

The Dangerousness of Persons with Delusional Jealousy

J. Arturo Silva, MD, Michelle M. Ferrari, MD, Gregory B. Leong, MD, and Gary Penny, MD

Delusional jealousy is an important subject for forensic psychiatry because of its well-known association with violence, especially as directed toward spouses. In this article, we report a study of 20 individuals who suffered from delusional jealousy. Important biopsychosocial parameters, the relation between jealousy and aggression, and directions for future study are explored.

Delusional jealousy has received increasing recent attention from the psychiatric community¹⁻⁴ and the public.⁵ This renewed interest is related to a greater appreciation of the linkage between delusional jealousy and subsequent aggression, especially aggression associated with domestic violence.^{3, 6, 7} Delusional jealousy may thus be one of the important variables to be studied when addressing violence prevention or setting social policy in domestic or similar dyads.

Despite renewed interest in the study of delusional jealousy, relatively little systematic work has been done to investigate

it from the perspective of a forensic psychiatrist.^{3, 7} Even less work has been done to develop a comprehensive biopsychosocial perspective of delusional jealousy by integrating neurobiological, psychological, ecological, and cultural parameters. The objectives of this article are as follows: (1) to report important psychiatric and psychosocial characteristics in a sample of 20 cases of delusional jealousy; (2) to explore the degree of dangerousness posed by these subjects; and (3) to initiate the development of a biopsychosocial framework for understanding dangerous delusional jealousy.⁸ Two cases of delusional jealousy are presented to highlight important characteristics of this potentially violent psychotic condition.

Case 1

Mr. A is a 39-year-old Latino male who was admitted to a psychiatric hospital secondary to experiencing feelings of hostility toward his wife of 14 years be-

Dr. Silva is staff psychiatrist, National Center for Post-traumatic Stress Disorder, Clinical/Education Division, Palo Alto Veterans Health Care System, Menlo Park Division, Palo Alto, CA. Dr. Ferrari is staff psychiatrist, Kaiser-Permanente Medical Group, Santa Clara, CA. Dr. Leong is Associate Professor of Psychiatry, Ohio State University College of Medicine, and Chief of Mental Health and Behavioral Science Service, Veterans Affairs Outpatient Clinic, Columbus, OH. Dr. Penny is Assistant Clinical Professor of Psychiatry, University of Texas Health Science Center at San Antonio. Address correspondence to: J. Arturo Silva, MD, Psychiatry Services (170SJC), Veterans Affairs Outpatient Clinic, 80 Great Oaks Blvd., San Jose, CA 95119.

cause he believed that she had engaged in over 50 sexual relationships with other men during their marriage. He accused his wife of having sexual intercourse with a number of his family members, coworkers of his and Mrs. A, as well as with many strangers. She denied these allegations, and no objective evidence could be found to support Mr. A's accusations of her infidelity. For the four years before the index hospitalization, Mr. A had hit his wife with his hands on a regular basis hoping to extract a confession from her. On one occasion he had been jailed after causing her a skull injury along with significant facial bleeding.

Mr. A drank alcohol heavily and regularly. While intoxicated, his hostility, paranoia, and jealousy increased substantially. He had no known history of violence independent of that associated with jealousy. Mr. A also complained of insomnia and ideas of reference. He had no nonpsychiatric medical disorders other than non-insulin-dependent diabetes, which was controlled by diet. There was no positive family psychiatric history.

Mr. A's physical examination, including his neurological examination, was within normal limits. His serum chemistries were within normal limits except for an admitting serum glucose level of 176 mg%. His complete blood count, urinalysis, and electroencephalograph (EEG) were normal. The computed tomographic (CT) scan of his brain revealed diffuse atrophy. Mr. A met DSM-IV criteria for paranoid schizophrenia and alcohol dependence.⁹ One month of treatment with 4 mg of risperidone daily along with ab-

stinence from alcohol resolved both his delusional jealousy and his hostility.

Case 2

Mr. B is a 58-year-old white male who was admitted to a psychiatric inpatient unit because of increasing paranoid delusions, hostility toward his wife of 26 years, and marked insomnia. He believed that his wife had been sexually involved with several men that he had never met. He also believed that his older daughter's husband had had sexual relations with Mrs. B. His wife corroborated that he had exhibited ideas of jealousy commencing shortly after their marriage. During the four years before this admission, Mr. B frequently washed the bathroom, especially the toilet, to prevent being infected with any sexually transmitted disease caused by Mrs. B's alleged sexual liaisons. Mr. B's history of physical aggression directed at his wife, secondary to his anger toward her for alleged infidelity, consisted of pushing her twice. Recently, however, he had begun threatening to cut her with a knife or to kill her in her sleep. Mr. B's escalating threats of violence finally led to the index hospitalization.

