



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.

Material and Methods: Our study included 50 patients who underwent Emergency laparotomy 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 retention (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. 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. 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. 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. 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.

Material And Methods

This is prospective randomised control study of patients admitted with perforative peritonitis at our yellow zone TAEI ward in coimbatore medical college hospital, coimbatore. A total of 50 perforative peritonitis patients who were undergoing surgery were randomly divided into Group A (N=25) and Group B (N=25).

Study Design: Prospective comparative study.

Study Location: Yellow zone TAEI ward in coimbatore medical college hospital, coimbatore.

Study Duration: 12 months (January 2019 to December 2019.)

Sample Size: 50 patients.

Subjects and selection method: Group A : patients with normal serum potassium level.

Group B: Patients with low serum potassium level.

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 into groups separately according to the various outcomes that have been proposed.

Statistical Analysis:

The Analysis of our study were as follows:

Total number of patients – 50

They were divided into two groups.

Group A: 25 patients (Normokalemic).

Group B: 25 patients (Hypokalemic)

All the 50 patients underwent Emergency Laparotomy for perforation peritonitis. The Group B Hypokalemic patients were given potassium correction. They were followed up in post operative period and the outcomes were documented in graphs and tables.

1. Age distribution of cases
2. Age with groups.
3. Urine retention with groups.
4. Wound dehiscence & infection with groups.
5. Potassium level with groups
6. Bowel sounds with groups.
7. Defecation time with groups.
8. Hospital stay with groups.

Result

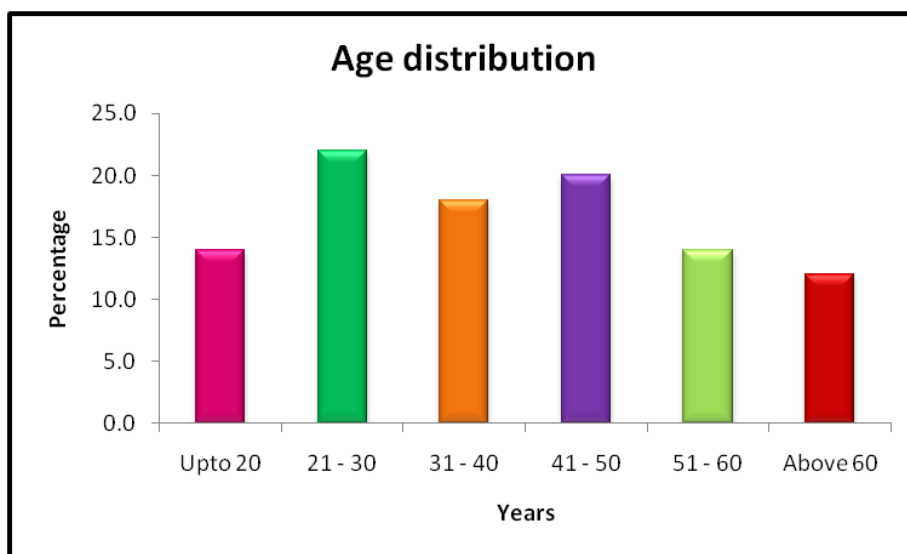
The collected data were analysed with IBM.SPSS statistics software 23.0 Version. To describe about

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 2x2 tables then the Fisher's Exact was used. In all the above statistical tools the probability value .05 is considered as significant level.

Table 1: Age distribution

Age in years	Frequency	Percent
Upto 20 years	7	14.0
21 - 30 years	11	22.0
31 - 40 years	9	18.0
41 - 50 years	10	20.0
51 - 60 years	7	14.0
Above 60 years	6	12.0
Total	50	100.0

