 400 abdominal and thoracic transplants in 2012.

"Trauma and transplantation are two very special reasons why patients come to the University of Maryland," says study co-author Stephen T. Bartlett, M.D., the Peter Angelos Distinguished Professor and Chairman of the Department of Surgery at the University of Maryland School of Medicine, and Surgeon-in-Chief and Senior Vice President at the University of Maryland Medical System. "It makes sense that we should be using our research resources to advance the care of patients who need our expertise in both of these areas. Our transplantation research has led to dramatic improvements in transplant success rates, reducing rejection of donated organs and minimizing the side effects of long-term immunosuppression. Our trauma research is aimed at developing ways to anticipate and cope with the body's normal inflammatory response to trauma."

Dr. Bartlett says the low incidence of injury in transplant patients may be attributable to many factors, such as the selection criteria of organ transplant patients who are committed to self care, including the use of seatbelts and avoidance of the use of drugs and alcohol, which can contribute to traumatic injury.

Particularly rare was the incidence of injury to a kidney transplant, the most frequently transplanted solid organ. Dr. Bartlett suspects that the low-

lying kidney transplant, positioned in the back of the abdomen, protects the kidney in most cases.

“The collaboration between physicians in Shock Trauma and the Division of Transplantation demonstrates the innovative thinking and cross-specialty partnerships in which our physicians engage every day,” says E. Albert Reece, M.D., Ph.D., M.B.A., vice president for medical affairs at the University of Maryland and the John Z. and Akiko K. Bowers Distinguished Professor and Dean of the University of Maryland School of Medicine. “We are fortunate to have two stellar programs that can produce visionary research and likely influence the way highly complex trauma and transplant patients are cared for beyond our own medical institution.”

Source: [University of Maryland Medical Center \(UMMC\)](#).

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