Diarrhea in Long-Term Care: A Messy Problem

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“‘There are only two reasons to sit in the back row of any airplane; either you have diarrhea, or you’re anxious to meet people who do.”

–Henry Kissinger

“It is still unbelievable to us that diarrhea is one of the leading causes of child deaths in the world.”

–Melinda Gates

As can be seen from the above 2 quotations, although diarrhea is a major cause of morbidity and mortality, it is often not given the respect it deserves. Diarrhea and fecal incontinence are extraordinarily common in the nursing home. Diarrhea is a significant cause of increased expenditures in the nursing home because of nursing time and laundry expenses. Most deaths from diarrhea occur in older persons, usually in association with dehydration. Diarrhea can be a particular problem in frail older persons. In a Salmonella outbreak in a Maryland nursing home where 72% of residents and 24% of staff were infected, 24% of the infected residents died. Despite this, there is a paucity of literature on the prevalence and causes of diarrhea in the nursing home. In many cases of chronic diarrhea, weight loss is the presenting feature, yet diarrhea is seldom considered in nursing homes as a major cause for weight loss. Chronic diarrhea can lead to fat-soluble vitamin deficiencies. This is particularly true for vitamin D. Vitamin D deficiency is very common in nursing home residents and results in decreased function and in increased falls, hip fractures, and mortality. Diarrhea appears to be particularly common in frail older persons. The role of acute and chronic diarrhea in the pathogenesis of delirium secondary to dehydration and micronutrient deficiency is underrecognized.

As in younger persons, diarrhea in the nursing home can be acute or chronic. Diarrhea needs to be distinguished from fecal incontinence. Fecal incontinence was present in 48% of residents in one nursing home study. Fecal incontinence can be functional in demented and depressed patients, secondary to neuromuscular abnormalities, or due to constipation with overflow incontinence. In one study, 87% of persons with fecal incontinence in the nursing home had cognitive impairment. In a study of 388 residents in 5 nursing homes, the factors associated with fecal incontinence included dementia, restricted mobility, and male gender. Not surprisingly, persons with frequent diarrhea were also more likely to have fecal incontinence.

Pseudodiarrhea, defined as frequently passing small volumes of stool of varying consistency, can be associated with irritable bowel syndrome (IBS). IBS occurs in at least 10% of older persons. IBS is associated with abdominal pain and often alternating constipation and diarrhea. Persons who have lived with IBS most of their lives often present de novo with symptoms when they become cognitively impaired. Residents with IBS who lose weight or become anemic may benefit from a colonoscopy.

In nursing homes, acute diarrhea has been reported to occur in between 36.4 to 67.0 cases/100 patient years. The most common causes of acute diarrhea are infections and drugs. Numerous drugs can cause diarrhea. In our experience, the failure to recognize laxatives (especially osmotic laxatives) as a source of diarrhea is the most common cause of diarrhea in the nursing home. Cholinesterase inhibitors are a not uncommon cause of diarrhea. Galantamine is more likely to cause diarrhea than rivastigmine or donepezil. Other drugs that can commonly cause diarrhea include nonsteroidal anti-inflammatory drugs, cardiac antiarrhythmics, antibiotics, theophylline, certain antidepressants, and antacids. Diverticulitis and ischemic colitis are less common causes of acute diarrhea. Diarrhea is not uncommon post cholecystectomy.

The aging gut is associated with decreased gastric acid secretion, increased susceptibility of the mucous membranes to infections, immunosenescence with alterations in immunoglobulin (Ig)A secretion and decreased antibody production, cytokine abnormalities, and altered gastrointestinal bacterial populations. In addition, older persons develop a physiological anorexia of aging, which results in reduced food intake, increasing the chance of translocation of bacteria across the gastrointestinal tract. All of these factors lead to an increased propensity of older persons to develop infectious diarrhea (Table I).
The most common causes of gastroenteritis are a variety of viral pathogens. In general, these cases are highly contagious. For example, in an Austrian nursing home a resident developed severe vomiting in the dining room.\(^\text{48}\) Within 8 days, this resulted in 73.9% of other residents and 38.9% of staff developing diarrhea and/or vomiting. The causative agent was Norovirus genotype GGII.4 (Jamboree-like) virus. Noroviruses are now considered the most common cause of nonbacterial gastroenteritis in older persons.\(^\text{49}\) Diagnosis of Norovirus is best made by polymerase chain reaction (sensitivity 94.1%; specificity 92.4%). Enzyme-linked immunosorbent assay (ELISA) has a lower sensitivity. Norovirus continues to be excreted in the feces for 2 to 15 days after the acute attack.\(^\text{50}\) This continued viral excretion was associated with nonspecific symptoms such as dizziness, headache, and thirst.\(^\text{50}\) The other small round virus of the Caliciviridae family is the Norwalk virus. Incubation occurs over 24 to 48 hours and patients remain ill for approximately 72 hours. Rotavirus has similar characteristics, and epidemics in nursing homes have been reported.\(^\text{51,52}\) Astrovirus serotype 1 has also been associated with a slightly milder epidemic of gastroenteritis in a nursing home.\(^\text{53}\) In viral infections, older persons typically have moderate fever, mild abdominal pain, and watery diarrhea.

