



Use of Polyethylene Glycol enema in Patients on Hemodialysis

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Abstract

Colonoscopy is a frequently performed procedure in the current era for evaluation of colitis and large bowel diarrhea. As a preparation for colonoscopy the patients are prescribed an enema which is most commonly a polyethylene glycol (PEG). This is usually given in a solution of about 2 liters and repeated if necessary. Since End Stage Renal disease (ESRD) patients on hemodialysis are not advised to consume large quantities of fluids, a patient undergoing colonoscopy is usually given inadequate preparation and subsequently inadequate radiological data. Here we have studied clinical and biochemical parameters of 5 patients who had to undergo colonoscopy or Contrast enhanced CT scan of the abdomen and our results show that the usage of Polyethylene solutions do not cause any increase in weight gain or are associated with dyselectrolytemia.

Introduction

Colonoscopy and contrast enhanced CT is frequently performed procedure in the current era for evaluation of colitis, large bowel diseases and for evaluation of abdominal pathologies. As a preparation for colonoscopy and CECT the patients are prescribed an enema which is most commonly a polyethylene glycol (PEG) in the current era. This is usually given in a solution of about 2 liters and repeated if necessary. Since End Stage Renal disease (ESRD) patients on hemodialysis are not advised to consume large quantities of fluids, a patient undergoing such investigative processes is usually given inadequate preparation and subsequently inadequate radiological data are obtained. Here we have studied clinical and biochemical parameters of 5 patients who had to undergo colonoscopy or Contrast enhanced CT scan of the abdomen.

Review of Literature

In the current era where more patients are being detected as End Stage Renal Disease and continued on dialysis whilst waiting for transplant, colonic pathology like colitis, carcinoma, angiodysplasias in this population is a common occurrence. The occult blood may be detected as positive due to various factors like use of heparin during dialysis or the occurrence of angiodysplasias in the colon, these patients would warrant a colonoscopy for accurate identification of the lesions. In order to achieve a good colonoscopy an adequate preparation is necessary with either a phosphate enema or polyethylene glycol enema. Oral sodium phosphate as a preparatory agent for colonoscopy is not to be used in the setting of $GFR < 60 \text{ ml/min}^1$. Hence PEG enema is preferred in ESRD patients for preparation of colonoscopy. There have been fatal

complications with regard to dysnatremia when used in dialysis patients .Hence there is a lot of apprehension in its use, also the use of polyethylene requires large amount of fluids for dilution, about 2 liters for every sachet (17gms), consumption of such large quantity of fluids can cause CCF in patients with hemodialysis.³

Aims and Objectives

To evaluate whether the use of PEG enema is associated with

- 1) Dyselectrolytemia, and
- 2) weight gain in dialysis patients

Materials and Methods

Study Design: clinical observational study

Sample Size: 5 patients

Method: Patients who were hemodynamically stable and on thrice weekly dialysis were chosen for the study. The indication of colonoscopy and CECT were varied and it was advised in consultation with a gastroenterologist.

All the chosen patients underwent hemodialysis at least 4 hours before the PEG enema was given and the procedure (colonoscopy and CECT) were performed after 8-12 hours. The patients underwent dialysis 24 hours after the procedure.

The body weight of the patient was monitored pre HD and on the day of the procedure (colonoscopy/CECT).

Serum electrolytes (sodium/ potassium/ chloride) were monitored pre HD before the enema and pre HD after the enema.

Study Period: 6 months (January 2014 to June 2014).

Inclusion Criteria

- Adult chronic kidney disease patients on maintenance hemodialysis (HD) for at least 3 months.

Exclusion Criteria

- H/o cardiac interventions (CABG/PTCA)
- Acute on chronic kidney disease
- Serum Sodium levels <135 and >150 mmol/L
- History of Arrhythmias

Analysis of Data: since the number of patients were small and this study was only to assess the safety of the procedure

Observations and Results

Total of 5 patients (5 males) completed the study.

Table 1: Serum pre HD sodium in mmol/l

Subject	Before procedure	After procedure
1	137.9	137.4
2	142.6	142.7
3	139.0	140.0
4	138.4	139.2
5	142.8	141.4

Table 2: Serum pre HD potassium in mmol/L

Subject	Before procedure	After procedure
1	3.7	3.7
2	4.2	4.2
3	3.9	4.0
4	3.8	3.9
5	4.2	4.1

Table 3: Serum pre HD chloride

Subject	Before procedure	After procedure
1	107.9	107.4
2	102.6	102.7
3	109.0	100.0
4	108.4	109.2
5	102.8	101.4

Table 4: Mean of Blood pressure

SUBJECT	SBP (mm of Hg)		(DBP mm of Hg)	
	Pre HD before enema	Pre HD after enema	Pre HD before enema	Pre HD after enema
1	145	147.5	88	87.5
2	144.4	150.2	88	86.66
3	147.75	139.5	83.5	83.25
4	137.11	129.11	77.33	74.44
5	142.5	145	79.75	88.5

Table 5: Weight Gain

Subject	Weight Gain (Kg)		
	Pre enema (pre HD)	Post procedure weight gain/loss	Post procedure (pre-HD)
1	2.64	0.3	2.44
2	3.46	0.8	3.0
3	3.57	0.4	2.9
4	1.32	0.2	1.1
5	3.42	0.9	2.8

Discussion

Chronic kidney disease (CKD) is often an asymptomatic condition resulting in dependence on renal replacement therapy at a later stage. Although, renal transplantation is an excellent option, there are shortcomings including lack of donors and cost. Dialysis is then adopted for survival in these individuals.

Disorders of the colon and abdomen are seen in patients on dialysis at a frequency of the regular population and some disorders are specifically seen in this population

With the advent of new treatment modalities it was necessary for better visualization of the colon and abdomen and hence the need for contrast CT and colonoscopy with preparation of the colon for facilitation. The enema that were used were phosphate based and resulted in retention of phosphorus in dialysis patients or lactulose based that did not ensure adequate preparation. The use of PEG enema in normal individuals resulted in better preparation and better radiological visualizations. However the PEG enema that was given orally had to be mixed with 2 liters of fluid for adequate outcomes, this quantity of fluid consumption would result in excessive weight gain and dyselectrolytemia, especially hyponatremia (dilutional) and hypernatremia (loss of fluids) in dialysis patients. Data on use of these enema in dialysis population is lacking though many studies did include CKD patients.

Here in this study we have tried to analyze if the use of this enema was safe for dialysis patients, its effect on hypertension, weight gain and electrolytes.

The pre HD blood pressure before giving oral 2 liter PEG enema was taken and compared with pre HD blood pressure after the procedure (CECT and colonoscopy), there was no change noted in the measurement of BP. The weight of the patient also did not change much, this may be due to the loss of fluids through the stools. There was weight gain in all patients but this gain was expected in dialysis patients. The serum electrolytes pre HD

before the enema and after did not alter significantly.

The number of patients studied was small and hence statistical significance was not reached. We hope that there will be large randomized controls to ascertain further evaluation.

Conclusion

The use of PEG enema for bowel preparation in dialysis patients is safe and not associated with significant dyselectrolytemia and weight gain, however larger trials are needed.

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References

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List of Abbreviations

CCF- Congestive cardiac failure
HD – Hemodialysis
ESRD-end stage renal disease
WG – weight gain
Na – sodium
K-potassium
Cl- chloride
BP- blood pressure
L – Liter
mm of Hg – Milli-meters of Mercury
SBP – Systolic blood pressure
DBP – Diastolic blood pressure
CKD – Chronic Kidney Disease
No. – Number
Fig – Figure