Found in Feces: Differential Diagnosis, Workup, and Treatment

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LESSONS LEARNED AT THE INTERFACE OF MEDICINE AND PSYCHIATRY

The Psychiatric Consultation Service at Massachusetts General Hospital sees medical and surgical inpatients with comorbid psychiatric symptoms and conditions. Such consultations require the integration of medical and psychiatric knowledge. During their twice-weekly rounds, Dr Stern and other members of the Consultation Service discuss the diagnosis and management of conditions confronted. These discussions have given rise to rounds reports that will prove useful for clinicians practicing at the interface of medicine and psychiatry.

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Have you ever seen a patient covered in feces and wondered why it happened? Can you imagine a "normal" person behaving in such a fashion? Have you felt disgusted and thought that your reaction might have affected the care you provided? If you have, then the following case vignette should serve as a stimulus for further discussion and clinical guidance and prepare you for the notion that certain situations direct medical care more than do symptoms.

CASE VIGNETTE

Ms A, a 68-year-old woman, was found amid her feces and urine following a mechanical fall. When a neighbor came by to check on her, he called for an ambulance. The emergency medical technicians noted that the room temperature was 40°F (secondary to a furnace malfunction), yet she had not called for assistance. While Ms A had managed to obtain fluids, she spent several days on her couch. She described herself as an independent woman and stated that she wanted to be left alone. Her house was described as "a mess." Preliminary examination by the emergency medical technicians revealed a probable hip fracture, and she was transported to the hospital for an open reduction and internal fixation. Ms A acknowledged that she was distraught over the death of her cat.

Ms A's past medical history was notable for a gait disturbance. Laboratory assessment included a serum urea nitrogen level of 4 mmol/L; a creatinine level of 0.46 μmol/L; a white blood cell count of 12,000/μL; and an albumin level of 4.6 g/L.

Physical examination revealed an awake, alert, polite, cooperative, and fluent but dysarthric 80-lb woman. Her Mini-Mental State Examination (MMSE)[1] score was 28/30. However, Ms A had problems with 3-step Luria maneuvers, was perseverative, and manifest poor planning on clock-drawing. In addition, she thought that the tallest building in Boston, Massachusetts, was 6 ft tall and that the average loaf of bread had 100 slices. Nonetheless, initial evaluations by clinical staff did not detect a psychiatric disturbance.

WHAT IS THE DIFFERENTIAL DIAGNOSIS OF BEING FOUND IN FECES?

The differential diagnosis of being found in feces is broad. Although being covered in stool may be a normal occurrence in certain professions (eg, sewage engineering), under most circumstances, being covered in fecal waste is a marker of underlying pathology.

Despite the fact that people produce solid waste from digested material on a regular basis, being covered in stool is relatively uncommon. The low frequency of this finding is due largely to our society's investment in significant resources to ensure that bodily wastes are disposed of in a neat, hygienic manner. From an early age, toddlers learn that stool is an undesirable bodily product and contact with it should be minimized. The vast infrastructure devoted to ensuring adequate sanitation practices (and that decrease the public's risk of infection) reinforces the lessons learned about stool management during potty training.

Clinical Points

- The differential diagnosis of being found in feces is broad.
- Those who let themselves be found in stool can be classified into 4 broad categories: those who are not aware that there is a problem, those who cannot move, those who will not move, and those who do not move.
- While the Mini-Mental State Examination can uncover moderate-to-severe impairments in cognitive function, it is insensitive to deficits in executive function; thus, more extensive mental status testing may be required during the assessment of neuropsychiatric dysfunction.

A practical approach to thinking about an individual who is brought to a medical facility covered in fecal matter involves consideration of both abnormal stool excretion and impaired response to fecal contamination. From a social perspective, the more stool on one's body, the greater the abnormality. Although many individuals have "accidents" in the setting of severe diarrhea, a rapid response time (for cleaning oneself) is expected to avoid social scorn. Thus, factors that impact the rate and quantity of stool production as well as the time to clean up the mess are considered when creating a differential diagnosis.

WHAT FACTORS INFLUENCE STOOL PRODUCTION?

Factors that influence stool production and fecal soiling need to be considered in the workup of a person brought in for medical attention after being found in feces.

