Differences in Characteristics and Outcome of Delirium as Based on Referral Patterns

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The authors studied factors associated with referral of delirium patients to psychiatry consultation and its outcome implications. Characteristics and treatment outcomes of delirium patients referred to psychiatry were compared with those not referred. Referred patients were younger, had a more hyperactive subtype, greater substance abuse, less comorbid dementia, were more likely to be recognized as having delirium, and be prescribed medications. Improvement in referred patients was indicated by lower readmission rate postdischarge. No differences were noted in length of stay, discharge status, or mortality within 1 year of the index episode. Psychiatric interventions were moderately helpful. Patients' characteristics and delirium subtypes may influence referral and should inform future liaison efforts. (Psychosomatics 2006; 47:367–375)

Delirium is a common and serious condition in hospitalized, medically ill patients, with a prevalence between 10% and 20% of all hospital admissions.1 These rates are even higher in specific at-risk groups, such as elderly patients, those on multiple medications, and those who have recently had major surgery.2 Delirium is associated with increased morbidity and mortality, greater use of hospital resources, increased rates of nursing home placement on discharge, and longer hospital stays.3–8 Despite its high prevalence, an estimated 32%–67% of cases go unrecognized on general-medical units.9–11 Thus, physicians from a variety of medical specialties treat patients with delirium who are not referred to psychiatry consultation services, and their care on different medical and surgical units may vary significantly. Regardless of setting, the standard approach to managing delirium includes specific interventions, such as the use of antipsychotics, to elucidate and correct its underlying causes and control its symptoms,12 and nonspecific psychosocial and environmental interventions, such as frequent reorientation, encouraging visits from families, and providing patients with familiar objects from home.13–14 However, the use of adjunctive nonpharmacological management strategies varies considerably.13,14 Given the nature of the interventions, it is likely that the skills psychiatrists bring to the management of delirium patients would prove helpful. However, it has not been determined conclusively that referral to psychiatry consultation offers any advantages.

The factors that determine whether delirium patients are referred to psychiatry are not well known. Some consultation–liaison psychiatrists have suggested that demographics and the clinical characteristics of the delirium may influence the likelihood of referral.15 Meagher and Trzepacz16 and Inouye17 note that detection of delirium is lower in older patients, those with depression or dementia, and in hypoactive individuals. Preferential referral of delirium

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Psychosomatics 47:5, September-October 2006
http://psy.psychiatryonline.org 367
caused by certain etiologies has not been noted, but it may be inferred from the fact that certain etiologies are more likely to have a hyperactive or hypoactive presentation.\textsuperscript{18} Referral to psychiatry may also depend on the comfort of primary physicians in managing the symptoms of delirium.\textsuperscript{19} Despite its prevalence, few studies have examined the referral process for delirium specifically. Previous studies have compared patients referred for delirium with those referred for other diagnoses who were ultimately found to have delirium. Nicholas and Lindsey\textsuperscript{15} examined the records of 42 patients referred for depression who were later found to be suffering from delirium. These patients were significantly older and more likely to be male than referrals diagnosed as having major depression. Similarly, Armstrong et al.\textsuperscript{10} described 93 psychiatric patients with delirium who were misdiagnosed by the referring team. Male patients with delirium were most likely to be misdiagnosed as having no psychiatric illness, and female patients were most likely to be misdiagnosed as having depression. However, the patients in these studies were all referred to a consultation–liaison psychiatry service. Thus, they provide no information on individuals with delirium who are not referred or on the factors influencing the decision to refer. Other studies have examined the detection of delirium in hospitalized patients\textsuperscript{20–23} and the effect of nonpharmacological interventions in reducing its occurrence or severity in prospective hospital admissions.\textsuperscript{13,24} None addressed whether referral to a consultation–liaison psychiatry service was associated with differences in treatment or outcome. A MEDLINE search combining the keywords “factors,” “referral” or “consultation,” and “delirium” or “confusion” or “organic mental disorder,” and “psychiatry” did not discover any studies examining characteristics of delirium, or of patients with delirium, that might influence referral. Despite their importance, neither the factors that determine whether or not delirium patients are referred to a psychiatric consultation service nor the impact of the referral on treatment outcomes has been sufficiently explored.

