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RESEARCH ARTICLE

CLINICAL STUDY OF ASSOCIATION BETWEEN THE SERUM SODIUM LEVEL AND SEVERITY OF COMPLICATIONS IN LIVER CIRRHOSIS AT KANYAKUMARI GOVERNMENT MEDICAL COLLEGE.

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Keywords:

Hyponatremia, Liver cirrhosis.

Abstract

Background: Cirrhosis is defined histopathologically and has variety of clinical manifestations and complications, some of which can be life-threatening. Dilutional hyponatremia associated with liver cirrhosis is caused by impaired free water clearance. The aim of this study was to evaluate the association between the serum sodium level and the severity of complications in liver cirrhosis.

Methods: This study was conducted in Kanyakumari Government Medical College in the department of general medicine. 200 patients were included in the study over a period from August 2017 – August 2018 for a period of 1 year. Data of inpatients with cirrhotic complications were collected retrospectively. The serum sodium level and severity of complications of 200 inpatients were analysed.

Results: The prevalence of dilutional hyponatremia, classified as serum sodium concentrations of >135 mmol/L, 131-135 mmol/L, and ≤130 mmol/L, were 44%, 24%, and 32%, respectively. The serum sodium level was strongly associated with the severity of liver function impairment as assessed by Child-Pugh and MELD scores ($p < 0.0001$). Even a mild hyponatremia with a serum sodium concentration of 131-135 mmol/L was associated with severe complications.

Conclusion: Hyponatremia is more common in liver cirrhosis and low serum sodium levels are associated with complications such as hepatic encephalopathy, hepatorenal syndrome, spontaneous bacterial peritonitis and GI bleeding. Lower serum sodium levels were associated with increased MELD CPS score and mortality indicating the inverse relationship between serum sodium levels and severity of the disease.

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Introduction:-

Cirrhosis is defined anatomically as a diffuse process with fibrosis and nodule formation. It is the end result of fibrogenesis that occurs with chronic liver injury. Decompensated liver disease associated with disturbances in water homeostasis which leads to dysnatremia. Excess water in relation to sodium results in hyponatremia. Disturbances in total body water regulation leads to reduced clearance of solute free water & the consequent inability to match the urine output to the amount of water intake, leads to dilutional hyponatremia.

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Methods:-**Subjects:-**

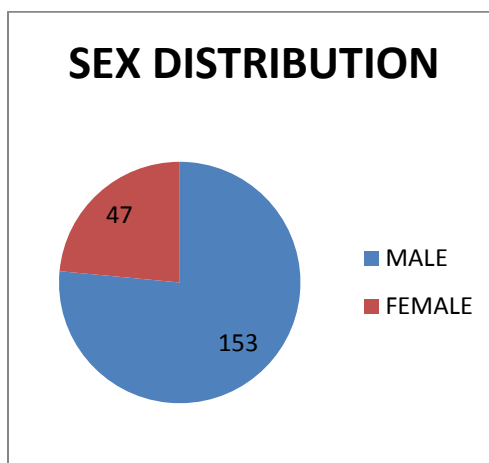
Patients who were hospitalized with complications due to liver cirrhosis during a 1 year period between 2017 to 2018 at Kanyakumari government medical college .