Figure 1

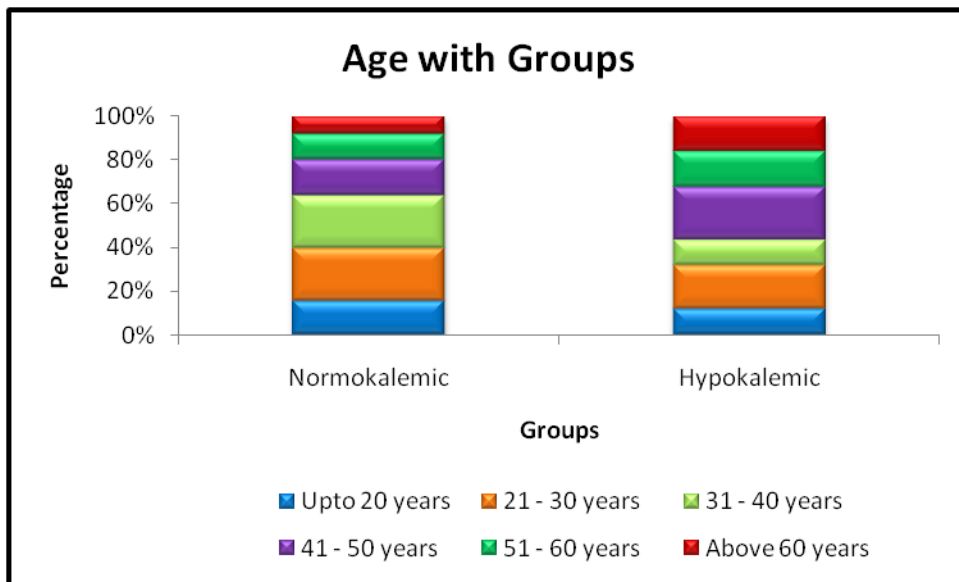


The above table shows Age distribution were 14.0% is Upto 20 years, 22.0% is 21-30 years, 18.0% is 31-40 years, 20.0% is 41-50 years, 14.0% is 51-60 years, 12.0% is Above 60 years.

Table 2: Comparison between Age with Groups

			Groups		Total	χ^2 - value	p-value
			Normokalemic	Hypokalemic			
Age	Upto 20 years	Count	4	3	7	2.443	0.785 #
		%	16.0%	12.0%	14.0%		
	21 - 30 years	Count	6	5	11		
		%	24.0%	20.0%	22.0%		
	31 - 40 years	Count	6	3	9		
		%	24.0%	12.0%	18.0%		
	41 - 50 years	Count	4	6	10		
		%	16.0%	24.0%	20.0%		
	51 - 60 years	Count	3	4	7		
		%	12.0%	16.0%	14.0%		
	Above 60 years	Count	2	4	6		
		%	8.0%	16.0%	12.0%		
	Total	Count	25	25	50		
		%	100.0%	100.0%	100.0%		
# No Statistical Significance at $p > 0.05$ level							

Figure 2



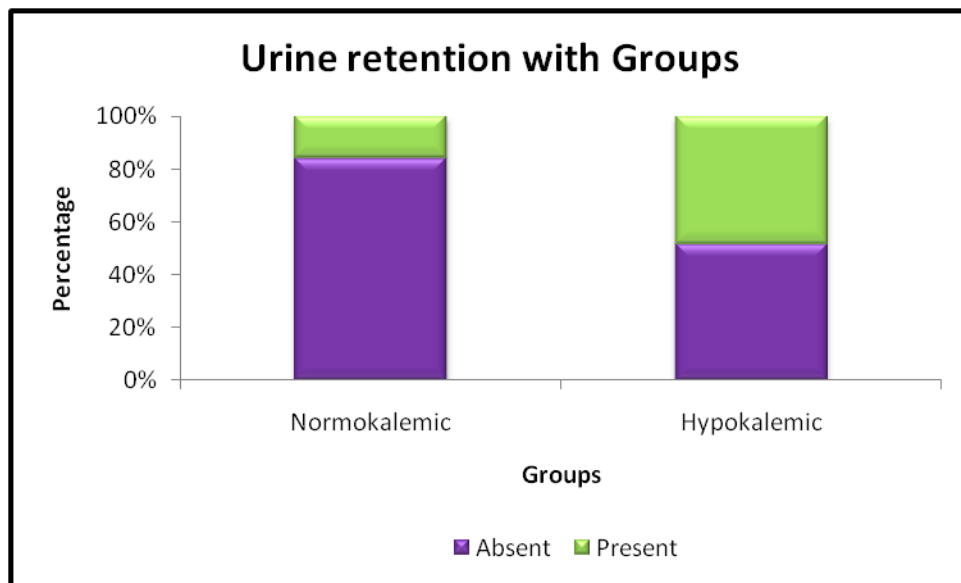
The above table shows comparison between Age with Groups by Pearson’s chi-squared test were $\chi^2=2.443$, $p=0.785>0.05$ which shows no statistical significant association between Age and Groups.

