

## Dementia as a Risk Factor for Homicide

---

**REFERENCE:** Rayel MG, Land WB, Gutheil TG. Dementia as a risk factor for homicide. *J Forensic Sci* 1999;44(3):565–567.

**ABSTRACT:** We report a patient with dementia due to B-12 deficiency and syphilis who presented to a forensic hospital after killing his ex-wife with a gun. Despite current awareness on the occurrence of aggression and violence in patients with dementia, there has been no report discussing dementia secondary to an infectious or nutritional origin causing homicide or severe violent behavior. We discuss possible mechanisms and several predisposing factors for violent behavior in the elderly. We also discuss use and access of a gun in demented patients and its complications. We recommend availability of neuropsychiatric assessments in the elderly, limitation of gun access to demented patients and inquiry about weapon possession in the elderly.

**KEYWORDS:** forensic science, forensic psychiatry, vitamin B-12 deficiency, syphilis, homicide, violence, elderly, dementia

Dementia has been associated with violence (1–4) and delusions (5–7). Alzheimer's disease, vascular dementia, dementia due to hydrocephalus, and alcoholic dementia have been implicated in elderly aggression, violence, and homicide (8). Despite the current awareness on the occurrence of aggression and violence in patients with dementia (9–16) there are few reports of homicide or attempted homicide in the elderly population. As quoted in the Taylor and colleagues' study, only 9 of the 536 men convicted of homicide in England and Wales in 1979 were over 60 years old (17). Ticehurst et al. (18) reported two cases of dementia leading to homicide and attempted homicide of a patient's wife. They postulated that cerebral damage decreases cortical inhibition of aggressive behavior. Ticehurst and co-workers (8) studied 14 elderly patients with homicidal behavior and described 12 patients with cognitive impairment, including six with dementia, one with multi-infarct dementia, one with dementia due to hydrocephalus, one with schizophrenia and dementia, and one with psychotic depression with dementia. In this study, seven of the victims were the elderly patients' wives. The presumed precipitant in half the cases involved delusional beliefs and three out of six delusional patients reported delusions of jealousy.

We report a patient with dementia due to B-12 deficiency and syphilis who presented to a forensic hospital after killing his ex-wife with a gun. There has been no previous discussion of this type of dementia causing delusion and subsequent homicide of an ex-

wife. Literature search using MEDLINE from 1966 to present using the following keywords: vitamin B-12 deficiency, syphilis, neurosyphilis, dementia, homicide, murder, violence, aggression, manslaughter, crime, and killing, did not reveal any study on dementia resulting from B-12 deficiency and/or syphilis subsequently causing homicide.

### *Case Report*

An 86-year-old divorced African-American man was admitted to a forensic psychiatry hospital for competency to stand trial evaluation after he fatally shot his ex-wife. During the year prior to the incident, his family noted that the patient had become increasingly forgetful. For example, he would leave his key in his car or would leave the house door unlocked. His personal hygiene also deteriorated and he would go in public wearing clothes soiled with urine. Several months prior to admission, he developed the belief that he and his ex-wife were not legally divorced. As a result of this delusion, he concluded that his ex-wife should not live with her new husband. His memory further deteriorated and he frequently repeated himself.

The patient and family denied any previous history of neuropsychiatric illness or psychiatric treatment. He denied any psychotropic medication and illicit drug use. He abused alcohol occasionally but never required treatment. There was no history of suicidality or homicidality. He had a previous criminal history including 22 arraignments for unnatural acts (sex offense), breaking and entering, larceny, carrying a dangerous weapon and failure to pay child support. He was incarcerated in state prison for three years for larceny of a motor vehicle and carrying a dangerous weapon.

Past medical history included hypertension. He denied any history of head trauma, seizure disorder, thyroid or cardiac disease. He was involved in a car accident in the early 1960's without neurologic sequelae.

The patient was born in East Boston, Massachusetts. His mother died in childbirth and he was raised by his maternal grandmother. He only completed eight grade and later served in the U.S. military for three years. After his military service, he worked as a cook and eventually opened his own deli in Boston which he successfully ran for 14 years.

He married but one of his daughters considered him an absentee father who would abandon his family for six or eighth months at a time. He was also reported to have molested one of his daughters, eventually impregnating her. Although he denied domestic violence, he reportedly threatened to kill his ex-wife many times. At one point, he threw a milk bottle at her and reportedly kicked or slammed chairs. They later divorced and he had no other intimate relationships for the next 30 years. However, after his automobile accident, he moved in to the same apartment complex where his ex-wife and her new husband lived.

<sup>1</sup> Clinical fellow, clinical instructor and professor, respectively, Harvard Medical School, Massachusetts Mental Health Center, Program in Psychiatry and the Law, Boston, MA.

Received 29 Jan. 1998; and in revised form 26 May 1998; accepted 23 June 1998.

