

Efficacy of magnesium sulfate for treating the acute organophosphorus pesticide poisoning- A Pilot Trial

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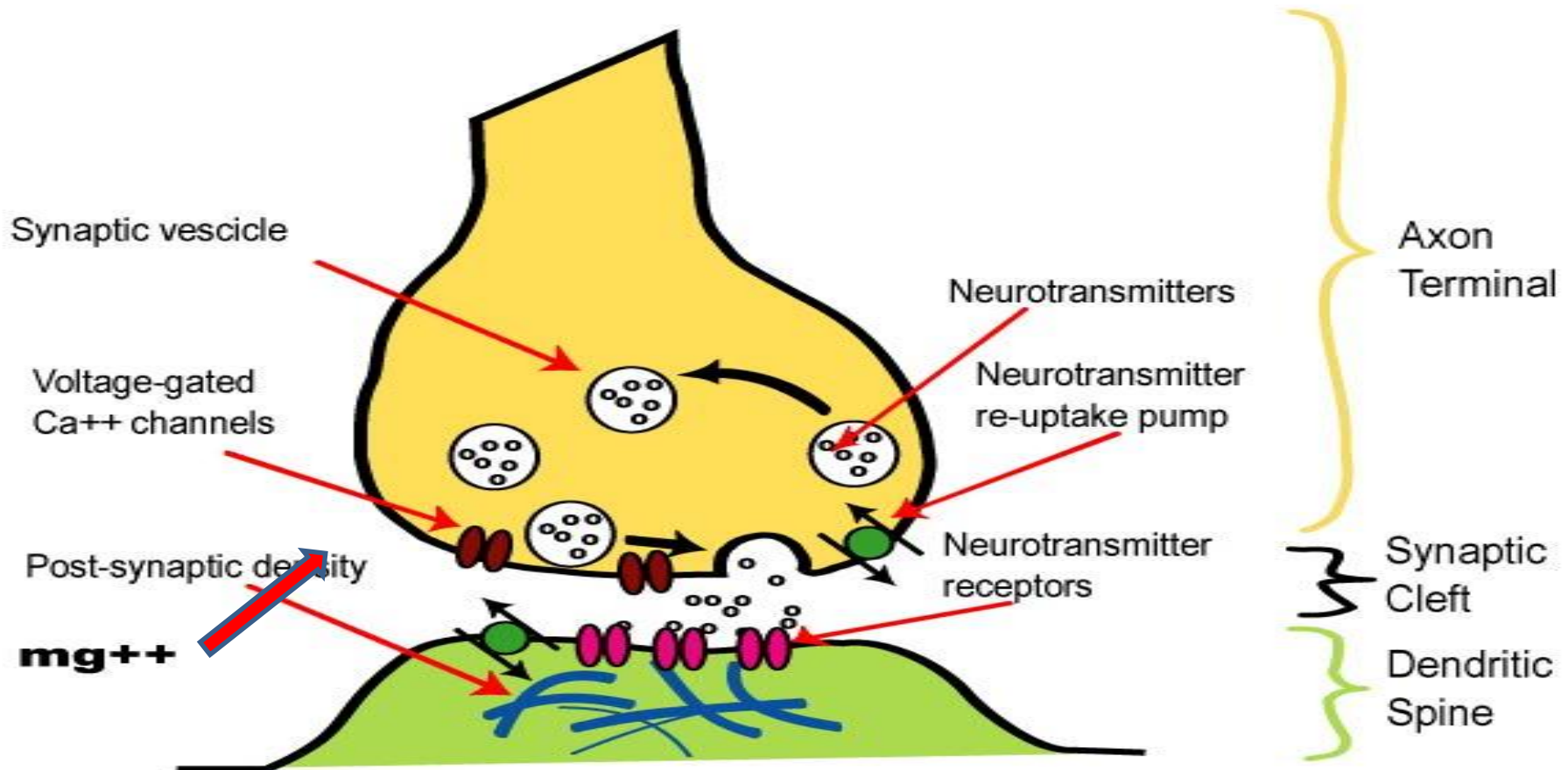
Dhaka, Bangladesh

Milieu

- **Second commonest cause of mortality in Bangladesh(BHB-1999)**
- **Commonest poisoning in Bangladesh**
- **High case fatality are multifactorial**
- **Antidote - 1. Atropine 2. Pralidoxime**
- **Adjuvant drugs – 1. Bicarbonate
2. Magnesium sulphate 3. Fresh Frozen plasma and 4. pancuronium**

?

