

# CHAPTER 1

## INTRODUCTION

### Rationale and Background

Currently, colonoscopy is the standard procedure for diagnosis and treatment of colonic lesions. Indications for colonoscopy included patients who have symptom of chronic diarrhea, bowel habit change, bloody stool, chronic constipation, lower abdominal pain, lower gastrointestinal hemorrhage, abnormal findings on X-ray and cancer surveillance.

The success of colonoscopy depends largely on the skill of endoscopist including the ability to examine the entire large bowel. Expertise in colonoscopy can be judged by technical aspects, such as completeness of insertion, precision of observation and minimal patient discomfort during the procedure. Various factors affect the success of colonoscopy. These factors include gender, age, obesity, bowel preparation, constipation, previous abdominal surgery and complicated diverticular disease<sup>[1-3]</sup>. Among these factors inadequate bowel preparation is the only correctable factor.<sup>[4]</sup>

An adequate clean colon is essential for visualization during colonoscopy. Adequacy of colon cleansing is also used as an indicator in some endoscopy unit for quality control.<sup>[5]</sup> Inadequate bowel preparation may lead to missed diagnosis, increase time of colonoscopy (7.5-10.3%), increase cost (12-22%)<sup>[6]</sup> and increase risk of contamination if there is accidental perforation. Sometime the patient has been investigated repeatedly and this means that the appointment is a waste of time and resources. Ness<sup>[7]</sup> reported 21.7% incidence of inadequate bowel preparation and 5.4 % had a poor preparation leading to cancellation or abortion of their procedure . The independent predictors of an inadequate colon preparation are failure to follow preparation instructions, a later colonoscopy starting

time, inpatient status, constipation, taking tri-cyclic antidepressant, male gender, cirrhosis, stroke or dementia.

The ideal bowel preparation for colonoscopy would (1) empty the colon of all solid and some liquid feces (2) have no effect on the colonic mucosa (3) require short period for ingestion and evacuation (4) cause minimal patient discomfort (cramping, bloating, nausea) and safe (5) have no significant shifts of fluid and electrolytes. Until now, there is no ideal regimen for bowel preparation. Over the last number of years, a variety of regimens for bowel prep has been evaluated. Depended on the characteristic of patients and preference of colonoscopist, many laxative agents or regimens are used in bowel cleansing as followed:

Standard bowel preparation has for years been a combination of dietary restrictions, laxatives and cleansing enema. This bowel regimen is time-consuming, inconvenient and unpleasant for the patients. Cathartics may also cause histologic changes in mucosal biopsy specimen<sup>[8]</sup>.

Mannitol, an osmotic agent to induce diarrhea yields an explosive gas, making the use of mannitol potentially hazardous. Whole-gut irrigation with rapid ingestion of large volumes (10 liter) of normal saline cause fluid overload and electrolyte imbalance. Both these two regimens are not used any more.

The combination of sodium picosulphate, a stimulant cathartic and magnesium citrate, an osmotic laxative (SPS-Mg, Pico-salax) has been commonly used in Europe since 1982<sup>[9]</sup>. Pico-salax is dissolved in a relative small volume of water and has been demonstrated to be well tolerated and effective bowel preparation.<sup>[10]</sup>

Currently, the two predominant regimens are the PEG-electrolyte lavage solutions (PEG-ELS, polyethylene glycol solution, colonic lavage solution) and oral sodium phosphate solution. The main advantage of balanced electrolyte solution is its minimal effect on intravascular volume and serum electrolyte balance. Despite the good efficacy and safety, this large-volume (2-6 liter) laxative is difficult for many patients to tolerate. The main advantage of oral phosphate solution is that lesser volume could be tolerated well by the patients.

Sodium phosphate is less costly than PEG-ELS. However, the side effects of oral sodium phosphate include hyperphosphatemia, hypocalcemia, hypernatremia and acidosis, so it is not recommended in patients with renal or cardiac dysfunction or advanced hepatic failure. Besides these adverse effects, the taste of the solution is not palatable.

Clinical trials comparing efficacy between PEG-ELS and NaP are controversial . Some authors believe that NaP is more efficacy than PEG-ELS.<sup>[11-15]</sup> A recent meta-analysis concludes that NaP is as effective as and less costly than PEG-ELS<sup>[16]</sup>.

Senna compound, a vegetative laxative , has long been used for constipation since ninth century.<sup>[17]</sup> Senna is also prescribed alone or in combination with balanced salt solution to reduce volume and to improve efficacy.<sup>[18]</sup>

However, there are few studies about the efficacy of senna for bowel preparation although it is cheap, easily to ingested and available. Those studies show conflicting result. Fear of its adverse effect may result in its underused in bowel preparation, though these effect may occur from chronic abuse. There is no epidemiologic data to support the neoplastic potential of senna compound. The link between senna and structural changes such as “cathartic colon ” or enteric nerve damage is not well established either.<sup>[19]</sup>

In Thailand there are 2 studies about bowel preparation for colonoscopy and there is no study about the efficacy of senna before.<sup>[20, 21]</sup>

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