Mental state examination revealed an anxious, tense, and tearful elderly black man, dressed in state-issue clothing. There was mild psychomotor retardation. He used a walker to ambulate as he had trouble with his gait. His speech was generally clear and coherent despite occasional tangentiality. His mood was depressed, especially when describing his ex-wife's death. He expressed the delusional belief that he and his ex-wife were not divorced and that she was "sleeping around." He was disoriented to place and time. Serial sevens were impaired.

Further neuropsychologic examination revealed diffuse cognitive impairment of moderate proportions. Memory testing (immediate and long-term) revealed the most profound deficit. Attention and concentration fell in the lower end of average range. Standardized tests of intelligence were in low-average range. Standardized academic tests of reading, spelling, and written arithmetic fell in the impaired-borderline range. He was unable to recall three objects after three minutes. His abstract reasoning was concrete.

Neurologic examination did not reveal definite neurologic deficits other than vibration loss in his feet.

Laboratory results revealed a significant Vitamin B-12 deficiency (154, Normal-250–1100 pg/mL) with Macrocytosis (MCV-109.3, MCH-36.3, RDW-15.5), and Syphilis (RPR positive 1:2, FTA-ABS positive 1:1, MHA-TP positive). Thyroid and Liver Function Tests, Folic Acid, and other labs were normal.

## Discussion

This case report describes the killing of an ex-wife by an elderly demented man with vitamin B-12 deficiency and syphilis. There has been no report discussing dementia secondary to an infectious or nutritional origin leading to severe violent behavior.

In this case, it is difficult to determine the predominant cause of dementia because B-12 deficiency and syphilis have been reported to cause cognitive impairment in the absence of neurologic deficits. Decreased vibratory sensation in the feet can be explained by both diseases (19,20).

## Mechanisms

Vitamin B-12 is required in the methylation of homocysteine to methionine, and in the synthesis of S-adenosylmethionine (SAM). SAM is involved in numerous methylation reactions involving proteins, phospholipids, DNA, and neurotransmitter metabolism (20). A current theory proposes that a defect in methylation processes is central to the biochemical basis of the neuropsychiatric manifestations of Vitamin B-12 deficiency (21).

Dementia as a manifestation of syphilis can occur in the late or tertiary stage of syphilis where there is diffuse inflammation of a more insidious onset that characteristically involves the central nervous system. Generalized involvement of the cerebral cortex may lead to decreased concentrating ability, memory loss, and personality change (19,22).

## Review of Literature

In Rosner and co-workers' study of 25 geriatric felons, 22 committed violent crimes, including murder (6 patients), manslaughter (6 patients), assault (8 patients), and attempted assault (one patient). The victims' relationship to the felons was not described. Seven were diagnosed with Organic Mental Syndrome. The authors concluded that patients over 70 were as likely to engage in violent offenses as those under 70. Paranoia was a major symptom in

the study sample and the authors noted that this symptom could have predisposed these defendants to violent behavior (23).

Petrie et al. (3) found that paranoia, access to firearms and history of previous break-ins or assaults appeared to predispose the elderly to violence. Some authors reported that delusions (8), failing memory (8,9), sense of being useless, loss of status, deterioration of physical and mental abilities and of inhibitions over sexual and aggressive behavior, and psychological dependence (24) are risk factors for violent behavior. The most obvious risk factor is the attackers proximity to the victim (1,8). Ticehurst et al. (18), in another study, noted marital disharmony as an important factor. The patient in our case report displayed some of these risk factors including delusions, marital disharmony, failing memory, access to firearms, victim's proximity to the patient, and previous break-ins.

The use and access of a gun in demented patients was addressed by Mendez (25) who reported two cases in which both patients used guns as a consequence of their delusions. He later recommended removing access to firearms and reevaluation of gun permits held by patients with dementia. Petrie et al. (3) reported that 18 of 222 patients admitted to geriatric service were considered violent and 12 patients had used a gun. The study further revealed that 39% of the 18 had organic impairment. In Ticehurst and colleagues' study (8), only one out of 14 elderly who commit homicide or attempted homicide used a gun.

## Conclusion

This case report raises several issues and recommendations. As the general population ages, neuropsychiatric assessment by qualified professionals should be more available in the community. Detection of failing memory and other mental status changes in elderly patients is important because some types of dementia are reversible with appropriate treatment. For example, vitamin B-12 deficiency and syphilis are treatable without neurologic sequelae after early detection. Delusions can sometimes be treated with low dose neuroleptics which can decrease the likelihood of violence. Gun ownership among demented individuals should be reevaluated and access to guns should be limited to prevent fatalities. In addition, clinicians evaluating the violent potential of elderly individuals should inquire about the possession of all weapons, including firearms.

