Unfortunately, nonpharmacologic treatment is effective by itself in only 10% of patients. When blood glucose levels fail to reach target levels after a 4- or 6-month trial of diet and exercise, an oral agent should be given. Obese patients may benefit from metformin, and nonobese patients from a sulfonylurea (*Figure*), but this can be modified according to the individual patient's response.

Sulfonylureas

Sulfonylureas, the mainstays of treatment, stimulate insulin secretion. Approximately 50% of patients will achieve acceptable control with these agents. Once-daily dosage forms probably are associated with better compliance and, perhaps, better control. However, hypoglycemia, the most important complication, is more frequent with the long-acting sulfonylureas, especially chlorpropamide. Merely giving such patients glucose in the emergency department and releasing them does not suffice, as the hypoglycemia can recur repeatedly until the drug is eliminated over the course of days. Such patients need to be hospitalized and monitored closely.

Metformin

In contrast, metformin does not affect insulin secretion. Rather, it increases peripheral glucose uptake and decreases hepatic glucose production.

Metformin is approximately as effective as the sulfonylureas, decreasing plasma glucose concentrations by about 60 mg/dL. In clinical trials, it also lowered hemoglobin A1c, total cholesterol, low-density lipoprotein (LDL) cholesterol, and triglyceride levels. High-density lipoprotein (HDL) levels rose, but not significantly. Patients lost an average of 2.5 kg. Because it lowers glucose concentrations by a different mechanism, it possesses an additive effect when used with a sulfonylurea. The dosage is 500 mg to 3 g per day, given either as a single dose or twice or thrice daily.

Phenformin, an earlier biguanide agent, was withdrawn in 1976 because of cases of lactic acidosis. Metformin causes less lactic acidosis, but it is contraindicated in states such as renal failure, liver disease, or uncompensated heart failure. The most common side effects are gastrointestinal, and for this reason metformin should be given with meals.

Some authorities advocate beginning therapy with insulin, especially if the fasting glucose level is higher than 400 to 500 mg/dL. Such an approach gives the islet cells a chance to rest, decreases glucose toxicity, and brings the glucose level under control quickly. However, many of such patients might still respond to an oral agent, especially if they are obese or are a transplant recipient taking cyclosporine or steroids.

When to resort to insulin

If the fasting glucose level remains above 140 mg/dL despite combination therapy with a sulfonylurea and metformin, insulin therapy should be instituted. This can occur with advancing age, increasing weight, or decompensating conditions such as infections, trauma, renal disease, or pregnancy.

Our preference is to use insulin alone when it is indicated and not in combination with a sulfonylurea, as the blood sugar control is easier to titrate. Some centers advocate an oral agent with an evening dose of intermediate-acting insulin. However, these regimens are not universally accepted, and the role of metformin in this situation is also not defined.

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THE ENDOSCOPE AND INFECTION TRANSMISSION: THE PROBLEMS AND HOW TO AVOID THEM

CONCERN about the transmission of infection is, and always has been, a part of gastrointestinal endoscopy: placing reusable devices into the gastrointestinal tract, with its plethora of potential pathogens, contaminates the equipment and creates the risk of transmitting infection to other patients, the endoscopist, or ancillary personnel.

No well-controlled clinical trials have proven that

cleaning and disinfecting the endoscope prevents the transmission of infection. Nevertheless, despite the lack of hard data, effective protocols do exist, and those who use endoscopes need to follow them to minimize the transmission of infection.

ORGANISMS AND ROUTES OF TRANSMISSION

The endoscopic transmission of infection can occur via several routes. First, organisms can be passed on from the previous patient. Second, certain organisms may be introduced during the process of cleaning and disinfection. Third, infection can result from the manipulation of an already infected system, eg, the biliary tree.

In recent reports of endoscopic transmission of infection, only a small number of organisms appear to be transmitted from one patient to the next, and *Salmonella* is at the head of the list. A variety of reports demonstrating outbreaks of infection with *Salmonella* almost always trace it to inadequate cleaning and disinfection. Other organisms transmitted from patient to patient include *Helicobacter*, *Clostridium*, and *Strongyloides*. There has never been a documented case of human immunodeficiency virus transmission via an endoscope.

Organisms can also be introduced during the cleaning process. For example, *Pseudomonas* and *Klebsiella*, often present in great numbers in the hospital's potable water supply, can be transmitted when the water is used to rinse the endoscope. However, despite the potential for transmission of infection in this way, a recent review by the American Society for Gastrointestinal Endoscopy suggests a very low risk (one in 1.8 million procedures).

PROTOCOLS

The cleaning and disinfecting process begins with proper cleaning of the scope immediately after its use. Water is suctioned through the channel. Then, before the scope can dry, it is mechanically cleansed, and all residual vegetative material is removed. This involves passing brushes through channels and removing all debris from areas on the scope tip. Only after it is thoroughly cleaned can the scope be properly disinfected. Current requirements call for the endoscope to undergo high-level disinfection to remove all bacteria and viruses, with the exception of some spores. The pathogens raising the most concern at this time are, of course, human immunodeficiency virus and *Mycobacterium tuberculosis*. The latter organism is resistant to 2% glutaraldehyde, and disinfection therefore requires long-term exposure if thorough cleaning is not accomplished first. However, the time required for exposure to 2% glutaraldehyde remains uncertain. Rinsing with alcohol, which facilitates drying, is also very effective in destroying M *tuberculosis*.

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