Table 3: Comparison between Urine retention with Groups

			Groups		Total	χ^2 - value	p-value
			Normokalemic	Hypokalemic			
Urine retention	Absent	Count	21	13	34	5.882	0.032 *
		%	84.0%	52.0%	68.0%		
	Present	Count	4	12	16		
		%	16.0%	48.0%	32.0%		
Total		Count	25	25	50		
		%	100.0%	100.0%	100.0%		

* Statistical Significance at p < 0.05 level

Figure 3



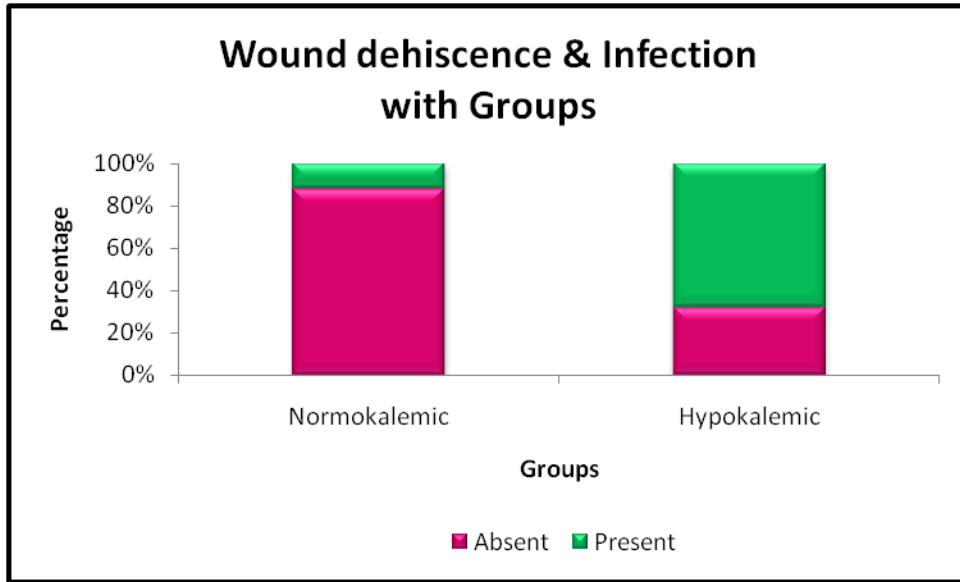
The above table shows comparison between Urine retention with Groups by Pearson’s chi-squared test were $\chi^2=5.882$, $p=0.032<0.05$ which shows statistical significant association between Urine retention and Groups.

Table 4: Comparison between Wound dehiscence & Infection with Groups

			Groups		Total	χ^2 - value	p-value
			Normokalemic	Hypokalemic			
Wound dehiscence & Infection	Absent	Count	22	8	30	16.333	0.0005 **
		%	88.0%	32.0%	60.0%		
	Present	Count	3	17	20		
		%	12.0%	68.0%	40.0%		
Total		Count	25	25	50		
		%	100.0%	100.0%	100.0%		

** Highly Statistical Significance at p < 0.01 level

Figure 4

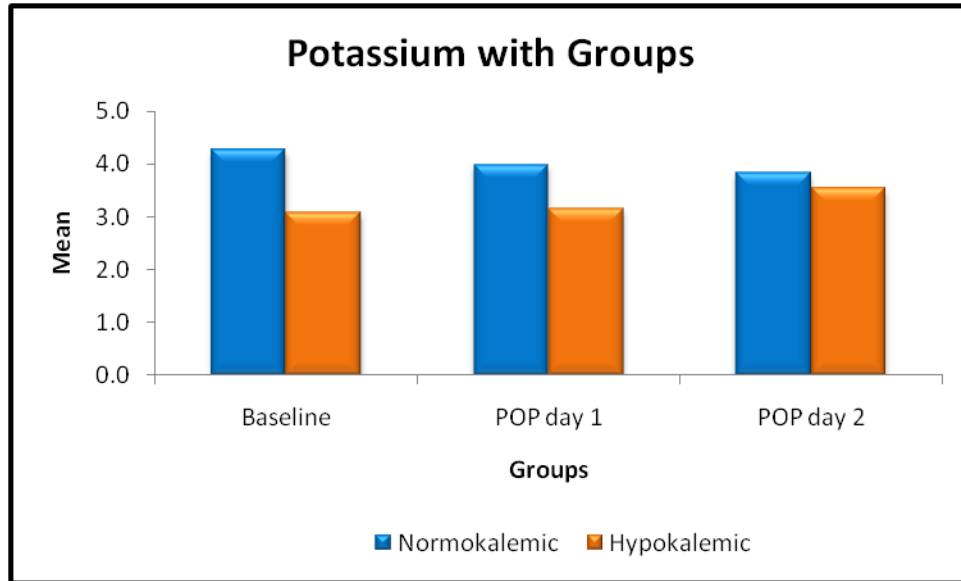


The above table shows comparison between Wound dehiscence & Infection with Groups by Pearson’s chi-squared test were $\chi^2=16.333$, $p=0.0005<0.01$ which shows highly statistical significant association between Wound dehiscence & Infection and Groups.

