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The physician's unique role in preventing violence: a neglected opportunity?

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Abstract

Background: Episodes of explosive rage and violence comprise a symptom complex which can have a devastating effect on a person's life. In the community this behavior is seen as workplace violence, domestic abuse and road rage, while in the clinical setting, this behavior is rarely mentioned by patients, despite evidence that it can signify an important biological disorder that may afflict more than three percent of the population.

Discussion: Patients are often reluctant to seek help for episodic attacks of rage, especially attacks which are accompanied by physical violence. Although, in the past, clinicians have had few treatment options to offer, recent neuroscience advances have created new possibilities to understand and help patients with this neglected problem. No formal medical guidelines for treating violence exist; however, many patients can be helped by diagnosis, referral and treatment. Treatment can include pharmaceuticals and nutrients, as well as referral for anger management or behavioral therapy.

Summary: The astute clinician has an opportunity to positively impact an important problem through the diagnosis and treatment of patients with symptoms of intermittent explosive disorder.

Keywords: aggression, alcoholism, psychopharmacology, violence, domestic abuse, prevention, neurobiology, treatment, domestic violence

Background

The symptom complex characterized by repeated episodes of explosive rage and violence, disproportionate to any provocation, is rarely a patient's chief complaint, but it is a common problem none the less. For the afflicted individual, such a complaint may have profound effects on their self-esteem, their interpersonal relationships, and even on their ability to function in society. While some violence can be premeditated, goal directed or related to antisocial, callous unemotional traits, it is rather the category of violence described as affective aggression, (that is, reactive, defensive or hostile aggression) associated with fear and threat which will be the focus of this paper [1]. For most clinicians, the clinical perspective of violence as seen with Intermittent Explosive Disorder, specified by DSM-IV to encompass "several discrete episodes of failure to resist aggressive impulses that result in serious assaultive acts or destruction of property", with the further specification that "the degree of aggressiveness expressed during the episodes is grossly out of proportion to any precipitating psychological stressors" [2], provides a framework for addressing this issue from a clinical standpoint. When afflicted individuals express a concern about this unwanted behavior, it becomes an issue which clearly warrants the concern of their physician. This paper will give a brief review of the clinical approach to this, often ignored, yet common problem.

Intermittent explosive disorder has a prevalence of 3.9%, suggesting that each year in the United States, it is responsible for more than 30 million violent assaults [3]. When manifested as domestic abuse, road rage or workplace violence, such behavior is commonly attributed to cultural factors, social stress, economic deprivation or substance abuse. Much more needs to be known about these behaviors; however, recent advances in neuroscience allow for a more complete understanding, which accounts for biological factors amenable to medical treatment [4-8].

A number of factors have limited the benefits which a neurobiological perspective on violence might bring.

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Perpetrators may be unaware that they could benefit from medical intervention. Clinicians may be uncomfortable dealing with an area of diagnosis and treatment with which they are unfamiliar. Considering a violent perpetrator to be responsible for their actions may be a critical legal policy to uphold, but such a policy may impede diagnosis. All these factors ultimately work together to deny the benefits of modern clinical care to individuals who may urgently need it.

This article will provide a brief overview of the diagnosis and treatment of chronic violent behavior. A brief discussion of the neurobiology of violence will be presented and legal aspects of treatment will also be discussed in an effort to encourage clinical interest in what may be one of the most neglected areas of medicine.

Discussion

Neurobiology

One way to understand the biological basis for explosive types of rage and violence is to consider it as behavior which promotes survival in the face of threat [6]. Although many "threats" are psychological, rather than physical, the autonomic nervous system is aroused in either case. The resulting rage response is an innate behavior that rises from the limbic system (for example, amygdale and related structures) and is associated with palpitations, sweating, tachypnea and trembling [9,10]. The individual's own perception of these symptoms may incite further arousal in a positive feedback loop on the limbic system response. The prefrontal cortex and the anterior cingulate gyus provide a "top-down" inhibition of this limbic response while evaluating whether a physical or psychological "threat" is a harmless insult or a serious challenge to survival [9]. Controlling this limbic response appropriately is one of the most time critical functions of the frontal cortex; the serotoninergic neurotransmitter system is thought to be critical in this process [11]. The rapid appraisal of potential threats is especially sensitive to perturbation, such as the sensory processing distortions caused by metabolic disturbances or substance abuse [9]. It is the prefrontal cortex which allows for the consideration of nuanced and nonviolent responses to any specific "threat" [12]. However, when violence is called for, limbic (for example, amygdale) activation will shut down the calming input from the prefrontal cortex in order to promote quick reactions and efficient fighting [13].

