

Longer stay in hospital ICU has lasting impact on quality of life

Muscle weakness associated with physical impairments two years later

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FAST FACTS:

- Every day of bed rest in the ICU lowers muscle strength between 3 to 11 percent over following months and even years.
- Dale Needham, M.D., Ph.D., and his colleagues followed up on 222 patients after discharge from ICU.
- The harms of bed rest far exceed the potential harms of rehabilitation services by clinical team, they found.
- The study is published in the April issue of *Critical Care Medicine*.

Patients have substantial physical impairments even two years after being discharged from the hospital after a stay in an [intensive care unit](#) (ICU), new Johns Hopkins research suggests.

The scientists found that for every day of bed rest in the ICU, muscle strength was between 3 and 11 percent lower over the following months and years.

“Even a single day of bed rest in the ICU has a lasting impact on weakness, which impacts patients’ physical functioning and quality of life,” says [Dale M. Needham, M.D., Ph.D.](#), an associate professor of medicine and of [physical medicine and rehabilitation](#) at the Johns Hopkins University School of Medicine and senior author of the study described in the April issue of *Critical Care Medicine*. “We previously thought that bed rest and sedation in an ICU were helpful for patients, but we’re finding this approach to care is actually harmful to the long-term recovery of many.”

For the study, the Johns Hopkins team followed up on 222 patients discharged from one of 13 ICUs at four Baltimore hospitals between October 2004 and October 2007. All patients spent time on a mechanical ventilator as part of their successful treatment for acute lung injury, a syndrome marked by inflammation and excessive fluid in the lungs and frequent multiorgan failure. The disorder is considered an archetype disease in studying patients with critical illness.

The patients underwent evaluation of muscle strength at hospital discharge and also three, six, 12 and 24 months later. More than one-third of survivors had muscle weakness at discharge, and while many saw improvement over time, the weakness was associated with substantial impairments in physical function and quality of life at subsequent follow-up visits.

The two variables most associated with a patient’s muscle weakness were age and the duration of bed rest in the ICU, a unit where patients are traditionally confined to their beds because of deep sedation, breathing tubes and life-sustaining machinery. “Age is not a modifiable risk factor, but bed rest is,” Needham says. “We need to focus on changing bed rest to improve patients’ recovery.”

Previous research has shown that during the first three days a severely ill patient spends in the ICU, he or she can expect a 9 percent decrease in muscle size. The patients in this new study spent an average of two weeks in the ICU.

The key to improving long-term physical outcomes for survivors of critical illnesses may be in rethinking how patients are treated in the ICU, the researchers say.

“The standard of care for really sick patients has been keeping them sedated and in bed,” says Eddy Fan, M.D., Ph.D., a former Johns Hopkins physician who now works at the University of Toronto and the study’s first author. “Many doctors and nurses believe that when there’s a breathing tube in place, patients need deep sedation, not rehab. But that is a myth. We need our patients awake and moving.”

Needham stresses the importance of keeping ICU patients as active as possible, even for severely ill patients who may only be able to sit up at the edge of the bed or have their arms and legs exercised by a physical or occupational therapist.

ICU-based rehabilitation therapy is underutilized, he adds, despite growing evidence of its safety and benefits. In a study being published in the June issue of the *Journal of Critical Care*, Needham and his colleagues found that among 1,110 patients consecutively admitted to The Johns Hopkins Hospital’s Medical Intensive Care Unit and undergoing more than 5,500 physical therapy sessions, only 34 sessions (0.6 percent) had significant changes in vital signs or potential safety concerns. Many of the 34 issues documented were a change in heart rate or blood pressure that remedied itself once the patient stopped the activity.

“Nothing is free of risk in the ICU, but the harms of bed rest far exceed the potential harms of giving these patients rehabilitation delivered by a skilled clinical team — even when patients are very sick and on life support,” Needham says.

“We must stop making excuses about why a patient can’t do rehabilitation today — he has a [CT scan](#) or she’s getting dialysis,” he adds. “We need to highly prioritize rehabilitation, which we now see as just as — if not more — important than many other tests and treatments we offer our patients in intensive care.”

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Other Johns Hopkins researchers who contributed to the study include David W. Dowdy, M.D., Ph.D.; Elizabeth Colantuoni, Ph.D.; Pedro A. Mendez-Tellez, M.D.; Cheryl R. Dennison Himmelfarb, R.N., Ph.D.; Sanjay V. Desai, M.D.; Nancy Ciesla, D.P.T.; and Peter J. Pronovost, M.D., Ph.D. Researchers from Emory University School of Medicine and the University of Maryland School of Medicine were also involved.

Pronovost lectures for Leigh Bureau to various hospitals and health care organizations, receives royalties from Penguin Group for a book he published and is a board member with the Cantel Medical Group.

Other researchers involved in the Journal of Critical Care study include Thiti Sricharoenchai, M.D.; Ann M. Parker, M.D.; Jennifer M. Zanni, P.T., D.Sc.P.T.; Archana Nelliott, B.S.; and Victor D. Dinglas, M.P.H.