Mr. B had a history of continuous alcohol abuse starting in adolescence. Mrs. B complained that he invariably became more hostile and jealous when intoxicated. While intoxicated he responded to visually hallucinated companions. He denied any history of experiencing alcohol withdrawal symptoms, and no withdrawal symptoms or signs were observed during the index hospitalization. Mr. B displayed mood lability. Independently of paranoia related to his delusional jealousy, he also

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believed that he was continually monitored by others who wanted to harm him, particularly passers-by in front of his house. Mr. B had no previous history of psychiatric hospitalization and had never been in prison.

Mr. B's physical and neurological examinations were within normal limits. His complete blood count, serum chemistries, urinalysis, urine drug screen, and EEG were unremarkable. A brain CT scan showed diffuse cerebral atrophy.

Mr. B met DSM-IV criteria for paranoid schizophrenia.⁹ Treatment with 6 mg of risperidone daily in combination with abstinence from alcohol significantly decreased but did not completely resolve his delusional jealousy. However, his hostility toward his wife essentially disappeared.

Methods and Results

Delusional jealousy has been defined as the belief in the infidelity of one's spouse or lover that reaches delusional intensity.^{3, 10, 11} Our clinical sample consists of 20 subjects who suffered from delusional jealousy and who were evaluated by the authors between 1990 and 1995. The sample was derived from various hospitals and locked forensic psychiatric facilities. Relevant clinical and forensic data were gathered retrospectively by record review. Diagnoses were made to conform to DSM-IV criteria.⁹

Table 1 details demographic information of our sample and information regarding the onset of psychosis and delusional jealousy. Table 2 provides information regarding diagnosis, substance use, and available neuroimaging

and EEG results. Table 3 presents information pertaining to the object of the delusional jealousy and on aggression associated with delusional jealousy. Table 4 describes psychotic symptoms that co-occurred with delusional jealousy in our sample.

Concerning the identity of the putative paramour of the spouse, 12 individuals stated that at least some of these paramours were known. Three were relatives of the jealous individual, including two sons-in-law and one brother-in-law. Four were acquaintances of the jealous person, and five were acquaintances of the allegedly unfaithful spouse. None of the putative paramours that were identified were attacked, and no serious threats of harm to them by the jealous person were recorded.

Treatment outcome was globally recorded from the medical charts according to whether delusional jealousy and other accompanying psychotic symptoms either resolved, improved, or no change was noted. All 12 subjects with schizophrenia were treated with neuroleptic medication. Two of these experienced complete resolution of their delusional jealousy; and six experienced some improvement. Four of the 12 were treated with atypical neuroleptics, two with clozapine¹² and two with risperidone.¹³ Those treated with clozapine experienced some improvement. Of the two treated with risperidone, one experienced total resolution of delusional jealousy, while the other experienced some improvement. In addition to neuroleptics, treatment for three of those with schizophrenia, cases 13, 14, and 19, also included valproic

Table 1
Demographics and Temporal Course of Delusional Jealousy^a

Case No.	Age/Sex	Marital Status	Ethnicity	Age of Onset	
				Psychosis	Delusional Jealousy
1	39/M	m	2	21	22
2	58/M	m	3	25	36
3	58/M	m	2	32	57
4	74/M	m	2	30	73
5	25/M	m	3	21	23
6	48/M	m	3	21	21
7	54/M	m	2	21	22
8	34/M	m	2	18	24
9	33/M	m	1	22	32
10	49/M	m	3	17	33
11	36/M	d	1	17	28
12	63/M	m	3	60	60
13	50/M	m	2	22	40
14	42/F	sp	3	11	42
15	77/M	m	1	76	76
16	39/M	d	1	19	19
17	39/M	m	1	27	39
18	53/M	m	2	48	48
19	45/M	d	3	20	38
20	42/M	m	2	39	39

^aM = male; F = female. m = married; s = single; d = divorced; sp = separated. 1 = black; 2 = white Hispanic; 3 = other white.

acid, phenytoin, and carbamazepine, respectively. All three experienced some reduction of delusional jealousy.