Various neurological disorders can disrupt the critical and sensitive processing necessary for appropriate behavior in response to perceived threat [9]. Neuroimaging studies suggest that in the pathological situation, calming cortical inputs are shut down when they should not be, permitting exaggerated and inappropriate limbic arousal and rage [8,12]. Impaired control of the limbic system rage response in this situation explains how a domestic violence perpetrator could physically attack their spouse with no apparent concern for the consequences. If cortical control is dysfunctional, relatively minor slights to the ego might be misinterpreted as overwhelming threat, leading to a violent response [12]. Acute psychological stress as well as social and cultural factors may interact with neurobiological deficits to create a situation where inappropriate violence becomes frequent [14].

Diagnosis

Episodes of explosive rage and violence can be a defining feature of a patient's personal life; however, in the same way that patients can be reluctant to admit they have depression; they are even more ashamed to admit they have violent behavior. Often patients experience remorse, but not always. Simply asking during a history and physical examination, "Do you lose your temper? Do you do things when you are angry that you later regret?" can lead an individual to discuss behaviors that they would otherwise never initiate. If a clinician can suspend judgment about their patient's behavior and discuss situations without making disparaging remarks, patients can potentially overcome their denial and face the destructive effects of their "anger problem". The use of valid scales, such as the STAXI [15] and the BPAQ-SF [16] may also be helpful in identifying such patients. Between episodes, there is no classical way for someone with rage and violence to present for care; however, considering the association between violence and alcohol, individuals undergoing alcoholism detoxification may be more likely to benefit from screening. Impulsive aggression is frequently found in a co-morbid association with substance abuse and with personality disorders. Also, patients presenting with injuries suffered as a result of interpersonal violence are themselves at risk for having inappropriate attacks of rage [17]. When patients do present with violence, it is a common cause for involuntary commitment to a psychiatric facility and acute therapy [18,19].

Although in many cases violence may be a behavior simply learned from the patient's social and cultural background, the unique role of the clinician is to critically evaluate each patient for biological factors which can be treated, or refer the patient to a physician who can [20-24]. Many disorders which affect the central nervous system have been associated with violence [20,25-29]. Episodic attacks of rage and violence are not a classic presentation of any specific disorder, but this behavior can arise from diverse causes, including epilepsy, nutritional deficiencies, brain tumors, toxic exposures and encephalopathy from endocrine, metabolic or infectious disorders [18]. Closed head injuries can leave patients with no objective sign of their injury but with a dramatic predilection for episodes of impulsive rage [27].

Both acute and chronic substance abuse, for example, alcohol, and stimulants, can contribute to violence [30]. Depression, mania, post-traumatic stress disorder and schizophrenia may be associated with irritably, rage and violence [20]. (See Table 1)

It is important to note that not all instances of violence have serious underlying pathology. For example, the aggression associated with hypoglycemia can be simply treated with food. Identifying the precise biological factors contributing to violence can be difficult as multiple predisposing conditions often coexist in one patient. As with any neurological issue, diagnostic testing is led by the symptom presentation and physical exam. For example, if temporal lobe seizures are suspected, an electroencephalogram (EEG) may be indicated [26]. In most cases, however, the physical exam will be normal, and a precise diagnosis will be elusive. In such a situation, empiric treatment may be indicated.

