

The Mortality Rate Among Patients with Delirium 6 Months After Diagnosis by A Consultation-Liaison Psychiatric Team



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SUMMARY

Background: Data from Western countries suggest that delirium is associated with a high rate of mortality; however, the mortality rate in patients with delirium in India has not been studied.

Aim: To determine the mortality rate among a group of hospitalized patients with delirium 6 months after being diagnosed with delirium.

Methodology: The study included 97 patients with delirium that were evaluated by the consultation-liaison psychiatric team. Informed consent was provided by the patients' caregivers. The patients were rated according to the Delirium Rating Scale-Revised 98 (DRS-R-98) and Delirium Motor Subtype Scale, and the etiology of delirium was recorded using a structured format.

Results: Mean age of the patients was 47.14 ± 18.10 years and mean duration of formal education was 8.35 ± 5.63 years. Most of the patients were male ($n = 69$, 71.13%) and had hospital-emergent delirium ($n = 68$, 70.10%). Mean duration of delirium was 4.15 ± 5.71 d at the time of assessment and mean DRS-R-98 score was 30.71 ± 4.82 . Among the 97 patients, 12 (12.1%) died during their hospital stay- a higher mortality rate than that observed in other patients referred for consultation-liaison psychiatric services that were diagnosed with psychiatric disorders other than delirium (4.43%) or not diagnosed with a psychiatric disorder (no deaths) during the same time period. The mortality rate in patients with delirium was also significantly higher than that seen among all other hospital admissions during the study period (6.79%; 2119 deaths among 31,190 admissions; chi-square value: 4.73; $P = 0.02$). Mortality rate in patient's with delirium at 6 month follow-up was 27.83%.

Conclusions: Delirium in hospitalized patients is associated with a high mortality rate.

Keywords: Delirium, mortality

INTRODUCTION

Delirium is an acute neuropsychiatric condition associated with a range of etiologies. Delirium is associated with prolonged hospitalization, functional decline, and an increase in healthcare costs (Trzepacz & Meagher 2005; Siddiqi et al. 2006). Delirium is also associated with high mortality rates. Studies have shown that 9%-34.5% of patients with delirium die during hospitalization (Inouye et al. 1998; McCusker et al. 2002); however, most such studies have evaluated inpatient and follow-up mortality rates among elderly patients

with delirium or those admitted to intensive care units (ICUs) (Inouye et al. 1998; Curyto et al. 2001; McCusker et al. 2002; Ely et al. 2004; Lislle et al. 2005; Adamis et al. 2006). Very few studies have evaluated mortality rates among medical/surgical inpatients with delirium that have been referred for psychiatric consultation.

Tennen et al. (2009) studied the 1-year mortality rate among 454 medical/surgical inpatients referred for psychiatric consultation that were diagnosed with delirium, and reported that 69 (15.2%) patients died within 1 year of referral for psychiatric consultation. Among the various predictors of

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mortality, delirium was the only psychiatric diagnosis associated with a high 1-year mortality rate (52.2% in patients who developed delirium vs. 29.9% who had other psychiatric diagnosis, $P = 0.01$; hazard ratio = 1.7). Although, delirium is the most common psychiatric diagnosis in medical/surgical inpatients referred for psychiatric consultation in India (Grover et al. 2009), outcomes in this patient population have not been studied. As such, the present study aimed to determine the inpatient mortality rate and the mortality rate 6 months after being diagnosed with delirium. Additionally, we aimed to identify the predictors of mortality in patients with delirium.

METHODOLOGY

The study was performed in a tertiary care hospital in Northern India. The study protocol was approved by the Ethics Committee and written proxy consent of the primary caregiver of each patient was obtained during the initial assessment, and when possible patient verbal consent was obtained during baseline assessment. This prospective study included 97 patients that were admitted to various medical/surgical and emergency wards, and diagnosed with delirium (according to DSM-IVTR criteria) following referral for consultation-liaison (CL) psychiatric services at the Department of Psychiatry. The patients were followed-up throughout their hospitalization, and then by phone or in person to assess their outcome 6 months after being diagnosed with delirium.

All patients diagnosed with delirium by the CL psychiatric team between February 2010 and June 2010 were asked to participate in the study. Details of the study were explained to each patient and those whose caregivers provided written informed consent were evaluated at baseline and then followed-up during their hospitalization. Follow-up assessment was based on clinical improvement in delirium, persistence of delirium, exacerbation of delirium, and mortality. The mortality rate among the 97 patients with delirium was compared with 2 data sets obtained from hospital records: 1. The mortality rate among all patients admitted to the medical/surgical ward during the same period and 2. The mortality rate among all the patients referred to the CL psychiatric team during the same time period. In order to determine the 6-month mortality rate (the mortality rate 6 months post delirium diagnosis), the patients and/or caregivers were contacted for follow-up between August 2010 and December 2010.