The goals of the present study were twofold. One was to compare the characteristics and motoric subtype of delirium (hyperactive and not-hyperactive) of patients referred to a consultation–liaison psychiatry service (referred group) with those not referred (non-referred group). The second was to compare treatment outcomes of the patients referred to psychiatry with those not referred. The primary hypotheses were that: 1) hyperactive delirium patients, that is, those who are agitated and disruptive, will be preferentially referred; 2) delirium patients who are referred to psychiatry will have better outcomes than patients who are not referred; and 3) there will be greater use of adjunctive pharmacological agents in the referred group than in the non-referred group.

METHOD

Subjects

Participants were 213 patients admitted consecutively to the G.V. “Sonny” Montgomery Veterans Affairs Hospital (Jackson, MS) who met DSM-IV criteria for delirium. Six patients who had delirium and met the inclusion criteria for a delirium treatment trial\textsuperscript{25} were excluded from this study because they received specialized care. Patients were divided into two groups, one of which was referred to the consultation–liaison psychiatry service by the primary team (N = 100), the other not referred (N = 113). Referral was indicated by request for psychiatric consultation in the computerized patient record system for any patient at any time during the hospitalization.

Measures and Patient Characteristics

The Confusion Assessment Method is a brief bedside screen for delirium, which was designed for use by non-psychiatric clinicians. It has high sensitivity (94%–100%), high specificity (90%–95%), and high interrater reliability.\textsuperscript{26} Also, it has high negative predictive accuracy (90%–100%) and so is a good tool for detecting delirium.\textsuperscript{26} Item 4 of the Confusion Assessment Method was used in this study to classify subjects as hyperactive or not hyperactive motoric subtypes, the former characterized as hyperalert, hypervigilant, agitated, restless, or having been restrained, and the latter as lethargic, drowsy, or stuporous. Item 4 of the Confusion Assessment Method does not have a separate category for a mixed presentation of delirium with both hyperactive and hypoactive symptoms. Subjects with a mixed presentation were classified as not hyperactive unless they had clear agitation.

Patients were also compared on several characteristics. Patients’ age and length of stay for the index admission were obtained from the computerized patient record system. Mortality rates (in-hospital and during the year after the index admission) were also obtained from the computerized patient record system. Hospital readmission rates and number of readmissions were indicated by the admission notes in the computerized patient record system in the year after the index admission. Also, if the chart notes mentioned any separate admissions to an outside hospital in the
year after the index admission, these were counted as readmissions. The lead author assigned a single most likely etiology of delirium. Types of medication prescribed for treatment of delirium (antipsychotics and benzodiazepines) were obtained from computerized patient record system chart notes and physician orders during the index admission. Presence of dementia was confirmed if the admission/discharge or clinic notes for the index hospitalization carried a formal diagnosis of dementia. Finally, discharge status was determined from the final progress note and discharge summary in the computerized patient record system, and was classified as home (including discharge to family or other relatives), nursing home, or “other.”

Procedure

In this naturalistic study, the research team reviewed computerized patient record system information for all patients admitted to the medical and surgical wards from November 2000 to April 2002 within 24 to 72 hours of their admission. Potential subjects were screened by examining the hospital chart and by communicating with the morning shift nurses after the morning report. Those with chart descriptions of agitation, use of restraints, or mention of the words “confusion,” “delirium,” “somnolent,” or “lethargic,” or those described similarly by nurses, were selected for additional evaluation. Subjects with possible delirium were administered the Confusion Assessment Method by a trained research assistant. Subjects who were determined to have delirium by the Confusion Assessment Method were then seen by the lead author, who confirmed the diagnosis of delirium according to DSM-IV criteria through patient and family interviews and chart review. One primary putative etiology was determined from review of the medical records by the lead author. Etiological categories were the following: metabolic-plus-infectious (combined because of the frequent difficulty in separating the two in most patients); substance abuse-related; neurological; neoplastic; and other. Although most deliria were multifactorial, we recorded the etiology that clinically seemed most likely to have precipitated delirium. All non-referred group subjects received usual care by the admitting service. All referred-group subjects were evaluated and treated by one psychiatrist from the hospital consultation-liaison psychiatry service, who was not affiliated with this study. Outcome data on length of stay, mortality, and rehospitalization rates were retrospectively obtained from the computerized patient record system 1 year postdischarge of the last patient entered into the study. These variables were selected because they lent themselves to quantitative analysis by chart abstraction after the prospective assessment of delirium. The local institutional review board approved all study procedures.