Diarrhea, with high quantities or fast flow of stool (and with attendant increases in the risk of fecal soiling), has myriad causes. Infections, medications, endocrine disorders, and several malabsorptive and inflammatory conditions can cause diarrhea and increase the likelihood that a patient may become covered in feces.[2–5] Other conditions (eg, ostomy malfunction, short-bowel syndrome, irritable bowel syndrome, diabetic autonomic neuropathy) can also place an increased burden on a patient's ability to remain free from fecal waste.[3]

At the other end of the spectrum, constipation can cause fecal soiling due to liquid stool leakage around an impacted fecal mass, a condition referred to as overflow incontinence or encopresis.[3,5,6] In general, constipation is multifactorial; however, it can be categorized by conditions that slow intestinal transit or by those that result in defecatory dysfunction.[7,8] Slow transit constipation can be caused by myopathy or enteric neuropathy, systemic and metabolic conditions (eg, hypothyroidism, hypercalcemia, amyloidosis, spinal cord injury, multiple sclerosis), or various drugs that reduce intestinal motility (eg, opiates, anticholinergics).[8] Defecatory disorders can arise from impaired rectal sensitivity, abnormal sphincter function, spastic floor syndrome, or structural abnormalities (such as rectocele, rectal intussusception, or rectal cancer).[7,8] Diet, hydration status, physical activity, and voluntary responses all influence the development of constipation. However, it is important to note that only a small subset of individuals with constipation experience overflow impaction, encopresis, or fecal soiling.[6,8]

In addition to constipation and diarrhea, other risk factors for adult fecal incontinence include female gender, pregnancy, advanced age, poor health status, neurologic disorders, and institutionalized residence.[5]

WHAT TYPES OF RESPONSES TO FECAL SOILING ARE ABNORMAL?

One has to consider factors that result in an abnormal response to fecal soiling to answer the question, "Who lets themselves be found in feces?" Those who let themselves be found in stool can be classified into 4 broad categories: those who are not aware that there is a problem, those who cannot move, those who will not move, and those who do not move.

Not Aware

Among the most obvious causes that contribute to an individual's risk of being covered in feces is impairment of one's ability to know that there is a problem. Impaired sensation, as can occur with cord paralysis or neurologic deficits (particularly if accompanied by anosmia), can limit awareness of the physical cues that signal the impending evacuation of fecal waste. Severe cognitive impairment or any cause of impaired consciousness (eg, encephalopathy, infection, metabolic disorder, and hypoxia) that interferes with an individual's awareness of his or her environment is a clear risk factor for being found in feces.[5] Intoxication, in particular, should be kept in mind as a cause of an altered, but reversible, sensorium that may have interfered with a person's ability to properly control evacuation of solid waste and to clean up after a bowel movement. Organophosphate poisoning provides a good example of this problem, as the cholinergic surge associated with this toxidrome results in diffuse diarrhea and an altered sensorium that impairs one's response to the bowel activity.[9]

Cannot Move

Some patients are aware that they have soiled themselves but are unable to clean up due to various physical impairments. These abnormalities are typically fairly obvious and usually result in the patient's requiring assistance from others for numerous activities (including maintenance of proper toileting). Conditions that can interfere with an individual's ability to maintain adequate personal hygiene include fractures, muscle weakness, strokes, morbid obesity, ataxia, poor coordination, hypoxia, and physical restrictions (eg, restraints, traction). In fact, fecal accidents are not uncommon in orthopedic wards

where patients require significant assistance with toileting due to restricted mobility.[10]

Will Not Move

Patients in this category are aware that they are covered in stool and are free from any physical limitation that might have impaired proper personal hygiene but still will not address the fact that they are covered in fecal matter. The causes underlying their inaction are usually difficult to detect, as they usually involve impairment of higher-order cognitive functions. Potential causes of abnormal evacuation behavior include personality disorders (that lead to problems with socialization and aggression and are linked with affective disorders and obsessive-compulsive disorder) and other types of psychopathology (eg, psychotic illnesses such as schizophrenia and catatonia) that affect the volitional component of defecation.[6,11] For example, a hospitalized patient without physical limitations might purposefully defecate in bed as an expression of anger (usually directed at his or her nurse), or an individual might soil himself rather than use a public bathroom because of underlying social anxiety.