Magnesium Sulfate



Literature review

- **Animal experiments and non-controlled trial report a benefit of Magsulf in acute OP poisoning**
- **RONALD J. BRADLEY (1986).**
- **Gagandeep Singh et al (1998).**
- **Pajoumand et al (2004).**

Objective

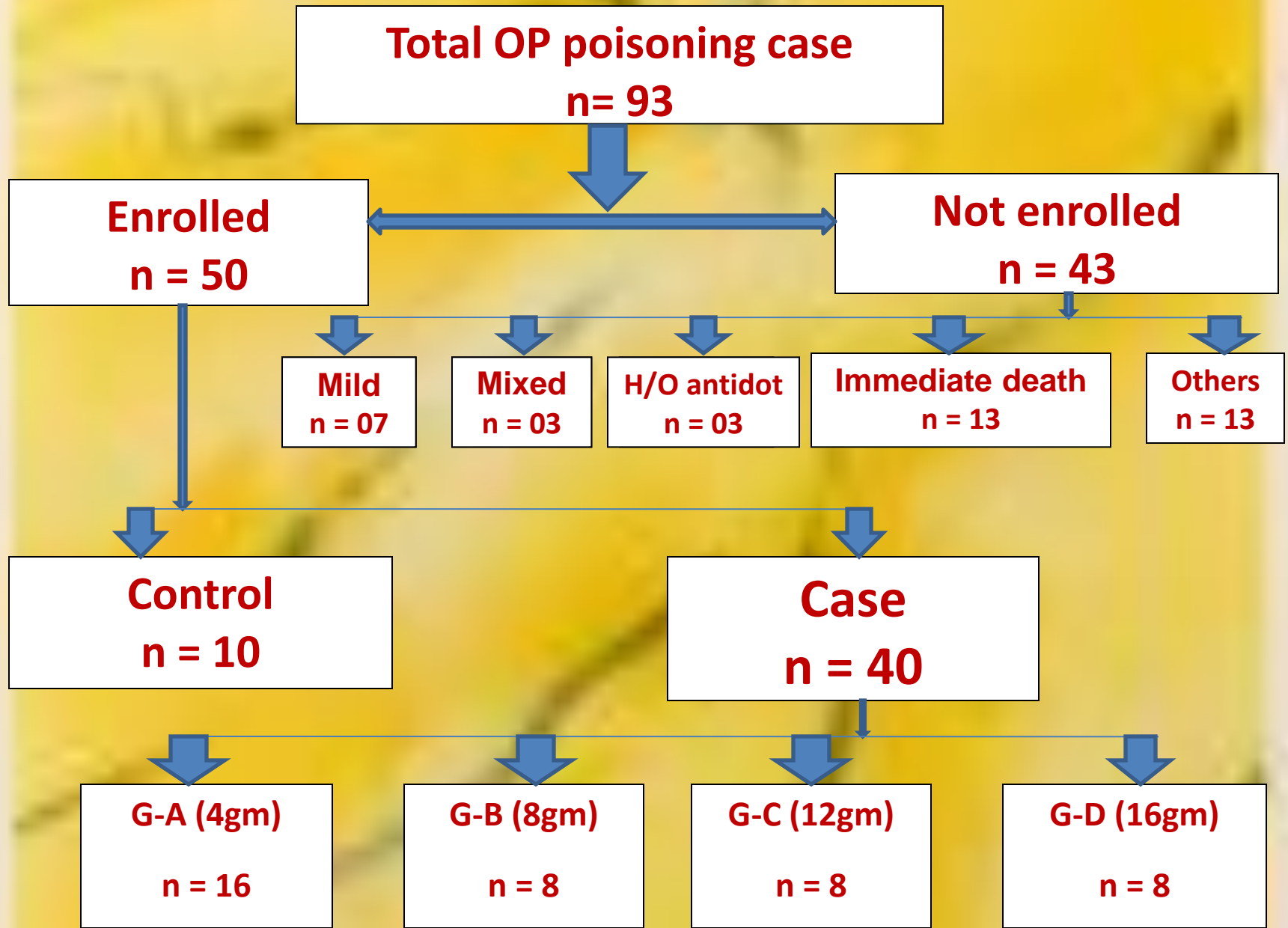
- **To provide improved evidence of efficacy and safety of Magnesium sulfate**
- **To describe the adverse event reported due to Magnesium sulfate**



Methodology

- **Type of study:** Randomized trial.
- **Place of study:** One Adult Medicine Unit.
- **Period of study :** 1st July 2006 - 30 June 2007.
- **Enrollment:**
 - Aged 12-60 years
 - Symptomatic acute OP poisoning
 - Not received advanced medical care
 - Admitted with in 24 hours.