Statistical Analyses

Descriptive statistics were conducted on background variables and patient characteristics (sex, age, ethnicity, presence of dementia, delirium subtype, putative etiology of delirium, and specialty that managed the patient). The referred group and non-referred group were compared to determine whether referral groups differed on any of these characteristics. Age was analyzed with an independent-samples t-test, and chi-square analyses were used for categorical variables. Next, chi-square analyses examined whether referral group was associated with medications prescribed (any psychotropics, atypical antipsychotics, benzodiazepines). Finally, the relationship between referral group and outcome variables (hospital readmission in the year after the index episode, mortality rate in the year after the index admission, length of hospital stay, and discharge status) was examined by regression analysis. Linear regression was used to predict length of stay, whereas logistic regression was used to predict the categorical outcomes. To control for differences in background variables and patient characteristics across referral groups, regression models entered these variables in Step 1. Medication variables were entered in Step 2, and referral group was entered in Step 3. Given that referral status may moderate the influence of delirium subtype on outcomes, an interaction of referral group and delirium subtype was entered in Step 4. Also, an interaction between referral group and recognition of delirium was entered in Step 4 to determine whether recognition of delirium moderated the outcome of referral status. However, neither interaction was found to be significant in any model (p>0.22); therefore, they were removed from analyses. It is also possible that medications prescribed may mediate the effects of referral group on outcomes. Therefore, models that found a significant relationship between medication use in Step 2 and no significant effect of referral group in Step 3 were reanalyzed with these two steps reversed. If referral status was significant in the second analyses, this would suggest that medications prescribed mediate the effects of referral status on that outcome variable. For all analyses, statistical significance was set at p<0.05.
Delirium Referral

RESULTS

Background Variables and Patient Characteristics

Demographics and subject characteristics by referral group are summarized in Table 1. In general, referred group patients were younger, were less likely to have dementia, were more likely to be characterized as hyperactive, had greater prevalence of substance-abuse etiology, and were more likely to be recognized as having delirium. Also, within the referred group, 51% of the patients were recognized as having delirium, whereas only 21% of patients within the non-referred group were recognized as having delirium. Regression analyses controlled for these group differences in predicting outcomes.

Medication

In the overall sample, 56.34% were prescribed some type of psychotropic medication. The use of psychotropic medication by referral group is summarized in Table 2. Analyses indicate that a greater proportion of patients in the referred group (82.00%) than patients in the non-referred group (33.63%) were prescribed psychotropic medication ($\chi^2[1] = 50.46; p < 0.001$). Further analyses were conducted to determine group differences in specific types of psychotropics. Seventy-three (34.27%) of the total sample were prescribed atypical and 18 (8.45%) received conventional antipsychotic medication. The proportion of patients receiving atypicals was significantly higher in the referred group (50.00%) than in the non-referred group (20.35%; $\chi^2[1] = 20.70; p < 0.001$), but the use of conventional antipsychotics was statistically equivalent between the two referral groups (referred group: 11.00%; non-referred group: 6.19% [$\chi^2[1] = 1.58; p = 0.21$]). Twenty-six patients (12.21%) from the total sample were prescribed benzodiazepines. They were more commonly prescribed for referred patients (18.00%) than for non-referred patients (7.08%; $\chi^2[1] = 5.90; p = 0.02$). To determine whether medication use was related to putative etiology, additional chi-square analyses were conducted. The use of atypical antipsychotics was unrelated to putative delirium etiology ($p = 0.67$); however, conventional antipsychotics were used more frequently (7.46%) in referred patients than in non-referred patients (2.53%) [$\chi^2[1] = 4.60; p = 0.03$].

