More benefits found from mild exercise in critically ill patients

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A new report from critical care experts at Johns Hopkins shows that use of prescription sedatives goes down by half so that mild exercise programs can be introduced to the care of critically ill patients in the intensive care unit (ICU). Curtailing use of the drowsiness-inducing medications not only allows patients to exercise, which is known to reduce muscle weakness linked to long periods of bed rest, but also reduces bouts of delirium and hallucinations and speeds up ICU recovery times by as much as two to three days, the paper concludes.

Mild exercise, the experts say, with sessions varying from 30 minutes to 45 minutes, should be performed by patients under the careful guidance of specially trained physical and occupational therapists and can include any combination of either leg or arm movements while laying flat in bed, sitting up or standing, or even walking slowly in the corridors of the ICU. Indeed, the Johns Hopkins team has since evaluated a number of additional physical rehabilitation therapies, such as cycling in bed using a specially designed peddling device, or stimulating contractions of the leg muscles with overlying electrical pads. Patients can often exercise while still attached to life support equipment, such as a mechanical ventilator that helps them breathe, the group shows.

In its latest exercise report, to be published in the journal *Archives of Physical Medicine and Rehabilitation* online April 9, the Johns Hopkins team closely monitored the progress of 57 patients admitted to The Johns Hopkins Hospital's medical intensive care unit (or MICU) in 2007. Their treatment encompassed 794 days spent in the unit. Members of the

MICU team checked the patients' records daily for several months before and after the physical rehabilitation project began. Each patient was mechanically ventilated for at least four days, with half receiving no more than one exercising session before the enhanced exercise plan started, while half received at least seven physical therapy sessions after the plan's implementation.

"Our work challenges physicians to rethink how they treat critically ill patients and shows the downstream benefits of early mobilization exercises," says critical care specialist Dale Needham, M.D., Ph.D., who spearheaded the project.

"Our patients keep telling us that they do not want to be confined to their beds, they want to be awake, alert and moving, and engaged participants in their recovery," says Needham, an associate professor at the Johns Hopkins University School of Medicine. "Patients are not afraid of exercising while they are in the ICU, and they are embracing this new approach to their care in the ICU. It actually motivates them to get well and reminds them that they have a life outside the four walls surrounding their hospital beds."

Needham's latest findings contribute to his team's other research in the past three years, demonstrating in more than 500 patients how early physical rehabilitation and mild exercise helped ICU patients move about, sit and stand up. He says patients can lose as much as 5 percent per week of leg muscle mass when confined to bed rest.

In the new report, Needham and colleagues found that the use of drowsiness-causing benzodiazepines declined to only 26 percent of patient days spent in the MICU in the four months following introduction of early mobilization practices, compared to 50 percent of patient days in the three months leading up to the project. Daily doses dropped even further. Half of the patients were given more than 47

milligrams of midazolam and 71 milligrams of morphine before early exercising was emphasized. After exercising became more widespread, half needed less than 15 milligrams of midazolam and 24 milligrams of morphine.

Daily episodes of delirium, when a patient may hallucinate, be unable to think straight, or simply be unaware of their surroundings, were sharply curtailed. Before exercising began, ICU patients were spending as little as 21 percent of all patient days without such disturbances, but this grew to 53 percent clear-thinking days afterward. Delirium is known to occur in ICU patients who have been heavily sedated, prolonging their ICU stay and recovery.

Overall time spent in intensive care and in the hospital also dropped after exercising was promoted, by 2.1 days and 3.1 days, respectively. And with patients recovering faster, the Johns Hopkins MICU was able to treat 20 percent more patients even though its capacity, at 16 beds, remained the same.

Critical care expert Eddy Fan, M.D., a member of the project team and instructor at Hopkins, says physicians are changing their perspective on prolonged bed rest with heavy sedation, and its long-term consequences to patient health.

Fan says developing appropriate physical therapy regimens involves careful planning and coordination among all member of the critical care team, including physicians, nurses, and respiratory, physical and occupational therapists.

He notes that it can take an hour to get a patient ready to perform and finish certain exercises, such as walking short distances, and that patient comfort and safety must be monitored throughout the activity.

Launching this kind of early physical medicine and rehabilitation program requires serious commitment. Fan says the Hopkins initiative involved nearly 150 hospital physicians and staff in meetings about early mobilization of their patients, including 16 educational seminars with MICU nurses on sedation alone, as well as staff presentations by former ICU patients about their problems with muscle weakness since their discharge.

"Things can change quickly in the ICU, but if the patient has the energy to exercise and their vital signs are okay, and the staff are trained and confident in the type of activity to be performed, then it is in the patient's best interest to get them moving," says Fan.

Needham says long-term clinical studies of these treatment techniques are already under way, in which some critically ill patients are performing early-mobilization exercises and others less so or not at all. The goal of researchers, now that the immediate physical benefits have been shown, is to gauge if early rehabilitation therapy improves patients' quality of life, such as their ability to stay active and mobile inside and out of the home, and to quantify any hospital cost savings accruing from the effort.

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