In our personal experience of an identified Norwalk virus outbreak, we noted rapid spread throughout the building, with most of the contacts being traced to the dining room. Since this occurrence, we exclude access to the dining room in residents with new-onset diarrhea, and this has decreased the spread of subsequent episodes.

Management of viral gastroenteritis consists of fluid maintenance using oral sugar-based fluids, or if necessary using parenteral fluids, with a preference for subcutaneous hydration when feasible.\(^\text{24,25,54}\) Hypodermoclysis is easier to do in nursing homes and we find that with hypodermoclysis, residents are more likely to receive the prescribed fluids.

Escherichia coli 0157 is a rare cause of diarrhea with the H7 strain being identified in fewer than 1 in 200 persons with E coli diarrhea.\(^\text{55}\) Outbreaks have been identified in nursing homes and institutions for the developmentally disabled.\(^\text{56-58}\) The phage type 2 appears to be less virulent.\(^\text{59}\) Patients present with diarrhea that can become bloody, and may have nausea or vomiting. Radiographically, they may have findings suggestive of ischemic colitis with thickening and thumbprinting of the colon. Approximately one quarter develop hemolytic uremic syndrome with a very high mortality rate.\(^\text{60}\) Treatment includes hydration and avoidance of loperamide. Antibiotics are not recommended.

Shigella somne outbreaks have been reported in nursing homes.\(^\text{61,62}\) Presentation usually consists of a watery diarrhea, lower abdominal cramps, fever, fatigue, and leukocytosis. When it is associated with bacteremia, there is an increase in death rate.\(^\text{63}\) Like E coli, it can lead to hemolytic uremic syndrome. Quinolone antibiotics may be useful in addition to hydration.

Salmonella gastroenteritis accounts for just under 20% of institutionalized cases of gastroenteritis.\(^\text{64}\) It is the major cause of food-borne diarrhea in nursing homes. Older persons often have minimal symptoms and are more likely to develop septicemia. Mortality is higher in older persons, leading to the recommendation to routinely give antibiotics for these patients.\(^\text{65,66}\) This is in contrast to the recommendations for nonfrail older patients.

With the increased prevalence of methicillin-resistant Staphylococcus aureus (MRSA),\(^\text{67-69}\) it now has to be considered as a potential cause of diarrhea, although patients may be colonized with MRSA in the stool and be asymptomatic.

<table>
<thead>
<tr>
<th>Staphylococcus aureus</th>
<th>&lt;1</th>
<th>Mild to severe</th>
<th>Mild</th>
<th>No</th>
<th>Yes</th>
<th>Consider methicillin-resistant Staphylococcus aureus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Escherichia coli 0157</td>
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<td>Severe</td>
<td>Mild</td>
<td>Moderate</td>
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<td>Yes</td>
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<td>High</td>
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<tr>
<td>Shigella spp</td>
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<td>Severe</td>
<td>High</td>
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<td>Yes</td>
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<tr>
<td>Small Round Viruses</td>
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<td>Moderate</td>
<td>Moderate</td>
<td>High</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Spp, species.

Table 1. Features and Treatment of Acute Infectious Diarrheas

<table>
<thead>
<tr>
<th>Incubation, Days</th>
<th>Vomiting</th>
<th>Abdominal Pain</th>
<th>Fever</th>
<th>Bloody Stools</th>
<th>Antiperistaltic Agents</th>
<th>Antibiotics</th>
</tr>
</thead>
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</tbody>
</table>

Table 2. Mnemonic of Causes of Chronic Diarrhoea*

<table>
<thead>
<tr>
<th>Drugs (Cholinesterase inhibitors, laxatives, antibiotics, antidepressants, cardiac antiarrhythmics)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflammatory (Crohn's disease, ulcerative colitis, collagenous colitis)</td>
</tr>
<tr>
<td>Malabsorption (pancreatic insufficiency, coeliac disease)</td>
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<tr>
<td>Rapid transit (hyperthyroidism, diabetes mellitus, Irritable Bowel Syndrome)</td>
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<tr>
<td>Radiation injury</td>
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<tr>
<td>Hormone-Producing Tumors (carcinoid, systemic mastocytosis, medullary carcinoma of thyroid, renal cell carcinoma, gastrinoma, villous adenoma)</td>
</tr>
<tr>
<td>Overgrowth of bacteria</td>
</tr>
<tr>
<td>Eosinophilic gastroenteritis</td>
</tr>
<tr>
<td>Addison's disease</td>
</tr>
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</table>

