Resolution Of Mysophobia Following Resection Of Large Sphenoid Wing Meningioma

R Elliott, B Rubin, J Jafar

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Abstract

Mysophobia is a variant of obsessive-compulsive disorder (OCD) characterized by intense fear of germs, dirt or contamination accompanied by behaviors to decrease contamination and exposure. While brain tumors, traumatic brain injury (TBI) and strokes have been demonstrated in patients with OCD and implicate abnormal function in the left frontotemporal regions, our review found no cases of mysophobia associated with structural lesions. Meningiomas are one of the most common forms of brain tumors and are more frequently diagnosed in women. We describe a woman with a three-year history of severe mysophobia found to have a large, left sphenoid wing meningioma. Following complete surgical resection and improvement in the mass effect on the frontal and temporal lobes, her mysophobia resolved completely and has remained in complete remission for almost 3 years.

INTRODUCTION

OCD is the fourth most common psychiatric disorder in the United States, affecting 1 to 4% of the population. [9-12] It is characterized by intrusive thoughts (obsessions), which cause anxiety, and repetitive behaviors that reduce that anxiety (compulsions).[12] Mysophobia is an OCD variant characterized by intense fear of germs, dirt or contamination accompanied by behaviors to decrease contamination and exposure such as avoidance of physical contact and frequent hand washing.[1, 13] While the pathophysiology of idiopathic OCD and mysophobia is unknown, current theories posit abnormal serotonin activity and altered neuronal activity in the frontal, temporal and striatal regions and their subcortical circuitry. [10-12, 14-17] OCD has also been found to occur in patients with brain tumors and following traumatic brain injury (TBI) or stroke—providing converging data suggesting alterations in left frontotemporal brain activity. [2-5, 18-22]

Meningiomas are typically benign tumors that arise from the dura mater covering the brain and are one of the most common types of brain tumors. Meningiomas typically present with headache, seizures, focal neurological deficits or personality changes depending on their size and location [6-8, 23-26]. To our knowledge, there are no reported cases showing an association between mysophobia and structural lesions of the brain. We describe a woman with a three-year history of severe mysophobia found to have a large, left sphenoid wing meningioma. Following complete surgical resection and improvement in mass effect on the frontal and temporal lobes, her mysophobia resolved completely.

CASE REPORT

History and Examination. After receiving therapy during a difficult marriage 18 years prior to admission, this 48-year old female was diagnosed as personality disordered, obsessive-compulsive type (OCPD) with generalized anxiety. Benzodiazepines and sertraline provided minimal benefit for her anxiety and obsessive-compulsive symptoms, respectively. Paroxetine, other benzodiazepines and topiramate were tried with varying but overall limited success over the years.

Three years prior to admission, this 48-year-old female developed progressively worsening fears of germs and contamination. She developed significant anxiety from shaking hands with others, eating in restaurants and going to movie theaters. Her symptoms worsened significantly over time and to such an extent that she avoided all physical contact with others, compulsively washed her hands multiple times daily and spending in excess of $1000 dollars every month on soaps and hand sanitizers. Eventually, her fears caused her to isolate herself and live separately from her family. Other treatments were attempted without success including selegeline, duloxetine, aripiprazole, mirtazipine, n-acetylcysteine (NAC), a glutamate modulator, in an attempt

to reduce her compulsive behaviors. Counter-phobic sensitization offered minimal improvement in her ability to cope with public settings.

Six months prior to admission the patient noted left sided headaches that progressed over time. An MRI scan of the brain with gadolinium contrast demonstrated a large, left sphenoid wing meningioma with significant edema and mass effect on the left frontal and temporal lobes (Figures 1A, B and C). She was neurologically intact on admission but was extremely anxious and visibly uncomfortable with any physical contact during the preoperative neurological examination.

Figure 1

Figure 1. Gadolinium-enhanced MRI scan of the brain with showing a large, left sphenoid wing meningioma with significant edema and mass effect on the left frontal and temporal lobes (Figure 1A & B). Following complete removal of the meningioma and resolution of mass effect on the brain, this patientÂ's mysophobia resolved (Figure 1C & D).