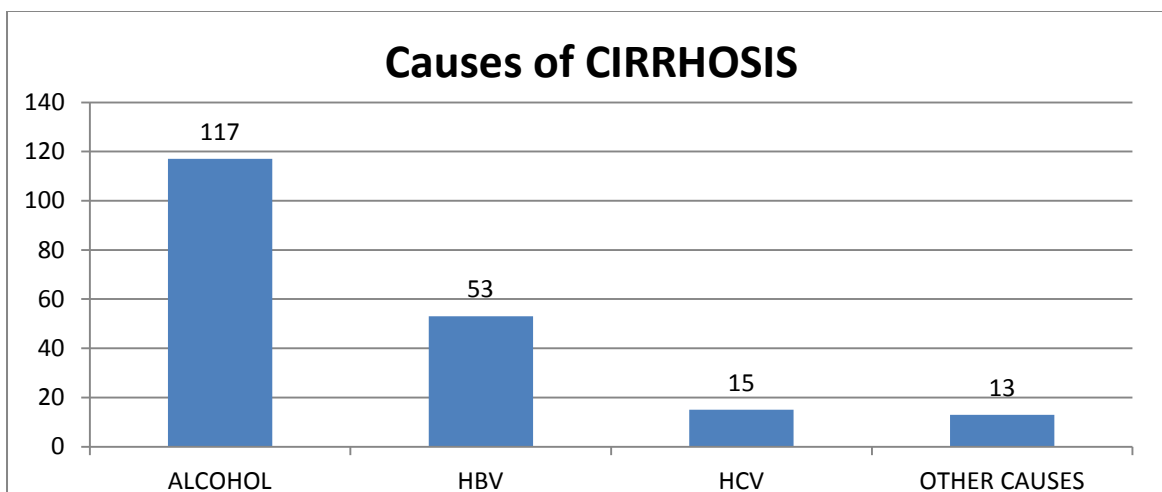
Study Design:-

Based on the serum sodium concentration measured at the time of admission, patients were divided into three groups serum sodium <130 mmol/l, serum sodium between 131-135mmol/l, serum sodium >136 mmol/l .

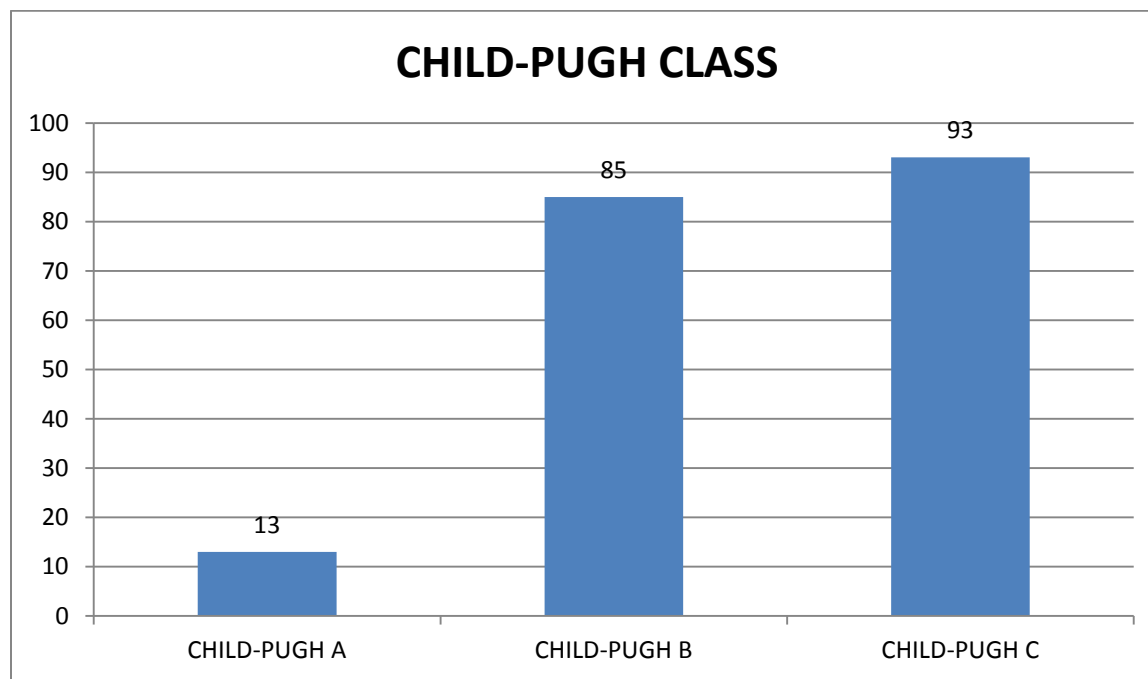
Basal characteristics of the patients:-

CHARACTERISTICS	VALUE
Gender (m/f)	153/47
Age , yr (mean +/- SD)	55.8+/- 11.6
Cause of cirrhosis	N(%)
Alcohol	117(58.5%)
HBV	53(26.5%)
HCV	15(7.5%)
Others	13(6.5%)



