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COMPARISON OF SAME DAY POLYETHYLENE GLYCOL REGIMEN VS SPLIT DOSE POLYETHYLENE GLYCOL REGIMEN FOR COLONOSCOPY

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Abstract:
Colonoscopy is a procedure which depends upon the quality of bowel preparation. Polyethylene glycol(PEG) is commonly used laxative for bowel preparation. The method of PEG administration affects the quality of bowel preparation. We designed this single-blinded randomized controlled trial to evaluate same day PEG regime vs split dose PEG regime in patients undergoing colonoscopy.
METHOD: Total out of 156 patients taken for the examination, they were divided randomly in two groups i.e. A & B.
The patients in the group A (same day group) took 2 L of PEG between 6:00 AM and 8:00 AM on the same day of colonoscopy.
The patients in the other group B (split dose group) took 1L of PEG between 6:00 PM and 8:00 PM on the preceding day and another liter between 6:00 AM and 8:00 AM on the day of colonoscopy. These patients had to stay in hospital for about 24 hours.
The accuracy of preparation was assessed on Boston Bowel Preparation Scale (BBPS). A sum total of ≤ 5 points shows poor bowel preparation & ≥ 8 shows very good bowel preparation. Side effects were recorded by asking symptoms of nausea, vomiting, abdominal pain & bloating.
Results: In same day dose group, 62 patients were having BPPS preparation score of >8. While in second split dose group 64 patients were having BPPS preparation score >8. Chi square test revealed that there was no significant difference in BPPS score between both groups. However, there was significant difference in patient satisfaction and willingness to repeat the same procedure between both groups. Group A same day regime were more satisfied & willing to repeat the procedure. They reported less interference in their sleep.
Conclusion: Same- day morning PEG regime should be used which is more easy & tolerable for our patient's population and its efficacy is same as other regimes for adequate bowel preparation.
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Introduction:

Adequate bowel preparation is very important for successful colonoscopy[1]. Poor preparation has side effects such as prolonged procedure time, increased patient discomfort, and increased chances of missed lesions.[2] Studies have reported that 25% of patients undergoing colonoscopy have inadequate preparation[3]. Polyethylene glycol is the agent of choice for bowel

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cleaning since 1982.[4] The timing of administration of Polyethylene glycol (PEG) affects the quality of bowel preparation.[5] The colon becomes increasingly filled with fluid or debris[6] if there is a long time between the administration of PEG and colonoscopy.[7] Hence same day PEG regime became more practical than currently recommended split dose PEG regime. Moreover majority of patients are daily wager, who cannot afford to stay at hospital for more than 12 hrs. However consuming entire PEG on the same day has abdominal side effects. Some studies recommend split-dose preparation. Others suggest same day preparation is better [8]. It remained a question of debate which method is best [9]. Hence we conducted a randomized controlled trial to compare same day PEG regime with Split dose PEG regime in patients undergoing colonoscopy.

Method:

We designed a single blinded randomized control trial at Sahara medical college Narowal, Pakistan. This trial was conducted between Jan 2022 to August 2022 after obtaining ethical clearance. Patients of both genders aged 18 years and above undergoing colonoscopy for various reasons were included. Patients with renal failure (creatinine clearance < 28 mL/min) hemodialysis patients, pregnant women, patients of severe congestive heart failure; and patients with history of bowel obstruction or surgery; and those with allergies to PEG were excluded from the study. The sample size calculation was done with an α error of 5% and a power of 95%. Total patients were 176. 20 were dropped out; and bringing the total to 156. 78 patients remained in each group. A written and informed consent was obtained from all the patients. The patients were randomized into two groups by one investigator, the explanation regarding colonoscopy was done by another doctor. A single blinded outcome assessment was done by the gastroenterologist doing the procedure of colonoscopy.

Total of 156 patients were taken for the examination. Corrected sample size was 78 in each group. They were divided randomly in two groups A and B.

The patients in the group A (same day group) took 2 Liters of PEG (polyethylene Glycol) between 6:00 AM and 8:00 AM on the day of colonoscopy. Patient was given 16 sachet of polyethylene glycol mixed with 2 liter of plain water. Group A patients had to stay in hospital for 12 hours.

The patients in the other group B (split dose group) took 1 liter of PEG (polyethylene Glycol) between 6:00 PM and 8:00 PM on the preceding day and another liter between 6:00 AM and 8:00 AM on the day of colonoscopy. Group B patients had to stay in hospital for 24 hours.

Similar liquid diet protocol like fruit juices, coconut water and lemon juice. was suggested to patients in both groups. Colonoscopy was done using video colonoscopies between 9.00 AM and 12:00 PM without sedation. The colonoscopist was blinded to the study groups. The colonoscopist had adequate experience to perform the procedure.

The accuracy of preparation was assessed on Boston Bowel Preparation Scale (BBPS) by colonoscopist who was blinded to the study groups. Each segment of the colon is classified from 0 to 3 depending on the quality of preparation. The sum total of the all three segments represent the level of soiling, A sum total of ≤ 5 points shows poor bowel preparation, while **6–7** shows good bowel preparation, & ≥ 8 shows very good bowel preparation.

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Statistical analysis:

The statistical analysis was done using Statistical Package for the Social Sciences (SPSS) software version 24. It was carried out at 5% level of significance and $p < 0.05$ was considered significant.

Results:

The reason for colonoscopy referral in our study were : chronic diarrhea (n= 50;32%), inflammatory bowel disease (n=30;19%), irritable bowel syndrome (n=29;18%), abdominal tuberculosis (n=6; 4%), chronic constipation (n=10;6.4%), lower GI bleed (n=15;9.6%), chronic abdominal pain (n=10;6.4%),screening colonoscopy (n=6; 4%). All the above indications were distributed similarly in both groups. In both groups good compliance to PEG preparation was seen in both groups.

