MgSO$_4$ regimens in eclampsia
ECLAMPSIA

“Like A Flash Of Lightening”

Acute Convulsive Disorder

Hypertension .... Induced Or....
Aggravated .... by Pregnancy

28/11/2010
Best Anticonvulsive

MAGNESIUM SULPHATE

is the drug of choice for routine anti-convulsant management of women with eclampsia, rather than diazepam or phenytoin.

Evidence from the Collaborative Eclampsia Trial.

DIFFERENT MgSO₄ REGIMENS …

- Eastman.
- Pritchard.
- Chesley & Teppers.
- Hall, Anderson, Harbert.
- Flowers.
- Zuspan.
- Cruik Shant.
- Sibai.
- Sardesai
- Leens.
- etc
MgSO$_4$ Regimens...

**VIMS classification**

- **HIGH dose regimens**: Pritchard’s, Lucas etc.
  - Loading dose > 10 gm

- **LOW dose regimens**: Zuspan, Suman Sardesai etc.
  - Loading dose < 10 gm

- **SINGLE DOSE Regimen**: VIMS Regimen

*Joshi Suyajna D. ‘Hypertensive Disorders In Pregnancy’ - 2009*
Pritchard’s regimen

**LOADING DOSE**

Loading dose:
4g (20ml of 20%)- IV -over not less than 3 min followed by 5 g (10 ml of 50%) IM in each buttock. (10 g)

If convulsion persists over 15 min 2g (10ml of 20%) is given over 2 min.

**MAINTENANCE**

Maintenance dose:
5g (10ml of 50%) is given every 4 hours & alternate sites after assuring

1) Presence of knee reflex
2) Respiratory rate > 14/min
3) Urine output 10

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### LOW Dose regimens....

<table>
<thead>
<tr>
<th></th>
<th>Loading</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Zuspan</strong></td>
<td>4g IV over 5-10 minutes</td>
<td>1-2g/hr as IV infusion</td>
</tr>
<tr>
<td><strong>Charles Flowers</strong></td>
<td>4g IV in 250 ml of 5% D</td>
<td>5g every 4-6 hrs as IM</td>
</tr>
<tr>
<td><strong>Chesley -Tepper</strong></td>
<td>5g every 4&lt;sup&gt;th&lt;/sup&gt; hour given as IM</td>
<td>5g every 4&lt;sup&gt;th&lt;/sup&gt; hour given as IM</td>
</tr>
<tr>
<td><strong>Eastman</strong></td>
<td>5g every 4&lt;sup&gt;th&lt;/sup&gt; hour given as IM</td>
<td>5g every 4&lt;sup&gt;th&lt;/sup&gt; hour given as IM</td>
</tr>
</tbody>
</table>
In 1997, Suman Sardesai from V.M. Medical College Sholapur described the following treatment:

<table>
<thead>
<tr>
<th>Loading dose</th>
<th>Maintenance dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>4g MgSO4 given as IV or IM</td>
<td>2g given as IV/IM every 3hrs. If convulsions recurred after 15 min additional dose of MgSO4 given</td>
</tr>
</tbody>
</table>

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Pritchard Vs Zuspan

• **Kathleem M Graham**
• The Lancet, **Volume 351, Issue 9108**, Page 1061, 4 April 1998
• **Magnesium sulphate in eclampsia**

• Review of CET

• “Examination of the Collaborative Eclampsia Trial, Sibai's work, and the research at the Parkland Memorial Hospital shows that Zuspan's regimen is eight times less effective than Pritchard's regimen in the prevention of convulsions in pre-eclampsia and eclampsia. Maternal mortality was 2.5 times greater in the women who received Zuspan's regimen than among those on Pritchard's regimen. Zuspan's regimen should not be used for routine clinical use.”

Which regimen to use .....???
CONVENTIONAL WESTERN REGIMENS:

- Cannot be given outside 'obstetric care units'

- Longer duration
- Cost in effective
- Trained Health prof
- More side effects
- Requires Ins. therapy
- High dose
- Costant supervision

28/11/2010
GLIMPSES OF ....