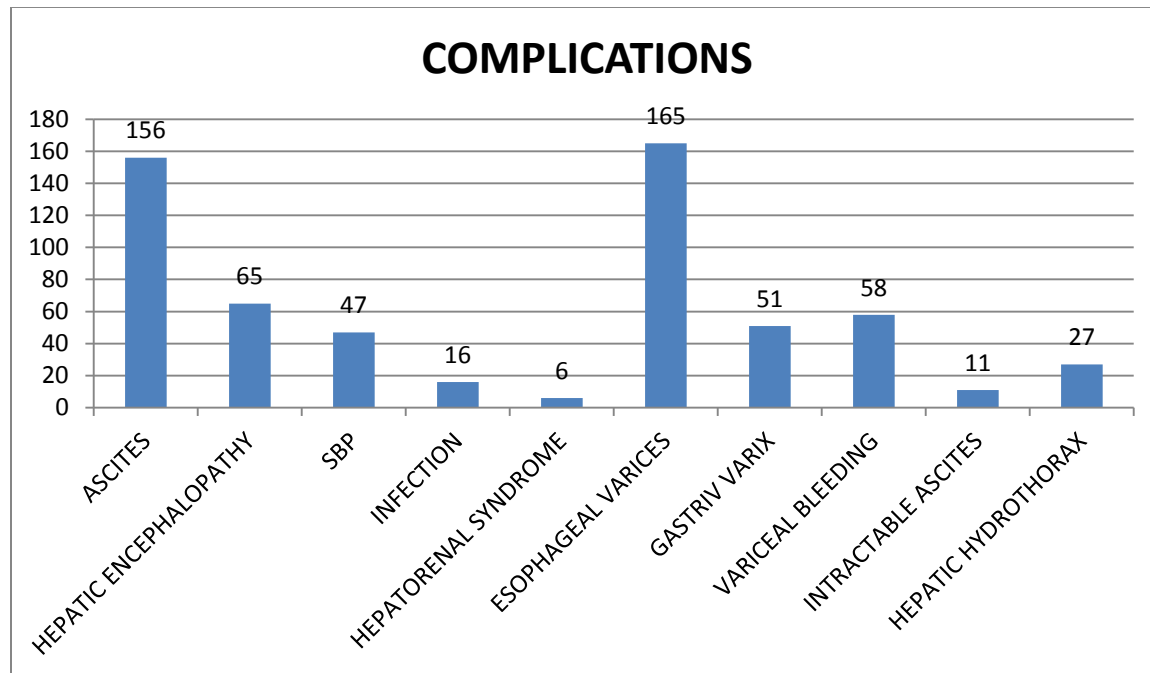


Child – pugh class	N (%)
Class A	13(6.5%)
Class B	85(42.5%)
Class C	93(46.5%)
MELD SCORE (mean+/-SD)	14.8+/- 6.1
Serum sodium(mmol/l ,mean+/- SD)	133.8+/- 7



Complications	
Ascites	156 (78.0)
Hepatic encephalopathy	65 (32.5)
Spontaneous bacterial peritonitis	47(23.5)
Hepatic hydrothorax	27(13.5%)

Infection	16(8%)
Hepatorenal syndrome	6(3%)
Esophageal varix	165(82.5%)
Gastric varix	51(25.5%)
Variceal bleeding	58(29%)
Intractable ascites	11(5.5%)



Statistical analysis:

Statistical analysis was performed using SAS. Statistical methods included the Chi-square test and ANOVA. A p value <0.05 was considered statistically significant.