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

Potassium	Groups	N	Mean	S.D	t-value	p-value
Baseline	Normokalemic	25	4.3	0.3	13.505	0.0005 **
	Hypokalemic	25	3.1	0.3		
POP day 1	Normokalemic	25	4.0	0.3	12.580	0.0005 **
	Hypokalemic	25	3.1	0.2		
POP day 2	Normokalemic	25	3.8	0.3	4.470	0.0005 **
	Hypokalemic	25	3.5	0.2		
** Highly Statistical Significance at p < 0.01 level						

Figure 5

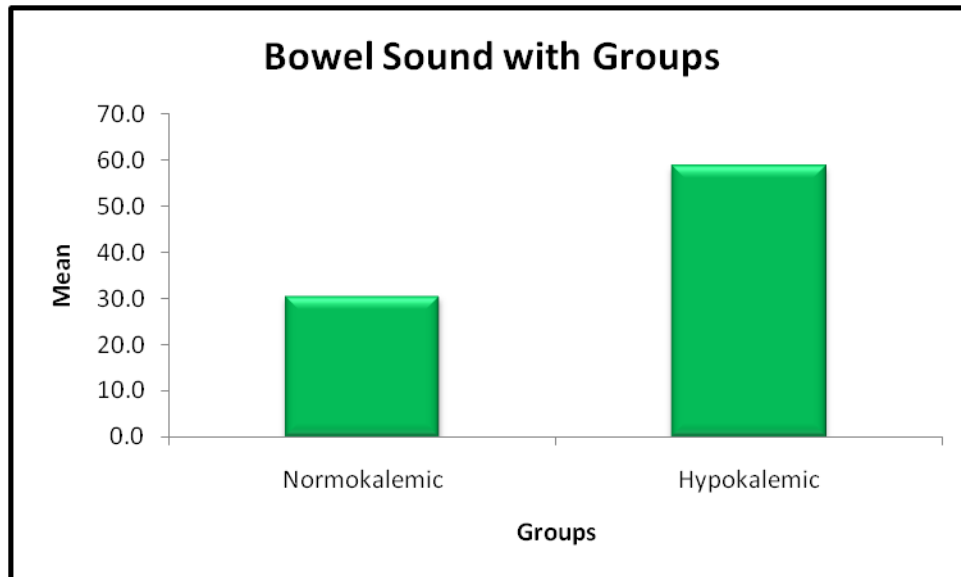


The above table shows comparison of Potassium with Groups by Unpaired t-test. In comparison of Potassium at Baseline with Groups were t-value=13.505 , p=0.0005<0.01 which shows highly statistical significant difference between Potassium at Baseline and Groups and in comparison of Potassium at POP day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

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

Variable	Groups	N	Mean	S.D	t-value	p-value
Bowel Sound	Normokalemic	25	30.6	8.3	13.006	0.0005 **
	Hypokalemic	25	58.9	7.1		
** Highly Statistical Significance at p < 0.01 level						

Figure 6



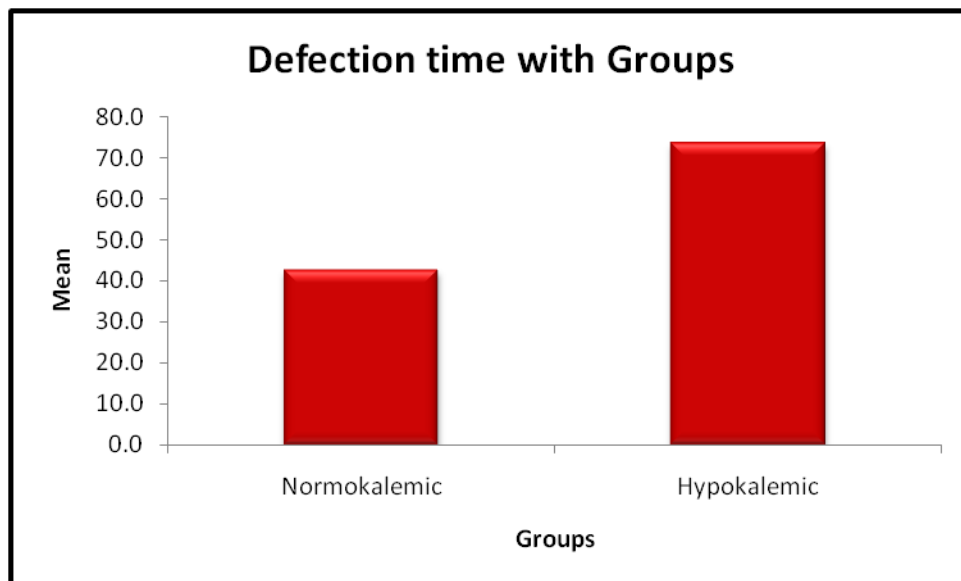
The above table shows comparison of Bowel Sound with Groups by Unpaired t-test were t-value=13.006 , p=0.0005<0.01 which shows highly statistical significant difference between Bowel Sound and Groups.