Case 4, who suffered from a psychotic disorder not otherwise specified and was treated with neuroleptic medication, experienced no improvement in his delusional jealousy. Case 20, diagnosed at different times as suffering from either a psychotic disorder not otherwise specified or a depressive disorder not otherwise specified, improved with use of a tricyclic antidepressant. Case 18, who suffered from a major depressive episode, experienced complete resolution of his delusional jealousy with the use of bupropion. Case 17, who carried a diagnosis of schizoaffective disorder, did not respond

to risperidone. Two of the three subjects (cases 6 and 15) with direct brain pathology improved with the use of neuroleptic medication; however, one of these two also received carbamazepine and a tricyclic antidepressant. The third individual with brain pathology (case 12) had no response to treatment with neuroleptic medication.

Discussion

Demographic and Diagnostic Issues

Although we use the term delusional jealousy to refer to a psychotic process encompassing a delusion of jealousy, the same phenomenon has often been given different labels in the psychiatric literature. Essentially equivalent terms for de-

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Table 2
Diagnostic and Biological Profile^a

Case No.	Dx	Alcohol Use (Current/Past)	Other Drug Use (Current/Past)	Neuroimaging	EEG
1	1	+/+	-/-	Diffuse atrophy	N
2	1	+/+	-/-	Diffuse atrophy	N
3	1	-/+	-/-	Diffuse atrophy; vascular calcifications	N
4	3	-/-	-/-	Frontal atrophy	N
5	1	-/-	-/-	NR	NR
6	2	-/+	-/a	Right brain stem infarct	N
7	4	-/-	-/-	NR	NR
8	1	-/+	-/a	N	NR
9	1	-/-	-/-	N	NR
10	1	-/+	-/-	N	N
11	1	-/-	-/-	N	N
12	2	-/+	-/-	NR	NR
13	1	-/-	-/-	NR	NR
14	1	-/-	-/-	NR	NR
15	2	-/+	-/-	Diffuse atrophy	NR
16	1	+/-	-/-	NR	NR
17	4	-/-	-/-	N	N
18	5	+/+	-/-	N	NR
19	1	-/-	-/a	N	NR
20	3, 6	+/+	a, b/a, b	N	N

^aDx = diagnosis (1 = paranoid schizophrenia; 2 = psychotic disorder secondary to general medical condition; 3 = psychotic disorder not otherwise specified; 4 = schizoaffective disorder; 5 = major depressive disorder with psychotic features; 6 = depressive disorder not otherwise specified). + = present; - = absent; a = cannabis; b = amphetamine abuse; N = normal; NR = no results (either not done or not available).

lusional jealousy include Othello syndrome, psychotic jealousy, erotic jealousy syndrome, delusion of infidelity, and conjugal paranoia. In addition, the terms sexual jealousy, pathologic jealousy, and morbid jealousy have also been used to encompass delusional jealousy.^{3, 11, 14} In this article we have adopted the term delusional jealousy (or delusion of jealousy) because it arguably represents the clearest descriptive term that refers to this psychotic phenomenon. According to DSM-IV, some cases involving delusional jealousy might qualify for delusional

disorder, jealous type.⁹ In delusional disorder, jealous type, a delusion of jealousy is the principal and prominent psychopathologic component defining the diagnosis.^{9, 15, 16} Delusional disorder, however, occurs infrequently.⁹ In the present sample, none of the subjects qualified for a diagnosis of delusional disorder, jealous type.

In contradistinction to delusional disorder, jealous type, we may encounter several psychotic disorders in which the delusion of jealousy is but one of several components intrinsic to that disorder. De-

Table 3
Nature of Threats and Violence

Case No.	Age of Spouse	Homicidal Threats	Spouse Attacked	Method of Attack	Violence History Unrelated to Jealousy
1	37	+	+	Hands	-
2	56	+	+	Hands	-
3	57	+	-	None	-
4	69	+	+	Hand	+
5	24	-	-	None	-
6	42	+	+	Hands	+
7	54	+	-	None	-
8	36	+	+	Hands	+
9	30	+	-	None	-
10	50	-	-	None	-
11	33	-	+	Hands	-
12	48	+	+	Cane, hands	-
13	39	+	-	None	-
14	39	-	+	Handgun	+
15	61	-	+	Hands	-
16	39	+	+	Knife	-
17	50	+	+	Hands	-
18	51	+	-	None	-
19	31	-	+	Hands	+
20	36	-	-	None	-