Do Not Move

Patients in the do-not-move category are similar to those that will not move in that they are aware and capable, but their reasons for their abnormal toileting behaviors and failure to avoid being covered in bodily excretions are more complex and multidimensional. The multifactorial nature of such behavioral disturbances results in more systemic dysfunction than in those with isolated psychopathology (eg, a combination of poverty and mild dementia in which people are forced to live in difficult situations with insufficient supplies and services). In this setting, lack of personal hygiene is a byproduct of global deficiencies, yet the individual remains aware of his or her condition. Evidence of social squalor and poor personal hygiene has been described in the medical literature and viewed as having multiple etiologies.[12] In particular, the terms *Diogenes syndrome* or *senile breakdown* have been used to describe elderly individuals with gross self-neglect, apathy, and social isolation. Although many with this syndrome have normal intelligence and no evidence of psychiatric disorders or frontal impairment,[13,14] such reclusive individuals who live in filth are known to social workers who often shepherd them toward contact with the medical community.

WHAT HAPPENED TO Ms A?

Ms A's dramatic presentation with manifestations of extreme self-neglect can serve as a stimulus for discussion of the evaluation and management of patients who are covered in feces.

The initial approach involves bathing the patient to remove barriers to care that result from health care workers' attitudes toward fecal contamination and addressing the patient's general medical needs. It is particularly important to recognize that these individuals often present in crisis; they frequently require volume repletion and correction of electrolyte abnormalities.[13,14] As many such patients present after a fall and have impaired mobility[14] and rhabdomyolysis, orthopedic evaluations need to be conducted. Careful nutritional support is imperative; this often requires repletion of caloric and vitamin deficiencies, being mindful of the risk of a refeeding syndrome.[15]

Specific therapies are predicated on the cause of the condition. Patients should be screened for conditions that result in abnormal stool production and for abnormalities that impair response time. Treatment of conditions that affect response time may involve treatment of reversible causes of an altered sensorium for a patient in the not aware category. Assistance from orthopedics, physical therapy, neurology, or medical services may be required for those patients who cannot move. Treatment of patients who will not move or do not move despite having normal capabilities requires a multidisciplinary approach.

Ms A required an open reduction and internal fixation to repair her hip fracture following a fall. Because of her heroic efforts to maintain hydration, her renal function was preserved, and she did not develop rhabdomyolysis (her creatine kinase level was 255 U/L). She did not manifest gastrointestinal abnormalities. Since she was able to travel between rooms despite her hip fracture, a lack of mobility was unlikely to be the primary reason that she was found covered in stool. Ms A's social situation was more consistent with the do-not-move causes of being found in excrement rather than those of the cannot move category.

Although Ms A did not exhibit syllogomania (excessive hoarding of rubbish) that is often seen in cases of Diogenes syndrome, her presentation was otherwise quite consistent with this diagnosis. Moreover, she came to medical attention following a fall (the most common cause for medical care in the original series of patients with this syndrome).[13] Despite taking great pains to maintain hydration, Ms A was unconcerned by the excrement and stench that surrounded her. She was of sufficient intelligence to mask her defects in executive function on an initial cursory evaluation; follow-up neuropsychiatric examinations uncovered her executive dysfunction. These findings, combined with defects in spatial cognition, language, mood, speech (dysarthria), and movement (ataxia), and results of imaging studies (that showed normal brain volume but cerebellar aplasia) pointed to the cerebellar cognitive affective syndrome as the underlying cause of her presentation.[16] Prior to the description of this syndrome in 1998,[16] little would have been made of her cerebellar aplasia except for the fact that it may have contributed to her dysmetria (despite subtle evidence from animal models that the cerebellum was involved in more than just motor function). While electrical stimulation of the vermis and fastigial nucleus can promote grooming behavior in rats and cats, mice with cerebellar degeneration exhibit impaired grooming behavior.[17] In a

sense, these studies foreshadowed Ms A's presentation. Her treatment required a multidisciplinary approach to promote better grooming behaviors and to ensure her safety, while still maintaining her independence.

WHAT SHOULD THE NEUROPSYCHIATRIC WORKUP OF A PATIENT FOUND IN FECES INVOLVE?