Flow Chart of OP Enrolment



Treatment

Both groups- Gastric lavage ,I/V atropine, and Pralidoxime .supportive and intensive care therapy will be decided by the discretion of the clinician.

Test groups -Magnesium sulfate (20% MgSO₄.7H₂O) at a dose of 4g/day i.v over 10-15min; increased every 10 patients interval at rate of 4g/day upto 16g/day.

Measurements

- **Number of dying patients**
- **Atropine doses and duration**
- **Magnesium level (serum and urinary)**
- **Biochemical and hematological investigations**
Electrolyte, Bl. Sugar, urea, creatinine, CPK ,
ECG.
- **intensive care therapy and mechanical ventilation**
- **Complication**

Results

	Case	Control
Age	25.2±10.04	24.4±9.24
	<i>Sex</i>	
Male	26	06
Female	14	04
	<i>Severity of Poisoning</i>	
Moderate	32	04
Severe	08	06

Results

GCS 4-6	GCS 6-9	GCS 9-11	GCS 11-14	Magnesium	Severity	Moderate	severe	Total
03	02	01	04	No magnesium		04	06	10
00	02	01	13	4 gm/day magnesium		13	03	16
01	00	00	07	8 gm/day magnesium		07	01	08
02	00	00	06	12 gm/day magnesium		06	02	08
00	02	00	06	16 gm/day magnesium		06	02	08
06	06	02	36	Total		36	14	50

Cross-Correlation

Count magnesium given			Assisted ventilation provided		
			Yes	No	NA
4gm	Intermediate syndrome	No	3		13
8gm	Intermediate syndrome	Yes		1	1
		No		0	6
12gm	Intermediate syndrome	Yes	1	1	0
		No	0	0	6
16gm	Intermediate syndrome	No	1		7
not given	Intermediate syndrome	No	4	3	3

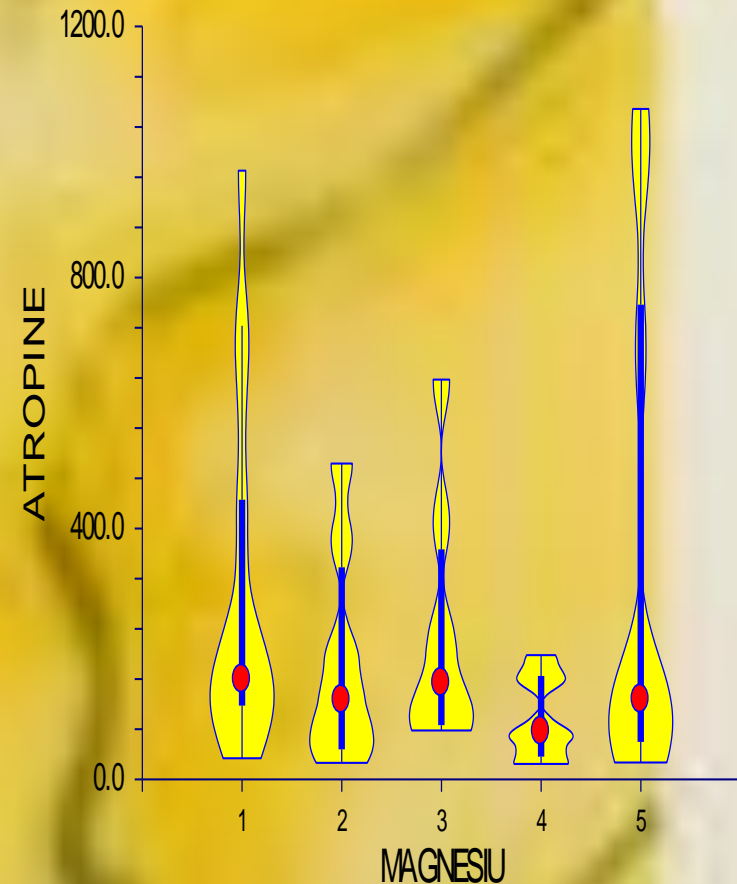
Atropine Requirement

Descriptives

Total amount of atropine (mg.)