+ = present; - = absent.

lusional jealousy is more commonly found among this group of psychotic disorders. Schizophrenia, psychotic disorder due to general medical condition, and psychotic disorder not otherwise specified are three major mental disorders in

which a delusion of jealousy can be considered a significant component of a constellation of symptoms that are important in defining the mental disorder.^{3, 10} Schizophrenia, psychotic disorders due to a general medical condition, schizoaffect-

Table 4
Relevant Co-occurring Psychotic Symptoms in Delusional Jealousy Sample

Psychotic Symptom	N (%)	Homicidal Ideation	Violence Toward Spouse
Paranoid delusions	19 (95)	12	12
Grandiose delusions	5 (25)	2	2
Religious delusions	4 (20)	2	2
Misidentification delusions	3 (15)	2	2
Auditory hallucinations	10 (50)	6	6
Visual hallucinations	2 (10)	2	1

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tive disorder, psychotic disorder not otherwise specified, and depressive disorder with psychotic features accounted for 60, 15, 10, 10, and 5 percent of our sample, respectively (see Table 2). In agreement with most previous studies in which all psychiatric diagnoses have been considered, the functional psychoses, especially schizophrenia, have accounted for a preponderance of the cases of delusional jealousy.^{3, 10, 17}

The average age of our sample is 48 years. The average age of onset of the subjects' psychosis was 28 years. In our sample it took an average of 10 years after the onset of the psychosis before delusional jealousy was first experienced. Therefore, increased age in the context of psychosis appears to predispose the development of delusional jealousy. Musalek and colleagues¹⁸ also find that the average age of onset of delusional jealousy may be closer to later adulthood. This effect is more likely to be operative among males in their sample. Given that our sample was 95 percent male, such an effect may be operating in our sample as well. Moreover, in the study of Musalek and colleagues, males were more likely than females to develop delusional jealousy.¹⁸ We will return to this finding later in our discussion.

In our sample, 80 percent of the subjects were married and lived with their spouses, suggesting that close geographical and emotional proximity to the potential victim is necessary for the development and consolidation of delusional jealousy. The rest of the sample were estranged from their spouses by separation or divorce and no were longer co-

habitating. This indicates that the strength of the emotional bond between estranged spouses coupled with the basic nature of the psychosis may be sufficient to nurture delusional jealousy long after the object of the delusional jealousy is no longer physically proximate and immediately accessible.

In the present study, non-Hispanic whites, white Hispanics, and blacks accounted for 35, 40, and 25 percent, respectively, of the sample. This ethnic/racial distribution is similar to that of the institutions from which our sample was derived. Therefore our data cannot support a correlation between ethnicity, race, or possibly culture and delusional jealousy, as has been previously suggested.⁵

Organismic Biological Contributors

In the recent psychiatric literature, there is an increasing focus on identifying biological factors in the genesis of delusional jealousy.^{3, 19-23} This trend may be explained by the greater availability of probes necessary to identify neurobiological causation of mental disorders in general. The most extensive information in this area suggests that psychoses due to either general medical conditions or associated with alcohol may constitute a greater risk in the development of delusional jealousy compared with functional psychoses such as schizophrenia or delusional disorders.¹

Delusional jealousy may be associated with a wide array of biological factors. Some cases of delusional jealousy can be associated with diffuse brain pathology. For example, Ravindran and colleagues²⁴ reported the case of a 45-year-old woman who experienced delusional jealousy in

the setting of active systemic lupus erythematosus. The delusional jealousy responded well to a combination of chlorpromazine and prednisolone.²⁴ Hodgson and coworkers reported the case of a 46-year-old man who developed delusional jealousy in association with hyperthyroidism. Treatment with carbimazole resolved their patient's delusions.¹⁹ Other medical conditions leading to delusional jealousy associated with relatively diffuse and bilateral effects on the brain are the dementias.^{22, 25} Interestingly, the literature has heretofore included only a few cases of localized lesions as likely causes of delusional jealousy. Left brain lesions such as infarcts have been associated with delusional jealousy,²⁰ as have right brain lesions.^{3, 22, 26} Cerebellar pathology may also be associated with psychotic disorders involving delusional jealousy.³