ANTICONVULSANTS

1979 To 2010
30 years

VIMS- Hospital
Bellary

28/11/2010
- 1978-1990: KRISHNA MENON’S REGIMEN
- 1990-1995: PRITCHARD’S OR K.M. REGIMEN
- 1995-1998: PRITCHARD’S … Dr. Shanthi
- 1998-2001: LOW DOSE – Dr. Veerendrakumar C.M.
- 2001-2003: SINGLE DOSE
  Dr. Noorulameen
1979-1990          KRISHNA MENON’S REGIMEN
1990-1995          PRITCHARD’S OR K.M.REGIMEN
1995-1998          PRITCHARD’S
1998-2001          LOW DOSE or `PRITCHARD’S
2001-2004          SINGLE DOSE OR LOW DOSE Study- 1
2004 onwards-     ‘SINGLE DOSE Magnesium Sulphate…’ Study- 2

28/11/2010
Pritchard’s Regimen…. 54 years old!

Pritchard J.A.

“The use of the magnesium ion in the management of eclamptogenic toxemias.”

*Surg Gynecol Obstet.* 1955;
100: 131–140
PRITCHARD’S REGIMEN

1995-1998

ABANDONED AFTER LOADING DOSE

NO CONVULSIONS !!!
Low-Dose Regimen...
Low...Dose....Steady Reduction in dose....Indian Scenario...

**SUB-OPTIMAL DOSE**

* MgSO4.....2 gram IM
* MgSO4......2 gram IV
* MgSO4.......2 gm. IM and 2 gm IM


28/11/2010
“Disciplined use of MgSO4 is difficult to achieve in ‘resource poor settings’ of developing countries”
Delay in MgSO4 treatment - referred to tertiary hospitals with no or wrong-treatment

13.9% maternal deaths..admitted in moribund state...

Lopez and Llera
Early and – ’PROPER” referral

is the **cornerstone** in the success of saving the mother in eclampsia.

Adetoro reported 14.4% of maternal mortality..referral without treatment....
SEARCH for a NEW MgSO₄ regimen

1. Easy to monitor
2. Safe to follow in any setup - FRU

At the DOORSTEP
SINGLE DOSE
MgSO$_4$

$4 + 4$

SUJAYNA JOSHI
1998
ONE Convulsion within 30 minutes NO TREATMENT
MORE THAN ONE CONVULSION

- WITHIN 30 MINUTES......

- 2 grams of IV MgSO₄
Convulsions after 30 minutes...

2 grams of IV MgSO₄

Can be repeated twice…
CONVULSIONS NOT CONTROLLED

Switch on to ...
Phenytoin Sodium regimen
Remaining question about Magnesium Sulphate

WHAT IS THE MINIMUM EFFECTIVE DOSE?

THE LANCET-vol.359-june 1, 2002,psge-1888
Support…came after Magpie…

To make magnesium sulphate available to women at risk from eclampsia, a short regimen is suitable for use in underdeveloped countries – **ideally this would include a single magnesium sulphate injection.**

Andrew d weeks, Samuel Ononge

The Lancet, Volume 360, Page 1331, 26 October 2002
**KSOGA - Mysore - 2004**

224 patients

- admitted in Eclampsia Labour Room
- District Hospital, Bellary

<table>
<thead>
<tr>
<th>SINGLE DOSE</th>
<th>LOW DOSE</th>
<th>PRITCHARD’S</th>
</tr>
</thead>
<tbody>
<tr>
<td>94</td>
<td>102</td>
<td>28</td>
</tr>
</tbody>
</table>

1st study……2001 & 2002….
Prospective Observational study

Total of 513 cases of eclampsia studied

All patients received ‘single dose MgSO₄’
<table>
<thead>
<tr>
<th>Complication</th>
<th>No of women</th>
<th>Percentage (n=513)</th>
<th>Recurrence with single dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>HELLP syndrome</td>
<td>11</td>
<td>2.1%</td>
<td>1</td>
</tr>
<tr>
<td>Abruption</td>
<td>10</td>
<td>1.94%</td>
<td>-</td>
</tr>
<tr>
<td>Cortical venous thrombosis</td>
<td>7</td>
<td>1.36%</td>
<td>2</td>
</tr>
<tr>
<td>Pulmonary edema</td>
<td>8</td>
<td>1.56%</td>
<td>-</td>
</tr>
<tr>
<td>Aspiration pneumonia</td>
<td>7</td>
<td>1.3%</td>
<td>1</td>
</tr>
<tr>
<td>Post partum hemorrhage</td>
<td>6</td>
<td>1.16%</td>
<td>3</td>
</tr>
<tr>
<td>Cortical blindness</td>
<td>3</td>
<td>0.6%</td>
<td></td>
</tr>
<tr>
<td>Acute renal failure</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe anemia</td>
<td>23</td>
<td>4.5%</td>
<td>2</td>
</tr>
</tbody>
</table>
Maternal deaths in eclampsia

