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Observation on Serum Magnesium in Chronic Kidney Disease

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ABSTRACT
The kidney provides for regulation of body magnesium so loss of renal function can alter the haemostasis of the major intracelluar cations. In this study in patients of CKD admitted In PMCH Patna were studied. Definite hypermagnesimia was noted in the patient of CKD. This study showed the estimation of serum Magnesium has great prognostic significance in patient of CKD.

INTRODUCTION

Magnesium is essential for life. It is the second most abundant intracellular cation and is the interacellular divalent cation. In normal humans with GFR about 150L/day and UF Mg of 40mg/L there is filltered Magnesium load of approx 2.1g/day. Normally only 3% of filtered Magnesium appears in urine, mainly by control of renal Magnesium reabsorption. Thus kidneyplay a major role in regulating the magnesium level in various renal diseases. In various study elevated Magnesium level where reported in CKD.

MATERIAL AND METHODS

The present study was conducted on 50 normal healthy adult as control and 100 cases of CKD with male and female admitted in Renal unit of PMCH Patna. Only adult patient were included the diagnosis of CKD was done on the basis of detailed history taking, clinical examination supplemented with routine and special investigations.

a) Examination of Blood for
- Haemogram:- CBC , ESR
- Blood Suger (mg/dl) – fasting & post-prandial
- Electolyte (mEq/L)- Na+ / K /Cl
- Blood Urea (mg/dl) / Serum Creatine (mg/dl)
- Serum Protein (gm/dl) – Total, Albumin, Globulin, A : G Ratio

b) Examination of Urine – Routine examination, microscopic examination , culture sensitivity test.
c) Plain X-RAY of KUB & IVP where indicated.
d) Chest X-ray PA view
e) USG of whole abdomen
f) Serum Magnesium– Estimated by photometric method

OBSERVATION

A. CONTROL GROUP: In the present study 50 healthy subject in age group 16 to 60 years were selected for the determination of normal serum Magnesium level Among 50 healthy subjects 32 were male & rest 18 were females.

Table 1 : Serum Magnesium (mg/dl) in male control of different age group

Age Group in Years	Mean	S.D.	S.E.	"t" value
A – 16 to 30	1.78	0.157	0.045	"t" between A &B , 2 at df 21.
B – 31 to 45	1.76	0.166	0.052	
C – 46to 60	1.79	0.175	0.055	
Pooled normal male Group	1.77	0.156	0.027	P > 0.05 (not significant)

Where df = degree of freedom

Table 2 Serum Magnesium in female control group.

Mean	Range	S.D.	S.E.
1.76	1.50 - 2.02	.171	0.040

B. STUDY GROUP: A total 100 patient of CKD of various etiologies were taken for study of serum Magnesium level.

Table 3 Age and Sex distribution of patient of CKD.

Age in year	Male	Female	Total
≤ 15	08	00	08
16 - 30	12	12	24
41 – 45	16	08	24
45 - 60	20	04	32
>60	08	04	12

Table 4

	On admission				After 14 days			
	Mean	Range	S.D.	S.E.	Mean	Range	S.D.	S.E.
Blood Urea (mg/dl)	150.32	80.23	42.83	8.56	107.14	63.18	25.52	5.57
Serum Magnesium (mg/dl)	3.43	2.93 – 4.06	0.325	0.065	3.03	2.64 – 3.42	0.236	0.051

Table 5 serum Magnesium level with different grades of CNS depression.