In the current sample, 13 of the subjects had been evaluated with brain CT scan neuroimaging. Cases 2, 3, 9, and 15 showed diffuse cerebral atrophy. Case 3 also showed many bilateral calcifications. In case 4, bilateral cerebral atrophy was confined to the frontal lobes. In case 6, a right brain stem infarct was noted. In cases 3, 4, and 15, severe short- and long-term memory deficits were noted. Case 15 was also associated with severe aphasia and apraxia. Our results indicate that 46 percent of the subjects in our sample of 13 who were evaluated with brain neuroimaging had evidence of cerebral abnormalities. The results also suggest that delusional jealousy may be significantly associated with bilateral cerebral abnormalities, which may be detectable with neuroimaging techniques. In our sample,

the only lateralized central nervous system abnormality noted was located in the right brain stem area (case 6). It has been suggested by Malloy and Richardson²¹ that the right hemisphere plays an important role in the development of content-specific delusions such as delusions of jealousy. We caution, however, that any reasonably firm hypothesis regarding delusional jealousy and brain localization must await more extensive studies.

Substance abuse may also be implicated as a biological contributor to morbid jealousy. Morbid jealousy defined as jealousy of a pathologic nature, whether or not it reaches delusional intensity, has a complex and unclear association with alcoholism. Michael and colleagues²⁷ studied 71 morbidly jealous individuals and found that alcohol brought about jealousy in 28 percent of the cases, while the rest were jealous even when sober. However, many of these subjects did not appear to suffer from jealousy of the delusional type. Mooney¹⁴ found that chronic alcoholism and precipitation of jealousy occurred in 22.5 percent and 15.9 percent of his combined sample of delusional and nondelusional jealousy subjects, respectively. Soyka⁴ studied two large groups diagnosed with schizophrenia and identified nine subjects with delusional jealousy, of which six also suffered from alcohol abuse or dependence. In our sample, 11 subjects reported a past history of alcoholism (see Table 2). Six of these subjects were drinking alcohol regularly at the time of the index assessment. These findings are consistent with those of other researchers indicating that alcoholism and delusional jealousy often co-occur. Non-

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alcohol substance abuse may also be implicated in delusional jealousy.²⁸ In our sample, one case was associated with amphetamine abuse (case 20), and three cases were associated with cannabis abuse (see Table 2).

Aggression and Delusional Jealousy

Individuals who suffer from delusional jealousy frequently harbor varying forms of hostility, especially toward the allegedly unfaithful spouse.^{3, 6, 7} In delusional jealousy, aggression may be minimal, as exemplified by mild hostile ideation that is never verbalized and therefore may go unrecognized, or it may be associated with extreme physical violence such as homicide of the spouse or less frequently the homicide of the alleged paramour.^{7, 29} In the present study, 65 percent of the subjects had threatened to kill their spouses because of alleged infidelity. Sixty percent of the sample had actually physically harmed their spouses. Of those who had threatened to kill their spouses, 66 percent subsequently perpetrated violence on the spouses, indicating that homicidal threats toward the spouse constitute a significant risk for incurring violent attacks. Equally important is the fact that four of those who engaged in violence toward their spouses had not previously threatened to kill them, revealing the potential that delusionally jealous individuals may harbor violent feelings toward their spouses and may act without verbal warning.

Table 3 lists the method of violence used by the delusionally jealous individuals in our sample. The weapon used by those engaging in violence toward their spouse was usually their hands (83%). In

case 12, the subject's wife suffered minor injuries after being hit with a cane. In case 16, the subject's wife suffered from multiple stab wounds and required hospitalization. Case 14 accounted for the only female subject with delusional jealousy in our sample. She shot her new husband in the head because she believed he had been unfaithful to her and in the process had infected her with the AIDS virus. Her husband had sustained a skull fracture and loss of hearing. She was charged with attempted murder.

All five individuals in our sample who had a history of violence unrelated to their jealousy subsequently committed violence on their spouses while experiencing a state of delusional jealousy. This finding suggests that a general tendency toward violence is also likely to generate violent behaviors in the setting of delusional jealousy. It is also consistent with the well-known observation that the best predictor of future violence is a history of past violence.³⁰ In the present sample, 28 alleged sources of paramours were mentioned, and of these, 46 percent were unknown to the subject. However, in the remaining 54 percent no incidents of violence or serious threats of harm were made toward the alleged paramours, all of whom were specifically identified. These findings are consistent with previous studies in which the paramour is not as likely as the spouse to become the object of violence at the hands of the individual with delusional jealousy.^{3, 10}

Hallucinations may also be associated with a significant risk of dangerousness.³¹ In our sample, 50 percent of individuals experienced auditory hallucinations (see

