

Accuracy of oncologist assessments of psychiatric problems in cancer inpatients

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ABSTRACT

Objective: Our objective was to examine the accuracy of non-psychiatrist assessments of psychiatric problems in cancer patients.

Method: We conducted a retrospective chart review of cancer patients who were admitted and referred to the consultation–liaison (C–L) team between January of 2011 and December of 2012. The agreement between non-psychiatrist assessments and final diagnoses by attending C–L psychiatrists was estimated for every category of referral assessment using codes from the International Classification of Mental and Behavioral Disorders (10th revision). The data were obtained from the consultation records of 240 cancer inpatients who were referred to the C–L service at a tertiary care center in Tokyo.

Results: The agreement ratio between referring oncologists and psychiatrists differed according to the evaluation categories. The degrees of agreement for the categories of “delirious,” “depressive,” “dyssomnia,” “anxious,” “demented,” “psychotic,” and “other” were 0.87, 0.43, 0.51, 0.50, 0.27, 0.55, and 0.57, respectively. The agreement for all patients was 0.65. Significant differences were observed among seven categories (chi-squared value = 42.454 at $p < 0.001$ and $df = 6$). The analysis of means for proportions showed that the degree of agreement for the “delirious” category was significantly higher and that that for the “depressive” category was lower than that for all patients, while for the “demented” category it was close to the lower decision limit but barely significant. One half of the 20 cases who were referred as depressive were diagnosed with delirium, with one quarter of those having continuously impaired consciousness. Some 7 of the 11 cases who were referred as demented were diagnosed as having delirium.

Significance of Results: The accuracy of non-psychiatrist assessments for psychiatric problems in cancer patients differs by presumed diagnosis. Oncologists should consider unrecognized delirium in cancer inpatients who appear depressed or demented.

KEYWORDS: Diagnostic error, Cancer care, Psychiatric diagnosis, Delirium, Inpatients

INTRODUCTION

A high prevalence of psychiatric disorders among cancer patients has been reported for decades (Dero-

gatis et al., 1983; Mitchell et al., 2011). The burden of these can decrease patient quality of life (QoL), affect the course of the illness, and/or cause severe distress in patients as well as in caregivers (Breitbart et al., 2002; Bruera et al., 2009; Pelletier et al., 2003; Portenoy et al., 1994).

Many screening tools have been developed, and research interest seems to be shifting to identification of effective interventions (Meijer et al., 2011; Rayner

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et al., 2011a; 2011b; Sharpe et al., 2014), but it is still unclear how accurately oncologists recognize the psychiatric problems of patients with cancer. The discrepancy with respect to diagnosis between non-psychiatrist oncologists and psychiatrists may result in significant problems that include reduced patient QoL, inappropriate treatment, prolonged unalleviated suffering, and insufficient information provided to patients and their family members.

In the area of primary care and geriatric medicine, there have been several studies that investigated the accuracy of mental health disorder recognition by general physicians, with findings of frequent misdiagnosis of delirium and overdiagnosis of depression in cases of hospitalized patients (Boland et al., 1996; Carey et al., 2014; Cepoiu et al., 2008; Farrell & Ganzini, 1995; van den Dungen et al., 2012; Yamada et al., 2012). By contrast, we have not found similar studies conducted for inpatients with cancer. Nevertheless, it would be reasonable to assume that there are similar problems in these settings, not only because of the reports in the other medical areas described above but also because there are a few studies that suggest a low sensitivity of oncologists to perceptions of psychological symptoms or reported delirium, which were neither well-documented nor recognized in palliative care settings (Hey et al., 2015; Newell et al., 1998).

If this assumption holds true, such oversight naturally may result in a loss of the possibility of recovery, despite reports that the reversibility rate of delirium in cancer patients can be quite high (30–70%) depending on the precipitating etiologies and patient-predisposing factors (Gagnon et al., 2000; Lawlor et al., 2000a; Leonard et al., 2008).

