

Do routine eye exams reduce occurrence of blindness from type 2 diabetes?

■ EVIDENCE-BASED ANSWER

Screening eye exams for patients with type 2 diabetes can detect retinopathy early enough so treatment can prevent vision loss. Patients without diabetic retinopathy who are systematically screened by mydriatic retinal photography have a 95% probability of remaining free of sight-threatening retinopathy over the next 5 years. If background or preproliferative retinopathy is found at screening (**Figure**), the 95% probability interval for remaining free of sight-threatening retinopathy is reduced to 12 and 4 months, respectively (strength of recommendation [SOR]: **B**, based on 1 prospective cohort study).

A reliably sensitive screening exam requires mydriatic retinal photography augmented by ophthalmoscopy when photographs are inconclusive (SOR: **A**, based on a systematic review). For patients with diabetes not differentiated by type, photocoagulation significantly decreases visual deterioration and reduces the chances of blindness (SOR: **A**, based on randomized controlled trials [RCT]).

■ EVIDENCE SUMMARY

The Liverpool Diabetic Eye Study¹ prospectively evaluated the risk of vision-threatening retinopathy in a cohort that included all patients with diabetes mellitus who were registered with a general practitioner and were not under the care of an ophthalmologist. A subgroup of 4770 patients with type 2 diabetes who did not have sight-threatening retinopathy at baseline underwent at least 1 additional screen. Screening included non-stereoscopic 3-field (45° or 50° field) mydriatic

photography. Median follow-up was 3.5 years (range, 1–8.5 years).

The patients were divided into cohorts based on level of demonstrated retinopathy. The mean screening interval for a 95% probability of remaining free of sight-threatening retinopathy was calculated for each grade of baseline retinopathy. Screening patients with no retinopathy every 5 years provided a 95% probability of remaining free of sight-threatening retinopathy. Patients with background retinopathy must be screened annually to achieve the same result, and patients with mild preproliferative retinopathy need to be screened every 4 months (**Table**).

A systematic review² of multiple small English-language studies evaluating screening and monitoring of diabetic retinopathy found consistent results. Screening by direct or indirect ophthalmoscopy alone detected 65% of patients with

What are Clinical Inquiries?

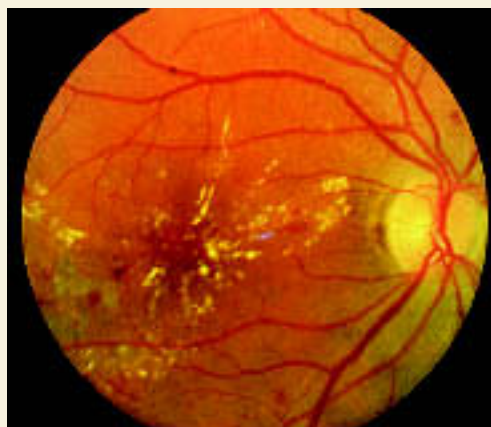
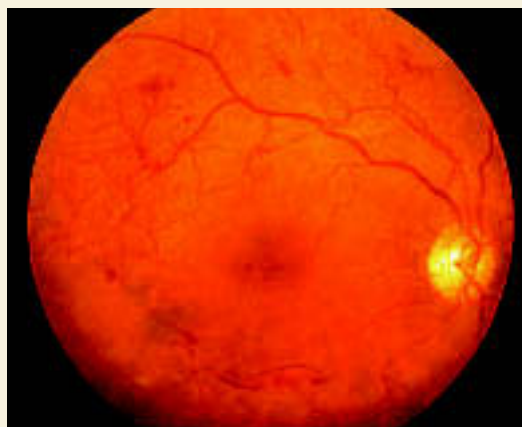
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FIGURE Nonproliferative and proliferative diabetic retinopathy

PHOTOGRAPHY BY JAMES J. AUGSBERGER, MD

Background (nonproliferative) diabetic retinopathy is characterized by macular retinal exudates, edematous retinal thickening, dot and blot retinal hemorrhages, and retinal capillary microaneurysms.

Proliferative diabetic retinopathy. Note the network of abnormal preretinal new blood vessels just superotemporal to the macula and the linear accumulations of blood in the preretinal vitreous below the macula.

sight-threatening retinopathy. Screening by mydriatic retinal photography, augmented by ophthalmoscopy when the photographs were inconclusive, detected 88% to 100% of such cases.