On admission			After 14 days		
Mean blood urea (mg/dl)	Mean Magnesium (mg/dl)	Level of consciousness	Mean blood urea (mg/dl)	Mean Magnesium (mg/dl)	Level of consciousness
122.20	3.23	Normal (32 patients)	100.70	3.01	Normal
137.20	3.34	Drowsy (40 patients)	98.60	2.94	Sensorium improved in all
201.00	3.65	Stuporous (8 patients)	147.50	3.24	Sensorium improved in all
201.20	3.83	Comatose (20 patients)	124	3.16	Sensorium improved in all

Table 6 Serum Magnesium in control and patient of CKD on admission

control				CKD patients (on admission)				t value	p value
Mean	Range	S.D.	S.E.	Mean	Range	S.D.	S.E.		
1.76	1.50 – 2.10	0.164	0.023	3.43	2.93 – 4.06	0.065	0.065	14.77	P < 0.001 Highly significant

Table 7

Serum Magnesium (mg/dl)	On admission	After 14 days	7.76	20	< 0.001 Highly significant
	3.43 ± 0.325	3.03 ± 0.236			

DISCUSSION

Serum Magesium in Control Group

The mean normal value of serum Magnesium in 32 male control subject of different age was 1.77 mg/ dl S.D – 156, S.E – 0.040 vide table no:- 1 Mean level og Serum Magnesium in 18 femal control group was 1.76 mg/dl (Range 1.50 – 2.02 mg/dl) S.D – 0.171, S.E – 0.040 vide table no:- 2, On statistical analysis of Serum Magnesium level is different age & sex group no significant difference was found. This is in accordance with study of Orange & Rhior, 1951; Kalgi et al, 1962, who pointed out that value of serum Magnesium in adult and children above one year of age not differ. The mean serum Magnesium in the control subject is in close proximity with Singh et al, 1974 and 1975, Woodbury et al, 1968 and cope et al, 1942.

Serum Magesium in patient of CKD

The majority of patient of CKD has high elevated serum magnesium than those of controls vide table – 6 . These patient also showed a significant positive correlation ($r= 0.960$; $p<0.001$) between Blood Urea (I.e. severity of renal failure) and Serum Magnesium levels . This is in agreement with observations of previous workers like Sharma S.K., Singh R (1990), Avasthi G & Singh H.P. (1991) S. Uthup, M.K.Mohandas (1997), all of them had demonstrated a singnificant positive correlation brtween severity of renal failure and serum magnesium values.

During follow up, with improvement in renal funcitions, there was significant fall in serum magnesium levels. This was statistically ($p<0.001$) vide table- 7 However the levels were still higher than normal. This is in conformity to the observations of Breen & Marshall (1966), Elin R.J. et (1988), and other workers.

SUMMARY AND CONCLUSION

Value of serum magnesium does not change with age & sex normally. Hypermagnesemia is a common finding in patient of chronic renal failure and level rise progressively with deterioration in renal function signifying a definite correlation between serum magnesium and severity or renal disease.

Significant higher serum magnesium level were observed in the patient of chronic renal failure with encephalopathy that in those without it. Greater the impairment in the level of consciousness, higher was the magnesium level. The improvement in neurological status correlated well with a fall in serum magnesium level.

REFERENCES

1. Aesbicher N, Aesbicher P, Fellary G, et al. Factory influencing Hypermagnesemia in CKD – Proc. Eur. Dial. Transp. Assoc – 1985(22) 97-100
2. Avasthi G, Singh H. P. Katya J. C., Avasthi R, Aggrawal SP – Cooper, Zinc, Calcium and Magnesium in CKD – J. Ass. Phy. In 1991 (Jul).
3. Chatterjee MN, Saran A – 1945 (JIMA) – Ser. Magesium in Renal disease.
4. Disturbances of Serum Magnesium in CKD – Vajno Sanit Preg. 1969, Apr- Popovic EP, Susa S, Savic B.
5. Elin RJ in Dis Min 1988 (Apr). Hypermagnesemia in ARF and CKD.
6. Harrison's Principles of Internal Medicine, Vol . 2, 16th edition.
7. Jain MC, Singh D – Some observations on serum magnesium is renal diseases, JIMA 1969 May.
8. Sharma SK, Singh R, Patney NL – Ser . Mg Levels in CRF – J. Ass. Phys. In., 1990(Aug.)
9. S. Uthup, MK Mohan Das, Manju, B. Upendran, M. C., Trivandram.
10. Zaman F., Abreo K. – Server hypermagnesemia as a result of laxative use in renal insufficience, South Med. J. 2003 Jan.