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GASTROENTEROLOGY AND HEPATOLOGY

Small Intestine Bacterial Overgrowth

There is normally a high concentration of bacteria in the colon, or large intestine, with a much smaller concentration in the small intestine. Rhythmic peristaltic contractions occur at regular intervals in the fasting state, about once every 90 minutes, and are partly responsible for keeping the bacteria down in the colon where they belong.

For reasons that are not clear, these normal Phase III or “housekeeper” waves may be absent in some people. The Interstitial Cells of Cajal (ICC) that are important in peristalsis have been shown to be damaged or destroyed in these individuals. When this occurs, the bacteria can migrate up into the small intestine, in high concentrations not normally seen. These bacteria may digest and metabolize foods before being normally absorbed in the small intestine. This may result in a number of symptoms including bloating, gaseous distention, flatulence (especially foul smelling), cramps, diarrhea, constipation, and sometimes fatigue and nausea. This “small intestinal bacterial overgrowth” or SIBO can be considered a subcategory of what has been referred to as the Irritable Bowel Syndrome. In SIBO the abnormal physiology is better understood, and treatment can be successful, though not necessarily easy or permanent. Why this occurs is not known, but it has been found that in up to 10% of cases following an “infectious gastroenteritis” long-term symptoms of SIBO can result. What other factors may play a role in the initiation of this problem are not known.

The diagnosis of SIBO is typically made by breath testing, though one can be highly suspicious of this diagnosis from just a clinical exam. One takes a non-absorbed sugar called lactulose on an empty stomach. The sugar is not absorbed, but gets to the bacteria which do metabolize it, and produce hydrogen and/or methane gas, among other gases. This hydrogen or methane is excreted in the breath. The longer it takes to see a peak of gas excretion in the breath, the farther down in the intestine the bacteria that produce it must be. The quantity of hydrogen or methane excreted early after ingestion is a measure of the quantity of bacteria up in the small intestine. This “lactulose hydrogen breath test” is considered to be either “positive” or “negative” for overgrowth. After taking the lactulose sugar, one gives one breath into a bag every 15 minutes for up to 3 hours. The test is done in the Motility lab at Cedars-Sinai.

If the symptoms and signs are highly suggestive and/or the breath test is positive, the most common treatment is to give non-absorbed antibiotics to reduce the number of bacteria in the small intestine. This hopefully reduces or eliminates symptoms, at least for some period of time. How long the benefit will last is variable, perhaps weeks, months or longer. If treatment is successful, to prevent a relapse, one should take a “pro-motility” agent as maintenance to stimulate this Phase III contraction that is not active in this situation. If such a maintenance program is not initiated, symptoms will most certainly recur and repeat treatment will be required at intervals.

A non-absorbed antibiotic that has been very successful and has the highest response rate is Rifaximin (Xifaxan). This medication has been designed to be not absorbed by the small intestine and when it reaches the colon will become inactivated by precipitation. Thus it will affect only the bacteria in the small intestine, avoiding problems in other areas of the body such as yeast infections or changes in colonic flora. This Xifaxan is often combined with another non-absorbed antibiotic, Neomycin. Neomycin is essential in those patients in whom constipation is present. This insures a broad coverage of many species of bacteria that have moved to the small intestine where they don't belong. Neomycin was used decades ago by injection and had potential side effects of kidney or hearing damage in high doses, but when taken by mouth is not absorbed and therefore is not associated with any of those problems (despite mention of these side effects in the package insert or by the pharmacist). Other antibiotics used with some success include Augmentin, Noroxin, Cipro plus Flagyl, Doxycycline and Biaxin. These are absorbed and have a “systemic” effect. The typical course of antibiotics is 10 days.

If symptoms persist after a 10 day course, this could be due to the treatment being unsuccessful, or that symptoms are due to causes other than small bowel overgrowth. One typically re-treats in that situation, either with the same two antibiotics or others. One may repeat a breath test to see if it has been normalized, or is still abnormal. If abnormal, further treatment may well be necessary. If normal, then the overgrowth has been successfully eradicated, but symptoms are likely due to some other problem.

If the course of antibiotics has been successful in eradicating symptoms to a great extent, one should use a maintenance therapy to prevent an otherwise almost sure recurrence. Certain “pro-motility” drugs can stimulate propagation of those “housekeeper” Phase III contractions, and are typically given once daily at bedtime. Erythromycin is such a medication. It is an antibiotic when used in high doses, such as 500mg four times a day, but in low doses, such as 50mg once at bedtime, acts only as a pro-motility agent and has no long-term antibiotic effect. In this small dose, side effects and allergic reactions are extremely unusual. If this is successful in preventing recurrence for a few months, one can consider longer term treatment. Erythromycin is available as a pediatric suspension and can be taken in small 50mg doses. Alternatively, one can have a tablet compounded at a compounding pharmacy in a dose of 50mg per tablet.

If multiple courses of antibiotics are not successful in eradicating the overgrowth, one can consider using an elemental powder protein formula as the ONLY calorie source for a period of 14 days. This preparation is absorbed very easily in the upper small intestine resulting in virtually no nutrients reaching the intestine below this level. The bacteria in

the upper and mid small intestine are thus “starved out” with the same result as successful antibiotics. The formula used is called Vivonex Plus and is a powder that is mixed with water and taken several times a day. One can use no other calorie source. No solid food or liquids containing any calories can be consumed for 14 days. If successful in eliminating the symptoms of SIBO, maintenance therapy is initiated. This is obviously not an easy option but is usually very effective. It is, however, rather expensive and typically not covered by insurance companies.

The treatment of SIBO may require multiple courses of antibiotics and a question may arise as to whether the symptoms are bad enough to warrant treatment as described above. Patients who take a course of antibiotics and do respond, should make sure a maintenance course is immediately initiated with Erythromycin.