An RCT of 1700 patients with diabetes and retinopathy evaluated preservation of vision with photocoagulation.³ Patients were not differentiated by type of diabetes. Each patient had initial and follow-up stereoscopic fundus photography. One eye was selected at random to receive treatment and the other remained untreated to serve as a control. Because of the magnitude of difference in vision between the eyes, the study was halted at 2 years to permit photocoagulation of the untreated eyes. Patients whose eyes had new vessels on or near the disk lost vision (defined as visual acuity less than 5/200) more often in untreated eyes (18.3% cumulative rate at 2 years) compared with treated eyes (6.4%; number needed to treat [NNT]=8.4).

Another RCT⁴ of patients with diabetes showed that photocoagulation maintained vision in diabetic retinopathy if the disease was not too advanced. Ninety-nine patients, also not differen-

tiated by type of diabetes, were each treated in 1 eye chosen at random with a xenon-arc photocoagulator. Patients underwent follow-up treatments to the treated eye by clinical indication. The untreated eyes were observed as controls. Blindness occurred significantly less often in the treated eyes (19% total after 5 to 7 years) than in the control eyes (39%; NNT=5 to prevent 1 blind eye). Patients without proliferative retinopathy at onset experienced the most dramatic slowing of deterioration; photocoagulation was more useful in maintaining than in improving vision.

■ RECOMMENDATIONS FROM OTHERS

The American Diabetes Association 2003 Clinical Practice Recommendations⁵ state that patients with type 2 diabetes should have an initial dilated and comprehensive eye examination by an ophthalmologist or optometrist shortly after diagnosis of diabetes. An ophthalmologist or optometrist who is knowledgeable and experienced in diagnosing diabetic retinopathy and is aware of its management should repeat subsequent examinations for both type 1 and type 2 diabetic patients

TABLE

Screening frequency for sight-threatening retinopathy

Stage of retinal disease	Screening frequency*
None	5 years
Background retinopathy	1 year
Mild preproliferative retinopathy	4 months

*For 95% chance of remaining free of sight-threatening retinopathy.

annually. Examinations are required more frequently if retinopathy is progressing.

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CLINICAL COMMENTARY

Screen for retinal complications early, regularly, by an experienced eye doctor

Family physicians play a central role in the diabetes care team. They must not only achieve good blood sugar control, but also monitor for complications and coordinate their treatment. Educating patients and reaching common ground with them is essential for success. Evidence suggests that screening for eye complications reduces blindness. Patients with early retinopathy changes are usually asymptomatic; therefore it takes a committed and educated patient to comply with screening recommendations. Also, many patients have the misconception that a visual acuity exam by an optometrist is sufficient for their diabetes eye screening. Family physicians must convey the importance of screening for retinal complications early, regularly and by an optometrist or ophthalmologist experienced in management of diabetes.

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What is the most effective diagnostic evaluation of streptococcal pharyngitis?

EVIDENCE-BASED ANSWER

Standardized clinical decision rules, such as the Centor criteria, can identify patients with low likelihood of group A beta-hemolytic streptococcal (GABHS) pharyngitis who require no further evaluation or antibiotics (strength of recommendation [SOR]: **A**, based on validated cohort studies). For patients at intermediate and higher risk by clinical prediction rules, a positive rapid antigen detection (RAD) test is highly specific for GABHS (SOR: **A**, based on systematic reviews of diagnostic trials).

A negative RAD test result, using the best technique, approaches the sensitivity of throat culture (SOR: **B**, based on retrospective cohort studies). In children and populations with an increased prevalence of GABHS and GABHS complications, adding a backup throat culture reduces the risk of missing GABHS due to false-negative RAD results (SOR: **C**, based on expert opinion).