Determination of an appropriate neuropsychiatric workup begins with the localization of a patient's specific cognitive and behavioral deficits, given that different neuropsychiatric disease processes may selectively affect specific brain systems. One difference between the classic localization strategy for detection of neurologic deficits by neurologists and the localization of deficits by cognitive and behavioral neurologists and neuropsychiatrists is that the latter try to identify neural systems and brain circuits.

One commonly used test, the MMSE,[1,18] was originally designed as a screening tool for detection of dementia in the primary care setting. While it can be useful in uncovering moderate-to-severe impairments, it is insensitive to deficits in executive function[19] (eg, a patient with frontal lobe impairment may score 28/30 on the MMSE, and the test may not detect behavioral problems or an ability to return home safely). Thus, more extensive mental status testing is required, as was done subsequently in the case of Ms A.

Ms A's neuropsychiatric consultant noted that she was awake, alert, oriented, and cooperative and that she had normal naming, repetition, comprehension, and intact 3-word recall. These observations suggested that she did not have a global acute confusional state. However, she was unable to copy pentagons, a star, or a 3-dimensional cube; this indicated an impairment of visuospatial processing. Most notably, she was unable to perform serial *7*s, her reverse auditory digit span was markedly reduced in relation to her forward span (forward auditory span 7 and reverse auditory digit span 2), she demonstrated perseveration on Luria alternating motor sequences (fist-side-palm), and she had decreased verbal fluency (2 *F* words in 1 minute), as well as poor planning and concrete thinking on a clock-drawing task. Last, she displayed poor judgment. All of these latter impairments represented different aspects of executive dysfunction and localized her dysfunction to frontal networks (ie, the frontal lobes and their connections).

Executive functions are a set of higher-order, "top-down" cerebral processes (ie, they act as the chief executive officer of the brain[20] that allows one to plan, prioritize, allocate, and manage competing cognitive resources [eg, attention, organization, initiation, planning, monitoring, set-shifting, and affect regulation]).[20]

The neural circuits that mediate executive function are widely distributed throughout the brain; as a result, they are extremely sensitive to the effects of systemic illness. The differential diagnosis of executive dysfunction is broad (Table 1); it overlaps significantly with that of acute delirium, since there is a tight link between the systems that oversee the brain's arousal and executive systems. Assessment also involves a thorough review of medications; detection of sedative-hypnotics and anticholinergics is crucial, as they are frequent iatrogenic instigators of executive dysfunction. Then, screening (for electrolyte imbalances, infection, inflammation, or endocrine dysfunction) is recommended, followed by neuroimaging and/or neurophysiologic studies, as clinically indicated. More invasive testing (eg, lumbar puncture, arterial blood gas) or tests for rarer causes of executive dysfunction (eg, paraneoplastic disease, neurodegenerative or neurogenetic disorders) should be considered on a case-by-case basis.