At baseline all the patients with delirium were rated according to the Delirium Rating Scale-Revised-98 (DRS-R-98) (Trzepacz 2001) and Delirium Motor Subtype Scale (DMSS) (Meagher et al. 2008). All possible etiologies associated with delirium were recorded in a structured proforma. Data were analyzed using SPSS v.14.0. Descriptive data include frequen-

cy, percentage, and mean $\pm$ SD. Student's t , chi-square, and Fisher's exact tests were used for between-group comparisons. Binary logistic regression was used to analyze the odds ratio, in terms of predictors of mortality.

RESULTS

Sociodemographic and clinical profile

Mean age of the patient with delirium was 47.14 ± 18.1 years (range: 18-85 years). Most of the patients were younger than 65 years of age ($N=76$; 78.4%). The majority of the patients were male (71.1%). Mean duration of delirium at baseline assessment was 4.15 ± 5.71 d (range: 1-40 d). In all 39 patients were admitted to the medical ward, 39 to the surgical ward, and 19 were admitted to the ICU. In total, 70.1% of the patients had hospital-emergent delirium. The mean number of etiologies associated with delirium was 4.3, anemia being the most common, followed by renal impairment, sepsis, and hepatic impairment (Table 1).

Symptomatology of delirium

The mean DRS-R98 severity score was 24.05 and DRS-R98 total score was 30.71. Among the 97 patients, 56 (57.73%) were classified as hyperactive delirium, 20 (20.6%) as mixed delirium, and 16 (16.5%) as hypoactive delirium, whereas 5 (5.2%) patients couldn't be classified as any of the 3 motoric subtypes, as per the DMSS.

Outcome of delirium

In total, 12 (12.1%) of the 97 patients diagnosed as delirium died during their hospital stay, and at the time of discharge, 55 (56.7%) patients who had developed delirium had improved, 29 (29.9%) still remained delirious, and 1 patient's delirium was more severe. The mortality rate among the hospitalized patients with delirium was significantly higher than that among other patients that were referred to CL psychiatric services and diagnosed with psychiatric disorders other than delirium ($n = 248$) (mortality rate: 4.43% [$n = 11$]) and not diagnosed with a psychiatric disorder ($n = 43$; mortality rate: 0%). The mortality rate among the patients with delirium was also higher than that among all admissions to the hospital during the study period (of the 31,190 admissions, 2119 died [6.79%]) (chi-square value: 4.73; $P = 0.02$).

At 6 months post initial evaluation we attempted to contact the caregivers of the 85 patients that were discharged from hospital; however, only 54 could be reached. Among these 54 patients whose information was available at 6 months after the initial diagnosis of delirium, 15 had died by the time of follow-up. As such, the inpatient mortality rate was 12.1% and the overall mortality rate at 6 months post delirium diagnosis using the last observation carried forward method was 27.83%.

Comparison of the sociodemographic and clinical characteristics of the patients that were dead and alive 6 months post delirium diagnosis is shown in Table 1.

For data comparison the last observation carried forward method was used for patients whose follow-up data were not available. Statistical significance was set at $P < 0.2$ and variables that significantly differed between the 2 groups (those who were alive and those who died) were entered into binary logistic regression to calculate the odds ratio. The mortality rate was higher among the patients that were admitted to the ICU compared to those admitted in general medical and surgical wards (chi-square value: 7.23; $P = 0.007$), had lower DRS-R-98 lability of affect item score (t-test value: 1.398; $P = 0.165$), higher DRS-R-98 language item score (t-test value: 1.56; $P = 0.122$), lower DRS-R-98 attention item score (t-test value: 1.398; $P = 0.16$), less frequently scored positive on withdrawal items of DMSS (t-test value: 1.741; $P = 0.18$), and less frequently had bone fracture dislocation as an etiology (chi-square value: 2.81; $P = 0.094$).

There are no significant difference on any of the other clinical variable and age of the patients [including analysis of age as a dichotomous variable: i.e., adult (< 65 years) and geriatric (≥ 65 years)].

Nonetheless, in logistic regression analysis none of the factors which were significantly different between those alive and dead emerged as significant predictors of mortality.