EVIDENCE SUMMARY

In the US, GABHS is the cause of acute pharyngitis in 5% to 10% of adults and 15% to 30% of children. It is the only commonly occurring cause of pharyngitis with an indication for antibiotic

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TABLE 1

**Centor clinical prediction rules
for diagnosis of GABHS (for adults)**

One point for each: History of fever, anterior cervical adenopathy, tonsillar exudates, absence of cough

Points	LR+	Pretest prevalence of GABHS (%)			
		5	10	25	50
		Post-test probability of GABHS (%)			
0	0.16	1	2	5	14
1	0.3	2	3	9	23
2	0.75	4	8	20	43
3	2.1	10	19	41	68
4	6.3	25	41	68	86

GABHS, group A beta-hemolytic streptococcus; LR+, positive likelihood ratio.
Adapted from data in Ebell et al 2000.⁵

TABLE 2

**Mclssac clinical prediction rules
for diagnosis of GABHS (for adults and children)**

One point for each: History of fever (or measured temperature >38°C), absence of cough, tender anterior cervical adenopathy, tonsillar swelling or exudates, age <15. Subtract 1 point if age 45 or more

Points	LR+	Pretest prevalence of GABHS (%)			
		5	10	25	50
		Post-test probability of GABHS (%)			
-1 or 0	0.05	<1	1	2	5
1	0.52	3	5	15	33
2	0.95	5	10	24	47
3	2.5	12	22	45	56
4 or 5	4.9	20	35	62	71

GABHS, group A beta-hemolytic streptococcus; LR+, positive likelihood ratio.
Adapted from data in Ebell et al 2000.⁵

therapy.¹ The main benefit of antibiotic treatment in adults is earlier symptom relief—1 fewer day of fever and pain if antibiotics are begun within 3 days of onset.

Antibiotic treatment also reduces the incidence of acute rheumatic fever, which complicates

1 case per 100,000 in most of the US and Europe (relative risk reduction [RRR]=0.28).² The risk of acute rheumatic fever is higher in some populations, particularly Native Americans and Hawaiians (13–45 per 100,000).³ Treatment may also reduce suppurative complications (peritonsil-

A negative rapid antigen detection test result approaches the sensitivity of throat culture

lar or retropharyngeal abscess), which occur in 1 case out of 1000.^{2,4}

A systematic review of the diagnosis of GABHS evaluated the accuracy of history and physical exam elements.⁵ Clinical prediction rules based on selected symptoms and signs can identify patients at low risk for GABHS. The 4 Centor criteria (history of fever, anterior cervical adenopathy, tonsillar exudates, absence of cough) are well validated in adult populations (**Table 1**), while other clinical prediction rules (such as McIssac) are validated in populations with children and adults (**Table 2**). The number of criteria present determines the likelihood ratio (LR), with which to calculate the posttest probability of GABHS.

The usefulness of clinical prediction rules depends on knowing how prevalent GABHS is among cases of pharyngitis in a particular community. In a typical US adult population, GABHS comprises 5% to 10% of cases. The presence of only 1 Centor criterion would reduce the probability of GABHS pharyngitis to 2% to 3%, while meeting all 4 criteria would raise the probability to 25% to 40%, an intermediate value (**Table 1**). If the prevalence of GABHS pharyngitis were 50%, as in some Native communities in Alaska, meeting all 4 criteria would predict an 86% probability of pharyngitis due to GABHS. Performing additional testing for patients with intermediate or high probability based on clinical prediction rules reduces the likelihood of unnecessary antibiotic treatment.¹

A systematic review⁶ of RAD testing demonstrates that the newer techniques (optical immunoassay, chemiluminescent DNA probes) have a sensitivity of 80% to 90%, which compares closely with that of throat culture (90%–95%). Both have a specificity greater than 95%, so false-positive test results are uncommon (LR+ =16–19). Treatment based on a positive RAD test would

result in few unnecessary antibiotic prescriptions.¹

A retrospective outcome study⁴ reviewed the frequency of suppurative complications of GABHS among 30,036 patients with pharyngitis diagnosed with either RAD testing or throat culture. Patients included adults and children in a primary care setting. Complication rates were identical. A prospective study of 465 suburban outpatients with pharyngitis assessed the accuracy of RAD diagnosis using throat culture as a reference. The RAD accuracy was 93% for pediatric patients and 97% for adults.⁵ In another retrospective review of RAD testing, investigators performed 11,427 RAD tests over 3 years in a private pediatric group. There were 8385 negative tests, among which follow-up cultures detected 200 (2.4%) that were positive for GABHS. In the second half of the study, a newer RAD test produced a false-negative rate of 1.4%.⁷ Because of the possibility of higher false-negative RAD test rates in some settings, unless the physician has ascertained that RAD testing is comparable to throat culture in their own setting, expert opinion recommends confirming a negative RAD test in children or adolescents with a throat culture.¹ Patients at higher risk of GABHS or GABHS complications may also warrant throat culture back up of RAD testing.¹