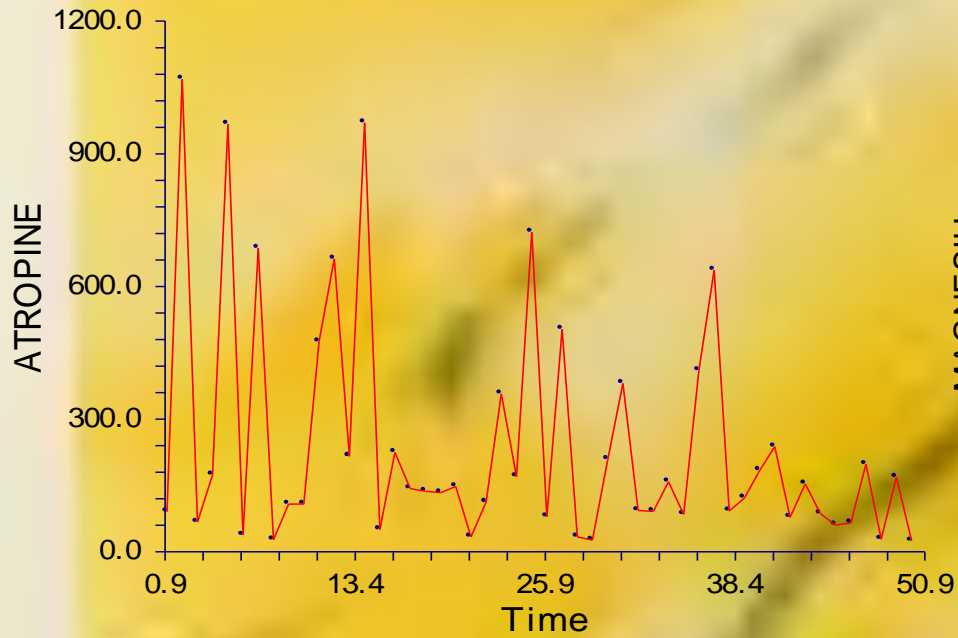
	N	Mean	Std. Deviation
4gm	16	289.6875	275.77662
8gm	8	187.0500	171.65716
12gm	8	230.7000	198.27021
16gm	8	98.1750	66.47358
not given	10	337.2600	406.77094
Total	50	242.7000	265.73329

