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Diabetics Considerations with Colonoscopy Preparation

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ABSTRACT

The quality of bowel preparation is essential for adequate visualization of precancerous or cancerous polyps in the colon. Patient compliance with colon preparation instructions directly impacts the quality of visualization. Previous studies have reported that diabetes mellitus is an independent risk factor for inadequate bowel preparation.\textsuperscript{1-3} Current guidelines do not recommend a specific preparation for diabetic patients. Commonly, prior to mechanical bowel prep, a clear liquid diet (CLD) for 24 hours and a low fiber diet for 3-4 days is recommended. For diabetic patients, compliance and tolerability with a clear liquid diet (CLD) can be very difficult. It can lead to episodes of hypoglycemia or poor bowel prep. Research shows when patient feel hypoglycemic while on the clear liquid diet, they consume non clear liquid calories, which leads to poor prep or cancelation of procedure. Published literature have shown that inadequate bowel preparation is linked to missed adenomas, increased interval cancer rates, increased procedure time, and increased healthcare costs resulting from repeating colonoscopic exams.\textsuperscript{4}

INTRODUCTION

Allowing patients to have low residue diet (LRD) or low fiber diet (LFD) as part of the preparation the day before along with colon preparation medication regimen in diabetic patients may reduce the risk of inadequate prep, better patient compliance/tolerability and less hypoglycemic events, therefore less disruption in scheduled procedures. The main concern with a 24-hour clear liquid diet in diabetes is the difficulty in ensuring appropriate carbohydrate intake and, consequently, maintaining glycemic control reducing hypoglycemic events.\textsuperscript{5} Some patients
have altered gastrointestinal motility, which might contribute to delayed transit, the precise pathogenesis of these motility disturbances is unknown, although it has been suggested that they may be due to autonomic neuropathy of the gastrointestinal tract or to hyperglycemia.\textsuperscript{5} In this respect, a clear liquid diet in patients with diabetes may further impair colon peristalsis and emptying of fecal matter.\textsuperscript{5} Keeping in mind, that poor preparation regardless of reason increases procedural risk, sedation time, missed diagnoses, and possible perforation during colonoscopy. Poor preparation not only increases risk but also increases cost.\textsuperscript{5} Rex et al \textsuperscript{6} studied 400 colonoscopies, noting that suctioning fluid and washing occupied a measurable proportion of total examining time and that imperfect bowel preparation led to aborted examinations and earlier repeat surveillance. These problems caused an increase in average costs of 12\% at the university hospital and 22\% at the public hospital studied.\textsuperscript{6}

**Diabetic Population of Colonoscopy Patients**

The need for colonoscopy is common among patients with type 2 diabetes mellitus due to the high prevalence of gastrointestinal symptoms and increased risk of colon cancer in this population.\textsuperscript{7} Colonoscopy is a common procedure in adults older than age 40 years, more than 10\% of whom have diabetes.\textsuperscript{8} Diabetic patients have a higher risk for complications during colonoscopy preparation caused by change of diet, concomitant presence of diabetes complications and comorbidities and untimely continuation or cessation of antihyperglycemic agents (AHAs).\textsuperscript{9}

**Low Fiber Diet (LFD) For Colon Prep in Diabetic Patients**

In the low-fiber diet phase, diabetic patients are instructed to consume refined carbohydrates. Examples of low LFD are; white bread without nuts and seeds, white rice, plain white pasta, and crackers, refined hot cereals, such as Cream of Wheat, or cold cereals with less
than 1 gram of fiber per serving, pancakes or waffles made from white refined flour, most
canned or well-cooked vegetables and fruits without skins or seeds, fruit and vegetable juice with
little or no pulp, fruit-flavored drinks, and flavored waters, tender meat, poultry, fish, eggs and
tofu, milk and foods made from milk, such as yogurt, pudding, ice cream, cheeses and sour
cream if tolerated.\textsuperscript{10} Patients who are accustomed to avoiding refined carbohydrates because of
their high glycemic index may significantly reduce their carbohydrate intake without a
concomitant adjustment of their AHA\textsubscript{s}, thus increasing the risk for hypoglycemia.\textsuperscript{9}