RECOMMENDATIONS FROM OTHERS

The Infectious Diseases Society of America recommends that if the physician is unable to exclude the diagnosis of GABHS on epidemiological or clinical grounds, either RAD testing or throat culture should be done. A positive result warrants treatment for patients with signs and symptoms of acute pharyngitis. A negative RAD result for a child or adolescent should be confirmed by throat culture unless the physician has ascertained that the sensitivity of RAD testing and throat culture are comparable in his or her practice setting.¹

The American Academy of Pediatrics also recommends laboratory confirmation of GABHS pharyngitis in children with throat culture or RAD testing. If a patient suspected clinically of GABHS has a negative RAD test, a throat culture should be

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The RAD test gives us the additional information needed to avoid overprescribing antibiotics

done. Since some experts believe RAD tests using optical immunoassay are sufficiently sensitive to be used without throat culture backup, physicians who wish to use them should validate them by comparison to throat culture in their practice.⁸

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CLINICAL COMMENTARY

The RAD test helps to avoid overprescribing antibiotics

The patient with a sore throat presents a diagnostic dilemma at 8:00 in the evening or on a Sunday morning. Patients (or parents) want something done, and frequently request antibiotics. Most of the time, they appreciate accurate information on the likelihood of a sore throat being a “strep throat” and the benefit or lack of benefit of antibiotics. The “in-between” cases are the toughest to manage, and the RAD test gives us the additional information needed to avoid overprescribing antibiotics. Empathetic reassurance and symptomatic treatment still suffice in most cases.

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Is the long-term use of proton pump inhibitors safe?

EVIDENCE-BASED ANSWER

Long-term use of proton pump inhibitors (PPIs) appears safe, resulting in no clinically relevant adverse effects (strength of recommendation: **B**, based on nonsystematic reviews, cohort studies, or low-quality randomized controlled trials). No evidence clearly links PPIs to gastric cancer or carcinoid, enteric infections, or significant nutrient malabsorption.

EVIDENCE SUMMARY

The long-term safety of PPIs is not completely known. There are 5 PPIs on the US market. Clinical experience with these medications ranges from 3 to 20 years. All of the identified studies addressing long-term use have follow-up of 10 years or less (**Table**). Studies of longer duration are warranted. We reviewed the possible adverse effects of these medications.

Gastric carcinoid. PPIs cause predictable and sustained hypergastrinemia in response to acid suppression. In rats, this causes enterochromaffin-like cell (ECL) hyperplasia and carcinoid tumors, raising a safety concern in humans. In a nonsystematic review of 11 studies of 1800 patients who used PPIs from 6 months to 8 years, there were no neoplastic ECL changes or carcinoid tumors.¹ Three other nonsystematic reviews

TABLE

Potential proton pump inhibitor safety concerns

Safety concern	PPI studied	Duration of studies	Evidence
Gastric carcinoids	Omeprazole, lansoprazole, pantoprazole, rabeprazole	1–8 years	No increased risk ^{1–5}
Gastric metaplasia/adenocarcinoma	Omeprazole	1–5 years	No increased risk ^{1–3,5}
Enteric infections	Omeprazole	1 year	No increased risk ⁶
Mineral malabsorption	Omeprazole	6 months–2 years	No increased risk ^{1,3}
B12 malabsorption	Omeprazole	10 years	Decreased B12 levels with high-dose therapy ^{1,2}

support these findings.^{2–4} In a randomized controlled trial comparing efficacy and safety of rabeprazole with omeprazole for gastro-esophageal disease, 123 (51%) out of 243 patients completed 5 years of the study; no patients had neoplastic ECL changes.⁵

Atrophic gastritis and gastric cancer. Atrophic gastritis with intestinal metaplasia is associated with gastric adenocarcinoma. Because PPIs can theoretically cause atrophic gastritis, there is a concern that this could lead to gastric cancer. The evidence regarding atrophic gastritis is contradictory. A nonsystematic review identified 1 cohort study and 1 randomized controlled trial of patients taking omeprazole from 1 to 4 years, which showed no association between PPI use and atrophic gastritis.¹ The same review reported that another cohort study of patients using omeprazole for 1 year showed an increase in atrophic gastritis. None of the studies reviewed showed an association between omeprazole use and intestinal metaplasia or its progression to gastric adenocarcinoma.¹ Three other nonsystematic reviews support these findings.^{2,3,5} The available evidence indicates that PPI use is not clearly associated with atrophic gastritis, or with progression from gastritis to metaplasia or cancer.