We therefore conducted a retrospective study to estimate the degree of agreement between oncologists and psychiatrists at a regional cancer care center for every category of assessments by non-psychiatrists. To improve clinical conditions in cancer care where the access to assessment by psychiatrists is often limited, the purposes of the present study were to examine: (1) the accuracy of non-psychiatrist oncologist assessment of psychiatric problems in cancer patients and (2) how oncologists often misrecognize psychiatric problems.

METHODS

Study Design

Our study was a retrospective chart review.

Study Setting and Subjects

Using consultation–liaison (C–L) records, we collected consecutive psychiatric consultation data

from January of 2011 to December of 2012 from the Tokyo Metropolitan Tama Medical Center, a 789-bed tertiary care teaching hospital in Tokyo, Japan. The institution is certified as a Regional Core Cancer Care Hospital based on the Cancer Control Act of Japan. According to the administrative claims data, there were 9,548 admissions with a diagnosis of cancer as their main disease during the 24-month study period. However, this number included repeat admissions for the same patient (e.g., scheduled admissions for chemotherapy).

All subjects were adult patients (≥ 18 years old) who were hospitalized in non-psychiatric wards and referred to the C–L service. From all referrals, we extracted those who had cancer as their main physical problem and collected their recorded variables, including: sociodemographic data, types of illness, illness and treatment-related factors (stage, metastasis, current use of steroids or opioids), hospitalization department, referring oncologist assessment or reason for referral, and diagnosis by C–L psychiatrists. There were no screening tools that were routinely administered to patients in the study sample by referring oncologists or psychiatrists. However, psychiatrists performed cognitive evaluations of patients using such simple tools as the Mini-Mental State Examination or the Revised Hasegawa Dementia Scale when necessary (Kim et al., 2005). Because the purpose of this study was to estimate the accuracy of oncologist assessments, the following patients were excluded: those referred within a week after a surgical operation (and highly likely to have postoperative delirium), referred for screening evaluation before bone marrow transplantation (as oncologists did not provide psychiatric assessment for these patients before referral), referred for continued psychiatric treatments for preexisting mental health disorders, or referred for a purpose other than evaluation for psychiatric problems (such as the usage of hypnotics).

Procedures

The medical records of the referred patients were examined retrospectively. Consultations were performed over the phone or by making an appointment electronically. Referring oncologists wrote referral letters that contained the presumed condition and the purpose of the consultation. C–L psychiatrists met patients on the day when referrals were made and conducted nonstructured interviews that included questions about life and medical history. The C–L team comprised six certified and six uncertified psychiatrists. Although uncertified psychiatrists made diagnoses as well as certified doctors, their diagnoses were supervised by a certified senior doctor on duty for that day. Psychiatric diagnoses

were based on the usual clinical assessments and classified according to the International Classification of Mental and Behavioral Disorders, 10th revision (ICD–10) (World Health Organization, 1992).

Although every psychiatrist routinely listed the referring oncologist's suspected diagnosis or the main finding assessed by them based on the referral letter or phone call, the assessments of non-psychiatrists were not described in proper psychiatric terms in many cases. Therefore, the authors grouped the mental health conditions assessed by non-psychiatrists on all referrals into several qualitative categories. When referring oncologists described only the primary finding but not the suspected diagnoses, we interpreted and judged their implications considering the context and the usual clinical parlance in Japan. If the primary finding was unclear or the meaning of the terms was ambiguous, we carefully checked the clinical records before the consultation and inferred the referrer's intentions.

For the classification, we prepared a set of categories a priori and with reference to some literature that employed similar methodology (Chiu et al., 2009; Yamada et al., 2012)—specifically, “delirious,” “demented,” “psychotic,” “depressive,” “dysomnia,” and “anxious.” However, if we found a considerable number of referrals that were qualitatively coherent but could not be classified into these categories, adding new categories was permitted.