Patient characteristics

In the current study, we analyzed 200 inpatients with liver cirrhosis who were hospitalized with complications such as simple ascites, spontaneous bacterial peritonitis, intractable ascites, hepatorenal syndrome, hepatic encephalopathy, variceal bleeding, hepatic hydrothorax, and infection. Patients in our series had a mean age of 55.8 ± 11.6 years (range, 29-82 years) and consisted of 153 men (76.5%) and 47 women (23.5%).

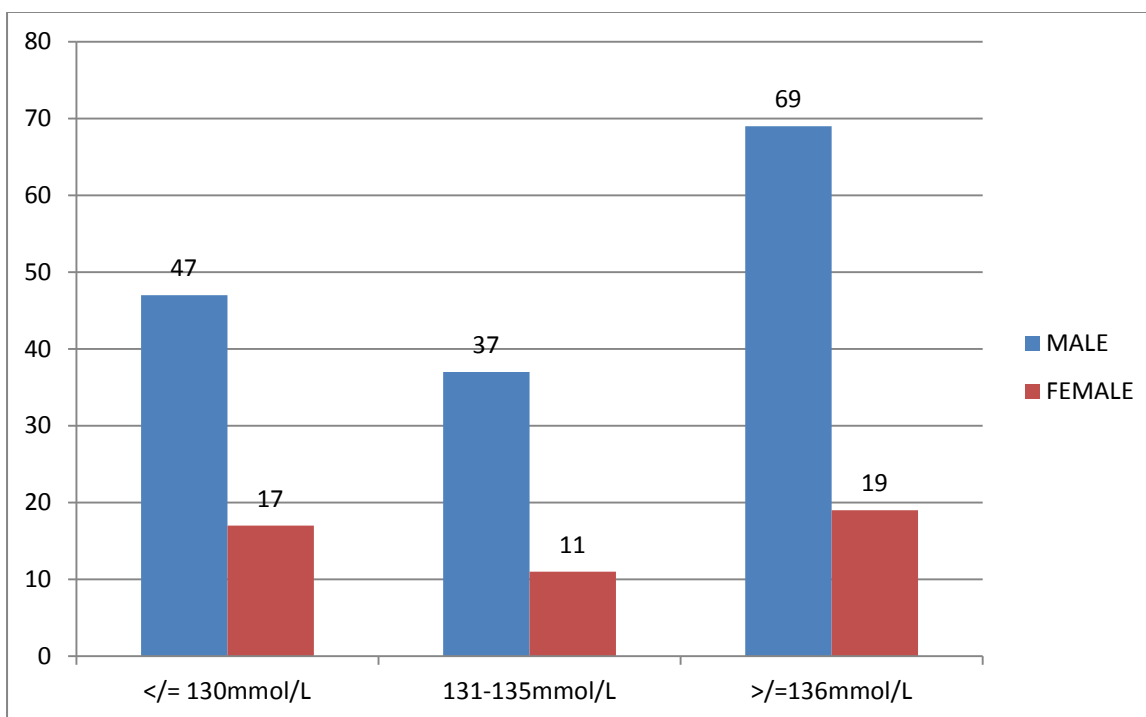
Liver function and concurrent complications based on serum sodium concentration

Based on the serum sodium concentration at the time of admission, patients were assigned to three groups: serum sodium ≤ 130 mmol/L (n=64) serum sodium between 131 and 135 mmol/L (n=48) and serum sodium ≥ 136 mmol/L (n=88)

