Punding as a Complication of Brain Stem Stroke?
Report of a Case

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Background and Purpose—Stereotyped motor behaviors, known as “punding,” originally described among amphetamine abusers have only recently been reported in Parkinson disease associated with both pro- (eg, levodopa) or anti- (eg, quetiapine) dopaminergic therapy. We describe a non–Parkinson disease case of nonpharmacologically induced punding as a complication of a brain stem cardiovascular accident.

Summary of Case—A 54-year-old man, after an episode of brain stem cardiovascular accident secondary to basilar artery thrombosis, was noted to endlessly purchase and hoard food items and to write, copy and organize recipes. His activity was excessive, disruptive and affected his interaction with family members. The patient’s punding behaviors significantly improved with an increased dose of sertraline from 100 mg to 150 mg per day.

Conclusion—Our patient’s presentation was most consistent with punding, but interestingly was not a result of dopaminergic therapy. Moreover, improvement of his behavior was noted with a selective serotonin reuptake inhibitor, further questioning the dopaminergic hypothesis of punding. (Stroke. 2007;38:1390-1392.)

Key Words: CVA ■ hypergraphia ■ punding ■ sertraline ■ stroke

Complex, prolonged and purposeless stereotyped motor behaviors, termed “punding” were originally adopted by Rylander in 1972 to describe these behaviors in amphetamine abusers. It is characterized by an intense fascination with repetitive manipulations of technical equipment, the continual examining, handling, and sorting of common objects, hoarding and abnormally increased writing. Punding is thought to be attributable to excess dopamine stimulation because similar behaviors can be induced by dopaminergic drugs in animals.

Increased writing activity (hypergraphia) is rarely seen in neurological illness but has been noted in patients with temporal lobe epilepsy, frontal lobe dementia, cerebrovascular disease or Parkinson disease (PD).

Here we report a case of punding presenting with hoarding and hypergraphia as a complication of a brain stem cerebrovascular accident (CVA).

Case Reports
A 54-year-old right-handed man initially presented with sudden onset of right hemi-body numbness, dizziness, diplopia and nausea. He later developed left facial droop and dysarthria. On examination, the patient was alert and oriented to person, place, time, and situation. He was noted to have right hemi-anesthesia involving face, arm, and leg, left sixth and seventh cranial nerve palsy, and prominent nystagmus. There was otherwise no weakness. The MRI and MR angiography study was consistent with right pontine acute ischemic regions (Figure 1) from a clot at the tip of basilar artery (Figure 2). He was not on warfarin at time of admission.

The past medical history was pertinent for hypertension, hypercholesterolemia, tobacco and alcohol abuse, and a possible transient ischemic attack. His psychiatric history was significant only for mild depression, which was well controlled on sertraline 100 mg per day.

His discharge medications included: metoprolol 12.5 mg two times a day, lisinopril 5 mg per day, atorvastatin 20 mg at bedtime, pantoprazole 40 mg per day, B12 200 μg two times a day, folic acid 1 mg per day, sertraline 100 mg per day, trazodone 25 mg and warfarin 7.5 mg at bedtime.

In the ensuing days after his brain stem CVA he became obsessed with watching cooking shows on television and began to purchase food items (eg, Jell-O, BBQ sauces) from televised shopping networks. He ate uncontrollably and he seemed to have no feeling of satiety. When at grocery stores, he continually filled the shopping carts with food items. Within 3 months of his brain stem CVA he gained 50 pounds.

He displayed a prominent hypergraphia, becoming fascinated with writing recipes while watching cooking shows on television. He also hand copied recipes from online websites and recipe books and spent an enormous amount of time during the day and night filling up several pages in a notebook. Each day he also placed reinforcements on the papers and categorized the recipes according to favorites.
Over the course of a few months, he accumulated more than 7 volumes. He did not perform any of these activities before his brain stem CVA. A “sense of relief” was absent and he felt annoyed and angered when asked to stop his activities. Family members were also unable to successfully interrupt his activities. During this period he denied any symptoms of depressed mood.

Several months after his brain stem CVA, the patient was referred for psychiatric consultation and sertraline was increased from 100 mg to 150 mg per day. Within 2 weeks, the patient and family members noted a decrease in both his purchasing of food items and his writing activity.

Two year follow-up revealed that he recovered well from the brain stem CVA motorically and that his initial punding behavior had significantly improved. He no longer excessively purchased or hoarded food items and he no longer wrote, copied, or sorted recipes online or from cook books. He had, however, developed an interest in making grouper jigs.

**Discussion**

In this patient, punding behavior was seen in the form of hoarding and purchasing of food items and in the fascination in organizing and sorting of copied recipes. His hypergraphia was similar to a case reported in a PD patient.6 Just as in previous PD reports, our patient’s punding behaviors also reflected past interests and hobbies.3,4,7 The key elements in punding behavior: excessive (lack of sleep), disruptive (affecting family interactions) and interruption causing anger or irritation, were all present in this case.3,4,5,7 Our patient also did not exhibit paranoia, mania or experience hallucinations, but the absences of which were also seen among reported PD punders.3,7

Obsessive compulsive disorder (OCD) is also a stereotyped behavior, and studies have suggested that there are similarities but also important differences between punding and OCD.3,7 Punding may be considered a form of compulsion, and punders may feel anxious when they attempt to stop.3,7 Although our patient’s behaviors were odd and excessive, the patient did not perceive a “sense of relief” and did not perform his actions to satisfy obsessive thoughts, as characteristic with OCD.3,6 Additionally, diagnostic criteria for OCD8 states that symptoms must not be attributable to the direct effects of a substance, including a drug of abuse or a medication or to a general medical condition.3,8 In this case, the punding behavior was seen after the patient’s brain stem CVA.

Although punding is thought to be attributable to excessive dopamine stimulation,1–4,6 current literature does not uniformly support this.5,9,10 Kurlan reported punding in PD patients that did not result from excessive dopaminergic therapy.10 Miwa et al reported punding in patients after administration of an atypical antipsychotic agent.5 It is interesting to note that the punding behavior in this patient did not result from excessive dopaminergic therapy such as that found in PD patients on L-DOPA.3,4,7

Punding may be more complex than just dopaminergic stimulation, and it may involve the brain stem serotonergic system. The serotonergic hypothesis for OCD involves the implication of serotonergic neurotransmitter system in both the etiology and pharmacological treatment of OCD.3,11 Moreover, an electrophysiological study12 reports possible brain stem involvement in OCD.12 Damage to serotonergic neurons of raphe nuclei may be a possible neuropathological process implicated in OCD.12 Although improvement in punding behavior in our patient with an increase in sertraline could simply be incidental, its temporal relationship of improvement within 2 weeks of increasing the dose after at least 3 months of punding behavior makes it unlikely.

Our case not only illustrates that punding can also result from brain stem structural abnormality and not just chemical induction or hypersensitivity, but it also challenges its current dopaminergic hypothesis. The exact pathophysiological

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**Figure 1.** Hyperintense signal seen in right ventral pons on transaxial B-1000 diffusion weighted MRI (arrow, A) and corresponding hypointense signal on apparent diffusion coefficient map (arrow, B) indicating restricted diffusion from an acute ischemic change. Accompanying MRI with standard transaxial T2-weighted sequence (C) failed to demonstrate pontine change, confirming acute infarct.

**Figure 2.** 3-D time of flight magnetic resonance angiogram demonstrating occlusion of distal basilar artery.
mechanism underlying punding therefore remains to be elucidated.

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References
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