![Table 1. Demographics and Patient Characteristics by Referral Group](http://psy.psychiatryonline.org)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Non-Referred Group (N = 113)</th>
<th>Referred Group (N = 100)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (SD)</td>
<td>74.36 (12.24)</td>
<td>65.23 (14.15)</td>
<td>&lt;0.003</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td>0.90</td>
</tr>
<tr>
<td>Men</td>
<td>98.23%</td>
<td>98.00%</td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>1.80%</td>
<td>2.00%</td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td>0.41</td>
</tr>
<tr>
<td>White</td>
<td>66.37%</td>
<td>61.00%</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>33.63%</td>
<td>39.00%</td>
<td></td>
</tr>
<tr>
<td>Comorbid dementia</td>
<td>53.09%</td>
<td>27.00%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Delirium subtype</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hyperactive</td>
<td>15.04%</td>
<td>63.00%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Not hyperactive</td>
<td>84.96%</td>
<td>37.00%</td>
<td></td>
</tr>
<tr>
<td>Recognition of delirium by primary team</td>
<td>20.54%</td>
<td>50.51%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Putative etiology of delirium</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substance-induced</td>
<td>0.88%</td>
<td>15.00%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Neurological</td>
<td>14.16%</td>
<td>15.00%</td>
<td>0.86</td>
</tr>
<tr>
<td>Neoplasm</td>
<td>15.04%</td>
<td>9.00%</td>
<td>0.18</td>
</tr>
<tr>
<td>Metabolic/infectious</td>
<td>69.91%</td>
<td>61.00%</td>
<td>0.17</td>
</tr>
<tr>
<td>Referring specialty</td>
<td></td>
<td></td>
<td>0.99</td>
</tr>
<tr>
<td>Medicine</td>
<td>75.22%</td>
<td>74.49%</td>
<td></td>
</tr>
<tr>
<td>Neurology</td>
<td>10.62%</td>
<td>11.22%</td>
<td></td>
</tr>
<tr>
<td>Surgery</td>
<td>14.16%</td>
<td>14.29%</td>
<td></td>
</tr>
</tbody>
</table>

![Table 2. Psychotropic Medication Use by Referral Group](http://psy.psychiatryonline.org)

<table>
<thead>
<tr>
<th>Medication</th>
<th>Non-Referred Group (N = 113)</th>
<th>Referred Group (N = 100)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any psychotropic</td>
<td>33.63%</td>
<td>82.00%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Atypical antipsychotic</td>
<td>20.35%</td>
<td>50.00%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Conventional antipsychotic</td>
<td>6.19%</td>
<td>11.00%</td>
<td>0.21</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>7.08%</td>
<td>18.00%</td>
<td>0.02</td>
</tr>
</tbody>
</table>

370 http://psy.psychiatryonline.org  Psychosomatics 47:5, September-October 2006
were more often used in patients with a substance-abuse etiology (25.00%) than neurological (0%), neoplasm
(7.69%), or metabolic/infectious causes (8.57%;
$\chi^2[3] = 8.55; p = 0.04$). Similarly, patients with substance-
use etiology (43.75%) were more likely to be prescribed
benzodiazepines than those with neurological (16.13%),
neoplasm (19.23%), or metabolic/infectious (6.42%) eti-
ologies ($\chi^2[3] = 20.86; p < 0.001$). Given the group differ-
ences in medication use, analyses on outcome variables
controlled for these differences. However, to avoid multi-
collinearity, only the variable coding psychotropic use ver-
sus non-use was entered into the models.

Outcome Variables

Descriptive statistics for outcome variables by referral
group status are listed in Table 3. Results of logistic-re-
gression analyses predicting outcome variables are pre-
vented in a data supplement that accompanies the online
version of this article.

Hospital Readmission Age (odds ratio [OR]: 0.969;
p = 0.014) and psychotropic medication use (OR: 0.448;
p = 0.019) were significantly related to hospital readmis-
sion. However, referral group was just below significance
level (OR: 0.494; p = 0.074). Older persons and those re-
ceiving psychotropic medication were less likely to be
readmitted in the year after the index episode. When psy-
chotropic medication use and referral group were entered
into the model in reverse order, referral group was signifi-
cant (OR: 0.369; p = 0.007). This suggests that the use of
psychotropic medication mediates the effect of referral
group.