\textbf{Clear Liquid Diet (CLD) For Colon Prep in Diabetic Patients}

The clear-liquid diet phase for a diabetic is generally hypocaloric even when sugary juice
and tea are consumed, and patients who continue their habitual avoidance of sugar-sweetened
beverages will consume no carbohydrates.\textsuperscript{9} Some examples of a clear liquid diet for diabetics
prep for colonoscopy are; water (plain, carbonated or flavored), fruit juices without pulp, fruit-
flavored beverages, carbonated drinks, gelatin, tea or coffee without milk or cream, strained
tomato or vegetable juice, sports drinks, clear, fat-free broth (bouillon), honey or sugar, hard
candy, and Ice pops without milk, bits of fruit, seeds or nuts.\textsuperscript{11}

\textbf{Managing Diabetic Medication for Diabetic Colonoscopy Patients}

Insulin secretagogues are likely to cause hypoglycemia in the liquid diet and cathartic day
prior to colonoscopy or the day of the procedure and should be discontinued.\textsuperscript{9} Sulfonylurea
preparations with a very long half-life can cause hypoglycemia even when taken more than 24
hours before the test and should be discontinued from the morning of the day prior to the test.\textsuperscript{9}
Likewise, insulin dose (long-acting basal preparations as well as short-acting insulin) should be
adjusted.\textsuperscript{9}

\textbf{REVIEW OF RESEARCH}
Research strategies consisted of databases reviewed from, PubMed, Medicine, Science direct, Wiley online library, and Lynchburg interlibrary loan. Terms used to guide search strategy included: diabetics and colonoscopy preps, clear liquid preps and colonoscopy, low residue preps and colon prep, diabetics and colonoscopy, colonoscopy preparation, diabetes, colonoscopy, low residue diet and colonoscopy, hypoglycemia and colonoscopy prep and colonoscopy detection rate. Filters used included adults, colonoscopy, diabetics, endoscopy. Firstly, three prospective random blind controlled trials and one single blind experimental design study were used to demonstrate the effectiveness of LRD for adequate colon preparation, increased patient compliance, satisfaction, tolerability, and lower incidence of hypoglycemic adverse events. The first single blind prospective controlled trial 2012-14, 280 patients of which 230 were used for trial, 8 blinded gastroenterologist to type of prep, 116 patients completed prep with low residue diet (LRD) the day before with colon prep and 114 patients completed colon prep with clear liquid diet (CLD) the day before, Boston bowel prep scale (BBPS) was used to evaluate clarity of prep, outcome was reported no difference in clarity of colon preparation, polyp detection nor withdrawal time, but LRD reported 2 times the satisfaction rate and lower incidence of cancelation before procedure.

