

# Review of Possible Etiologies and Treatment Options in a Teen With Coprophagia

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**Case:** An 18-year-old, single, unemployed Bahamian male with a diagnosis of new-onset schizophrenia was treated with risperidone (Risperdal) on the inpatient unit, then discharged home to his family. Later that day, he became physically aggressive when family members attempted to prevent him from eating his own feces. They physically restrained him until police arrived, after which he was brought to a different hospital, given family members' continued concerns that the patient was a danger to himself. At the hospital, the patient demonstrated signs of psychosis, including disorganized behaviors, internal preoccupation, and thought blocking. He was laughing and smiling as he spoke both of eating his own feces and of his earlier aggression towards his family members. Given his clinical presentation and concern at that time that he presented an acute danger both to himself and others, the treatment team decided that he required involuntary admission to a psychiatric inpatient unit.

Coprophagia, of which there are few reported cases, is a complex behavioral disorder that can have various etiologies, each of which might warrant a different treatment or management approach. Coprophagia comes from the Greek *copros*, feces, and *phagein*, to eat. It is the act of consuming feces, whether directly from the same individual (autocoprophagy), other individuals (allocoprophagic), or other species (heterospecific), and is considered normal behavior amongst certain invertebrate and vertebrate animal species. Invertebrates such as dung beetles, worms, and flies often consume and redigest the feces of large animals.<sup>1</sup> Termites consume one another's feces as a means of aiding digestion.<sup>1</sup> There are some vertebrate herbivores (e.g., rabbits, hamsters, guinea pigs, mole rats, horses, tortoises, gorillas, etc.) that need to consume their own feces to help digest their food and extract sufficient nutrients such as vitamins.<sup>2</sup> Some vertebrate mothers eat the feces of their newborn young to prevent alerting potential predators of their location.<sup>1</sup> Other vertebrates (e.g., the young of elephants, pandas, hippopotamuses, koalas, etc.) are born with a sterile gastrointestinal system, and they obtain the necessary bacteria by eating the feces of others in their herd in order to digest vegetation.<sup>1</sup> Coprophagia has also been reported in dogs, chimpanzees, and even early humans,

but it is unclear if *homo sapiens* have ever routinely engaged or still engage in coprophagia.<sup>3</sup>

Although coprophagia represents normal biological functioning in some vertebrates, it currently is considered abnormal behavior in humans, particularly given the risks associated with this behavior. Coprophagia in humans can result in *E. coli* infection, hepatitis A, hepatitis E, influenza, pneumonia, polio, chronic gingival infections, chronic lesions of vestibule mucosa, infections of the salivary glands (sialadenitis), intestinal parasitosis, and gastrointestinal obstruction (which can cause death).<sup>1,4,5</sup> Although fecal matter has been used in humans for fecal bacteriotherapy (patients suffering from intractable diarrhea caused by *Clostridium difficile*—bacteria that affects the gastrointestinal tract—can undergo fecal microbiota transplantation), in instances such as these, the fecal matter is administered via nasogastric tube, enema, or in a capsule form to decrease the risks associated with oral fecal ingestion.<sup>6</sup>

The literature available to guide clinicians to appropriate treatment for patients with coprophagia is limited, due in part to its complexity and the relatively small number of occurrences. Understanding coprophagia in humans is critical—particularly given the potential negative health sequelae of this complex behavior. This article reviews possible etiologies, key work-up strategies, and several

treatment options to consider when working with patients with coprophagia.