Table 4). Of this group, 60 percent experienced homicidal ideation toward their spouses. In addition, 50 percent of those who experienced auditory hallucinations physically attacked their spouses. Of those two who exhibited visual hallucinations, both experienced homicidal ideation toward the spouse, but only one attacked his wife. In cases 16, 17, and 19, there was evidence that the subjects' auditory hallucinations directly increased their paranoia and hostility toward their spouses. All three of these subjects went on to attack their wives. Cases 16 and 19 also experienced command auditory hallucinations reportedly ordering the affected individual to attack their wives. Both attacked their wives while they were experiencing hallucinatory commands and believed their wives unfaithful. These results suggest that experiencing command auditory hallucinations to physically injure a spouse in the context of delusional jealousy heightens the likelihood of following the command. These results are also in agreement with prior studies indicating that command auditory hallucinations may cause persons to attack others.^{32, 33} However, it should also be emphasized that the mere presence of command hallucinations may not increase dangerousness and that perhaps most cases of command hallucinations do not necessarily carry an increased risk of physical aggression.³⁴

In the assessment of individuals with delusional jealousy, it is important to stress that delusional jealousy rarely exists as the only prominent symptom but is found usually in conjunction with other symptoms, including other delusions and

psychotic symptoms.^{3, 6, 10} Thus, delusional jealousy may be but one component of a more complex delusional system. This is supported in our sample by the finding that all but one subject experienced more than one type of delusion. In 95 percent of the subjects, a paranoid component was found closely associated with delusional jealousy, which is not surprising because delusional jealousy, along with its associated symptoms, is classically considered a type of paranoia.³⁵ This pattern is exemplified by the cases of Mr. A and Mr. B, who both suffered from prominent paranoid delusions. In addition to paranoia, in 35 percent of the sample other delusions were present including grandiose, religious, and misidentification delusions (see Table 4). Delusional jealousy, with its prominent paranoid delusional component, may be very important in the genesis of aggression, and therefore it should be emphasized that other associated delusions may also be important factors that may act synergistically with delusional jealousy to bring about aggression. For example, cases 17 and 19 displayed grandiose delusions. In both cases the subject's grandiose delusion involved claims of invulnerability and the belief that others, including their wives, were disrespectful of their putative lofty status. The subjects, in turn, became increasingly hostile and decided to physically attack their wives. Persons who suffer from psychotic disorders who are also at risk of developing grandiosity secondary to mania may be dangerous to others and are known to comprise a substantial portion of the population at forensic psychiatric facilities.³⁶

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Religious delusions are also known to cause dangerous behaviors.³⁷ In our sample, four individuals suffered from religious delusions, but only case 16 exhibited evidence that his religious delusions were associated with delusional jealousy and dangerousness. That individual believed his wife was possessed by demons who, in effect, had caused her to be unfaithful. As a result of this belief, he had proceeded to stab her. Case 16 also displayed a misidentification delusion, believing that demons not only possessed her mind but had substituted another mind for her own.³⁸ Delusional misidentification can be a cause of the violence often directed at the delusionally misidentified figures.³⁹⁻⁴³ However, it should also be emphasized that as with all types of delusions, cases of delusional misidentification do not automatically result in physical violence. In the other two subjects with misidentification delusions, cases 10 and 13, no verbal or physical aggression was noted during the observational time period.

Substance abuse is a well-known causative agent of aggression.⁴⁴ Substance abuse may also be implicated in the genesis of aggression in the context of delusional jealousy. In the present sample of those with a current diagnosis of alcohol abuse or dependence, three had assaulted their spouses while intoxicated with alcohol. Six of the 11 individuals with a history of alcohol abuse or dependence, two of which were still using alcohol on a regular basis, had assaulted their spouses. The cases of Mr. A and Mr. B exemplify people who exhibited delusional jealousy while sober and without the benefit of

neuroleptic medication, with delusional jealousy and violent proclivity toward their spouses increasing significantly while intoxicated. In our sample, cases 6 and 8, who had a history of cannabis abuse, also had a history of assaulting their spouses. It is likely that case 6 experienced increased hostility and delusional jealousy that was causally related to cannabis abuse.