The second, prospective random blind controlled trial 2015, had 200 patients randomly split into two groups, all for screening colonoscopy, group one, LRD for breakfast and lunch then clear liquids and colon prep split dose, and group two, CLD all day the day before with split dose colon prep. Outcome was 96% excellent prep using the BBPS, similar polyp detection rate, similar withdrawal time, reported similar patient satisfaction for both diets and preps. The third prospective random blind controlled multicentered trial 2016, 150 patients randomly split into two groups, group one (74 pts) conventional protocol bowel prep (CBP), low-fiber diet for 3 days followed by a clear liquid diet for 24 hours before colonoscopy, group two (76 pts) diabetic
specific prep (DSP) includes a multifactorial strategy combining an educational intervention, a low-fiber diet, and adjustment of blood glucose-lowering agents. Boston scale was used for prep quality. Outcome of study demonstrated CBP had 20% poor preps, increased hypoglycemic events such as headaches, fatigue, sweating, and shakiness. DSP 7% poor preps, tolerability, polyp detection and withdrawal time. Additionally, an audit was completed of guidelines for patients with diabetes, purpose for improving practice outcomes for colonoscopy preparations. The study proposed standards for diabetic patients through pilot guidelines, using 40 patients on insulin and or oral agents over 5 months. 48% of the patients on oral or insulin medications were scheduled first thing in the morning. None reported hypoglycemic event, the day before procedure they morning dose of oral agent or insulin with light low fiber meal before 0700 then take first dose of (Fleets), clear liquids only for rest of the day, continue with desired prep (fleets for this study) 1900 take second dose of fleets. No statically significant difference in the 8 (1427 patient) studies evaluated between LFD and CLD for adequate bowel preparations. Seemed tolerability for the LFD is 10% more tolerable of a bowel preparation regimen over clear liquid diet. Next a clinical and endoscopic data were collected and analyzed on 352 diabetic patients with a mean age was 63.5 years. Patients were analyzed based on HBA1C, bowel preparation was poor in 46.7% of patients with good glycemic control, 52.1% of patients with fair control and 50% of patients with poor control. ADR was 24.3% in patients with good glycemic control, 20.2% in patients with fair glycemic control and 27.1% in patients with poor glycemic control. There was no statistically significant difference in the quality of preparation or adenoma detection amongst the groups. Lastly, possible mechanisms for inadequate prep in diabetic patients to be considered may include colon dysmotility secondary to diabetic neuropathy, reduced physical exercise because of comorbidities, and medications that slow bowel motility and cause constipation such as
antihypertensive medications. Whereas glucagon-like peptide 1 (GLP-1) agonists slow bowel motility and could potentially increase the risk of poor bowel preparation, a single study found no evidence of worse bowel preparation when comparing diabetic patients treated with GLP-1 agonists or other medications. Despite these observations, current guidelines do not advocate different preparation regimens for diabetic patients.

**DISCUSSION OF RESULTS**

Three above, prospective random blind controlled trials and one single blind experimental design study were used to demonstrate the effectiveness of LRD for adequate colon preparation, increased patient compliance, satisfaction, tolerability, and lower incidence of adverse hypoglycemic events in diabetic patients. If patients glycemic index range is not complicating the adequacy of bowel preps itself then one can assume it may be the lack of compliance of the prep itself that is complicating outcomes. Additionally, research of one study found no evidence of worse bowel preparation in diabetic patients on traditional prep of CLD, when comparing them on different known slow motility diabetic medications. This may indicate the antihyperglycemic medication is not the only factor, that compliance to prep for diabetics might be a bigger factor and the need for better guidelines specifically for diabetic patients.

Further research still needed to help demonstrate patient hypoglycemic events during colonoscopy preparation and early morning low fiber/residue still produce adequate prep for polyp detection with different types of bowel preparation solutions.

**CONCLUSION**

Creating a specific bowel prep regimen for adequate colon cancer screening is essential for our ever-increasing population of diabetic patients. Most patients refer to bowel preparation as the most difficult and unpleasant part of colonoscopy, and adherence to bowel preparation
instructions is critical for the quality of the procedure. Patients with diabetes can have many difficulties managing insulin, diabetic medications, hypoglycemic events during preparations for colonoscopy. The constant struggle with patient compliance in preparations for colonoscopy, for excellent prep overall and the complication of diabetes as a co morbidity can further complicate this compliance as well as increase procedure cancelations or repeat procedure for poor pre-preparation. Colonoscopy preparation can include low fiber diets the day before and still have adequate colon preparation for colonoscopy procedure. Consideration for guidelines to reduce the risk of hypoglycemia recommendations could also include dose adjustments for blood glucose-lowering agents with low fiber diet considerations the day before procedure. Data collected supports LRD lessens diabetic patients’ risk for hypoglycemia, increases compliance, and can be utilized as an adequate option for pre-preparation for colonoscopy. Lack of adequate colon preparation in diabetics leads to inferior screening and potential for development of interval colon cancers.
References