## References

- Haller E, Binder R, McNiel DE. Violence in geriatric patients with Dementia. *Bul Am Acad Psy* and 1989;17(2):183–8.
- Shah AK. Violence and psychogeriatric inpatients. *Int J Geriatr Psychiatry* 1992;7:39–44.
- Petrie WM, Lawson EC, Hollender MC. Violence in geriatric patients. *JAMA* 1982 Jul;248(4):443–4.
- Birkett DP. Violence in geropsychiatry. *Psychiatric Annals* 1997 Nov;27:752–6.
- Cummings JL. Neuropsychiatric aspects of alzheimer's disease and other dementing illnesses. In: Yudofsky SC, Hales RE, editors. *Synopsis of neuropsychiatry*. Washington, DC: American psychiatric press, Inc.; 1994:469–82.
- Moore DP, Jefferson JW. *Handbook of medical psychiatry*. St. Louis: Mosby; 1996.
- Miller BL, Chang L, Oropilla G, Mena I. Alzheimer's disease and frontal lobe dementias. In: Coffey CE, Cummings JL, editors. *Textbook of geriatric neuropsychiatry*. Washington, DC: American psychiatric press, inc.; 1994:523–47.
- Ticehurst SB, Ryan MG, Hughes F. Homicidal behavior in elderly patients admitted to a psychiatric hospital. *Dementia* 1992;3:86–90.
- Hamel M, Gold DP, Andres D, Reis M, Dastoor D, Grauer H, et al. Predictors and consequences of aggressive behavior by community-based dementia patients. *The Gerontologist* 1990;30(2):206–11.

10. Tardiff K, Sweillam A. The relation of age to assaultive behavior in mental patients. *Hosp Community Psychiatry* 1979 Oct;30(10):709-10.
11. Swearer JM, Drachman DA, O'Donnel BF, Mitchell AL. Troublesome and disruptive behaviors in dementia. *J Am Geriatr Soc* 1988 Sept;36(9):784-90.
12. Rovner BW. Behavioral and psychiatric disability in alzheimer's disease. *J Geriatr Psychiatry* 1992;25:247-55.
13. Cohen-Mansfield J. Agitated behaviors in the elderly: II. Preliminary results in the cognitively deteriorated. *J Am Geriatr Soc* 1986;34:722-7.
14. Cummings J. Dementia syndromes: neurobehavioral and neuropsychiatric features. *J Clin Psychiatry* 1987;48(suppl.):3-80.
15. Nasman B, Bucht G, Eriksson S. Behavioral symptoms in the institutionalized elderly-relationship to dementia. *Int J Geriatr Psychiatry* 1993;8:843-9.
16. Chou KR, Kaas MJ, Richie MF. Assaultive behavior in geriatric patients. *J Gerontol Nursing* 1996 Nov;22(11):30-8.
17. Taylor PJ, Parrot JM. Elderly offenders. *Br J Psychiatry* 1988;152:340-6.
18. Ticehurst SB, Gale IG, Rosenberg SJ. Homicide and attempted homicide by patients suffering from dementia: two case reports. *Aust NZ J Psychiatry* 1994;28:136-40.
19. Lukehart SA, Holmes KK. Syphilis. In: Fauci AS, Braunwald E, Isselbacher KJ, Wilson JD, Martin JB, Kasper DL, Hauser SL, et al., editors. *Harrison's Principles of Internal Medicine*. New York: McGraw Hill;1998:1023-33.
20. Beal MF, Martin JB. Nutrition and metabolic diseases of the nervous system. In: Fauci AS, Braunwald E, Isselbacher KJ, Wilson JD, Martin JB, Kasper DL, Hauser SL, et al., editors. *Harrison's Principles of Internal Medicine*. New York: McGraw Hill;1998:2451-7.
21. Bottiglieri T. Folate, vitamin B-12, and neuropsychiatric disorders. *Nutr Rev* 1996 Dec;54(12):382-90.
22. Scharre DW. Neuropsychiatric aspects of neoplastic, demyelinating, infectious, and inflammatory brain disorders. In: Coffey CE, Cummings JL, editors. *Textbook of geriatric neuropsychiatry*. Washington, DC: American psychiatric press, Inc. 1994:523-47.
23. Rosner R, Wiederlight M, Schneider M. Geriatric felons examined at a forensic psychiatry clinic. *J Forensic Sci* 1985 July;30(3):730-40.
24. Bergman S, Amir M. Crime and delinquency among aged in Israel, an experience survey. *The Isr Ann Psychiatr Relat Discip* 1973 March;11(1):33-48.
25. Mendez MF. Dementia and guns. *J Am Geriatr Soc* 1996 April;44(4):409-10.

Additional information and reprint requests:

Thomas G. Gutheil, M.D.  
 Harvard Medical School  
 Massachusetts Mental Health Center  
 Program in Psychiatry and the Law  
 74 Fenwood Road  
 Boston, MA 02115-6196