# Depressive Symptoms and Risk of Postoperative Delirium

*Patrick J. Smith, Ph.D., M.P.H., Deborah K. Attix, Ph.D., B. Craig Weldon, M.D., Terri G. Monk, M.D., M.S.*

**Objective:** *Previous studies have shown that elevated depressive symptoms are associated with increased risk of postoperative delirium. However, to our knowledge no previous studies have examined whether different components of depression are differentially predictive of postoperative delirium.* **Methods:** *One thousand twenty patients were screened for postoperative delirium using the Confusion Assessment Method and through retrospective chart review. Patients underwent cognitive, psychosocial, and medical assessments preoperatively. Depression was assessed using the Geriatric Depression Scale–Short Form.* **Results:** *Thirty-eight patients developed delirium (3.7%). Using a factor structure previously validated among geriatric medical patients, the authors examined three components of depression as predictors of postoperative delirium: negative affect, cognitive distress, and behavioral inactivity. In multivariate analyses controlling for age, education, comorbidities, and cognitive function, the authors found that greater behavioral inactivity was associated with increased risk of delirium (OR: 1.95 [1.11, 3.42]), whereas negative affect (OR: 0.65 [0.31, 1.36]) and cognitive distress (OR: 0.95 [0.63, 1.43]) were not.* **Conclusion:** *Different components of depression are differentially predictive of postoperative delirium among adults undergoing noncardiac surgery.* (Am J Geriatr Psychiatry 2016; ■■:■■–■■)

**Key Words:** Delirium, depression, behavioral inactivity, negative affect

## INTRODUCTION

The presence of delirium after surgery is independently predictive of increased incidence of adverse medical outcomes, longer hospital stays, and increased rates of cognitive decline.[1,2] Delirium is relatively common among hospitalized older adults and is associated with significant public health expenditures[3] and with a substantially increased risk of 6-month mortality risk after controlling for disease severity.[4] Available evidence suggests that the presence of delirium may also be associated with adverse cerebrovascular outcomes, similar to other surgeries.[5,6] For example, a prospective cohort study found that a greater duration of delirium in the intensive care unit was associated with greater white matter damage at discharge,[7] which persisted over a 3-month follow-

Received August 25, 2015; revised December 7, 2015; accepted December 9, 2015. From the Psychiatry and Behavioral Sciences (PJS, DKA), Division of Medical Psychology; Department of Neurology (DKA), Duke University Medical Center, Durham, NC; and Department of Anesthesiology and Perioperative Medicine (BCW, TGM), University of Missouri-Columbia, Columbia, MO. Send correspondence and reprint requests to Patrick J. Smith, Department of Psychiatry and Behavioral Sciences, Duke University Medical Center, Durham, NC. e-mail: Patrick.j.smith@dm.duke.edu

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up period. Evidence also has also demonstrated that the presence of delirium is independently associated with long-term cognitive impairment.[1]

Although numerous medical factors have been shown to increase the risk of postoperative delirium, evidence suggests that the presence of depressive symptoms or a major depressive episode may be associated with elevated risk of delirium. Among cardiac patients the presence of an ongoing major depressive episode has been associated with a nearly fourfold increased risk of delirium.[8] Subclinical depressive symptoms have been associated with graded increases in delirium incidence among individuals undergoing elective noncardiac surgery.[9]

Despite the increased risk of delirium, the mechanisms underlying the depression and delirium relationship have not been studied. Although greater depressive symptoms have been associated with greater incidence of depression across multiple patient samples,[9] no past studies, to our knowledge, have examined whether different components of depression are differentially predictive of delirium risk. Different components of depression are known to result from different neurobiologic mechanisms[10] and are differentially predictive of adverse events among coronary patients.[11] We therefore examined the association between various components of depression and risk of delirium among a large sample of older adults undergoing noncardiac surgery.

Understanding the risk factors for delirium are important to improve patient management and risk stratification before surgery.[2] Increasing evidence suggests that greater depressive symptoms are associated with an increasing incidence of postoperative delirium.[9,12,13] Prior research has shown that elevated preoperative depressive symptoms are associated with increased risk of delirium after coronary artery bypass grafting[13] as well as noncardiac surgery,[9,12] independent of demographic, medical, and cognitive factors. Despite the increased delirium risk associated with depression, no studies to our knowledge have attempted to better elucidate the nature of this association by examining which components of depression are most predictive of postoperative delirium. We therefore examined the association between components of preoperative depressive symptoms and postoperative delirium in a sample of 1020 individuals undergoing major, noncardiac surgery.

## METHODS

### Participants

Participants were enrolled in a previous reported trial examining predictors of postoperative cognitive decline. Potential participants were approached for participation at Shands Hospital (Gainesville, Florida) between February 1, 1999 and January 31, 2002 and gave written informed consent before participation. Inclusion criteria included adult age (≥18 years) and a scheduled hospital admission as an inpatient for a minimum of 2 days after noncardiac surgery. Patients with a Mini-Mental Status Exam score ≤23, a history of dementia or central nervous system disease, current or past history of psychiatric illness, substance abuse disorders, current or past electroconvulsive therapy, or undergoing active pharmacologic management by a psychiatrist or primary care provider (including tranquilizers and/or antidepressants) were excluded.

Delirium status was determined by chart review and/or the Confusion Assessment Measure.[14] The Confusion Assessment Method diagnostic algorithm was used to define the presence or absence of delirium, monitored up to 8 days after surgery. Delirium was defined as the presence of both (1) acute onset and fluctuating course and (2) inattention as well as either (3) disorganized thinking or (4) altered level of consciousness.

Preoperative assessments were conducted by interview within 14 days of surgery to obtain demographic information, medical history, and background information. Medical comorbidities were indexed using the Charlson Comorbidity Index (CCI).[15]

Depression was assessed using the 15-item short form of the Geriatric Depression Scale (GDS) (Appendix 1).[16] The GDS assesses several dimensions of depression, including negative affect (NA), cognitive distress (CD), and behavioral/social inactivity (BI), with higher scores indicating greater severity of depressive symptoms. The GDS-NA subscale included items assessing life satisfaction and general mood (e.g., "Are you basically satisfied with your life?"; "Are you in good spirits most of the time?"). The GDS-CD subscale included items assessing negative thoughts about one's life (e.g., "Do you feel your life is empty?"; "Do you think that most people are better off than you are?"). The GDS-BI subscale included items assess-

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