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Effect Of Hypokalemia In Perforative Peritonitis Patients

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Abstract

Background: Perioperative electrolyte homeostasis is very important in perforative peritonitis patients to enable them to tolerate the surgery, maintain stable vital signs and recover from the surgery. Serum potassium levels are closely related to the gastro intestinal functions. The first measurement of the serum potassium level after admission to the hospital shows that many patients had hypokalemia before due to inadequate intake or excessive loss of potassium. Hypokalemia plays an important role in post operative complications. Early Post operative potassium correction has recently been demonstrated to accelerate the recovery of gastro intestinal function.

Aim of The Study : This review aims to clarify the relationship of hypokalemia and peritonitis in peritoneal dialysis.

Material and Methods: This study was conducted in 2022 at Government Medical College, Omandhurar Estate, Chennai Tamil Nadu, Indiaour study included 50 patients who underwent Emergency lapratomy for perforation peritonitis under general anaesthesia were randomized into two groups of 25 each. Group A contains normokalemic patients – no intervention, Group B contains hypokalemic patients - potassium correction done. Careful monitoring of outcomes in terms of first bowel sound, First defecation time, urine retention, wound dehiscence, wound infection, length of hospital stay after operation.

Results: In our study, we have derived that , Group A containing 25 patients who are Normokalemic developed less incidence of wound infection, wound dehiscence, paralytic ileus, less hospital stay. In Group B containing 25 Hypokalemic patients developed more incidence of the above parameters. Also there was significant difference in the post operative urinary retension (p-0.032), return of bowel sounds and defecation time (p-0.005) and duration of hospital stay (p- 0.005) lesser in Normokalemic group.

Conclusion: Study concludes that patients with perforation peritonitis undergoing emergency midline laparotomy with normal potassium level are experiencing a decrease in the incidence of wound dehiscence, wound infection, urinary retention, lessens hospital stay, early appearance of bowel sounds and defecation. Whereas these factors are delayed in hypokalemic patients. Hence these patients need early correction of potassium level in the post operative period.

Keywords: hypokalemia, perforative peritonitis, emergency laparotomy, paralytic ileus.

Introduction

Blood potassium levels could differ slightly among individuals and they were very important during perioperative management of patients undergoing abdominal surgery. The effects of postoperative potassium metabolism in patients is always a concern for surgeon.[1] The first measurement of the serum potassium level shows that many patients had

hypokalemia before, it could be explained by common causes such as inadequate intake or excessive loss of potassium.[2] With the development of economy, improvement of living standards, increase in work pressure, and changes in lifestyle, the primary disease spectrum has altered greatly, resulting in hypertension and diabetes mellitus (DM) becoming very common conditions. Medications, health-care products, and concomitant lifestyle factors have some effects on the distribution and shifting of potassium within the body but were never paid much attention.[3] Moreover, digestive organs were primarily involved in abdominal surgeries, and diet was closely related with differences in blood potassium levels. All of the above mentioned made the causes of hypokalemia.[4] Management of hypokalemia during the post operative period was too late. Hypokalemia occurred for many different controlled and uncontrolled reasons. In addition, there were still some controlled causes that could be prevented. In this study the importance of potassium level correction is deeply explained.[5]

Material And Methods

This study was conducted in 2022 at Government Medical College, Omandhurar Estate, Chennai Tamil Nadu, Indiaour study included 50 patients who underwent Emergency lapratomy for perforation peritonitis under general anaesthesia were randomized into two groups of 25 each. Group A contains normokalemic patients – no intervention, Group B contains hypokalemic patients - potassium correction done. Careful monitoring of outcomes in terms of first bowel sound, First defecation time, urine retention, wound dehiscence, wound infection, length of hospital stay after operation. Blood samples will be collected for serum potassium level measurement during various periods (Admission, Immediate, 24h, 48h post operative). Hypokalemia corrections were given to Group B individuals. Visceral dynamics were assessed in both the groups during post operative period.