Table 1. Differential Diagnosis and Workup for Executive Dysfunction

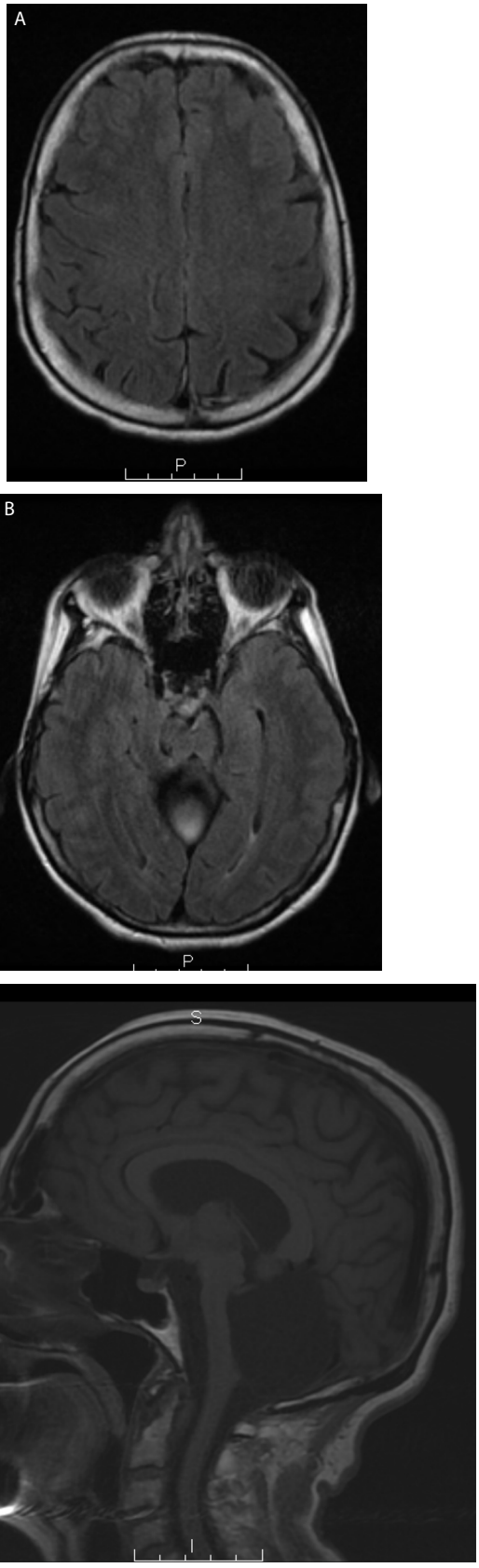
Differential Diagnosis	Workup
Metabolic	Electrolytes, vitamin B_{12}
Oxygen	Arterial blood gas
Vascular	Magnetic resonance imaging (± magnetic resonance angiography)
Endocrine	Thyroid-stimulating hormone, glucose
Seizure/structural	Electroencephalogram, magnetic resonance imaging
Tumor	Magnetic resonance imaging (± magnetic resonance angiography)
Uremia	Serum urea nitrogen/creatinine, ammonia
Psychiatric	Examination
Infectious/inflammatory	Serum studies, lipoproteins
Degenerative/developmental	Imaging
Drugs	Toxicology screen, medical review

One might also consider screening for anosmia, although anosmia alone is unlikely to cause unawareness of fecal incontinence in the absence of impaired executive function. Increasingly, impairment of olfactory function has been detected in a number of neurodegenerative disorders (eg, Alzheimer's and Parkinson's disease)[21–23]; furthermore, given the anatomic proximity of the olfactory bulb and the orbitofrontal cortex, many diseases and conditions (eg, traumatic brain injury, tumor) simultaneously present with olfactory impairment and executive dysfunction.[22] Several standardized tests of olfactory function are currently available[22]; however, simple materials (such as coffee and toothpaste) are readily available for brief bedside evaluations. Last, it is also important to note that if olfactory dysfunction is identified, intranasal causes of anosmia should be considered.

In the case of Ms A, basic screening for electrolyte imbalance, endocrine dysfunction, infection, and inflammation were unremarkable. Brain magnetic resonance imaging (Figure 1A–C) revealed remarkably little cortical atrophy (with possible mild biparietal atrophy) and no evidence of subcortical white matter disease to suggest a cerebrovascular cause of her executive dysfunction. Unexpectedly, however, Ms A was found to have complete absence of the cerebellum (ie, cerebellar agenesis).

For decades, this rare congenital condition was believed to be asymptomatic. However, cerebellar agenesis has subsequently been shown to be associated with a range of

Figure 1. Magnetic Resonance Imaging of Ms A's Brain: (A and B) Axial Views and (C) a Sagittal View, Revealing Agenesis of the Cerebellum