The investigators decided which psychiatric diagnoses corresponded to each category of referral assessments, allowing an investigator to determine the agreement between the referring oncologists and the attending psychiatrist for every referred patient. For example, a “depressive” assessment by an oncologist was judged to agree with the final diagnosis by the psychiatrist if the diagnosis corresponded to any of the following: “Depressive Episode (F32),” “Recurrent Depressive Disorder (F33),” “Reaction to Severe Stress,” and “Adjustment Disorders (F43)” or “Organic Depressive Disorder (F06)” (see Table 1). The left-hand column of this table lists diagnoses or core symptoms described by referring doctors that were qualitatively categorized, and the right-hand column includes the psychiatric diagnoses that were thought to correspond to each category. Our study was approved by the institutional review board of the Tokyo Metropolitan Tama Medical Center, who issued a waiver of informed consent in order to review patient charts.

Statistical Analysis

The agreement ratios were calculated for each category of referral assessments. The chi-squared (χ^2) test was utilized to determine the significance of

Table 1. Categories of referring oncologist assessments and psychiatric diagnoses corresponding to each category

Category	Corresponding diagnoses (ICD–10 code)
Delirious	Delirium (F05, F1x.4)
Depressive	Depressive Episode (F32) Recurrent Depressive Disorder (F33) Reaction to Severe Stress and Adjustment Disorders (F43) Organic Depressive Disorder (F06)
Dyssomnia	Nonorganic Sleep Disorders (F51) Organic Insomnia (G47)
Anxious	Anxiety Disorders (F40–41), Reaction to Severe Stress and Adjustment Disorders (F43)
Demented	Dementia (F00–04, F1x.73)
Psychotic	Schizophrenia, schizotypal, and delusional disorders (F20–29) Organic hallucinosis/delusional disorder (F06.0, F06.2), Psychotic disorders due to psychoactive substance use (F1x.5)
Others	Unspecified

differences in agreement ratios between the seven categories. In addition, as a method of multiple comparison procedures, we employed analysis of means (ANOM) for proportions to identify if any categories had significantly different agreement proportions than the overall proportion. Significance was judged by the upper/lower decision limits (UDL/LDL), which depend on sample size and the response proportion of each category. The calculations were carried out using JMP 9.0 (SAS Institute Japan, Tokyo). A value of $p < 0.05$ was deemed to be significant.

RESULTS

Patient Characteristics

During the 24-month study period, the C–L team accepted 1,846 referrals. A total of 320 patients among all referrals had cancer as their main physical problem. Among them, 26 referred within a week after surgery, 34 referred for screening before bone marrow transplantation, 17 referred for preexisting mental health disorders, and 3 referred for a purpose other than psychiatric evaluation were excluded, leaving 240 patients identified for analysis. In total, there were 107 referring physicians. Of the 240 referral letters, 92 were prepared by attending physicians, 134 by fellows, and 14 by residents.

Patients were grouped into seven categories based on the mental health conditions assessed by referring oncologists: “delirious” ($n = 104$, 43.3%),

“depressive” ($n = 40$, 16.7%), “dyssomnia” ($n = 35$, 14.6%), “anxious” ($n = 18$, 7.5%), “demented” ($n = 11$, 4.6%), “psychotic” ($n = 11$, 4.6%), and “other” ($n = 21$, 8.7%).

The descriptions on referral letters that were grouped into each category were as follows: delirium ($n = 54$), disquietedness ($n = 43$), confusion ($n = 4$), and acute disorientation ($n = 3$) for the “delirious” category; depression ($n = 35$), psychogenic appetite loss ($n = 4$), and adjustment disorder ($n = 1$) for the “depressive” category; insomnia ($n = 35$) for the “dys-somnia” category; anxiety ($n = 14$) and unrest ($n = 4$) for the “anxious” category; dementia ($n = 11$) for the “demented” category; and hallucinations ($n = 9$) and acute psychosis ($n = 2$) for the “psychotic” category. The “other” category comprised various miscellaneous conditions with four or fewer patients each, such as emotional instability ($n = 4$), alcohol abuse ($n = 3$), personality disorder ($n = 2$), and behavior abnormality ($n = 2$).

Table 2 shows the distribution of final diagnoses by psychiatrists. Among the psychiatrist diagnoses, the most frequent was delirium (54.6%), followed by adjustment disorders (11.7%) and insomnia (organic/nonorganic) (7.5%). The diagnosis of depressive disorders was less prevalent (2.5%). Impaired consciousness was diagnosed when the patients showed a continuously decreased level of consciousness but did not fulfill the diagnostic criteria for delirium. This did not fit into any psychiatric disorder and was not regarded as a corresponding diagnosis for any of the categories of presumed psychiatric conditions.