Treatment of Delusional Jealousy

The primary treatment of delusional jealousy is psychopharmacologic and proceeds according to the underlying mental disorder.^{14, 45} In our series, we found that 66 percent of the individuals who suffered from paranoid schizophrenia experienced partial or complete resolution of their delusional jealousy upon treatment with various neuroleptic medications. Moreover, three of the four who were treated with atypical neuroleptics experienced a partial or full resolution. These findings suggest that atypical neuroleptics may have an advantage over conventional neuroleptics in the management of delusional jealousy. Both risperidone^{46, 47} and clozapine^{12, 48} have been found to be effective in the control of psychotic disorders as well as aggression. Although pimozide was not administered to patients in the index sample, this medication has generated anecdotal reports of effectiveness in the treatment of delusional jealousy.⁴⁹⁻⁵³ Nonetheless, pimozide has also been found to be ineffective as a treatment for delusional jealousy.⁵²

Anticonvulsant medication was also prescribed in four cases in our series, three cases of schizophrenia, and one case involving evidence of gross neuropathol-

ogy. All four experienced some reduction in their delusional jealousy, particularly the propensity for aggressive behaviors. This suggests that anticonvulsants may have a therapeutic role in reducing impulsivity associated with delusional jealousy. Finally, the two cases with primary depressive symptomatology responded favorably to treatment with antidepressants. This suggests the importance of treating depression associated with delusional jealousy. It should be noted, however, that recent anecdotal reports have described the effectiveness of fluoxetine in the treatment of pathological jealousy.⁵⁴⁻⁵⁷ These findings suggest the existence of possible jealous conditions that may be mediated by serotonergic systems, especially when there is a substantial obsessive component to the jealousy.^{56,57} Some patients, as exemplified by cases 1 and 2, will benefit substantially by concurrent psychopharmacologic treatment while abstaining from alcohol. Abstinence from other types of substance abuse may also help increase the efficacy of psychopharmacologic interventions for the treatment of delusional jealousy.

Although insight-oriented psychotherapies are not likely to be effective in the treatment of delusional jealousy,⁵⁸ certain psychologically based therapies such as cognitive therapy⁵⁹ and couples therapy combined with psychopharmacologic treatment have some efficacy, provided the patient regains sufficient insight into his or her disorder to engage in the psychotherapeutic process. Psychotherapeutic efficacy for patients with delusional jealousy depends on careful consideration of transference, countertransference, and

empathic interpretation, as well as the successful development of a therapeutic alliance, factors that are of course also important in the therapy of nonpsychotic patients. However, factors such as the use of certain defense mechanisms and the "working through" process may present particular challenges in the therapy of individuals with delusional jealousy.⁶⁰ In our sample, the few individuals who received individual or couples counseling showed some reduction in their jealousy symptom. Nonetheless, most of our subjects were unwilling to accept psychological treatment or were deemed unable to benefit from this approach. This finding underscores the widely held clinical observation that treatment of delusions via psychotherapeutic approaches is not particularly effective.

In many patients, it may become necessary to institute a "geographic" treatment (i.e., physical separation of the delusional individual from the target of the delusion, generally the spouse). Operationalization of geographic treatment remains problematic because of situational or legal factors. For example, the wife who depends financially and/or emotionally on the delusionally jealous husband may not be able to mobilize herself to seek the safety of a battered wives shelter. A second example would be the general lack of functional utility of a restraining order in the prevention of the delusionally jealous person from physical and/or psychological assaults toward the target, even with the availability of a highly staffed local police force.

Evolutionary Perspectives In recent years, an important development has

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taken place in our understanding of human nature that has, in turn, contributed to a more comprehensive approach to the analysis of psychiatric disorders. This development has been made possible by the introduction of evolutionary biology into the realm of psychiatry, a branch now known as evolutionary psychiatry.^{61, 62} Recently, male jealousy has also been analyzed from an evolutionary perspective. From this vantage point, the human species has evolved psychological mechanisms to defend confidence of paternity, leading some investigators to postulate that the consistent and pervasive trend of world cultures for male control of the sexual activity of females implies an essentially universal and therefore possibly a biological process designed to preserve sexual exclusivity.^{63, 64} From this perspective, male sexual jealousy is conceptualized as having evolved as a biological mechanism to insure that the guarding of a female by her mate throughout her fertile reproductive period would result in the perpetuation of the genetic makeup of the protective male via his own progeny. Evolutionary considerations emphasize that males, in contradistinction to females, are at higher risk of misidentifying their young, resulting in caring for non-genetically related offspring. Evolutionary psychologists have termed this cognitive-behavioral trend a "behavioral/motivational complex as male sexual jealousy."⁶³ It is important to emphasize that the tendency for jealousy, whether exhibited by males or females, to serve biological adaptive responses for the organism rests on its ability to stabilize mate pairing and insure the transmission

of genetic makeup by the relevant mates. Therefore, a sufficient degree of reality-testing ability must be assumed for sexual jealousy to function adaptively.