Enteric infections. Because hypochlorhydria is associated with bacterial enteric infections, bacterial enteritis is a theoretical risk of long-term PPI use. A large case-control study of 54,461 patients using omeprazole for 1 year showed no

association with such infections.⁶

Mineral malabsorption. Dietary calcium, phosphorus, magnesium, zinc, and iron depend on gastric acid for absorption. Two separate nonsystematic reviews showed no problems with malabsorption of these micronutrients.^{1,3}

B12 malabsorption. Two nonsystematic reviews showed a decrease in vitamin B12 absorption among patients on high-dose (up to 80 mg of omeprazole daily), long-term PPI therapy (eg, patients with Zollinger-Ellison syndrome).^{1,2} This has not been demonstrated for patients taking more typical doses of omeprazole. The clinical significance of this is unknown; however, the authors of these reviews suggested monitoring B12 levels of patients on long-term, high-dose PPI therapy.

RECOMMENDATIONS FROM OTHERS

A Federal Drug Commission report indicates that labeling PPIs for cancer risk is not warranted.⁷ The American College of Gastroenterology and the University of Michigan Health System guidelines for treatment of gastroesophageal disease recommend long-term PPI therapy as an option without any warning against their use.^{8,9}

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■ CLINICAL COMMENTARY

No evidence of long-term adverse health effects from PPIs, but cost still a problem

Proton pump inhibitors work. They effectively treat the symptoms and reduce the complication involved with peptic ulcer disease. The lack of evidence suggesting any long-term adverse health effects, even if not definitive, is very encouraging, but the cost of these medicines remains a problem. Both patients and third-party payers continue to object to their cost, and for this reason, as well as longer safety track records, less expensive medicines such as H₂ blockers and over-the-counter antacids should be tried for longer-term treatment.

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First- or second-generation antihistamines: which are more effective at controlling pruritus?

■ EVIDENCE-BASED ANSWER

For urticarial itch, first- and second-generation antihistamines have similar clinical benefit and are superior to placebo (strength of recommendation [SOR]: **A**, systematic review of randomized trials [RCT]). For itch related to atopic dermatitis, antihistamines are no better than placebo (SOR: **B**, small RCTs and other studies). Other categories of pruritus are best treated with non-antihistamine agents (SOR: **C**, based on expert opinion and disease-oriented research).

■ EVIDENCE SUMMARY

Based on the advantage of nocturnal sedation of first-generation antihistamines, clinicians frequently use these agents to treat pruritus. Evidence is lacking to support this intuitive approach. Furthermore, not all pruritus can be lumped into a single category, as distinct treatment recommendations exist for different categories.

The best evidence supporting antihistamines is for the treatment of urticarial pruritus. A Medline-based review found 7 double-blind, placebo-controlled trials that compared the benefit of first- and second-generation antihistamines in 720 patients with chronic idiopathic urticaria. Hydroxyzine was used in 682 patients, while the remainder took clemastine. Second-generation agents included cetirizine, loratadine, or acrivastine. The researchers qualitatively summarized outcomes and concluded that the treatment benefits were equivalent and superior to placebo.¹ The clinical practice of doubling the dose of second-generation agents for initial treatment failures was not recommended, due to absence of supporting data for this approach.

A recent review of therapies for urticarial itch concluded that second-generation antihista-

mines were preferred.² However, the methodology failed to use a systematic search technique. The conclusion was based upon a single double-blind placebo-controlled study of 188 patients at least 12 years of age. They received cetirizine 10 mg daily, hydroxyzine 25 mg 3 times daily, or placebo. This study found both agents produced significant, and equivalent, pruritus reduction relative to placebo.³

In contrast to urticarial itch, pruritus from atopic dermatitis does not improve with antihistamines. An NHS Centre narrative review on relieving pruritus in atopic dermatitis concluded that there was little objective evidence to support the efficacy of first- or second-generation antihistamines; 803 participants from 16 case series and reports were included. There were no large RCTs. Results were not pooled or tested for heterogeneity, so they should be interpreted cautiously.^{4,5}

Another systematic review focusing on pediatric patients concluded oral antihistamines are not beneficial for pruritus from atopic dermatitis. A search of Cochrane and PubMed revealed only 2 relevant RCTs involving 177 children. Cetirizine and chlorpheniramine were each compared with placebo, and no statistically significant reduction in symptoms was found.⁶

Vigilance must be exercised when interpreting pruritus literature. Many studies are phar-

In contrast to urticarial itch, pruritus from atopic dermatitis does not improve with antihistamines

macodynamic only, omit appropriate statistical information, and measure surrogate outcomes in healthy volunteers, such as wheal and flare suppression to injected histamine. Such disease-oriented evidence has filtered into clinical recommendations.

