Body Dysmorphic Disorder in Patients With Autism Spectrum Disorder: A Reflection of Increased Local Processing and Self-Focus

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Case 1

"Mr. D" is a 25-year-old single white man who meets DSM-5 criteria for autism spectrum disorder (ASD), along with comorbid attention deficit hyperactivity disorder and a nonverbal learning disability (verbal IQ score, 99; performance IQ score, 79). He was diagnosed with ASD as a child and received early intervention and sensory integration services. He currently lives with his mother, is a college graduate, and is employed part-time. He has been preoccupied with the size, shape, coarseness, and color of his body hair, including hair on his wrists, abdomen, fingers, and eyebrows, for the past decade. He is compelled to monitor the hair's movement and position and whether or not hairs "stand out" and become observable to others, and this nearly constant preoccupation with body hair and compulsion to check his appearance in the mirror is distracting at work. He reports discomfort with any deviation from his expectations. He describes a heightened sensory sensitivity to movement of his hair and disorganization of the hair pattern, wanting it to be in a certain direction and "just so." For example, wind blowing his body hair causes a feeling of discomfort. This is associated with a high level of anxiety and feelings of shame and self-consciousness. In an attempt to reduce the anxiety and discomfort, he engages in compulsive grooming behaviors, finding the right way for hairs to sit on each finger, sometimes strategically pulling out hairs for a better overall look. On one occasion, he attempted to impose organization on his eyebrows with selective plucking, but he was not satisfied with the result. He admits that it is "ridiculous," but the discomfort feels "real." The compulsions are time-consuming and interfere with his performance of tasks at work, and as a result he has repeatedly been fired from jobs.

Case 2

"Mr. E" is a 36-year-old man with diagnosed ASD and pectus excavatum, for which he has undergone surgical correction. He graduated from college 5 years ago and is unemployed and lives alone. He has been seen as an outpatient for 7 years. He is preoccupied with the appearance of his nose and chest and is overwhelmed by feelings of self-consciousness. He reports obsessing over his nose and feeling compelled to touch it and feel for the presence of a bump, which he does repeatedly, often leaving marks. He frequently compares his nose and chest to those of other people, and he believes that others think he looks deformed. These symptoms improved only slightly after the surgical repair of his chest, and he still feels too self-conscious to go to the swimming pool, an activity he wishes to be able to do.

While in college, Mr. E reported socializing with friends and studying in groups with others, but he described feeling nervous, overthinking things, and frequently having time management problems. Since graduating from college and moving into his own apartment, he has become increasingly socially isolated. He feels he has "awkward social interactions" and questions his social skills. He performs his instrumental activities of daily living, including laundry and grocery shopping, on his own. He reports spending much of his time on the Internet playing computer games, staying up late at night, and avoiding looking for a job.

DISCUSSION

Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by deficits in social communication and interaction in addition to restricted, repetitive patterns of behaviors or interests. There is a substantial comorbidity with other psychiatric conditions, including social anxiety disorder, obsessive-compulsive disorder (OCD), affective disorders, and others (1).

See related feature: **Clinical Guidance** *(Table of Contents)*

A group of obsessive-compulsive spectrum disorders including OCD, body dysmorphic disorder, and trichotillomania has been recognized and studied (2–4). DSM-5 introduced a new category, "obsessive-compulsive and related disorders," which has increased the recognition, understanding, and treatment of these disorders. In recent years there has been increasing interest in and research on the comorbidity of ASD with OCD, identifying phenotypic, pathogenic, and pathophysiologic overlaps (5, 6). A population-based study showed familial links between ASD and OCD and additionally revealed that an ASD diagnosis doubled the risk of an OCD diagnosis later in life, and an OCD diagnosis quadrupled the risk of an ASD diagnosis (7). In addition, the presence of obsessive-compulsive traits or OCD in parents of children diagnosed with ASD has been linked to a higher occurrence of repetitive behaviors in these children, suggesting a possible genetic liability (8). Despite this extensive research on the overlap of obsessive-compulsive spectrum disorders and ASD, there has been little mention of the coexistence of ASD with body dysmorphic disorder. Body dysmorphic disorder is characterized as an intrusive, unwanted, and time-consuming preoccupation with one or more perceived defects or flaws in physical appearance that seem slight or are unobservable to others. These preoccupations are associated with repetitive behaviors such as mirror checking, grooming, reassurance seeking, and mental acts of comparing one's appearance with that of others.