Treatment

Although no drugs have a Food and Drug Administration (FDA) approved indication for violence, many therapeutic options have been tested in randomized, placebo-controlled double-blind trials [20,28,31]. (see Table 2) Psychiatrists use various classes of drugs as treatment for violence, but treatment guidelines have not been established. The point of this article is to introduce existent therapeutic options rather than to provide a detailed review of pharmacotherapy, which has been reviewed elsewhere [18,20,25,31-40]. Medication is not a panacea; all types of violence are not amenable to pharmacological therapy. For example, treatment with the classic anticonvulsant phenytoin was shown to reduce impulsive but not premeditated violence [41]. In previous reviews the use of anticonvulsants, beta blockers and atypical antipsychotic agents has been described in detail [20,31,40-49]. For more than 40 years, lithium has been used in many populations to treat violence [50]. Serotonin reuptake inhibitors are commonly used in the setting of depression but can also be effective for reducing chronic anger [20]. Serotonin reuptake inhibitors are often initially used at low doses to guard against any paradoxical exacerbating effect [31,22,41]. Since the use of all of these medications for reducing violence is "off label", it is important to carefully monitor for any adverse effects which can in some instances cause an increase in irritability and aggression [22,40].

Nutritional factors, especially the essential omega-3 fatty acids, docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) are critical components of the nervous system, but can be deficient in the diet [51-53]. Some controlled trials suggest that these nutrients may reduce aggression and produce other benefits with few side effects [54-56]. In recognition of this, the American Psychiatric Association recommends that individuals with mood, impulse-control or psychotic disorders consume 1 gram of EPA + DHA per day [57]. When essential fatty acids were administered with multiple vitamins to young men in prison, violence was reduced by one third [58], a finding which was later replicated [59]. Although there are many more studies demonstrating the effectiveness of prescription pharmaceuticals than there are of studies testing nutrients, omega-3 fatty acid (that is, fish oil) and vitamins have the benefit that they may be readily accepted by patients who desire a more "natural" type of therapy without the stigma and serious side effects which sometimes accompany psychotropic medications [60]. Because of the potential for nutritional therapy to address the problem of violence on a public health basis, there is a critical need for more research to resolve controversies in this area.

Substance abuse treatment as therapy for aggressive behavior

Alcoholism may be the most common condition associated with violence; alcohol is thought to have a

Table 1 Some medical conditions associated with episodic rage and violence

Psychiatric	Organic brain syndrome [35], Korsakoff's psychosis [86], bipolar disorder [87], psychoactive substance intoxication and withdrawal [88], psychotic disorders [89], premenstrual dysphoric disorder [90], post-traumatic stress disorder [22], panic disorder [4], generalized anxiety disorder [91], antisocial personality disorder [92], borderline personality disorder [92], personality disorders [92], attention deficit disorder [93], major depressive disorder [94].
Neurological	Brain tumors/lesions [95], head injury [27], Parkinson's disorder [96], seizure disorder [26], multiple sclerosis [97], normal pressure hydrocephalus [98], autism [34], Wilson's disease [29], Huntington's disease [99], dementia [100], stroke [101].
Nutritional deficiency	Omega-3 fatty acids [56], folate [29], cobalamin (B_{12}) [102,103], thiamine [104,105], iron [106], lithium [107], magnesium [53,108], tryptophan [109], pyridoxine [29].
Medical and toxic	Alcohol [21,110], cocaine [21,111], manganese [29,112], organophosphorous compounds [29,113], phencyclidine (PCP) [114], lysergic acid diethylamide (LSD) [101,115], heroin [101,116], amphetamines [117], benzodiazepines [117,118], prescription drugs [117,119], anabolic steroids [117].
Metabolic/ Endocrine	Hypoglycaemia [101,117,120], hepatic encephalopathy [121], fluid and electrolyte imbalances [119], disorders of the thyroid, parathyroid and adrenal glands [29,122], hypoxia [101].
Miscellaneous	Intermittent Porphoria [123], chronic pain [124], sleep disorders [29,125], anemia [126], vasculitis [119], meningitis/encephalitis [101], syphilis [102].