* Denotes British English spelling of the word.
Clostridium difficile represents a major cause of severe diarrhea in the elderly. Infection is related to antibiotic use, especially beta-lactams and cephalosporins. Low albumin (cytokine excess) and proton pump inhibitors are risk factors for C difficile diarrhea in nursing homes. Disease is a result of the release of 3 toxins: toxin A is an enterotoxin that causes watery secretion, toxin B is a cytotoxin that affects the actin cytoskeleton, and the third toxin is a binary toxin whose effects are not well established. New drug-resistant strains such as B1/NAPI/027 have emerged in recent years. The disease typically consists of watery diarrhea, fever, and leukocytosis that may be very robust. Complications include perforation, pseudomembranous colitis, kidney failure, and toxic megacolon. It has been estimated that the disease costs more than $1 billion per year in the United States.

Most C difficile-associated diarrhea occurs in hospitals or in acute rehabilitation centers. C difficile is more common in older persons, perhaps because of decreased ability to phagocytose C difficile and a decrease in serum IgG and IgM response to toxin A in this population. Diagnosis is usually made by detection of cytotoxin in the stool. Unfortunately, although these tests have high specificity, they lack sensitivity. Also, some tests detect only toxin A or B, whereas some strains produce only one toxin. Thus, a negative toxin test may fail to rule out disease. As many older persons in nursing homes are colonized with C difficile but have no symptoms, testing (and treatment) should be limited to symptomatic individuals. Recurrence of symptoms in nursing home residents occurs in up to one quarter of patients.

Management of C difficile diarrhea involves replacement of fluid and potassium losses, stopping antibiotics, and not using antitimotility agents such as loperamide, diphenoxylate, bismuth, or opiates. Antibiotic treatment consists of metronidazole, and if it fails, vancomycin. These antibiotics are approximately 90% effective and take 7 to 10 days to cure symptoms. In nonresponsive patients, rifaximin can be used. Teicoplanin (not available in the United States) inhibits toxin and has been reported to be effective. Probiotics

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**Fig. 1. Approach to the Diagnosis of Chronic Diarrheas.**
(Saccharomyces boulardii and Lactobacillus G9) appear to decrease recurrences.80,81

To prevent spread of C difficile, hand washing with soap or a microbial agent is recommended after each contact.79

Use of alcohol-based gel-type disinfectants may be inadequate to eradicate C difficile spores. Room disinfection should be done with sporicidal compounds (eg, hypochlorite solution). We have found no need for cohorting or isolation in nursing homes.

A meta-analysis of probiotics has shown that 3 probiotics (Saccharomyces boulardii, Lactobacillus rhamnosus GG, and probiotic mixtures) are successful at preventing antibiotic diarrheaa.82 We have dramatically reduced nursing home—acquired C difficile in our nursing homes since we began routinely prescribing yogurt with antibiotics.

Chronic diarrhea is classically divided into secretory, osmotic, malabsorption (steatorrhea), inflammatory, and factitious. A mnemonic for the common causes of chronic diarrhea is given in Table 2. An approach to the diagnosis of chronic diarrhea is given in Figure 1. Lactose intolerance is not uncommon in this population, and gluten enteropathy is becoming increasingly common, although seriously undiagnosed. Both of these can be significant causes of diarrhea. Collagenous colitis causes chronic watery diarrhea, and the diagnosis is made by biopsy of normal-appearing colon. Eosinophilic gastroitis occurs in atopic individuals, with eosinophilic infiltration of the gut causing diarrhea, pain, nausea, vomiting, and occasionally ascites.

Bacterial overgrowth is not rare in older persons. It leads to a chronic diarrhea. Older persons are at increased risk of bacterial overgrowth because of achlorhydria and the high use of anti-acid secretory medicines, dysmotility, and occasionally jejunal diverticulosis. It is associated with weight loss and nausea but rarely vomiting. Elevated serum folate levels and anti-acid secretory medicines, dysmotility, and occasionally jejunal diverticulosis. It is associated with weight loss and nausea but rarely vomiting. Elevated serum folate levels and

Tetracycline is the antibiotic of choice.

Diarrhea is a major and often underrecognized problem in long-term care. It is a major cause of morbidity (especially weight loss, dehydration, and delirium) and mortality, as well as being costly. It would not be unreasonable to consider giving yogurt daily to all nursing home residents with diarrhea. Antibiotic use should be limited and coupled with daily yogurt use. Chronic diarrhea in the nursing home needs to be carefully evaluated for underlying treatable causes. It is important that nursing homes monitor for infectious causes of diarrhea and discuss occurrences at their quality assessment and assurance (QA&A) meetings, as well as reporting to public health officials when required. Obviously, regular interventions on the importance of hand washing and keeping persons with new-onset diarrhea away from common areas are key to successful infection control.

REFERENCES