Mortality Rate Logistic regression predicting death in the
year after the index episode of delirium indicated that none
of the predictors, including referral group or delirium subtype,
were significantly related to mortality rate (all
p > 0.18). The proportion of patients who died in the non-
referred group was 41.59% and was 36.00% in the referred
group (Table 3). Given that the referral group \times delirium
subtype interaction was not significant, this means that
mortality rate for each subtype of delirium did not differ
between referral groups. The 1-year mortality rate in pa-
tients with non-hyperactive delirium was 40.62% in the
non-referred group and 40.54% in the referred group.
One-
year mortality rate for patients with hyperactive delirium
was 47.06% in the non-referred group and 33.33% in the
referred group.

Length of Stay Linear regression predicting length of stay
in the hospital after the index episode revealed that none
of the predictors, including referral group, were signifi-
cantly related to the length of hospital stay.

Discharge Status Separate logistic-regression analyses
were performed to predict discharge status (home, nursing
home, in-hospital death, other). For the model predicting
home discharge, only age emerged as a significant predictor
(OR: 0.960; p = 0.002), suggesting that older patients
were less likely to be discharged to home. For the model
predicting nursing home discharge, age (OR: 1.06;
p = 0.001) was the only significant predictor, although a
diagnosis of comorbid dementia (OR: 1.96; p = 0.059) was
just below significance level. This suggests that older pa-
tients were more likely to be discharged to a nursing home.
None of the patients with a putative substance-abuse etiol-
ology died in the hospital; therefore this variable was omit-
ted from the logistic-regression model predicting in-hospi-
tal death (it caused problems with model convergence).
For this model, referral-group status emerged as the only
significant predictor (OR: 3.687; p = 0.04), but recognition
of delirium (OR: 0.29; p = 0.078) and psychotropic med-
ication use (OR: 0.335; p = 0.073) were just below signif-
ificance level. These data suggest that referred patients
were more likely to have died in hospital before discharge.
Finally, for the model predicting discharge status other than
those listed above (i.e., "other"), comorbid dementia (OR:
0.235; p = 0.02) was the only significant predictor. Par tic-

<table>
<thead>
<tr>
<th>TABLE 3. Outcome Data by Referral Group</th>
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<tbody>
<tr>
<td>Non-Referred Group (N = 113)</td>
</tr>
<tr>
<td>----------------------------------------</td>
</tr>
<tr>
<td>1-year rehospitalization rate</td>
</tr>
<tr>
<td>1-year mortality rate</td>
</tr>
<tr>
<td>Length of stay, days mean (SD)</td>
</tr>
<tr>
<td>Discharge to home</td>
</tr>
<tr>
<td>Discharge to nursing home</td>
</tr>
<tr>
<td>In-hospital death rate</td>
</tr>
<tr>
<td>Other disposition</td>
</tr>
</tbody>
</table>

Psycosomatics 47:5, September-October 2006

http://psy.psychiatryonline.org 371
Delirium Referral

Participants without comorbid dementia were more likely to be discharged to "other" status.

Ancillary Analyses

Referral to Psychiatry In an exploratory analysis, logistic regression was conducted to determine which combination of variables best predicted referral to psychiatry. Age, ethnicity, sex, diagnosis of comorbid dementia, and recognition of delirium were entered in Step 1. In Step 2, delirium subtype was entered. In Step 3, treating specialty was entered, with medicine used as the reference group relative to neurology and surgery. In Step 4, putative etiologies were entered, with metabolic/infectious used as the reference group relative to neurologic, neoplasm, and substance abuse. Age (OR: 0.962; p = 0.011), recognition of delirium (OR: 2.95; p = 0.004), and delirium subtype (OR: 7.07; p<0.001) emerged as significant predictors. After controlling for all other variables, younger age, recognition of delirium, and hyperactive subtype were associated with being referred to psychiatry.