Inclusion Criteria:

1. Patients with perforative peritonitis undergoing abdominal surgery.
2. Both males and females.
3. Age: More than 13.
4. Serum potassium level < 3.5mmol/L during admission period (hypokalemic patients).
5. Serum potassium level between 3.5 to 5.0 mmol/L.

Exclusion Criteria:

1. Patients refusal.
2. Major organ dysfunctions.
3. Chronic vomiting.

Procedure methodology: After proper clinical assessment of the perforative peritonitis patients. They were initially resuscitated with analgesics, intravenous fluids, nasogastric aspiration and antibiotics. The bladder catheterization was done to monitor the urine output. The patients were taken up for surgery after stabilizing the general condition. During the Postoperative period nasogastric aspiration was continued, with the help of the intravenous fluids the nutrition and electrolyte balance were maintained. Daily the patients were assessed for recovery and if there were any complaints they are recorded. A separate proforma for each case containing all the relevant particulars were maintained. All data were recorded and statistically analysed. Specific instruction was given to each patient on discharge, to come for periodical review regularly. The patients were followed up during the post operative period and the post operative outcomes after the surgical procedure were documented and graphed intro groups separately according to the various outcomes that have been proposed.

Stastical Analysis

The collected data were analysed with IBM.SPSS statistics software 23.0 Version. To describe about the data descriptive statistics frequency analysis, percentage analysis were used for categorical variables and the mean & S.D were used for continuous variables. To find the significant difference between the bivariate samples in Independent groups the Unpaired sample t-test was used. To find the significance in categorical data Chi-Square test was used similarly if the expected cell frequency is less than 5 in 2×2 tables then the Fisher's Exact was used. In all the above statistical tools the probability value .05 is considered as significant level.

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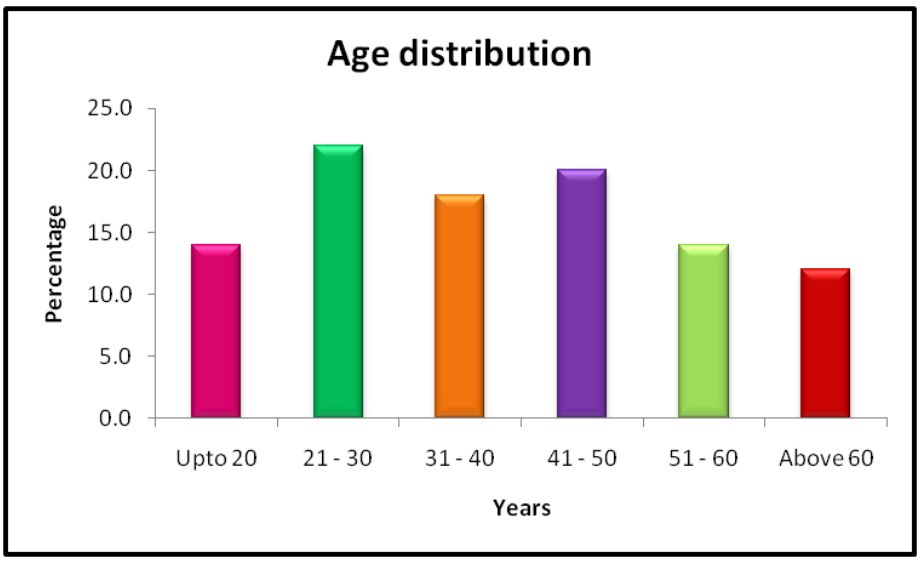
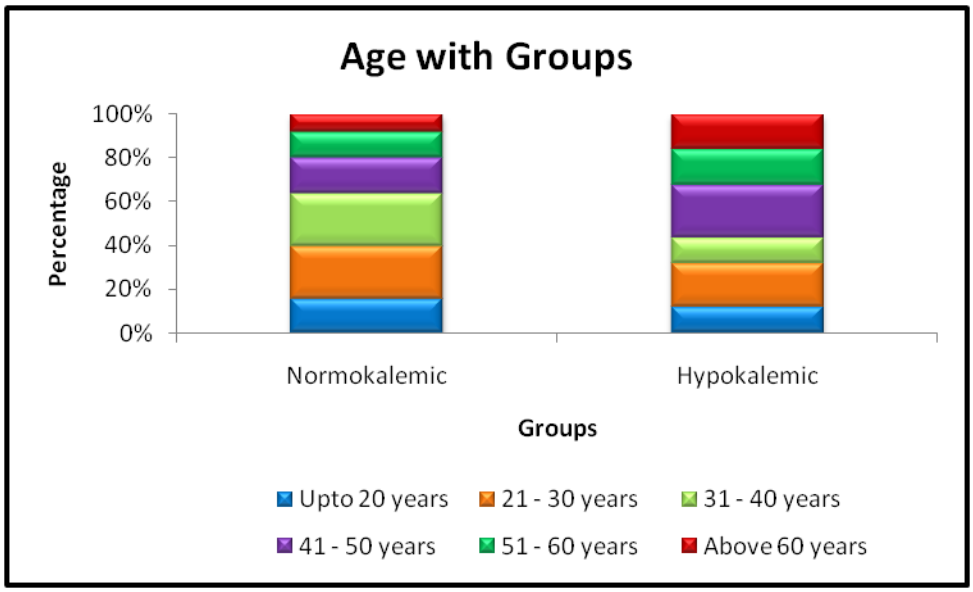
Result

