Novel device helps monitor mental illness

Psychiatric researchers at the University of California, San Diego (UCSD) School of Medicine will report important new findings from a study of patients with bipolar affective disorder and schizophrenia at the upcoming meeting of the Society of Biological Psychiatry.

The patented approach developed at UCSD, using a novel device called a "LifeShirt" - a computerized vest that continuously monitors the patient's movements - shows that patterns of movements differ between patients with the two disorders. The device, manufactured by VivoMetrics, monitors hyperactive and repetitive movements, and collects data on respiration, heart rate and other physiological measures.

While wearing the vest, subjects' movements were also recorded by a camera embedded in the ceiling, and the film of their exploratory behavior converted into movement patterns that characterize the manic phase of the disorder. Patients with bipolar disease exhibited hyperactivity and a wide range of exploration when in a novel environment, according to the researchers. Schizophrenic patients, on the other hand, exhibited much more restricted movements.

"When patients are highly symptomatic, it is sometimes difficult for physicians to diagnose..."
whether an individual is exhibiting signs of schizophrenia or bipolar disorder," said William Perry, Ph.D., UC San Diego professor of psychiatry, who is leading a five-year study of bipolar disorder funded by the National Institutes of Mental Health. "In our first report from the study, we find that patients in the two groups show different patterns of exploration in new environments."

The "behavioral pattern monitor" research in patients is based upon parallel studies with rats and mice, conducted by co-investigators Mark Geyer, Ph.D., and Martin Paulus, M.D., both UC San Diego professors of psychiatry. When rodents are given drugs such as amphetamines, or have genetic abnormalities that change brain chemistry, they exhibit distinctive, abnormal movement patterns and difficulties in filtering information. The medications that are used to treat bipolar disorder normalize these behaviors and thoughts.

"The LifeShirt and our analyses of their exploratory movements allow us to take precise measurements while the person moves freely," said Perry. "It offers a promising approach to helping us learn about the underlying function of patients with bipolar disorder."

The researchers will also report on how bipolar patients screen out or filter unimportant information from the environment. According to Perry, patients with bipolar disorder have difficulty screening excessive or unimportant information, which may lead to the inappropriate behaviors that is seen during their manic episodes. During such episodes, patients display an exaggerated sense of their abilities, speak extremely fast and exhibit excessive motor movements. These behaviors are thought to result from impairments in brain systems that regulate behavior.

Perry and his colleagues hope that, by studying the brain's screening or filtering mechanisms in manic patients before and after they are treated with medication, they will be able to compare their results to those that have been collected in mice. If so, they believe the mice can be used to discover new and improved drugs by observing how their movement pattern is altered after taking medication. The collective findings might also offer insight into the chemical imbalances and genetic abnormalities that appear to contribute to bipolar disorder.

The 62nd annual Science Conference and Meeting of the Society of Biological Psychiatry will be held at the Westin Horton Plaza in San Diego May 17, 18 and 19. Perry and his colleagues will report on preliminary findings.
from their study utilizing the LifeShirt technology on all three days.

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