Recognition of Delirium A similar analysis was conducted to predict which patients were recognized as having delirium. In Step 1, age, ethnicity, sex, and diagnosis of comorbid dementia were entered. In Step 2, delirium subtype was entered. Treating specialty was entered in Step 3, and putative etiology was entered in Step 4. The presence of comorbid dementia (OR: 0.407; p = 0.016) and delirium subtype (OR: 2.04; p = 0.032) were significant predictors, suggesting that persons without dementia and persons with a hyperactive subtype were more likely to be recognized.

DISCUSSION

This study adds significantly to our knowledge about the management of delirium by examining the characteristics and outcomes of patients with delirium who were referred or not referred to a psychiatric consultation–liaison service. Patients with the hyperactive subtype of delirium were preferentially referred and received pharmacological interventions more often than non–referred–group patients. The outcome of the patients in the referred group was better than that of patients in the non–referred–group, although this was not consistent across all measures. Improvement in the referred group was indicated by a lower readmission rate after discharge, following the index episode of delirium. No differences between the two groups were noted in length of stay, discharge status, or mortality within 1 year of the index episode of delirium. The referred–group patients were more likely to have higher in–hospital mortality.

Another significant finding involves characterization of patients and delirium subtypes in the non–referred group versus the referred group. Patients in the non–referred group were older, were more likely to have comorbid dementia, were more likely to have the hypoactive subtype of delirium, had a lower prevalence of substance–abuse etiology, and received fewer psychotropics than patients in the referred group. There were no differences between the two groups in underlying etiologies or referral source. Interestingly, for 21% of the non–referred group, the primary team knew of the symptoms of delirium but did not refer, whereas in half of the referred group, the primary team did not recognize symptoms of delirium, but referred for other reasons. In the former group, the reasons for lack of referral are not known. For the latter group, referrals were made for a variety of reasons, including depression, anxiety, and capacity determination, but specific data were not recorded.

This study reinforces the clinical impression that patients with hyperactive delirium are preferentially referred, probably because this subtype is associated with more agitation and disruptive behavior. Patients in our sample with comorbid dementia were less likely to be referred to psychiatry. This finding may be attributed to the assumption that the symptoms are due to dementia rather than delirium, and so points to the need for consultation–liaison psychiatrists to educate providers about delirium in this population.

The greater use of psychotropics to treat referred–group patients may relate to greater adherence to APA guidelines by consultation–liaison psychiatrists, in that they generally recommend symptomatic treatment while the underlying cause of delirium is addressed. Atypical antipsychotics were significantly more often prescribed for referred–group patients, whereas the use of conventional antipsychotics was not significantly different among the two groups. Some experts have advised that atypical antipsychotics comprise the first–line treatment of delirium because of their more favorable side–effect profile and greater specificity for the brain regions involved in this condition, although this remains an area of disagreement. More frequent use of benzodiazepines in treating referred–group patients is cause for some concern, in that benzodiazepines have the potential to worsen delirium. However, given the greater proportion of substance–abusers in the referred group and the fact that benzodiazepines are the treatment of choice for alcohol and benzodiazepine withdrawal, this may simply indicate that such patients were
receiving appropriate treatment. Data on the rates for initiating diagnostic work-up or non-pharmacological treatment were not available. Given that such recommendations are less likely to be followed than recommendations for medications, the approach should be explored in future studies.

The fact that there were no significant differences in length of stay, discharge status, and 1-year mortality rates between the two groups was a bit surprising. Some studies have found delirium to be associated with increased length of stay, whereas others have not. Several studies have also noted increased mortality among patients suffering from delirium, although it is unclear whether this is due to delirium itself or the underlying medical condition. Previous studies have also shown that delirium is associated with increased risk of institutional placement, but the moderation of this effect among patients receiving psychiatric consultation has not been documented. Certainly, a finding that referral to psychiatry leads to improvements in these areas would provide a strong impetus for consultation–liaison psychiatrists to be involved in the care of these patients and would justify the use of their services. Absence of significant differences between the referred-group and the non-referred-group patients may point to limitations of the usual psychiatric interventions in managing these outcome variables. It seems plausible that, similar to proposals for evaluating the effectiveness of physical rehabilitation, there are so many factors involved in length of stay, discharge status, and mortality that it is difficult to change these through a single intervention. It is also unknown whether the availability of services (such as rehabilitation or nursing home facilities) may have influenced discharge. Improvement in other aspects of care and outcome remains a worthwhile reason for the use of consultation–liaison services. In this regard, the reduced readmission rates among the referred-group patients represent a significant reduction in patient burden. This can also represent a significant cost savings in the care of delirium patients, given the enormous costs associated with repeated hospitalizations. Specific factors leading to reduced readmission rates have not been identified, but they may be due to better treatment planning, based on a biopsychosocial model of assessment and management practiced by psychiatrists. Finally, consultation–liaison psychiatrists may provide such worthwhile functions as alleviating patient and family distress during the course of delirium, and these are factors that were not addressed in this study.