Graph 1: Age distribution



The above graph shows Age distribution were 14.0% is Upto 20 years, 22.0% is 21-30 years, 18.0% is 31-40 years, 20.0% is 41-50 years, 14.0% is 51-60 years, 12.0% is Above 60 years.

Graph 2: Comparison between Age with Groups



Graph :2 The above table shows comparison between Age with Groups by Pearson's chi-squared test were $\chi 2=2.443$, $p=0.785>0.05$ which shows no statistical significant association between Age and Groups.

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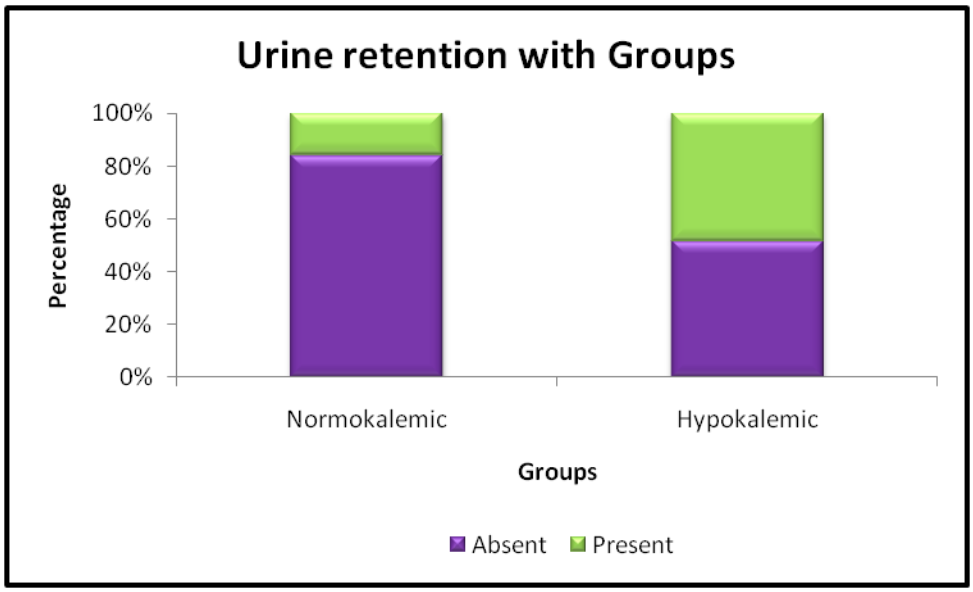
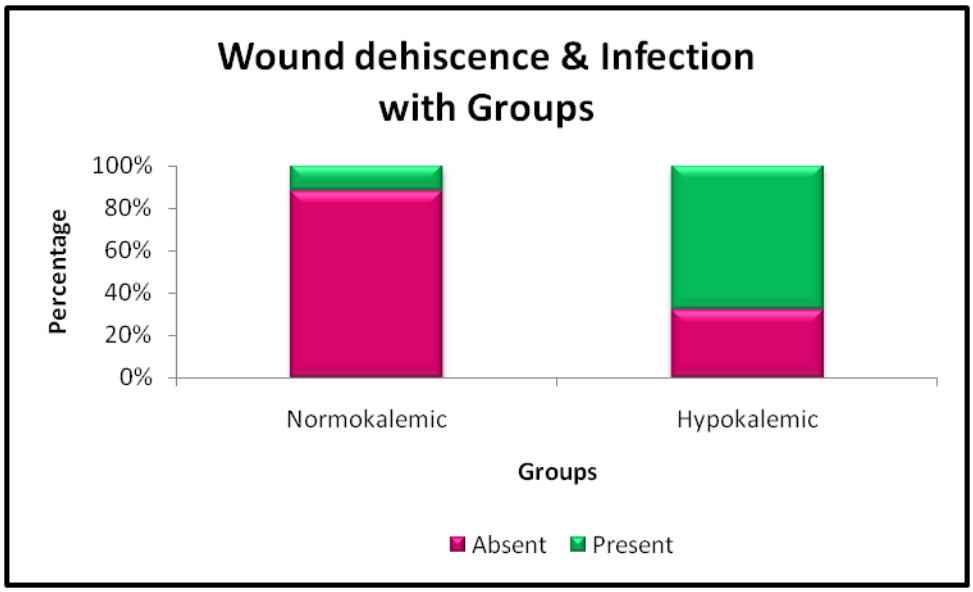
Graph : 3 Comparison between Urine retention with Groups