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

Variable	Groups	N	Mean	S.D	t-value	p-value
Defection time	Normokalemic	25	42.6	7.1	9.242	0.0005 **
	Hypokalemic	25	73.6	15.2		

** Highly Statistical Significance at p < 0.01 level

Figure 7



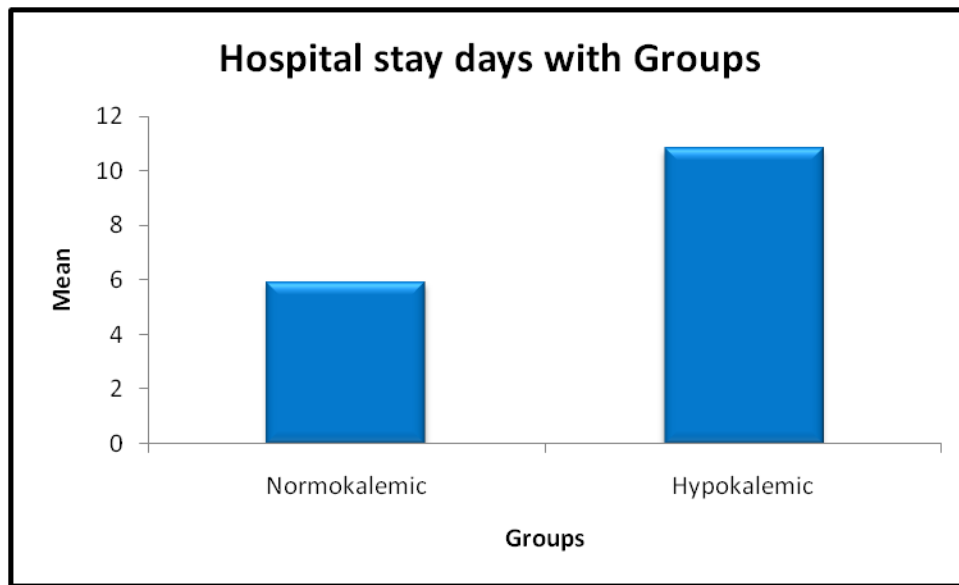
The above table shows comparison of Defection time with Groups by Unpaired t-test were t-value=9.242 , p=0.0005<0.01 which shows highly statistical significant difference between Defection time and Groups.

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

Variable	Groups	N	Mean	S.D	t-value	p-value
Hospital stay days	Normokalemic	25	6	1	12.483	0.0005 **
	Hypokalemic	25	11	2		

** Highly Statistical Significance at $p < 0.01$ level

Figure 8



The above table shows comparison of Hospital stay days with Groups by Unpaired t-test were $t\text{-value}=12.483$, $p=0.0005 < 0.01$ which shows highly statistical significant difference between Hospital stay days and Groups.

Conclusion:

1. 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.
2. 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.
3. 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.
4. 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.
5. Potassium with Groups by Unpaired t-test. In comparison of Potassium at Baseline with

- Groups were $t\text{-value}=13.505$, $p=0.0005 < 0.01$ which shows highly statistical significant difference between Potassium at Baseline and Groups and in comparison of Potassium at POP day 1 with Groups were $t\text{-value}=12.580$, $p=0.0005 < 0.01$ 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 $t\text{-value}=12.580$, $p=0.0005 < 0.01$ which shows highly statistical significant difference between Potassium at POP day 2 and Groups respectively.
6. Bowel Sound with Groups by Unpaired t-test were $t\text{-value}=13.006$, $p=0.0005 < 0.01$ which shows highly statistical significant difference between Bowel Sound and Groups.
7. Defection time with Groups by Unpaired t-test were $t\text{-value}=9.242$, $p=0.0005 < 0.01$ which

shows highly statistical significant difference between Defection time and Groups.

8. Hospital stay days with Groups by Unpaired t-test were $t\text{-value}=12.483$, $p=0.0005<0.01$ which shows highly statistical significant difference between Hospital stay days and Groups.

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