Table 2 Examples of some agents used to reduce violence and aggression

Medications for alcoholism	Naltrexone and acamprosate in sober alcoholics to reduce craving and relapse [63,64]; prazosin in alcoholism with PTSD for caving and relapse [127].
Nutritional factors	Essential omega 3 fatty acids, docosahexaenoic acid (DHA) and eicosapentaenoic acids (EPA) in bipolar disorder and borderline personality disorder; multiple vitamins and minerals with DHA and EPA in young male prisoners, and in children [53,57-59,128].
Lithium	In children and adults, in personality disorders, and in combination with other anticonvulsants or atypical antipsychotics [40,48].
Beta-blockers	Propranolol in brain-injury, autism, schizophrenia, organic mental disorders [37,129].
Anticonvulsants	Carbamazepine/oxcarbazepine in impulsive violence and in elderly [32,36]; phenytoin in prisoners and in intermittent explosive disorder [32,38,49,130]; Topriamate in borderline personality disorder and in depression [40]; valproate/divalproex in a variety of psychiatric conditions [32,40].
Antidepressants	Flouxetine in personality disorders [131], and in domestic abuse when combined with Cognitive Behavioral Therapy (CBT) and alcohol treatment [132]; trazodone in dementia associated aggression [133].
Atypical antipsychotics	Clozapine in schizophrenia [33,134]; quetiapine in schizophrenia and bipolar disorder [33,40]; Loxapine in schizophrenic and psychosis [40], olanzapine in schizophrenia and borderline personality disorder [33,40]; aripiprazole in schizophrenia, autism spectrum disorders and borderline personality disorder [33,40]; risperidone in a variety of psychiatric illness [40].

disinhibiting effect on aggressive behavior [6]. Reports suggest that most severe interpersonal violence occurs when the perpetrator is intoxicated. Cocaine abuse is also associated with violence [30]. Not surprisingly, recent research has found that substance abuse treatment can reduce the prevalence of violent behavior by more than half [61]. Patients can be referred to specific substance abuse treatment programs as well as to self-help programs such as Alcoholics Anonymous. Medical management of alcoholism is effective and can include the use of naltrexone or acamprosate [62]. These drugs are relatively underused medications which can reduce the incidence of relapse to alcoholic drinking [63]. Side effects are relatively minor, and in some alcoholics, these drugs can have a marked effect [64].

Psychological intervention as a treatment for aggression

In addition to any prescribed medical treatment, patients must recognize their need to change, assume responsibility for their behavior and begin to deal with conflict in a positive manner. To facilitate these cognitive processes, violent individuals are commonly offered anger management or behavioral therapies [65-68].

Psychological interventions can be very helpful for some aggressive individuals [69], and effects can last for months, even years after the therapy is terminated [66-68]. In a meta-analysis looking at 50 studies, angry, (and in some cases violent), patients treated with a variety of cognitive behavioral therapy (CBT) treatments had better outcomes than 76% of non-treated control patients [70]. These studies considered inpatients and outpatients, children and adults, abusive parents and spouses, prisoners and individuals with mental retardation as well as the general population. The most effective CBT anger management programs include two or all three of the following components: relaxation techniques, cognitive interventions and communication skills [71]. For individuals with borderline personality disorder, dialectical-behavioral therapy (DBT) is an effective therapy [72,73]. The success of psychological interventions on domestic violence recidivism is controversial, but a meta-analysis of 22 studies suggests that the effect size of therapy is generally significant though small [65]. Treatments specifically for domestic violence include feminist psycho-educational men's groups, (that is, the Duluth model) [68], men's CBT groups, anger management and couples' therapy [65]. Many states regulate the therapy of domestic abusers and, in some cases, restrict the use of couple's therapy or the consideration of neuropsychiatric issues (for example, alcoholism); the extent to which such legislation inhibits potentially beneficial treatment has not been evaluated [74]. Recently, a computer assisted treatment adjunct based on a Trans Theoretical Model of behavior change has been shown to reduce violence, suggesting that entirely new treatment paradigms could be developed in the future [75]. The effectiveness of domestic violence treatment is difficult to study, and the problem is compounded by the effect of high dropout rates (40% to 60% within three months), which predict poor outcome [69]. A positive correlation has been found repeatedly between the strength of the therapeutic alliance, patient attendance rates and the overall likelihood of the participant benefiting from the treatment [76,77]. Therefore, when referring aggressive patients for therapy, a physician should supply several options and emphasize the importance of finding a therapist with whom the patient feels comfortable. In the United States, the American Psychological Association (1-800-964-2000) or the National Domestic Violence Hotline (1-800-799-SAFE) can provide referral information.