Graph :3 The above table shows comparison between Urine retention with Groups by Pearson's chi-squared test were $\chi 2=5.882$, $p=0.032<0.05$ which shows statistical significant association between Urine retention and Groups

Graph : 4 Comparison between Wound dehiscence & Infection with Groups



Graph :4 The above table shows comparison between Wound dehiscence & Infection with Groups by Pearson's chi-squared test were $\chi 2=16.333$, $p=0.0005<0.01$ which shows highly statistical significant association between Wound dehiscence & Infection and Groups.

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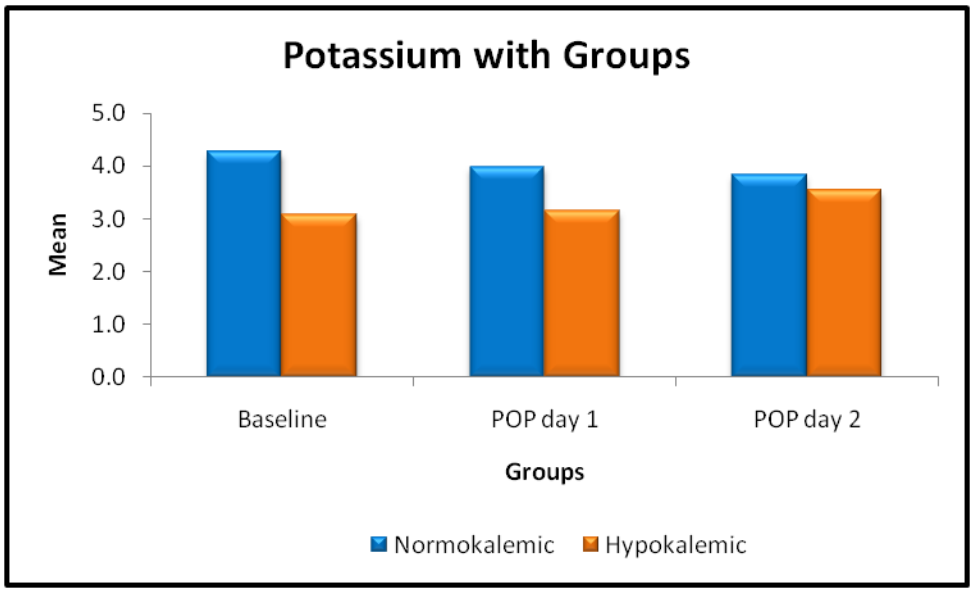
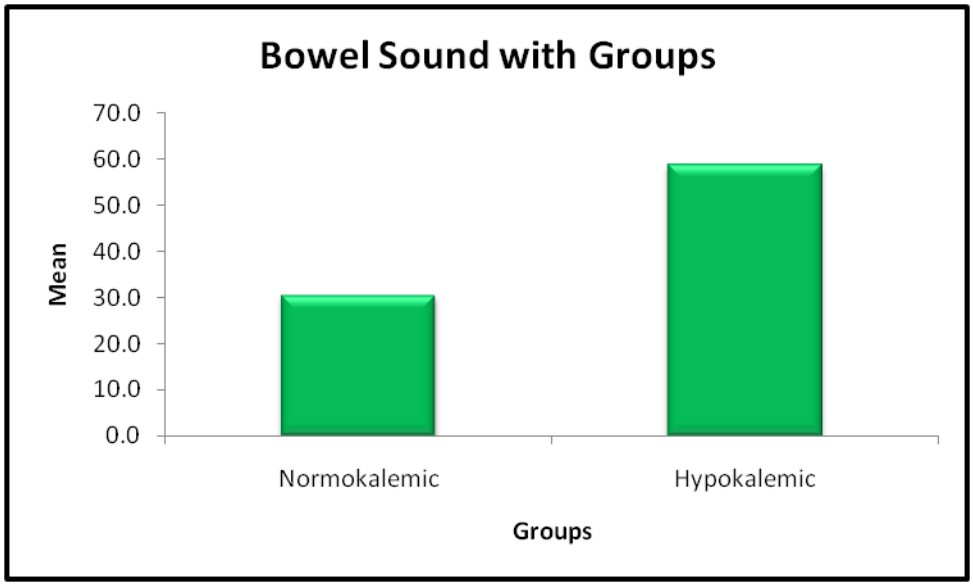
Graph : 5 Comparison of Potassium with Groups by Unpaired t-test



The above table shows comparison of Potassium with Groups by Unpaired t-test. In comparison of Potassium at Baseline with Groups were t-value=13.505 , p=0.0005<0.01 which shows highly statistical significant difference between Potassium at Baseline and Groups and in comparison of Potassium at POP day 1 with Groups were t-value=12.580, p=0.0005<0.01 which shows highly statistical significant difference between Potassium at POP day 1 and Groups. Similarly in comparison of Potassium at POP day 2 with Groups were t-value=12.580, p=0.0005<0.01 which shows highly statistical significant difference between Potassium at POP day 2 and Groups respectively.

Graph 6: Comparison of Bowel Sound with Groups by Unpaired t-test



The above table shows comparison of Bowel Sound with Groups by Unpaired t-test were t-value=13.006 , p=0.0005<0.01 which shows highly statistical significant difference between Bowel Sound and Groups.