Although the point at which jealousy becomes maladaptive remains a source of controversy, delusional jealousy clearly occupies the psychobiological maladaptive end of the jealousy spectrum. There are several reasons supporting this assertion. First, the degree of jealous concern in the framework of delusional jealousy is characterized by a consistent and pervasive misreading of social cues of the spouse, a situation that insures that the delusional individual spends excessive amounts of time monitoring the activities of the spouse at the cost of ignoring other important family survival activities such as procuring nourishment and shelter. Second, delusional jealousy may occur across a wide age range, including the geriatric age for both male delusional individuals and their spouses, essentially ages at which the female spouse is no longer fertile.¹⁸ This situation is well illustrated by case 15 in which a 77 year-old man believed that his 61 year-old wife was involved with unknown young men. He manifested no awareness that younger males might be less likely to seek out his older wife as a partner and that such males would probably be more likely to search for younger women. The man in case 15 displayed delusional thinking that represents a maladaptive process from an evolutionary biology standpoint, since "guarding" a sexual partnership with a postmenopausal female from potential male competition would not represent an advantageous reproductive strategy.

Third, we note that most of our subjects suffer from mental disorders that are either accompanied by gross cerebral abnormalities identified by standard neurobiological probes such as brain neuroimaging or that occur in psychiatric disorders such as schizophrenia, in which biological factors are also implicated.^{65, 66} We can therefore infer that the significant biological abnormalities found in major mental disorders are likely to result in maladaptive survival strategies for the affected individuals of which delusional jealousy constitutes a major example.

Delusional Jealousy as a Biopsychosocial Process Delusional jealousy appears to occur in several diagnostic, age, and psychosocial clusters. For example, the group of 12 individuals who suffered from schizophrenia in our sample had an average age of onset of delusional jealousy of 33 years. The three subjects with an average age of onset of delusional jealousy after age 60 (mean age, 70 years) presented with either a mental disorder secondary to a general medical condition or a poorly characterized psychosis, suggesting that delusional jealousy in geriatric populations, in comparison with younger groups, is more likely to be associated with gross cerebral deficits, a finding that is consistent with other recent studies.^{22, 25} The remaining six subjects were a diagnostically heterogeneous group with an average age of onset of delusional jealousy of 34 years.

It is also important to emphasize that delusional jealousy is usually initiated and perpetuated in a psychosocial setting in which a psychotic person has a spouse

(or significant other). Therefore, in the geriatric groups, a previously physically healthy married individual may develop delusional jealousy subsequent to the onset of a medical condition that is considered an etiologic or at least a contributing factor. In this group with an older age of onset, relatively readily identifiable biological etiologies such as cardiovascular accidents or dementia may be operating. Therefore, in this group biological, developmental, and psychosocial factors play important roles in the development and consolidation of delusional jealousy.

There appears to be a larger group, younger in age, in which marriage occurs after the onset of psychosis, despite this psychopathology. We postulate that some of these younger psychotic individuals who marry and/or remain married are able to attract a spouse for economic, cultural, or other social reasons. For example, in case 8, the subject was able to marry because he apparently attracted a woman who was secure in the fact that the subject received compensation for a permanent psychiatric disability that guaranteed her lifelong financial stability. In case 1, the delusional jealousy and its associated violence placed a strain on the relationship, but the subject's wife was a woman with a very traditional Catholic, Hispanic, rural upbringing who strongly believed in preserving marriage and who also felt a moral obligation to remain with her husband because he was both physically and mentally ill.

The present study is limited by its retrospective review methodology, the resultant incomplete data in various areas, and nonrandom sampling. Therefore, fur-

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ther studies of delusional jealousy will require not only systematic assessment of neurobiologic, ecologic, phenomenologic, diagnostic, and psychosociocultural factors but must also use prospective designs with adequate sampling methods. Such studies may facilitate improved models of delusional jealousy, including a better classification scheme and more efficacious treatment modalities. Furthermore, a careful psychiatric and ecologic assessment of individuals with delusional jealousy along with careful characterization of relevant psychosociocultural correlates may also lead to more accurate models for the assessment of dangerousness in these psychotic states.

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