Legal and ethical issues in the United States

While the American Medical Association's Ethics Code requires and emphasizes the importance of patient confidentiality, it also states the following: "When a patient

threatens to inflict serious bodily harm to another person or to him or herself and there is a reasonable probability that the patient may carry out the threat, the physician should take reasonable precautions for the protection of the intended victim, which may include notification of law enforcement authorities..." (E-5.05 Confidentiality). Additionally, in the landmark Tarasoff cases (Tarasoff v. Regents of the University of California 1974 and 1976) [78] the ruling established in the state of California a legal duty of health workers to warn and protect potential victims from a patient's foreseeable violence. Since then, some states have codified the health worker's duty to protect specifying how to discharge that duty, some states have declined to uphold the duty to protect in court and some states have not addressed the issue in court or legislation [79]. In states where the duty to protect does apply it is only operative when the patient identifies a specific victim or has a history of violence and there is substantial and compelling reason to believe that the patient will be violent again. The health worker fulfils the duty in most states by informing the relevant authorities, warning the victim or having the patient hospitalized, although a few states have additional requirements. For victims who are minors, all 50 states have passed some form of a mandatory abuse and neglect reporting law. Some states mandate that the suspicion of domestic violence or elder abuse must be reported to the legal authorities [80]. All states require reporting of suspected child abuse [81]. When treating an adult victim, mandatory reporting laws also vary by state and are based on the type and circumstances of the injury; laws in all states are listed in a 2002 article by Houry and colleagues [82]. For more information on legal responsibilities as a physician, the American Medical Association recommends contacting the state licensing board. Screening a patient for violent activity can be unethical if a physician fails to discuss the limits of confidentiality and any legal requirement of the state to break confidentiality and involve the legal system [83].

While knowledge of laws in one's state of practice is essential, experts in medical law strongly recommend that clinicians approach the dangerousness of a patient as a clinical rather than legal issue [79,84,85]. The primary determinants in a malpractice suit are the thoroughness of the clinicians' assessment of a patient's potential for violence and the care with which options of action were considered, rather than the accuracy of the clinicians' predictions [79]. Thorough mental status examinations and substance use histories should be documented with direct quotes from the patient. Careful notes should be taken explaining why a certain course of action was taken, what other options were considered but opted against and why. The more potentially dangerous the client, the more care one should take in the documentation of the case [85].

Summary

Although it is unknown what proportion of explosive rage and violent behavior can be successfully treated, the price of ignoring treatment includes the staggering cost of injuries that might be prevented, and an even greater cost in shattered communities, broken families and personal suffering. Various neurobiological disorders can affect the processing of perceived threats by the brain, leading to dysfunctional, violent behaviors. Future research will add to our understanding of violence, but existing evidence clearly shows that physicians today have a unique opportunity to address medical aspects of this problem when they identify the perpetrators of explosive violent behavior. Asking patients if they lose their temper can identify violent individuals in a non-judgmental way and can open the door to appropriate medical evaluation, treatment and referral. Patients are given an important degree of self-determination when they are offered expanded treatment options that include not only behavioral therapy, but also nutritional supplementation, alcoholism treatment and pharmaceuticals.

Abbreviations

CBT: Cognitive Behavioral Therapy; DBT: dialectical behavior therapy; DHA: docosahexaenoic acid; EPA: eicosapentaenoic acids; FDA: Food and Drug Administration.

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Authors' contributions

JCU conceptualized, wrote and edited the manuscript. KT and MS wrote and edited the manuscript. DTG provided intellectual background and assisted in writing and editing the manuscript. All authors read and approved the final manuscript.

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Competing interests
The authors declare that they have no competing interests.

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