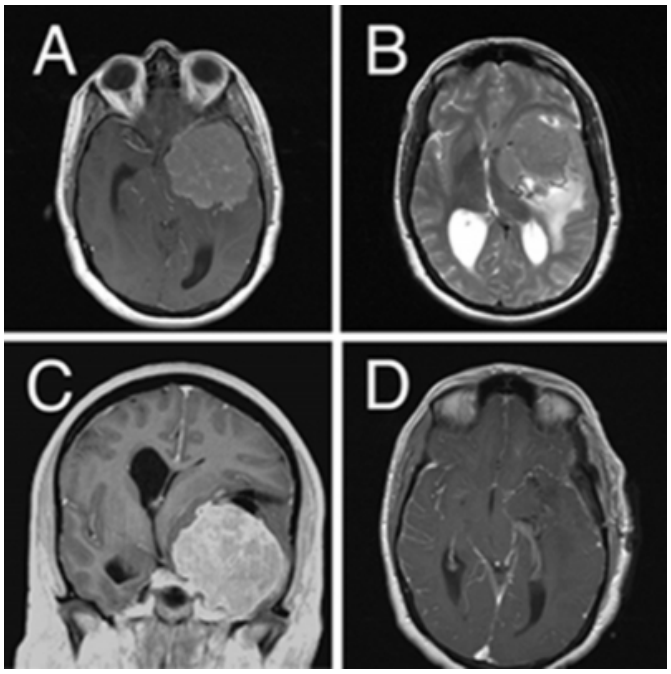

Figure 1. Preoperative MRI shows a large lateral sphenoid wing meningioma causing significant mass effect and edema on the left temporal lobe, insula and frontal operculum (Figure A, B & C). She underwent left pterional craniotomy and gross-total resection of the mass without neurological complication (D).

Surgical Procedure and Postoperative Course. She underwent left craniotomy and complete resection of the meningioma with marked resolution of the mass effect and midline shift (Figure 1D). Postoperatively, she had a third cranial nerve paresis which resolved over a period of 6 weeks. Her mysophobia symptoms resolved rather quickly following surgery. On the first post-operative day, she was able to shake hands with the surgical team with less fear of contamination or the need to immediately wash her hands. At the time of discharge on the fourth postoperative day, she reported no mysophobic symptoms whatsoever. She has remained without symptoms of mysophobia now almost 3 years following surgery and her imaging shows no recurrence of tumor. She has led a normal and active life since discharge following tumor removal and has returned to essentially normal social interaction. She exhibits no anxiety or avoidance behaviors to physical contact or germs nor obsessions concerning contamination.

DISCUSSION

Originally described by Dr. William Alexander Hammond in 1879, [1] mysophobia is rare variant of obsessive-compulsive disorder (OCD) characterized by intense and pathological fear of dirt, germs or contamination accompanied by behaviors to decrease contamination and exposure. [13] Compulsive hand washing, one of the most common subtypes of OCD, is a prominent feature of this disabling condition. While fear of dirt may underlie the hand washing compulsion of OCD, some contend that it is not primarily a fear of germs per se, as appears to be the case with mysophobia. Rather, patients with hand-washing compulsions in OCD feel that their hands must be washed. [17]

The underlying etiology of OCD and mysophobia is currently unknown. Neurochemically, disruption of serotonin activity is believed to play a prominent role. [10-12, 16] Functional imaging (fMRI, SPECT, PET) studies had identified the frontal, temporal, and striatal regions as possible neuroanatomical substrates of OCD and its variants. [14, 15, 27-33] Using quantitative electroencephalography in patients with OCD, Tot et al. found left frontotemporal dysfunction, especially in women. [34] Others have used magnetoencephalography (MEG) to demonstrate abnormal activity in the left frontotemporal regions, [35] and in the frontotemporal and subcortical/limbic circuitry. [36] Using MRI to measure gray matter volume, other centers have reported a reduced size of the superior temporal gyrus [37] and left orbitofrontal cortex [29, 38] in patients with OCD compared to controls. Numerous centers have also reported on the improvement in the abnormal activity in these regions with successful pharmacological or cognitive-behavioral therapy. [15, 32, 39]