Table 2. Distribution of final diagnoses by psychiatrists

Diagnosis (ICD-10 code)	<i>n</i>	(%)
Delirium (F05, F1x.4)	131	(54.6)
Reaction to severe stress, and adjustment disorders (F43)	28	(11.7)
Organic/Nonorganic Insomnia (F51, G47)	18	(7.5)
Impaired consciousness (R40)	14	(5.8)
Dementia (F00–04, F1x.73)	10	(4.2)
Depressive episode/disorders (F32, F06)	7	(2.9)
Organic hallucinosis/delusional disorder (F06.0, F06.2)	5	(2.1)
Schizophrenia, schizotypal/delusional disorders (F20–29)	3	(1.3)
Alcohol dependence (F10.2)	3	(1.3)
Anxiety disorders (F40–41)	3	(1.3)
Bipolar disorder (not currently in depressive episode) (F31)	2	(0.8)
Dissociative and conversion disorders (F44)	2	(0.8)
Restless leg syndrome (G25.81)	1	(0.4)
No diagnosis (including normal reaction) (Z03.89)	13	(5.4)

Table 3 presents patient demographic and clinical factors. Ages ranged from 18 to 89 years, the median age was 71 years (interquartile range = 64.0–77.8), and 100 patients (41.7%) were female. With regard to social factors, about 70% of patients were married, and only 14% were employed (full- and part-time). The most common cancer site was the lung, followed by bladder, uterus, and colon. Approximately 60% of patients had metastases, and about 60% were at stage IV. Opioids and steroids were prescribed to about 40 and 30% of patients, respectively.

All patients were evaluated with regard to agreement or disagreement between the oncologist’s assessment and the psychiatrist’s final diagnosis. These agreed in 155 cases and disagreed in 85. There were no statistically significant differences between the disagreement and agreement groups.

Degree of agreement differed according to the referring assessment categories. The degrees of agreement for the “delirious,” “depressive,” “dyssomnia,” “anxious,” “demented,” “psychotic,” and “other” categories were 0.87, 0.43, 0.51, 0.50, 0.27, 0.55, and 0.57, respectively, while the degree of agreement for all patients was 0.65. Significant differences were observed in degrees of agreement among the seven categories ($\chi^2 = 42.454$ at $p < 0.001$ and $df = 6$). These results are given in Table 4.

The analysis of means for proportions showed that the degree of agreement in the “delirious” category was significantly higher than the upper decision limit ($0.87 > \text{UDL } 0.74$), while that of the “depressive” category was lower than the lower decision limit ($0.43 < \text{LDL } 0.46$). The degree of agreement in the “demented” category (0.273) was close to the lower decision limit (LDL 0.269) but not below it. The ANOM decision chart is depicted in Figure 1.

Of the 23 cases who were referred as “depressive” but were diagnosed otherwise by psychiatrists, 10 had delirium (7 hypoactive and 3 mixed subtype), 5 had continuously impaired consciousness, and 1 each had cerebral infarct, dementia, alcoholism, dissociative disorder, and no mental health disorder. Similarly, of the 8 cases who were referred as “demented” but were diagnosed otherwise, 6 had delirium (3 hyperactive, 2 hypoactive, and 1 mixed subtype).

The sensitivity and specificity of oncologist assessments for the final diagnoses of delirious, depressive, and demented status were 0.69/0.88, 0.51/0.89, and 0.30/0.97, respectively.

DISCUSSION

In this study, we have compared the degrees of accuracy for each assessment category by non-psychiatrist oncologists.