One recent nonsystematic, narrative review of pruritic dermatoses concluded second-generation antihistamines appear to be more effective.⁷ This conclusion was largely based on a study of 14 young, healthy, "light-skinned" Canadian men. No placebo control was used. Seven received fexofenadine 120 mg; the other 7 took diphenhydramine 50 mg. Primary outcomes were concentrations of drug in skin punch biopsies and plasma samples, plus degree of wheal and flare suppression to histamine. In this study, fexofenadine showed statistically significant disease-oriented results.⁸

■ RECOMMENDATIONS FROM OTHERS

No evidence-based guidelines or consensus statements were found that address antihistamine preference in the treatment of pruritus. Although use of non-antihistamine agents is beyond the scope of this inquiry, an excellent topical review of pruritus was recently published that comprehensively outlined the Twycross classification system and detailed the evidence for usual and nontraditional treatments.⁹ Since antihistamines do not benefit atopic-related pruritus, other options include emollients, counterirritants such as menthol/camphor or capsaicin, EMLA cream, topical pramoxine, topical corticosteroids, topical doxepin, topical immunomodulators such as pimecrolimus or tacrolimus, topical aspirin, and phototherapy with psoralen ultraviolet A-range (PUVA).

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Consider colonoscopy for young patients with hematochezia

Pulmonary arterial hypertension: A current review of treatment

■ CLINICAL COMMENTARY

Antihistamines are not likely to remedy the itch for pruritus not due to urticaria

Pruritus is a symptom; therefore, I must ask, "what is causing it?" For pruritus not due to urticaria, antihistamines are not likely to remedy the itch. For urticarial itch, I must consider the sedative, psychomotor, and anticholinergic effects of the first-generation antihistamines. In fact, the soporific effect may be their only useful property in nonurticarial pruritus—including atopic dermatitis—where it is considered a mainstay therapy. Yet in many situations, patients with urticaria cannot risk the significant CNS side effects of first-generation agents, which are comparable to alcohol and tranquilizers. Therefore, it is reassuring that the second-generation antihistamines seem equally efficacious.

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What is the most effective way for relieving constipation in children aged >1 year?

■ EVIDENCE-BASED ANSWER

A combination of laxatives, behavioral therapy, and balanced diet is the treatment of choice for pediatric constipation (strength of recommendation [SOR]: **B**, based on randomized, nonrandomized, controlled and uncontrolled clinical trials). Laxatives are used for disimpaction and maintenance therapy.

Trials that compare different laxatives have shown similar effectiveness, although polyethylene glycol (PEG) 3350 (MiraLax) may be better tolerated (SOR: B). The roles of dietary changes and acupuncture have been minimally studied.

■ EVIDENCE SUMMARY

Constipation in toddlers is characterized by a delay or difficulty in defecation that is present for 2 or more weeks. It is a common problem, accounting for 3% of all general pediatric visits. In most children, constipation is functional without pathological cause. Treatment for pathological constipation is not addressed here.

Laxative therapies were compared in 2 studies. An unblinded, randomized, crossover trial enrolled 37 children referred for subspecialty evaluation of functional constipation. It found that PEG 3350 and lactulose were equivalent in improving stool frequency, stool form, and ease of passage.