A review of the literature revealed one case report describing body dysmorphic disorder in a young man with ASD, presenting as a preoccupation with being "too old" and "too tall" (9). The cases presented here reinforce the idea that body dysmorphic disorder can occur in patients with ASD and perhaps offer insight into a possible link between these two disorders with respect to two domains: focus on detail and focus on the "self." Focus on detail may result from a local processing bias reflected in the positive valence system domain construct of habit, as described by the Research Domain Criteria (RDoC) framework, and the cognitive system domain subconstruct of visual perception, which may contribute to the repetitive behaviors and visual perception abnormalities in both disorders. Focus on self may be a manifestation of aberrant social processes related to the RDoC's social processes domain constructs of perception and understanding of self in both disorders.

Focus on Detail: A Local-Processing Bias

One theory of ASD that has been supported by research is the "weak central coherence" theory, which describes a detail-focused processing bias (10). A similar detail-oriented focus is evident in body dysmorphic disorder, in which the hallmark is an impairing preoccupation with a perceived physical defect. Patients with body dysmorphic disorder have been found to have impairments in visual and verbal memory tasks related to an increased focus on details rather than global organization of information (11). This tendency for local processing may be a manifestation of frontostriatal dysfunction. MRI studies have shown impairments in frontostriatal connectivity as well as a correlation between striatal abnormalities and repetitive behaviors in ASD patients (12, 13). Body dysmorphic disorder is also associated with repetitive behaviors, which are evident in the clinical presentations described here. The less extensive existing research in samples of patients with body dysmorphic disorder also provide evidence of abnormalities in frontostriatal function (14, 15). However, further research is needed to elucidate whether the repetitive behaviors characteristic of body dysmorphic disorder, such as in our patients' cases, are similarly related to the striatal abnormalities found in ASD.

In addition, there is substantial evidence that patients with ASD and body dysmorphic disorder show abnormalities in face recognition, perhaps related to this imbalance in part-based processing over holistic processing. Deficits in attention to faces and abnormalities in facial perception in the ASD population have been implicated in the social communication deficits that define the disorder (16, 17). More evidence of abnormal face processing arises from tests using inverted faces, which are more difficult for healthy control subjects, likely because these tests necessitate part-based processing rather than holistic processing. These tests show that children with ASD are better than control subjects at recognizing inverted faces, which further supports a local processing bias (18). Likewise, individuals with body dysmorphic disorder exhibit faster response times with inverted faces than do healthy controls, thus demonstrating a detail-focused processing style (19). This abnormal processing style in both body dysmorphic disorder and ASD samples represents a potential link between these disorders.

Focus on the "Self": Emotion Perception and Amygdala Hyperreactivity

ASD and body dysmorphic disorder can be conceptualized as disorders with a pathologically increased focus on the "self." There has been interest in the construct of the "autistic self" in ASD research and theory, ranging from the idea of an "absent self" to a pattern of egocentrism (20). Individuals with ASD have been found to have abnormalities in self-referential cognition, which may contribute to self-focus exemplified by restricted behaviors and interests and social deficits (21, 22). In addition, emotion recognition, which is essential for social interaction and interpersonal functioning, has been studied robustly in the ASD population, revealing abnormalities in comparison with control subjects, with a particular bias for interpreting emotions as negative (23–25). This bias for perceiving emotions as negative may lend insight into the deficits in reciprocity and social interactions seen in ASD patients, resulting in greater interest in the self than in others. All of these findings illustrate the deficits in social communication and interaction that define ASD and contribute to self-focus.

Similarly, patients with body dysmorphic disorder exhibit an increased focus on the self. They are frequently concerned with how others perceive them and appraise this as a great

source of distress, often reporting ideas of reference. Patients with body dysmorphic disorder also show more difficulty recognizing emotional expressions, with a bias for misinterpreting others' emotional expressions as negative, especially in scenarios of self-reference (26). These findings suggest that these deficits may be associated with a tendency to interpret others' expressions as rejecting, consistent with a self-referential processing bias. This self-focused cognitive pattern has been the target of cognitive-behavioral therapy approaches for the treatment of body dysmorphic disorder.