Table 3. Demographic characteristics and clinical variables of 240 cancer inpatients

	All (<i>n</i> = 240)	Disagreement (<i>n</i> = 85)	Agreement (<i>n</i> = 155)	Chi-square test value	Value of <i>p</i>
Age, years				$\chi^2 = 1.42, df = 1^\dagger$	<i>p</i> = 0.23
Median	71	70	72		
Interquartile	64–78	62–77	65–78		
Gender				$\chi^2 = 1.57, df = 1$	<i>p</i> = 0.21
Male/female	140/100	45/40	95/60		
Marital status				$\chi^2 = 2.46, df = 3$	<i>p</i> = 0.48
Married	171 (71.2)	59 (69.4)	112 (73.3)		
Unmarried	34 (14.2)	10 (11.8)	24 (15.5)		
Widowed	16 (6.7)	8 (9.4)	8 (5.2)		
Unknown	19 (7.9)	8 (9.4)	11 (7.1)		
Employment status				$\chi^2 = 0.46, df = 5$	<i>p</i> = 0.99
Retired	103 (42.9)	37 (43.5)	66 (42.6)		
Housewife	43 (17.9)	16 (18.8)	27 (17.4)		
Full-time worker	29 (12.1)	10 (11.8)	19 (12.3)		
Part-time worker	5 (2.1)	2 (2.4)	3 (1.9)		
Unemployed	11 (4.6)	3 (3.5)	8 (5.2)		
Unknown	49 (20.4)	17 (20.0)	32 (20.6)		
Cancer stage				$\chi^2 = 4.47, df = 2$	<i>p</i> = 0.09
IV	151 (62.9)	57 (67.1)	94 (60.6)		
I–III	60 (25.0)	23 (27.1)	37 (23.9)		
Unknown	29 (12.1)	5 (5.9)	24 (15.5)		
Metastasis				$\chi^2 = 3.45, df = 2$	<i>p</i> = 0.18
[+]	137 (57.1)	54 (63.5)	83 (53.5)		
[–]	68 (28.3)	23 (27.1)	45 (29.0)		
Unknown	35 (14.6)	8 (9.4)	27 (17.4)		
Opioid usage				$\chi^2 = 0.03, df = 1$	<i>p</i> = 0.85
[+]	95 (39.6)	33 (38.8)	62 (40.0)		
[–]	145 (60.4)	52 (61.2)	93 (60.0)		
Steroid usage				$\chi^2 = 0.07, df = 1$	<i>p</i> = 0.79
[+]	76 (31.7)	26 (30.6)	50 (32.3)		
[–]	164 (68.3)	59 (69.4)	105 (67.7)		
Cancer site				$\chi^2 = 16.52,$ $df = 16$	<i>p</i> = 0.41
Lung	54 (22.5)	22 (25.9)	32 (20.6)		
Urinary organs	26 (10.8)	8 (9.4)	18 (11.6)		
Uterus	19 (7.9)	10 (11.8)	9 (5.8)		
Colon	18 (7.5)	5 (5.9)	13 (8.4)		
Stomach	14 (5.8)	5 (5.9)	9 (5.8)		
Ovary	14 (5.8)	5 (5.9)	9 (5.8)		
Lymphoma	13 (5.4)	0 (0.0)	13 (8.4)		
Head and neck	12 (5.0)	4 (4.7)	8 (5.2)		
Breast	11 (4.6)	6 (7.1)	5 (3.2)		
Leukemia	10 (4.2)	3 (3.5)	7 (4.5)		
Pancreas	10 (4.2)	4 (4.7)	6 (3.9)		
Esophagus	7 (2.9)	3 (3.5)	4 (2.6)		
Biliary tract	7 (2.9)	4 (4.7)	3 (1.9)		
Liver	6 (2.5)	2 (2.4)	4 (2.6)		
Kidney	6 (2.5)	1 (1.2)	5 (3.2)		
Others	6 (2.5)	1 (1.2)	5 (3.2)		
Unknown	7 (2.9)	2 (2.4)	5 (3.2)		

† Kruskal–Wallis *H* test.