DISCUSSION

The present study determined the mortality rate among patients diagnosed with delirium following referral for CL psychiatric services, and to the best of our knowledge this is the first such study from India. The present results show that 12.1% of the patients died while hospitalized, a signifi-

cantly higher rate than that among other patients referred for CL psychiatric services and diagnosed with other psychiatric disorders (mortality rate: 4.43%) and not diagnosed with a psychiatric disorder (mortality rate: 0%) during the same period. Furthermore, the mortality rate among the patients with delirium was also higher than that among all hospital admissions during the study period. In the present study the mortality rate among the patients with delirium while hospitalized was similar to that previously reported (9%-34.5%) in studies that included elderly patients and patients referred for CL psychiatric services (Inouye et al. 1998; McCusker et al. 2002; Tennen et al. 2006). Nonetheless, it is important to consider that a large proportion of delirium cases (32%-67%) in general medical wards remain undiagnosed (Mittal et al. 2006) and only a small proportion of inpatients with delirium (10%) are referred for CL psychiatric services (Sirois 1988; Francis et al. 1990; Meagher et al. 2001). Taking this fact into consideration, the actual mortality rate among patients with delirium may be higher than reported.

The mortality rate at 6 months post delirium diagnosis in the present study was 27.83%. Earlier studies that evaluated mortality in elderly patients with delirium at the 1-year post-diagnosis follow-up reported rates of 17%-40% (Cole & Primeau 1993; Moran & Dorevitch 2001), which is similar to the rate observed in the present study. Moreover, in the present study most (78.1%) of the patients with delirium were younger than 65 years of age, and there wasn't a significant difference in the mortality rate between the patients that were younger and older than 65 years of age. This suggests that delirium may be a risk factor for mortality, irrespective of the patient age. As most studies conducted in Western countries have evaluated delirium in the elderly, similar mortality rates in young and elderly patients with delirium must be recognized.

Physicians must be made aware of the prognostic implications of delirium in all age groups, when diagnosed it must be man-

Table 1. Sociodemographics, clinical status, DRS-R-98 and DMC scores, and etiology in the patients with delirium.

	Total study sample n = 97 Frequency (%) / mean ± SD	Alive at 6-month follow-up n = 70 Frequency (%) / mean ± SD	Dead at 6-month follow-up n = 27 Frequency (%) / mean ± SD	Chi square/t-test value/ Mann-Whitney U
Setting				
Medical/Surgical Ward	78 (80.41%)	61 (87.14%)	17 (62.96%)	7.23 ($P = 0.007$)
Intensive Care Unit	19 (19.59%)	09 (12.85%)	10 (37.03%)	
Delirium Rating Scale-Revised-98				
Lability of affect	1.63 ± 0.85	1.71 ± 0.87	1.44 ± 0.80	1.398 ($P = 0.165$)
Language	1.43 ± 0.77	1.35 ± 0.81	1.62 ± 0.62	-1.56 ($P = 0.122$)
Attention	2.30 ± 0.52	2.34 ± 0.53	2.18 ± 0.55	1.286 ($P = 0.202$)
Hypoactive Delirium Motor Subtype Scale (DMSS) items				
Decreased alertness/withdrawal - Present	39 (40.20%)	31 (44.28%)	08 (29.62%)	1.741 ($P = 0.187$)
Etiology of delirium				
Fracture dislocation*	15 (15.46%)	14 (20.00%)	01 (3.70%)	2.38 ($P = 0.122$)

*Chi-square with Yates correction

aged appropriately, and efforts should be made to prevent its onset. A study that evaluated mortality at the 1-year follow-up in patients referred for CL psychiatric services reported a mortality rate of 52% in patients with delirium and having a diagnosis of delirium during the inpatient stay was associated with higher 1-year mortality compared to those without delirium (Tennen et al. 2009). The mortality rate at 6 months reported by Tennen et al. (30%) is similar to the 28% observed in the present study. None of the sociodemographic variables evaluated in the present study were predictive of mortality in the patients with delirium, suggesting that the diagnosis of delirium itself might be a predictor of mortality.

Although according to binary logistic regression analysis none of the clinical variables were significant predictors of mortality, our comparison data suggest that the patients admitted to the ICU had a higher mortality rate. Similarly, some patient characteristics, especially presence of decreased alertness (in contrast to absence of the same), which is indicative of hypoactive delirium, were associated with higher mortality. Studies from the West also suggest that admission to an ICU and hypoactive delirium are associated with higher mortality rates (Ely et al.

2004). This is clinically very important, as hypoactive delirium is often undiagnosed by clinicians (Inouye et al. 2001). As such, physicians must be made aware of the prognostic implications of hypoactive delirium, especially in ICU patients, and that appropriate management can reduce mortality.

The present study has some limitations that should be considered while interpreting the results. The sample size was small, we did not follow-up the patients referred for CL psychiatric services that were diagnosed with disorders other than delirium, and we did not examine the influence of treatment on the outcome of delirium. Furthermore, not all 97 patients initially evaluated were available for 6-month follow-up and analysis was performed using the last observation carried forward method. This would have actually led to missing out on some of the cases that would have expired during this time.

In conclusion, the present study's results show that the mortality rate was higher in patients with delirium during hospitalization than that in hospitalized patients without delirium. The mortality rate at the 6-month follow-up observed in the present study was similar to that previously reported from Western countries.

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