There are also important differences between ASD and body dysmorphic disorder. Patients with body dysmorphic disorder are frequently concerned with how others view them and appraise this as a great source of distress, whereas in ASD there may be a more general lack of interest in or failure to participate in social interactions, although this is not always the case. However, both ASD and body dysmorphic disorder populations exhibit difficulty appreciating others' affect and inferring their internal emotional state, leading to a tendency for self-focus and avoidant social behaviors in response.

Dysfunction of the amygdala has been associated with many disorders, among them body dysmorphic disorder and ASD. The amygdala has been widely implicated in ASD both theoretically, given the amygdala's role in social behavior, and through evidence of abnormality, via functional MRI data, postmortem evidence, and animal models of ASD (24, 27, 28). Although this was first conceptualized as a hypofunctioning amygdala supporting the deficits in social-emotional reciprocity and abnormalities in communicative behaviors seen in ASD, it is now more commonly believed that a hyperreactive amygdala leads to these clinical features to avoid emotional overload (27). While not as extensive as the research in ASD, there have been some studies examining neurobiological patterns in patients with body dysmorphic disorder. In one study, symptom severity in body dysmorphic disorder correlated positively with right amygdala volume, suggesting involvement of this structure (29). In another study, functional MRI results showed that patients with body dysmorphic disorder have abnormally increased amygdala activation during certain facial-matching tasks (30). These findings implicate the amygdala in both ASD and body dysmorphic disorder and elucidate a possible pathophysiological overlap of hyperarousal of the amygdala with a failure of top-down modulation.

Considerations for Treatment: The Role of Serotonin and Oxytocin

There is some evidence that selective serotonin reuptake inhibitors (SSRIs) are of benefit in patients with ASD, specifically for repetitive behaviors (31), although some studies suggest that SSRIs may not be efficacious in children with ASD and that a subgroup may experience activation (32). In body dysmorphic disorder, there is a selective efficacy of serotonin reuptake inhibitors but not norepinephrine reuptake inhibitors (33). While not specific to ASD and body dysmorphic disorder, SSRIs may improve symptoms in both disorders, although less consistently in ASD, but it is unclear whether this represents a common neurochemical pathway.

In response to intranasal oxytocin, healthy volunteers with avoidant attachment were found to improve in measures of "communion," switching focus from self to others (34). There is growing evidence that oxytocin may be efficacious in a range of neuropsychiatric disorders that affect social functioning. Adults with ASD showed reduced repetitive behavior severity (35) and improvements in social cognition with administration of exogenous oxytocin (36), which is thought to dampen amygdala reactivity, thereby increasing prosocial behavior. While exogenous oxytocin has not been studied as a treatment for patients with body dysmorphic disorder, it has been shown to reduce negative self-appraisals in patients with anxiety when administered before a speech task (37). Patients with body dysmorphic disorder and ASD could conceivably respond to oxytocin by shifting focus from the self to others and lessening amygdala reactivity to perceived social threat from others. Patients such as those described here may benefit from oxytocin treatment or psychosocial interventions targeting social engagement to dampen amygdala reactivity to perceived negativity, resulting in prosocial behaviors.

CONCLUSIONS

ASD and body dysmorphic disorder may share a similar neurocognitive profile characterized by both detail-oriented processing bias (associated with frontostriatal involvement and increased local circuitry) and focus on self (associated with amygdala hyperreactivity). Specific treatments that target this neurocognitive profile and its underlying circuitry, such as oxytocin, may be especially efficacious in those individuals who have both comorbid conditions. Research examining this comorbidity and the clinical, biological, and cognitive correlates of the two disorders in cases where they co-occur may be useful for discovering possible endophenotypes. The coexistence of these disorders can provide insight into the complex relationship between ASD and obsessive-compulsive spectrum disorders and stimulate a better understanding of the social deficits and repetitive behaviors seen in these populations.

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