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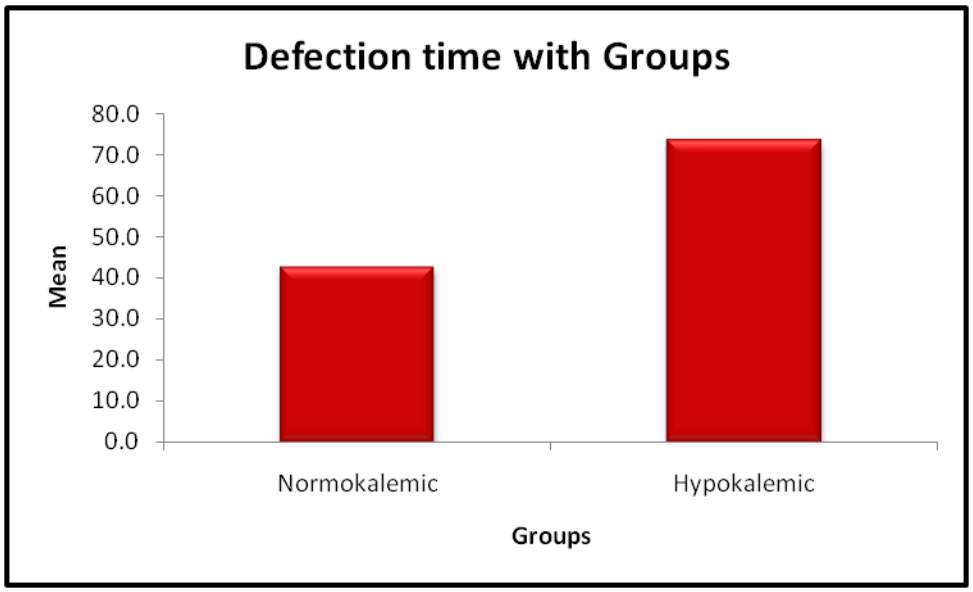
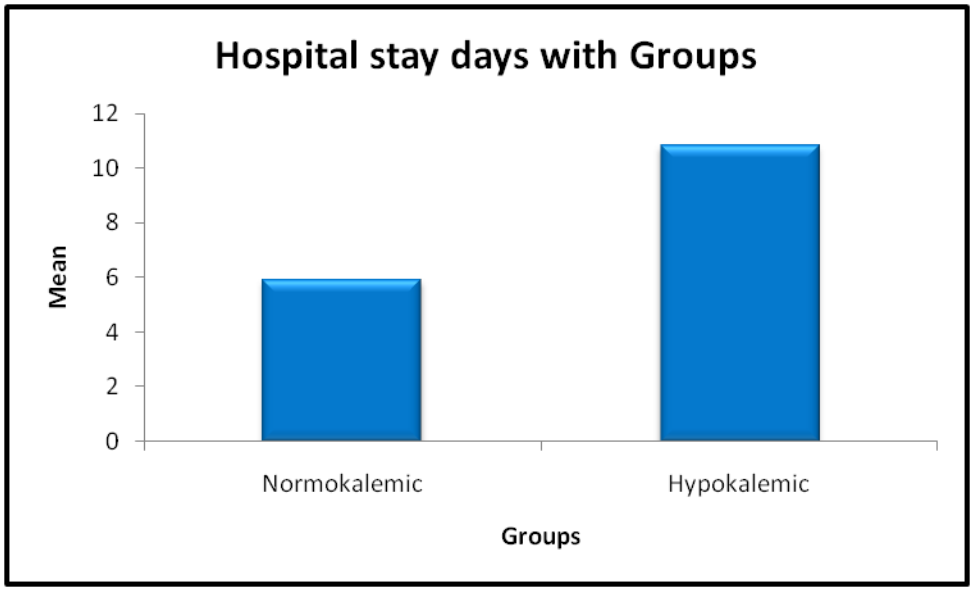
Graph 7: Comparison of Defection time with Groups by Unpaired t-test



The above table shows comparison of Defection time with Groups by Unpaired t-test were t-value=9.242 , p=0.0005<0.01 which shows highly statistical significant difference between Defection time and Groups.

Graph 8: Comparison of Hospital stay days with Groups by Unpaired t-test



Discussion

The association between hypokalemia and peritonitis in patients undergoing peritoneal dialysis is feasible but currently inconclusive. [6]The results were controversial and insufficiently adjusted for confounding factors contributing to the association between peritonitis and hypokalemia. Occasionally, hypokalemia has close links with poor dietary intake, malnutrition, and poor general condition so that the association with peritonitis also may depend on such status.[7] Ultimately, we must determine whether the therapeutic interventions used to normalize serum potassium levels, such as the administration of potassium chloride and adjustment of food or dialysate, decrease the risk of peritonitis and infection-related mortality in patients undergoing peritoneal dialysis. In fact, hypokalemia is so common in peritoneal dialysis that several attempt to adjust serum potassium levels in such patients .[8]The effectiveness of spironolactone for peritoneal