Violin Plot

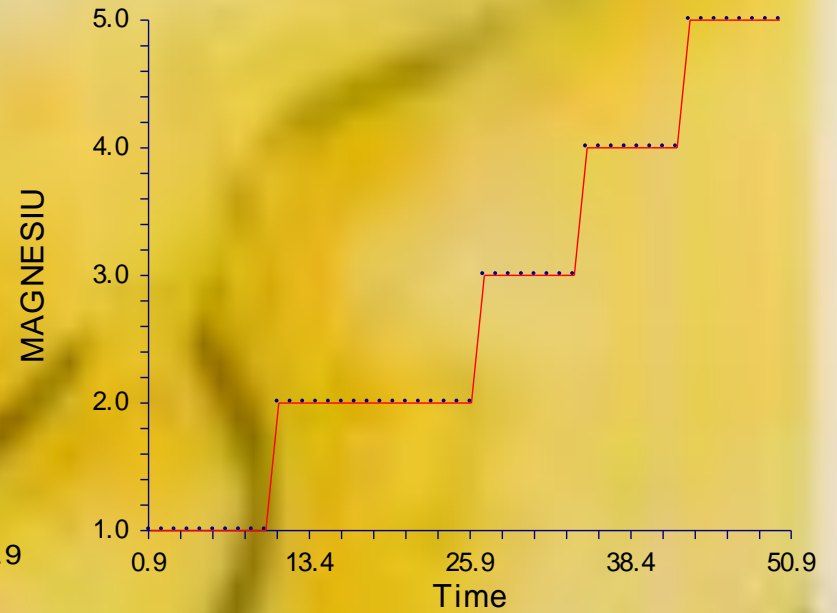


Cross-Correlation

Plot of ATROPINE



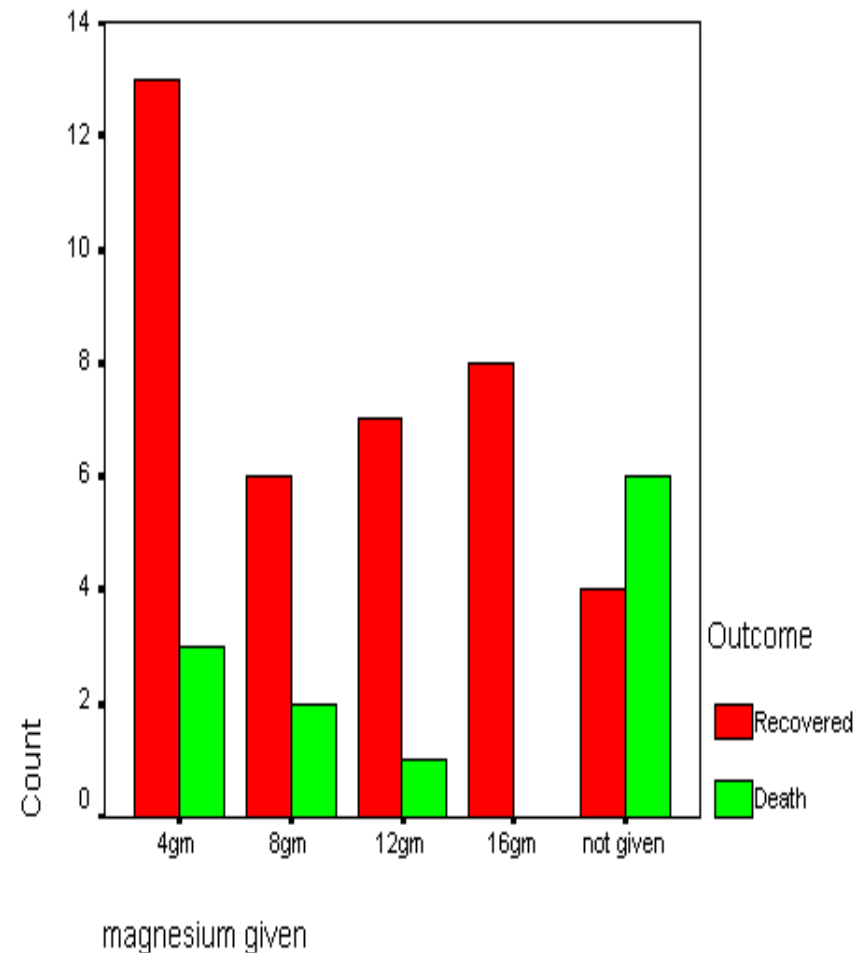
Plot of MAGNESIU



Outcome

Number of dying patients

magnesium given * Outcome Crosstabulation			
		Outcome	
		Recovered	Death
Magnesium given	4gm	13	3
		81.3%	18.8%
	8gm	6	2
		75.0%	25.0%
	12gm	7	1
		87.5%	12.5%
	16gm	8	0
		100.0%	0.0%
	not given	4	6
		40.0%	60.0%



Complication

Renal complication	Cardiovascular complications	ARDS	Magnesium given	Outcome	Recovered	Death
Yes	Yes	No	4gm			1
			Not given			1
	No	No	4gm	1		1
			Not given	0		1
No	Yes	No	Not given			1
	No	No	4gm	12		0
			8gm	6		2
			12gm	7		1
			16gm	8		0
			Not given	4		3
		Yes	4gm			1

Addendum



CPK level

Intermedi
ate

syndrom	Mean	N	Std. Deviation	Minimum	Maximum
Yes	757.65	4	721.0785	250	1801
No	939.0859	17	881.6541	85.32	2709
Total	904.5267	21	839.7464	85.32	2709



Addendum

Paired Samples Statistics

		Mean	N	Std. Deviation	Sig.
Pair 1	Na level before intrvention	135.58	25	5.754057	0.044
	Na level after 24 hours	138.02	25	5.113707	
Pair 2	k level before intervention	3.6096	25	0.507038	0.449
	K level after 24 hours	3.7068	25	0.535698	
Pair 3	Cl level before intervention	96.92	25	6.013388	0.211
	Cl level after 24 hours	98.732	25	5.743672	
Pair 4	TCO2 level beforeintervention	23.74583	24	2.208871	0.141
	TCO2 level after 24 hours	24.475	24	2.816296	

Conclusion

- *We escalated the magnesium dose upto 16 gm without any adverse effect.*
- *This study is very small; numerous parts of the methodology were incompletely described.*
- *Thus we believe further research is required before this treatment can be universally recommended.*



THANKS