### Coprophagia and Its Comorbidities

Coprophagia in humans is typically associated with either a medical or psychiatric disorder. Frequent comorbidities of coprophagia include mineral deficiency, neurological dysfunction, disorders of development, intellectual disabilities, psychosis, anxiety, and affective instability.<sup>7</sup> Coprophagia commonly is considered a variant of pica (the persistent and developmentally inappropriate eating of nonnutritive substances),<sup>8</sup> which itself is frequently associated with either a medical disorder (e.g., iron-deficiency anemia) or psychiatric disorder (e.g., autism spectrum disorder and intellectual disability<sup>9</sup>). Haoui *et al.* found that the majority of psychiatrically hospitalized patients who demonstrated pica also were diagnosed with either a disability of mental impairment (48%) or developmental delays (26%).<sup>10</sup> Sharma *et al.* found that coprophagia and other forms of pica occur in individuals with mild to moderate dementia and mixed (iron deficiency and macrocytic) anemia.<sup>11</sup> Josephs *et al.* conducted a medical record review at Mayo Clinic from 1995-2015 that identified 12 adult patients with coprophagia; half of the patients had neurodegenerative dementia, two had developmental delay, and one each had a history of seizures, steroid psychosis, frontal lobe tumor, and schizoaffective disorder.<sup>12</sup> Individual case reports also have suggested associations between coprophagia and psychosis,<sup>13-15</sup> obsessive-compulsive disorder (OCD),<sup>16</sup> mood disorders,<sup>7</sup> personality disorders,<sup>17</sup> and paraphilias.<sup>18</sup>

### Work-Up of Coprophagia

Treatment modalities are constructed to address the underlying etiology for a disorder (see Table 1). As just described, deciphering the etiology of coprophagia can be a difficult task depending on the patient's cognitive limitation and presentation. All patients should receive a thorough medical work-up upon admission to rule out any medical causes. Tests that should be ordered include complete blood count (CBC) with differential and iron studies (e.g., serum iron, total iron binding capacity

[TIBC], and serum ferritin) for causes of iron deficiencies, comprehensive metabolic panel (CMP) and urinalysis (UA) for abnormalities causing cognitive impairment, thyroid stimulating hormone (TSH) for causes of affective instability, urine toxicology for causes of decision impairment, brain imaging for any malformations, and electroencephalogram (EEG) in cases of seizure history. If the patient's medical work-up comes back within normal limits, then consideration of psychiatric causes is warranted. To help guide clinicians in diagnostic clarity, it is recommended to conduct an in-depth search for collateral information to better understand the timeline and presentation of the coprophagia. If the patient is communicative and medically stable, then neuropsychological testing can be helpful to determine the patient's IQ score as well as to detect any psychiatric disorders. Although the medical and psychiatric work-up of coprophagia can be extensive, the findings are often negative or contribute minimally to understanding the etiology in most cases.

### Treatment

In general, effective diagnosis and treatment of underlying medical and/or psychiatric conditions is the priority, because coprophagia often resolves with the improvement of other comorbid symptoms. Ing *et al.* (2011) completed a functional analysis in a six-year-old female with autism and demonstrated that her coprophagia was driven by automatic reinforcement (the behavior itself produces its own reinforcement); providing noncontingent access to alternative stimuli decreased coprophagia for her.<sup>19</sup>

In cases where coprophagia is secondary to mineral deficiencies such as iron, altering the diet of the patient to include the missing nutrients has been shown to resolve the secondary behavior. Bugle and Robin (1993) wrote about three cases of individuals with profound intellectual disabilities, coprophagia, and nutritional deficiencies. In each case, the individual was given twice the doses of a daily oral supplement of an "elemental diet," which would provide all the nutrients necessary for sustenance. The frequency of coprophagia was