The reasons for the association of increased in-hospital mortality with referral to psychiatry are not entirely clear. The regression analyses suggest that psychotropic medication use and recognition of delirium were associated with a lower in-hospital mortality rate; however, this effect was just below the level of significance (p = 0.07). It is tempting to speculate that increased in-hospital mortality in the referred group may be related to severity of the delirium or to underlying physical conditions, but the finding warrants further investigation.

This study is limited in several key aspects, the most significant being the lack of information regarding other patient characteristics (such as severity of delirium), treatments (such as non-pharmacologic interventions), and outcome measures (such as duration of delirium) that would give a more comprehensive view of the differences between patients referred to a consultation–liaison psychiatry service and those who are not. In particular, it is not known whether severity of delirium moderates the referral process. This study also does not examine characteristics of the referring service or the perceived quality of the consultation, which may influence the decision to refer. Outcome data were obtained by chart abstraction alone, and thus may be subject to detection biases. In particular, the diagnosis of dementia, determined by chart review, may not be accurate for all subjects. Similarly, the determination of a single predominant putative etiology was made by the authors and may be subject to personal judgment. Another limitation is that it is also possible that patients received additional care or hospitalization outside of the VA system, which would not be obvious using the methods involved in this study. Also, classifying delirium only into hyperactive and non-hyperactive subtypes is a limitation of the study because a large number of delirium states have mixed features. One of the strengths of this study is that all patients in the non-referred group were seen prospectively by one psychiatrist to confirm the diagnosis of delirium by use of DSM–IV criteria. Those in the referred group were seen by only one consultation–liaison psychiatrist, thus providing consistency in the quality of consultation and recommendations.

Although these data demonstrate some areas wherein psychiatric interventions may be limited, they also highlight the areas wherein interventions may be helpful. As first outlined by Lipowski, we believe that psychiatric consultation in delirium can provide at least four specialized sets of skills in assessing and managing delirium in medical inpatients. First, the psychiatric consultant offers special knowledge and awareness with respect to the evaluation of physical illness processes that give rise to psychiatric symptoms, including delirium. Second, the psy-
Delirium Referral

psychiatric consultant offers expertise in differentiating delirium from dementia and in identifying delirium in patients with preexisting dementia. Third, the psychiatric consultant brings extensive working knowledge of psychotropic medications to the treatment of delirium. Fourth, the psychiatric consultant is well prepared to evaluate and address nonpharmacological interventions in the hospital and psychosocial issues that pertain prior to discharge.

Overall, this study demonstrates that delirium patients who are referred to a consultation-liaison psychiatry service differ in several key respects from those who are not. By identifying such characteristics, psychiatrists may make targeted efforts to educate primary providers about detection and referral for vulnerable populations. This study also gives preliminary evidence of improved care (increased use of psychotropics in accord with APA guidelines) and outcomes (decreased readmission rates) among delirium patients receiving psychiatric consultation, which should be further investigated and hopefully supported in future studies. If borne out, this would give providers additional incentive for detecting and referring delirium patients and provide consultation-liaison psychiatrists even stronger justification of the utilization of their services. Finally, this study demonstrates the potential for bias in delirium research studies that rely solely on referrals as a source of subjects, and highlights the need for screening measures or other methods of detecting delirium. Further studies are needed to expand on these findings in order to provide a comprehensive view of delirium and the role of consultation-liaison psychiatrists in its treatment.

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