Our results suggest that oncologist assessments were highly accurate when delirium was considered but inaccurate when depression was considered. Although many studies conducted in primary care

settings have reported that the low accuracy of depression recognition by general physicians is caused by a tendency to overlook depression (Cepoiu et al., 2008), the findings of our study suggest that non-

Table 4. Degrees of agreement between the referring oncologists and the C-L psychiatrists for each assessment category

Categories of the main symptom or condition described by referring oncologists, <i>n</i> (%)	Agreement with diagnoses by C-L psychiatrists			Degree of agreement	
	Disagreement, <i>n</i> .	Agreement, <i>n</i>			
Delirious	104 (43.3)	14	90	0.87	$p < 0.0001$ $\chi^2 = 42.45$ $df = 6$
Depressive	40 (16.7)	23	17	0.43	
Dyssomnia	35 (14.6)	17	18	0.51	
Anxious	18 (7.5)	9	9	0.50	
Demented	11 (4.6)	8	3	0.27	
Psychotic	11 (4.6)	5	6	0.55	
Others	21 (8.7)	9	12	0.57	
Total	240 (100.0)	85	155	0.65	

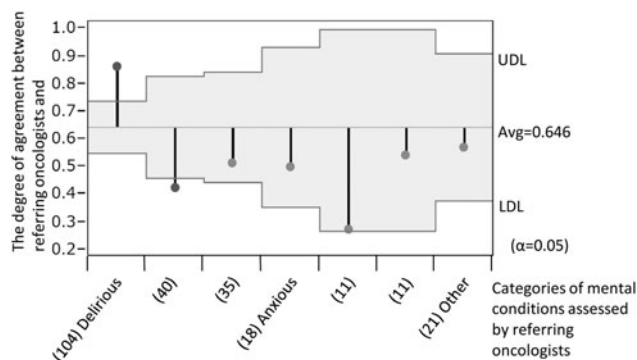
psychiatric oncologists may tend to overestimate depression. This discrepancy can arise partly from the differences of the populations studied, especially whether inpatients or outpatients. As regards inpatients, Rhondali et al. (2015) found no significant agreement (kappa coefficient, $\kappa < 0$) between psychiatric clinical interviews and oncologist assessments in detecting depression, and also reported that oncologist assessment tended to overlook depression (low sensitivity/high specificity = 0.13/0.82). However, the population of that study included all inpatients, whereas our study included only referred inpatients. The number of previous studies that investigated diagnostic accuracy in hospitalized patients referred for psychiatric consultation is limited, but almost all of them have shown that a substantial proportion (33–78%) of referrals for depression were found not to have a depressive diagnosis, but most frequently had delirium (Boland et al., 1996; Farrell & Ganzini, 1995; Yamada et al., 2012). Our results suggest that there is a similar tendency even in cancer care for inpatients.

There may be some concern that such misrecognition is caused by a lack of knowledge on the part of oncologists. However, a previous study that examined

physicians' knowledge about depression suggested that most oncologists were already well-trained about depression (Rhondali et al., 2012). Similarly, in Japan, depression is emphasized in palliative care educational programs provided for all physicians engaged in cancer care. Therefore, it can be assumed that detecting or differentiating symptoms of depression is difficult, even for physicians with sufficient knowledge. The results of the present study suggest that such misrecognition may arise from the phenomenological overlap of delirium and depression, including sleep disturbances, psychomotor symptoms, and altered mood states. In similar fashion, delirium and dementia overlap at several points with respect to clinical features (Farrell & Ganzini, 1995; Leonard et al., 2014).

Although the symptoms presented by delirium and dementia differ with respect to temporal fluctuation and patterns of onset, it is often difficult to distinguish between them, particularly in the hypoactive subtype of delirium or in delirium comorbid with dementia (Leonard et al., 2014). Although in the present study ANOM showed little statistically significant differences in the agreement ratio of the presumed dementia group compared with that of all patients (0.273 vs. LDL 0.269), probably owing to the small sample size of the category, most of the cases diagnosed as “demented” by oncologists had delirium. This finding could be interpreted as a propensity to misrecognize delirium as dementia.