However, there was a significant difference in total stool transit time in subjects taking PEG compared with those taking lactulose (47.6 hours vs 55.3 hours, respectively; $P=.038$). In addition, twice as many parents and guardians rated PEG effective as those rating lactulose effective (84% vs 46%); and 73% of parents preferred PEG to lactulose.¹

A randomized trial compared PEG with milk of magnesia in 49 children with functional

constipation and encopresis. Follow-up at 1, 3, 6, and 12 months revealed similar effectiveness in increasing bowel movement frequency, decreasing soiling episodes, and decreasing abdominal pain. It also revealed that PEG was more palatable and better-tolerated than milk of magnesia (33% of children refused to take milk of magnesia, whereas none refused PEG). No side effects from PEG were reported.²

Behavioral modification has been studied for constipation-related encopresis. A randomized controlled trial of 87 children with fecal soiling compared the effect of enhanced toilet training (including behavioral therapy) with aggressive medical management that included disimpaction, enemas, and regular laxative therapy. After 12 months, the enhanced toilet training with behavioral therapy was more effective in reducing daily frequency of soiling (78% of the children had significantly decreased average daily frequency of soiling compared with 41% in the aggressive medical management group; $P < .0001$; absolute risk reduction = 0.37; number needed to treat for 1 year = 2.7).³

Dietary management centers on a balanced diet with whole grains, fruits, and vegetables. A case-control study evaluated 291 subjects with constipation and compared their diet with 1602 controls. Mean daily fiber intake was lower in the constipation group. Compared with fiber intake of more than 29 g/d, the relative risk was 8.0 for fiber intake of less than 12.4 g/d.⁴

A nonrandomized, controlled trial of acupuncture treatment enrolled 17 children with history of constipation for a minimum of 6 months. Bowel movement frequency improved in both males ($1.5 \pm 0.1/\text{week}$ to $4.4 \pm 0.6/\text{week}$; $P < .01$) and females ($1.4 \pm 0.3/\text{week}$ to $5.6 \pm 1.1/\text{week}$; $P < .01$) after 10 acupuncture sessions. No other bowel movement parameter was reported.⁵

■ RECOMMENDATIONS FROM OTHERS

The North American Society for Pediatric Gastroenterology and Nutrition (NASPGN) rec-

A third of children in 1 study refused to take milk of magnesia, whereas none refused polyethylene glycol

ommends parental education, initial disimpaction as needed, and maintenance therapy with a balanced diet, behavioral modification, and laxatives for all children aged >1 year. Recommended laxatives include mineral oil, magnesium hydroxide, lactulose, and sorbitol. Behavior modification includes regular toileting, unhurried time on the toilet after meals, diary of stool frequency, and a reward system.⁶ The American Academy of Pediatrics supports the above guidelines.

A multispecialty panel from the University of Michigan used a structured literature review as a basis for a consensus guideline. The resulting protocol was similar to the NASPGN protocol, with the addition of stool softeners as an alternative to laxatives.⁷

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■ CLINICAL COMMENTARY

After disimpaction, try bowel training, exercise, dietary fiber, and increased fluid

Successful treatment of chronic constipation in children involves skillful use of diet and lifestyle modification, medication, and behavioral interventions, especially if encopresis accompanies the constipation. After initial disimpaction with lubricant laxatives, osmotic laxatives, and enemas, I recommend a maintenance program of bowel training, exercise, dietary fiber, and increased fluid intake. Effective bowel training includes having toilet-trained children sit on the commode after breakfast and prior to afternoon outdoor play.

In keeping with Healthy People 2010 recommendations, as well as studies that link diets rich in fiber to decreased constipation, I encourage parents of toddlers and children to provide them with ample fruits, vegetables, and 6 servings of whole grains per day. I address psychosocial aspects of chronic constipation by acknowledging that family tensions may surround a child's bowel habits, assisting parents to establish a sense of control within their child, advocating a nonpunitive approach to soiling accidents, and suggesting positive reinforcement of their child's successes.

For medical management, I use primarily lactulose, although PEG 3350 (Miralax) has also been shown effective and safe for long-term use. I avoid mineral oil, due to the rare association with lipoid pneumonia; I also avoid sodium phosphate (Fleet) enemas in children aged <2 years, due to the associated risks of electrolyte disturbances and cardiac arrest in this population.

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DRUG BRAND NAMES

Cetirizine • Zyrtec
 Clemastine • Tavist
 Doxepin, topical • Zonalon
 Fexofenadine • Allegra
 Hydroxyzine • Atarax, Vistarol
 Lansoprazole • Prevacid
 Lidocaine and prilocaine, topical • EMLA cream
 Loratadine • Claritin
 Omeprazole • Prilosec
 Pantoprazole • Protonix
 Pimecrolimus • Elidel
 Polyethylene glycol 3350 • MiraLax
 Rabeprazole • AcipHex
 Tacrolimus • Prograf

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