



CLINICAL AND RESEARCH UPDATES FROM *THE UNIVERSITY OF MARYLAND SCHOOL OF MEDICINE*  
AND *THE UNIVERSITY OF MARYLAND MEDICAL CENTER*



## LIVER DIALYSIS MACHINE PRESERVES ORGAN FUNCTION FOR CRITICAL LIVER PATIENTS

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As a large, strapping college football player, Gavin Class radiated good health. But it was the sun's radiation that changed all that when a severe case of heatstroke last summer caused the 20-year-old's liver and other major organs to fail in a sudden turn that took the young man to the brink of death.

Class was fortunate to be transferred to the University of Maryland Medical Center, where a newly acquired liver dialysis machine stabilized him long enough for Class to receive a liver

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- MARS machine, acquired by UMMC last summer, serves as a form of liver dialysis
- Collaboration of partner hospital, CCRU and Liver Center vital to patient's survival
- UMMC performs most liver transplants in Maryland for fourth consecutive year



# LIVER DIALYSIS MACHINE PRESERVES ORGAN FUNCTION FOR CRITICAL LIVER PATIENTS | CONT'D FROM P1

transplant just days later. Known as the MARS (Molecular Adsorbents Recirculation System) machine, the FDA-approved device has been at UMMC for less than a year but already has provided a bridge to liver transplant for a handful of desperately ill patients.

The college athlete's dramatic case epitomizes UMMC's leading status in liver failure treatment, performing the most liver transplants in Maryland for the fourth consecutive year and acquiring state-of-the-art equipment unavailable at most major medical institutions.

"The addition of the liver dialysis machine means we now have every single tool available in modern medicine to help patients with end-stage liver failure," explains Rolf Barth, M.D., director of liver transplantation and hepatobiliary surgery at UMMC. "University of Maryland cares for the largest number of acute liver failure patients in the region. This device complements our expertise in making time-sensitive decisions for patients in need of life-saving liver care."

## WASHING TOXINS AWAY

While patients with kidney failure have benefited for decades from the availability of kidney dialysis equipment, it wasn't until 2005 that those with end-stage liver failure had a similar option in the United States, though sparsely available. The MARS machine essentially "washes" a patient's blood with a solution containing albumin — normally produced by healthy livers — to remove toxins

such as bile acids, ammonia, bilirubin, copper, iron and phenols from the blood.

Several potential causes of liver failure may lead a patient to be eligible for liver dialysis, including those from drug overdose, viral infection, toxic chemical exposure or — like Class — heatstroke, though that situation is rare.

"The liver has a remarkable capacity to recover over time, but for certain patients the damage has gone too far," says Dr. Barth, also an associate professor of surgery at the University of Maryland School of Medicine. "For someone like Gavin, published reports said there was up to a 75% chance of not surviving, even with a transplant, but our team felt we could get him through against the odds."

For all UMMC patients placed on liver dialysis thus far, the therapy is extremely short-term — less than a week — and it cannot fully replace natural liver function, according to Deborah Stein, M.D., M.P.H., chief of trauma and medical director of Neurotrauma Critical Care.


"Liver dialysis can only clear the toxins the liver normally clears," says Dr. Stein, also an associate professor of surgery. "It can't produce essential factors, so it only really buys time until the liver recovers its native function or the patient gets a transplant."

## COLLABORATION CRUCIAL TO RESULTS

The machine proved to be a vital bridge to transplant after Class was stricken with heatstroke on the football field and transferred from University of Maryland St. Joseph Medical Center, a University of Maryland Medical System hospital in Towson. He first was brought to the Critical Care Resuscitation Unit (CCRU), run by Lewis Rubinson, M.D., Ph.D., where he was assessed and stabilized by Dr. Stein and Mayur Narayan, M.D., M.P.H., among others, and hooked up to the MARS machine along with other organ support.

Placed on urgent status for a liver transplant, Class was continually attended to by William Hutson, M.D., professor of medicine, director of hepatology and medical director of liver transplantation, along with other ICU staff members during the wait for a donor liver. After Class' transplant two days later, a microscopic evaluation of his diseased liver showed that 90% of its cells were necrotic.

"It's hard to say what would have happened in Gavin's case if we hadn't intervened with the MARS machine," Dr. Stein



DR. DEBORAH STEIN AND DR. ROLF BARTH surround the MARS machine, which has provided patients a bridge to liver transplant.



“THE LIVER DIALYSIS MACHINE COMPLEMENTS OUR EXPERTISE IN MAKING TIME-SENSITIVE DECISIONS FOR PATIENTS IN NEED OF LIFE-SAVING LIVER CARE.”

- ROLF, BARTH, M.D.

says, adding the device bought extra time to find an organ better matched to his stature. “But clearly he was on a trajectory that everyone feared he wouldn’t be able to survive if we didn’t transplant him in that time frame. The entire team thought this would give him the best shot.”

#### ‘LEADING A ROBUST LIFE’

The road to recovery for Class after transplant was admittedly rocky, requiring several weeks in the ICU and additional medical therapies. But the college student is back to school — though not yet back on the football field — and in many ways his life has returned to normal.

“While Gavin had a complicated course post-op, he’s now leading a pretty full, robust life,” Dr. Barth says. He credits many factors — from the continuum of care provided by the Liver Center, to the establishment of the CCRU in 2013, to the collaboration of a multidisciplinary team — for the successful treatment of critical liver failure patients both before and after the arrival of the liver dialysis machine.

“Every element of what we want this liver center to be able to offer patients was functioning in a way to beat the odds to get Gavin through an event that likely would have ended his life,” he says. “It was a very deliberate and conscious effort by many on our team to have a center to do these things so patients can beat the odds.” +



To reach the University of Maryland Medical Center and the liver team 24/7, please call **1-800-373-4111**.

## ROUNDING OUT CARE AND RESEARCH

### DIABETES AND ENDOCRINOLOGY SERVICES HAVE A NEW HOME

In late March, the University of Maryland Center for Diabetes and Endocrinology opened its doors to its new regional practice at the UMMC Midtown Campus (the former Maryland General), where it will continue to serve patients from all across the state.

The Center merged with the existing UMMC Midtown Campus services to provide care for patients from infancy through adulthood in one location. The Center continues to offer comprehensive diabetes care, including access to eye, foot, vascular, kidney and other specialists on site. The physicians are also experts in diagnosing and treating complex endocrine disorders. The center’s staff work with primary care providers and other specialists to seamlessly coordinate patient care.

To speak to an endocrinologist or refer a patient, please call **1-800-373-4111**.

### BRAIN SCIENCE RESEARCH CONSORTIUM UNIT ESTABLISHED

The new Brain Science Research Consortium Unit (RCU), which will conduct large-scale, multidisciplinary studies on brain function, brings together faculty from multiple disciplines to probe the inner workings of the brain and to develop therapies for a wide range of neurological disorders.

The Brain Science RCU, led by Bankole A. Johnson, DSc, MD, MB, ChB, MPhil, Professor and Chair of the Department of Psychiatry and Behavioral Science, will set out to answer challenges presented by the NIH BRAIN (Brain Research through Advancing Innovative Neurotechnologies, also referred to as the Brain Activity Map Project), a national research program announced by President Obama last year. The program was established to revolutionize how we understand the human brain and mind, and to find new ways to identify and treat disorders such as Parkinson’s disease, schizophrenia, Alzheimer’s disease, autism, stroke and brain injury. +