<table>
<thead>
<tr>
<th>Cause</th>
<th>No of women (n=17)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intracranial hemorrhage</td>
<td>10</td>
<td>58.82%</td>
</tr>
<tr>
<td>Pulmonary edema</td>
<td>5</td>
<td>29.41%</td>
</tr>
<tr>
<td>Ante partum hemorrhage</td>
<td>1</td>
<td>5.88%</td>
</tr>
<tr>
<td>Acute renal failure</td>
<td>1</td>
<td>5.88%</td>
</tr>
</tbody>
</table>

Convulsion-treatment interval
The ‘convulsion-treatment’ interval.

MgSO₄ before referral and after reaching the referral centre—…..???????

87.5% of the patients did not receive any treatment before reaching the referral centre.

87.5% of the patients did not receive any treatment before reaching the referral centre.
SEIZURE -FREE TRANSPORTATION

‘MgSO₄’ before referral
FOGSI PROJECTS

Bellary District

REACHING & SENSITISING ALL THE
24 X 7 MEDICAL OFFICER’S IN INDIA
UNDER
SAFE-MOTHERHOOD INITIATIVE

EMOC
FOGSI PROJECTS

‘REACHING THE UNREACHED’

Sanjay Gupte’s vision for FOGSI INITIATIVE 2010

Hospet... Koppal...Gangavathi...Shimogga...
168 Eclamptic women admitted to Dept of OBG, Vijayanagar Institute of Medical Sciences.

Single dose MgSO₄ (group B - 88 patients)

Pritchard regimen (group A - 80 patients)

July 2009 to June 2010

42 patients came with SDM given at FRU
Why Magnesium Sulphate ...?

1. To abort an attack of convulsion
2. To prevent immediate recurrence of convulsions
3. To gain time for the ANTIHYPERTENSIVE to act...

‘ONE ADEQUATE DOSE’ is sufficient
Maternal mortality vs MAP

<table>
<thead>
<tr>
<th>MATERNAL MORTALITY</th>
<th>MAP (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CASE `1</td>
<td>120 to 130</td>
</tr>
<tr>
<td>CASE 2</td>
<td>&gt; 130</td>
</tr>
</tbody>
</table>

Study 3....RCT
Single dose MgSo4 (VIMS Regimen) Vs Pritchard regimen

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Recurrence Vs MAP

Study 3....RCT
Single dose MgSo4 (VIMS Regimen) Vs Pritchard regimen

Patients

<120mmHg
120-130mmHg
>130mmHg
Maternal complications vs MAP

Study 3... RCT
Single dose MgSo4 (VIMS Regimen) Vs Pritchard regimen
### Maternal mortality

<table>
<thead>
<tr>
<th>Maternal death</th>
<th>VIMS regime</th>
<th></th>
<th>Pritchard regime</th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>88</td>
<td>100</td>
<td>78</td>
<td>97.5</td>
<td>166</td>
</tr>
<tr>
<td>Yes</td>
<td>02</td>
<td>2.5</td>
<td>02</td>
<td>2.5</td>
<td>02</td>
</tr>
<tr>
<td>Total</td>
<td>88</td>
<td>100</td>
<td>80</td>
<td>100</td>
<td>168</td>
</tr>
</tbody>
</table>

Comparison of maternal deaths between two groups
Fischer exact test P – value – 0.22
## Comparison of toxicity between two treatment groups

### Groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>VIMS regime</th>
<th>Pritchard regime</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td></td>
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<tr>
<td>Mgso4 regime</td>
<td>88</td>
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<td>Pritchard regime</td>
<td>80</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

### Toxicity

- **Yes**
  - VIMS regime: -
  - Pritchard regime: 27 (33.8%)
  - Total: 27
- **No**
  - VIMS regime: 88 (100%)
  - Pritchard regime: 53 (66.2%)
  - Total: 141

### Comparison of toxicity between two groups

Fischer exact test

\[ P \text{ – value} = 0.00 \]
What is the problem with PRITCHARD’S REGIMEN

1. Loading dose is **MORE** than necessary

2. Maintenance dose is **NOT** necessary
What is the problem with LOW DOSE REGIMEN...eg. ZUSPAN’s

1. **Loading** dose is **NOT** sufficient

2. Maintenance dose is **NOT** necessary
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