motor, cognitive, and behavioral abnormalities (including developmental motor delay, mild ataxia, eye movement abnormalities, language impairment, "autistic-like" behaviors, and, notably, both visuospatial and executive dysfunction [perseveration, poor abstract reasoning, impaired working memory, reduced verbal fluency]), as was seen in the case of Ms A.[24] These abnormalities have in fact been identified in a wide range of developmental, acquired, and degenerative cerebellar conditions; taken together, they form a clinical entity known as the cerebellar cognitive affective syndrome.[24] Initially described by Schmahmann and Sherman[16] in 1998, the cerebellar cognitive affective syndrome is characterized by 4 major cognitive and behavioral features: executive dysfunction, visuospatial disorganization, language dysfunction (typically agrammatism, mild anomia, and dysprosodia), and "affective overshoot," consisting either of emotional blunting or behavioral disinhibition. Deficits in each of these domains are thought to arise from dysfunction of different corticocerebellar regulatory networks, in which the cerebellum serves to regulate and refine cognitive and affective processes (described by Schmahmann as the "universal cerebellar transform"[24[p374]]) in a manner similar to its traditionally described role in regulation of movement. Thus, as Alexander and colleagues[26] described parallel motor, cognitive, and affective circuits in their model of the basal ganglia (which now serves as a basis for understanding neuropsychiatric disorders such as Tourette's disorder and obsessive-compulsive disorder),[26,27] it appears that the cerebellum has similar nonmotor connections. Therefore, one should consider deficits in frontal, parietal, and limbic networks as potentially arising from dysfunction of corticocerebellar circuits. Early lesion studies, followed by recent functional neuroimaging studies, have proposed that each of these circuits is localized in different cerebellar regions, with lateral cerebellar hemispheres mediating the different cerebellar cognitive affective syndrome components and medial structures (cerebellar vermis) mediating affective and autonomic circuits.[28]

In summary, the identification of cerebellar agenesis during the neuropsychiatric workup is not merely a "radiologic incidentaloma," but instead it is likely to be a key contributor to Ms A's presentation (both in terms of her unsteady gait that may have precipitated her fall, as well as her persistent cognitive dysfunction).

One should remain concerned by the possibility of a superimposed early degenerative process that could compound Ms A's baseline executive dysfunction and explain the "why now" question of her case. Thus, continued cognitive evaluations to monitor for subsequent cognitive decline would be recommended.

WHAT ARE THE SOCIAL IMPLICATIONS OF BEING FOUND IN FECES?

The dual practices of carefully applied mindfulness and attention to personal insights are especially important for all

health care providers when faced with patient presentations that threaten and disrupt established and accepted cultural standards. Certainly this is true for the patient who is covered in his/her own feces. Such presentations commonly evoke feelings of disgust and near universal repulsion. In fact, a content search of these topics using medical search engines consistently yields articles with the key terms of *disgust*, *repulsion*, and *grotesque*.[29–31] This finding suggests that providers who care for any patient who is covered in feces ought to steel themselves for what may be seemingly universal responses. It serves no one, neither patient nor colleague, to act as if these responses are not present. As the famous poet and pediatrician William Carlos Williams stressed, it is far better to know and to grapple with what we feel when treating our patients than to act as if these feelings are forbidden or not present at all.[32]

Evolutionary theorists have suggested that there is teleological repulsion triggered by the stench of human and other mammalian excrement that derives from primitive brain regions; this information is then efficiently and powerfully coded within our neurobiological architecture as something to be avoided.[33] As excrement can be associated with disease and is indeed implicated as a vector for many infectious processes, this primitive repulsion makes evolutionary sense.[31,33,34] Therefore, medical professionals should remain vigilant so as not to allow a seemingly hard-wired response to interfere with patient care.

Additional concerns include the theorized and even measured economic devaluing that occurs with the sensation of disgust or repulsion. Economists, such as Alvin Roth,[35] have noted that modern culture tends to place less value on ideas or practices that are universally off-putting. Other theorists[36] have noted particular aspects of our culture that are especially likely to be devalued on the basis of these principles, and fecal matter is often mentioned as a "core disgust elicitor." This view suggests that physicians and indeed entire systems of care may respond with an overall sense that such patients who present like Ms A are somehow worth less.

It also seems clear from the literature that nurses may be more comfortable with these issues than are physicians. The majority of articles addressing how best to understand and care for these patients are found in the nursing literature.[29–31] One might postulate that doctors view these issues in more emotionally sterile ways than do nurses, as a defense against the strong feelings that are evoked.

Finally, literature also suggests that despite the seemingly primitive response to feces described above, neuroimaging investigations show that reactions to feces among human subjects involve activation of the prefrontal cortex in a manner similar to the contemplation of morally charged topics, such as incest.[37] This reaction is different from the more neurobiologically primitive response to fears of infection that has also been studied.[37] Thus, one could argue that the apparent sterility with which the health care system might treat such patients stems from a moral judgment that is made regarding the hygiene of the patient. As moral judgments clearly and often negatively affect care, it is important that doctors be wary of these judgments when facing such patient presentations[38] and that they investigate the underpinnings for being found in feces to guide their workup and treatment.

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