dialysis patients was evaluated in several surveys however, serum potassium levels were not influenced by spironolactone in two studies .[9] serum potassium levels were increased in patients with spironolactone, but the prevalence of hypokalemia and peritonitis were comparable between patients with and without spironolactone.[10] The effect of glucose-free icodextrin on the improvement of hypokalemia compared with conventional glucose-containing dialysate, possibly through an enhanced nutritional status and an intracellular potassium shift. The effectiveness of acute potassium loading via the dialysate in peritoneal dialysis patients; however, the influence to peritonitis was not studied. The risk of potassium supplements should also be considered. [11]For example, in patients with chronic heart failure, potassium supplements could increase hospitalization because of worsening heart failure against all expectations .The above table shows comparison of Hospital stay days with Groups by Unpaired t-test were t-value=12.483 , p=0.0005<0.01 which shows highly statistical significant difference between Hospital stay days and Groups.Age distribution were 14.0% is Upto 20 years, 22.0% is 21-30 years, 18.0% is 31-40 years, 20.0% is 41-50 years, 14.0% is 51-60 years, 12.0% is Above 60 years.Age with Groups by Pearson's chi-squared test were $\chi 2=2.443$, p=0.785>0.05 which shows no statistical significant association between Age and Groups. [12]Urine retention with Groups by Pearson's chi-squared test were $\chi 2=5.882$, p=0.032<0.05 which shows statistical significant association between Urine retention and Groups.[13]Wound dehiscence & Infection with Groups by Pearson's chi-squared test were $\chi 2=16.333$, p=0.0005<0.01 which shows highly statistical significant association between Wound dehiscence & Infection and Groups.Potassium with Groups by Unpaired t-test. [14]In comparison of Potassium at Baseline with Groups were t-value=13.505 , p=0.0005<0.01 which shows highly statistical significant difference between Potassium at Baseline and Groups and in comparison of Potassium at POP day 1 with Groups were t-value=12.580, p=0.0005<0.01 which shows highly statistical significant difference between Potassium at POP day 1 and Groups.[15] Similarly in comparison of Potassium at POP day 2 with Groups were t-value=12.580, p=0.0005<0.01 which shows highly statistical significant difference between Potassium at POP day 2 and Groups respectively.Bowel Sound with Groups by Unpaired t-test were t-value=13.006 , p=0.0005<0.01 which shows highly statistical significant difference between Bowel Sound and Groups [16].Defection time with Groups by Unpaired t-test were t-value=9.242 , p=0.0005<0.01 which shows highly statistical significant difference between Defection time and Groups. [17]Hospital stay days with Groups by Unpaired t-test were t-value=12.483 , p=0.0005<0.01 which shows highly statistical significant difference between Hospital stay days and Groups.[18,19,20]

Conclusion

These observations suggest that clinicians should pay more attention to hypokalemia and recognize that while it is a possible risk factor for death and possibly peritonitis in PD, preventive efforts should focus on factors associated with hypokalemia (e.g., poor nutrition and wasting). Our findings of substantially stronger risks of death and peritonitis with persistent hypokalemia should stimulate investigation of interventions that minimize the duration of hypokalemia given our identification of potentially modifiable factors. For example, increasing PD prescription or using high-dose diuretics in an attempt to maintain urine output may be appropriate but might exacerbate hypokalemia risk that could be mitigated with potassium supplements. Until appropriately designed trials have established a causative role for low serum potassium in reduced survival and greater peritonitis risk, it seems prudent that increasing PD prescription should be done with careful monitoring for the development of persistent hypokalemia. Dietary counselling to encourage the intake of vegetables and fruits, the avoidance of inappropriate dietary potassium, restriction, and nutrition support to maintain good nutritional status (from the start of PD) combined with potential interventions to increase serum potassium, if needed, seem appropriate.

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