Moreover, patients with brain tumors, strokes and traumatic brain injury (TBI) and OCD have added additional supporting evidence implicating the frontotemporal regions, especially on the left side. [2-5, 19-22, 40, 41] Specifically, Mainio et al. studied levels of obsessive-compulsive symptoms in 59 patients with primary brain tumors and found significantly increased OCD tendencies in patients with left frontal lesions, more so in women. [20]

However, others have suggested that OCD is correlated with greater dysfunction on the right side of brain, but most studies agree that the neuroanatomical substrate may lie in cortiostriatal systems, caudate and the orbitofrontal and dorsolateral prefrontal cortices. [12, 15, 33] Whiteside et al. urge caution in the interpretation of functional imaging studies as differences in relative metabolic activity in these different brain regions may not be the underlying cause of the behavioral manifestations. [33]

The primary treatment options for OCD include serotonin reuptake inhibition and psychological treatments such as cognitive behavioral therapy. [12] Selective serotonin reuptake inhibitors (SSRIs) like fluvoxamine and the tricyclic antidepressent clomipramine have been shown to have equal efficacy in patients with OCD and are usually the first-line pharmacological treatment options. [42-45] However, up to 40 to 60% of patients with OCD are refractory to SSRI medications. [46] Limited data suggest that SSRI treatment may be augmented by antipsychotic medications [46, 47] or NAC, an amino acid that modulates glutamate activity. [48, 49]

Brain tumors have been recognized as a cause of psychiatric symptoms since the 16 th century. [50] Autopsy studies in patients with psychiatric conditions estimate a 1.8 to 3.5% incidence of brain tumors. [24, 50-52] This rate was higher than a control population of patients without psychiatric diagnoses and meningiomas, specifically, constituted a significant proportion of that difference. [51]

Meningiomas are tumors that arise from the meningeal coverings of the brain and are usually benign. [6-8] They account for 13 to 26% of all primary brain tumors and asymptomatic meningiomas are estimated to occur in 1 to 3% of the population. [6, 7] Meningiomas are almost twice as common in females and can present with seizures, focal neurological deficits, or a neuropsychological decline. [8] Moreover, personality, mood and behavioral changes are frequently noted in patients with meningiomas compressing the frontal lobes. [23, 25, 53-56] The primary treatment remains surgical resection, [7, 8] however, minimally invasive options like focused beam radiosurgery are also used as primary treatment and, specifically, for tumors in areas difficult to treat with microsurgery. [57]

In this report, we described a woman with a large meningioma with significant compression of the left frontotemporal lobes and mysophobia. Given the slow growth rate of these benign tumors, a steady growth over the few years prior to her admission could certainly account for the onset and progression of her mysophobic symptoms. The location of the tumor in the left frontotemporal region is concordant with current data from functional imaging and lesional studies implicating the frontotemporal regions and their subcortical circuitry in the pathophysiology of obsessive thoughts and compulsive behaviors. Removal of the tumor resulted in complete resolution of her mysophobia, providing further evidence that the etiology of the disorder was related to the tumor itself.

Given this patient's long-standing history of anxiety and OCPD and the slow growth rate of meningiomas, early diagnosis in this case was difficult. The refractory nature of her symptoms and the eventual onset of headache prompted imaging. In agreement with others authors, [58] neuroimaging should be considered in patients with new onset psychiatric symptoms, atypical presentations of common psychiatric conditions and cases refractory to standard treatment regimens.

CONCLUSIONS

This is the first reported case linking a brain tumor to the onset of mysophobia and its resolution following successful surgical treatment. The location of this large meningioma compressing the left frontal and temporal lobes and their subcortical connections converges with neuroanatomical data from patients with idiopathic OCD and OCD in patients with other brain lesions. Neuroimaging should be considered in patients with atypical presentations or refractory cases of psychiatric conditions.

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Author Information

Robert E. Elliott, M.D.
Neurosurgical Care, LLC

Benjamin A. Rubin, M.D.
Department of Neurosurgery, New York University Langone Medical Center

Jafar J. Jafar, M.D.
Department of Neurosurgery, New York University Langone Medical Center