Characteristics of patients according to serum sodium concentration

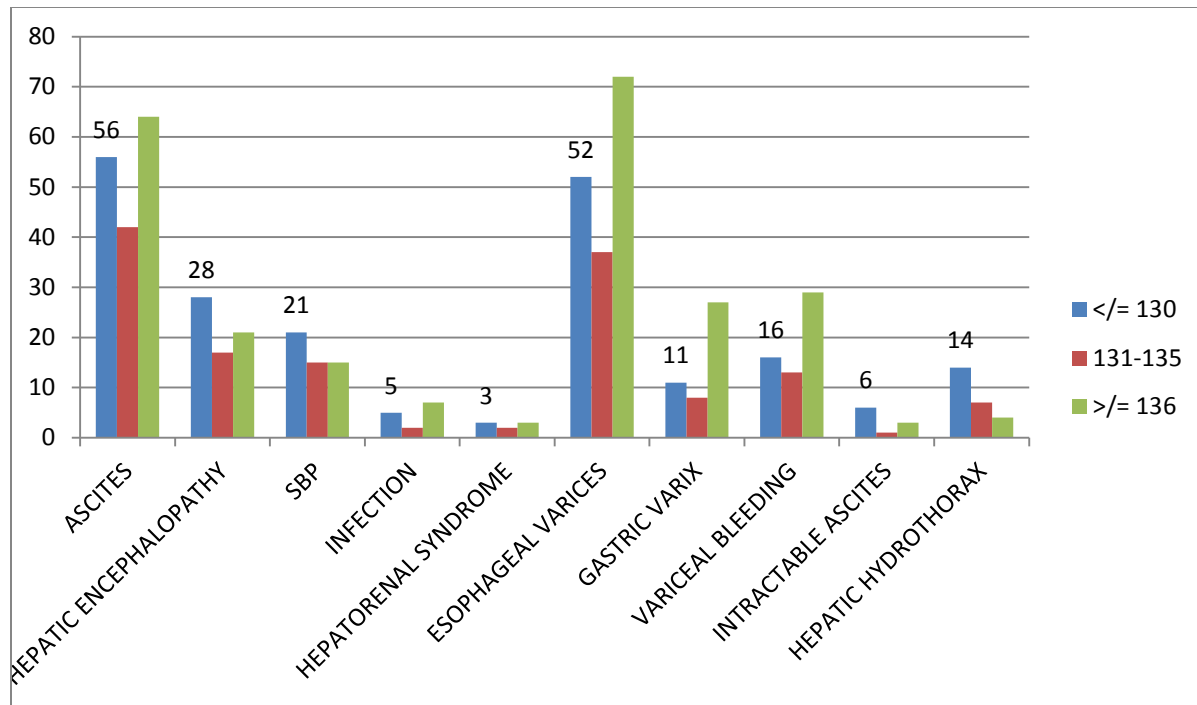
Characteristics	</-130mmol/l (n = 64)	131-135mmol/l (n = 48)	>/-136 mmol/l (n = 88)
MALE	47	37	69
FEMALE	17	11	19
ETIOLOGY			
ALCOHOL	37	22	42
HBV	20	19	36

HCV	4	3	4
Non B / Non C	3	4	6
CHILD PUGH CLASS			
CLASS A	5	4	7
CLASS B	17	19	53
CLASS C	42	25	28



Frequency of complications by serum sodium concentration:

COMPLICATION	</-130 mmol/l (n=64)	131-135mmol/l (n=48)	>/-136 mmol/l (n=88)
Ascites	56	42	64
SBP	21	15	15
Intractable ascites	6	1	3
HRS	3	2	3
H.Encephalopathy	28	17	21
Varix bleeding	16	13	29
H.hydrothorax	14	7	4
Infection	5	2	7
Esophageal varix	52	37	72
Gastric varix	11	8	27



Conclusion:-

Hyponatremia is a commonly encountered problem in patients with end stage liver disease. Low serum sodium is a poor prognostic indicator in both the pre & post transplant patient population. It is associated with increased risk of early mortality & complications including infection, hepatorenal syndrome, & encephalopathy. So patients with reduced serum sodium levels should be considered high risk population due to increased frequency of complications & mortality.

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