For the group of patients diagnosed as “delirious,” the accuracy of oncologist assessments was relatively high. This could be explained by a difference in detection rates depending on the motor subtypes of delirium. One prospective study reported that the detection rate of delirium in terminal cancer inpatients depended on motor subtypes: 45% of all subtypes of delirium but only 21% of the hypoactive subtype were detected by the palliative care team (Fang et al., 2008). Thus, most patients referred for

**Fig. 1.** ANOM decision chart.

delirium would be of the hyperactive subtype that could be easily recognized and referred. While we only examined a group of referred patients in the present study, the majority of delirium patients misrecognized as depressive and demented were of the hypoactive or mixed subtype. Therefore, it would be reasonable to assume that most patients referred for delirium were of the hyperactive subtype that could be easily recognized, but that there would be many delirious patients who were not detected nor referred by oncologists above and beyond the cases of misrecognized delirium that were referred.

In a palliative care setting, delirium is a highly distressing experience not only for patients but also for their caregivers (Breitbart et al., 2002; Morita et al., 2007). Moreover, delirium reliably predicts impending death in advanced cancer (Hui, 2015; Maltoni et al., 2012). Thus, recognizing delirium is important for alleviation of suffering, treatment planning, and informing family members of what to expect. Some misrecognition is inevitable, particularly by non-psychiatrists, and referral for precise diagnosis by psychiatrists is an appropriate clinical action. However, access to psychiatrists is limited in many cancer care settings, and it is thus desirable that non-psychiatrist oncologists properly detect and recognize psychiatric problems.

Oncologists should suspect patients of having organic mental health disorders, including delirium, before suspecting depression or dementia. Distinguishing depression or dementia from delirium may be difficult (Nicholas & Lindsey, 1995), and chart review focused on symptom fluctuation and onset time and such simple attention tests as the Months Backwards Test for attentional deficits are useful (Lawlor & Bush, 2014; Leonard et al., 2014; Meagher et al., 2014; 2015; O'Regan et al., 2014).

Furthermore, our results demonstrated that, without any screening tools, the sensitivity of oncologist assessments for patients who were delirious, depressive, and demented was low. This finding suggests that the screening process for psychiatric assessments should be further evaluated. The use of tools that have been validated in patients with cancer is also recommended—for example, the Edmonton Symptom Assessment System for comprehensive symptom assessment and the Memorial Delirium Assessment Scale for delirium screening (Breitbart et al., 1997; Bruera et al., 1991; Lawlor et al., 2000b; Watanabe et al., 2012).

The present study has several methodological limitations. First, we employed a retrospective design. There might therefore be information bias, particularly in the classification of non-psychiatrist assessments because of insufficient documentation and inconsistencies, as well as in the interpretation of a

psychiatrist's diagnosis recorded as a "suspected" diagnosis. Second, we only examined a group of patients who were referred for evaluation and could not investigate patients who were not referred but should have been referred. There might have been a significant level of underdiagnosis of various conditions among these non-referred patients that might have been diagnosed differently by a psychiatrist. Third, our sample was obtained from a single medical center and was small in size, and several oncologist assessments were ambiguous. Thus, our findings may not be generalizable to all cancer patients or oncologists. Fourth, each final diagnosis was made by one certified senior psychiatrist rather than by two psychiatrists independently. Finally, the proficiency of the group of referring physicians might have influenced the accuracy of their assessments. However, as the proportion of referral letters prepared by residents in this study was low (14/240, 5.8%), it cannot be presumed that there were such effects. Further prospective studies and investigations using cross-sectional methods to discriminate delirium from other psychiatric statuses are warranted.

In summary, the accuracy of non-psychiatrist assessments for psychiatric problems in cancer patients varies depending on the presumptive diagnosis. Oncologists should be made aware of the possibility of delirium when cancer inpatients appear to be depressed or demented. The hyperactive subtype of delirium is more easily recognizable than the hypoactive subtype. Careful chart review to prevent overlooking temporal fluctuations and patterns of acute onset as well as examinations for attentional deficit are strongly recommended.

DISCLOSURES

The authors hereby declare that they have no conflicts of interest to disclose.

STATEMENT OF AUTHORSHIP

D.Y. and H.T. made substantial contributions to this study. J.S. revised the sections of the manuscript. K.N. gave advice from the viewpoint of an expert consultation–liaison psychiatrist. All authors have read and approved the final manuscript.

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