Table 1: Comparison of baseline characteristics between Group A and B

Parameter	Group A Same dose	Group B split dose	P value
Age mean (years)	46.63 (41.5-50.5)	45.15 (43.7-47.5)	0.23
Gender	Male 40 Female 38	37 41	0.8
Education	Educated 42 Uneducated 36	43 35	0.3
BMI* median	22.7 (16-39)	23 (11-36)	0.16
Smoker	13	11	0.7
Prior abdominal surgery	27	28	0.66
History of previous colonoscopy	19	18	0.89
Compliance to PEG preparation	78	78	0.5
Adherence to dietary restrictions	78	78	0.5

***BMI (Body Mass Index)**

In Group A same day full dose, 62 were having BPPS (Boston Bowl Preparation Scale) preparation score of >8 which was excellent in preparation. 6 patients had average BBPS score between 5& 8 whereas 10 patients had poor BBPS score less than 5.

	Group A Same day full dose
BPPS Score	**Number of patients**
>8	62
5-8	6
<5	10

In Group B split dose group, 64 were having BPPS preparation score of >8 which was excellent in preparation. 5 patients had average BBPS score between 5& 8 whereas 9 patients had poor BBPS score less than 5.

	Split dose Group B
BPPS Score	**Number of patients**
>8	64
5-8	5
<5	9

BPPS Score	Group		p-value
	A	B	
>8	62 (79.5%)	64 (82.1%)	0.916
5-8	6 (7.7%)	5 (6.4%)	
<5	10 (12.8%)	9 (11.5%)	

Table-2: Boston Bowel Preparation scale in the same day and split dose group.

Chi square test was to compare the BBPS score between same day and split dose groups. Results revealed that there was no significant difference in BPPS score between both groups.

No major side effects were reported in both patients. No statistical difference was noted as shown in table 3. Significant difference was observed in patient satisfaction between groups. Group A same dose regime were more satisfied & willing to repeat the procedure. They reported less interference in their sleep as they had to stay in hospital for 12 hours only. Whereas

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Group B patients had to stay in hospital for 24 hours.

Table 3: Comparison of side effects between both groups

Side effects	Group A	Group B	P value
Nausea	37	35	0.62
Vomiting	19	22	0.68
Bloating	11	12	0.49
Abdominal pain	7	6	0.79
Dizziness	3	2	0.63
Headache	1	1	0.62

Table 4: Comparison of patient satisfaction/willing to repeat same regime in both groups

Response	Group A same day full dose	Group B split dose	P value
Excellent	45	22	0.001
Very good	25	30	
Poor	8	26	

Discussion:

Successful colonoscopy requires good bowel preparation and Good bowel preparation depends upon factors such as type &dose of bowel cleaning agent, timing of administration and adherence to liquid diet. Several gastroenterology societies have recommended the use of 4 liter PEG in split doses, a part of it is administrated on the previous day while rest is given on the day of colonoscopy. Split dose PEG regime was found to interfere with work, sleep &other activities. Most of our patients are daily wagers and cannot afford to stay in hospital for 24 hours for split dose regime. Therefore it leads to the idea of same-day dose. Our study compares same-day PEG regime with split-dose PEG regime in patients undergoing morning colonoscopy.

Baseline characteristics, adherence to diet & compliance to PEG preparation were similar in both groups undergoing colonoscopy. Patients in our study underwent colonoscopy without sedation.

The efficacy of split-dose PEG vs same-day PEG was determined using Boston Bowel Preparation Scale (BBPS). The median BBPS in both groups was similar in our study. Several earlier studies also compared split – dose vs same–day PEG regime. Zhang et al.[9] and Shah et al. [10] recommended the use of split-dose PEG preparation, however split dose requires 24 hours stay in hospital which interferes with routine activities, work & sleep of patients. However, in Anudeep et al. (2022) study same-day PEG regime showed significantly better bowel preparation results.[11] Zhang et al used 3Litre of PEG , Anudeep et al used 2 liter of PEG, we & Shah et al used 2 liter of PEG. A study done by Cesaro et al (2013) recommended 4 liter of PEG to be used for bowel cleaning.

In a meta-analysis done by Cheng et al (2018) no difference in efficacy was found between split-dose &same-day dose regime. Similarly studies done by Avalos et al (2018) and Bucci et al (2019) also showed no significant difference between both regimes. Various scoring systems were used including Aronchik, Ottawa & BBPS to check bowel preparation. BBPS is the best for practical hospital setting.[12] It resembles real –life situation. Only 4 studies have used BBPS. The timings of colonoscopy were also different in different studies. Four studies did not mention anytime. Patients in our study had colonoscopy in morning time.

We found the willingness to repeat same procedure, overall satisfaction & tolerability of PEG regime of same-day regime to be more significantly better than split-dose regime. Patients in same-day group had less interference in their sleep. Cheng et al also

reported better sleep in Same-Day group patients[4]. Anudeepet al (2020) also reported significantly better sleep in same-day group patients. In contrast Avolas et al &Bucci et al showed no significant difference in tolerability & willingness to repeat the same procedure between both regimes.[5]

The strengths of this study are a large sample size, Multi Centre study and use of a standardized BBPS for colonoscopy. The limitation of the study is that patients who had undergone bowel surgery were excluded; hence, the outcome of this study cannot be applied for all colonoscopies.

Conclusion;To conclude, same–day administration of PEG was superior to split-dose regime in attaining adequate bowel preparation in patients undergoing morning colonoscopy.

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