**Table 1: Tools to Help Guide Diagnostic Formulation and Treatment Planning**

TOOLS	DEFINITION	SCORING SYSTEMS
Full-scale IQ	Designed to measure intelligence and cognitive ability by verbal scales (i.e., general knowledge, language, reasoning, and memory skills) and performance scales (i.e., spatial, sequencing, and problem-solving skills)	130 and above = very superior 120–129 = superior 110–119 = high average 90–109 = average 80–89 = low average 70–79 = borderline 69 and below = extremely low
Beck's Depression Inventory (BDI)	BDI is a 21-item, self-report rating inventory that measures characteristic attitudes and symptoms of depression	0–9 = minimal depression 10–18 = mild depression 19–29 = moderate depression 30–63 = severe depression
Thematic Apperception Test	A projective test designed to reveal a person's social drives or needs by their interpretation of a series of pictures of emotionally ambiguous situations	1. Defense Mechanisms Manual (DMM) 2. Social Cognition and Object Relations (SCOR) 3. Personal Problem-Solving System–Revised (PPSS-R)
Rorschach	A psychological test in which a person's interpretations of a series of standard inkblots are analyzed as an indication of personality traits, preoccupations, and conflicts	Exner scoring system, also known as the Rorschach Comprehensive System (RCS)
Minnesota Multiphasic Personality Inventory (MMPI)	A standardized psychometric test of adult personality and psychopathology	Analysis compares relative elevation of factors to the different norm groups studied

decreased in all three cases when they received the supplemental nutrients as compared to when they were maintained on a balanced institutional diet alone.<sup>20</sup>

When coprophagia is caused by mood and anxiety disorders, treatment of the underlying depression or anxiety can resolve the coprophagia. Beck and Froberg (2005) did a case report on a 77-year-old male with mild intellectual disability who was evaluated for sudden-onset of coprophagia, which revealed an underlying depression that responded to sertraline 25 mg daily with resolution of symptoms.<sup>7</sup> A Zeitlyn and Polivy (1995) case report showed that an adult male with normal cognitive functioning but who suffered from severe posttraumatic stress disorder and compensatory OCD behaviors could have remission in coprophagic behavior with the treatment of his OCD. The male had remission after initiation with a behavioral treatment program comprised of exposure and response prevention.<sup>16</sup>

Pharmacotherapy to treat comorbid conditions other than mood and anxiety disorders has been shown to be benefi-

cial, as well. A Pardini *et al.* (2010) study showed improvement in a 29-year-old male with high-functioning autism on aripiprazole 15 mg daily dose after 4 weeks.<sup>13</sup> Similarly, antipsychotics have been used to treat coprophagia in patients with schizophrenia. A Lingeswaran *et al.* (2009) study showed complete resolution of symptoms for a 19-year-old South Indian male with schizophrenia on olanzapine 10 mg daily with no relapse 3 months after initial evaluation.<sup>14</sup> Another study conducted by Harada *et al.* (2006) described resolution of symptoms for a patient with schizophrenia who suffered from medication-refractory coprophagia on perospirone.<sup>15</sup>

The goal of any treatment plan is for the resolution of symptoms. If the various treatment modalities prove ineffective to decrease coprophagic behaviors, then consideration for long-term placement for continued treatment should be discussed with the patient and family.

## Conclusion

Coprophagia is a variant form of pica that, despite being necessary for survival in other species, can be harmful

in humans, causing diseases and infections in the body. It requires immediate assessment to determine the root cause of the behavior, which is either medical or psychiatric in nature. A full work-up will reveal if there are any disorders or deficiencies that can explain the coprophagia and lead to a treatment plan. Although coprophagia literature is limited, it appears to be related to mental illness, neurodevelopmental disorders, or mental impairments because cognitive limitations prevent individuals with these conditions from understanding the risks of coprophagia. In these instances, treatment involves a comprehensive analysis to construct a behavioral management plan that will decrease the coprophagia and replace it with a positive behavior. Additionally, coprophagia can be present in individuals with schizophrenia, which is a psychotic process that also affects executive functioning, reasoning, and decision making. Psychotic disorders are best treated with antipsychotics and have been proven to decrease coprophagia in prior case reports. Coprophagia is a critical abnormal behavior that should be investigated emergently to provide treatment. In cases where the mainstay of treatment does not provide improvement on an inpatient unit, individuals may need a longer course of treatment in state facilities prior to reintegration into the community.

### Take Home Summary

Coprophagia is a variant form of pica where individuals will consume feces. It is a complex behavioral disorder that can have various etiologies; because there are few reported cases, it presents a challenge in putting together an appropriate treatment plan. However, it is critical to determine a treatment plan because coprophagia is a dangerous behavior that can lead to infections and medical complications that can result in death.

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