Characteristics of patients receiving vasopressors

Julie Benbenishty RN MA ICU
Hadassah Medical Organization

Jerusalem Israel
Vasopressor support

- Vasopressors are indicated to maintain mean arterial pressure of <65 mm Hg, both during and following adequate fluid resuscitation.

- Norepinephrine or dopamine are the vasopressors of choice in the treatment of septic shock.

- Norepinephrine may be combined with dobutamine when cardiac output is being measured.

- Epinephrine, phenylephrine, and vasopressin are not recommended as first-line agents in the treatment of septic shock.

Vasopressor and inotropic support in septic shock:

Beale, Richard J.; Hollenberg, Steven M.; Vincent, Jean-Louis MD,; Parrillo, Joseph E., evidence-based review (11)32Critical CareMedicine 2004 465
Initial Vasopressor dose

All drugs are initiated at lowest dose and titrated until hemodynamic stability has occurred.

For how long?

What is maximal administered recommended dose?
In some ICUs in Israel there are no upper limits to vasopressor doses.

- Up to 50 mg/hr of adrenaline (0.71 mg/kg/hour)
- Up to 64 mg/hr noreadrenaline
Case

46 year old female admitted to ICU with acute pneumonia after 3 courses of chemotherapy. The medical staff agree to support-override this acute stage and return to oncology. Patient in respiratory distress and intubated.
6 weeks later.....

- Multi-organ failure
- FiO2 0.7
- PaO2 60 mm/Hg
- Inotropic doses:
  - Noreadrenaline - 64 mg/hr
  - Adrenaline - 50 mg/hr
Family involvement

Medical staff and family discussed and agreed on life support limitation - no further elevation of treatment - TLC only.

Withdrawal of therapy illegal in Israel.

4 more days until patient passed away.
Duration and concentration

How long can inotropic drugs be administered before we can say "patient unresponsive to max treatment?"

What is maximum dose of drug that can be administered and patient survives?
Majority of ICU physicians discontinue VP when patient no longer responds to maximum therapy

However, every physician has his own definition of “response”

Sprung CL. JAMA ETHICUS 2003;290:790
The administration of VP in extreme doses.....

- Causes great frustration and demoralization of the nursing staff
- Nurses feel that treatment is being ordered when patient no longer benefits (FUTILITY)
- It needlessly prolongs dying process and denies the patients’ right to die with dignity.
The administration of VP in extreme doses.....

- Prolongs the grieving process of the family
The administration of VP in extreme doses.....

- Requires extra resources-staff
- To prepare 50 mg/ml adrenaline syringe, staff must open 50 ampoules of 1 ml
- Takes 20 minutes of every hour
Conflict

Nurses felt that they were forced to deliver treatment that was against their moral conscience.

CONFLICT

Between our duty administering treatment which we felt was not beneficial and the patients’ right to die with dignity.
EVIDENCED BASED SOLUTION

- To reach our goal to promote change...
- We believed that we had to speak the same language as physicians
- Literature search for guidelines, protocols, written policies, expert advice, any RCT, demonstrating the maximum beneficial dose of noreadrenalin and adrenaline
Investigation Goals

- To find the maximum dose of VP that any patient survived
- Optimal amount of time that VP can be delivered and result in survival
Method

- Helsinki approval
- Retrospective- all ICU patient medical files in 2001
- Documenting: APACHE II scores, VP type and dose from initiation till D/C or death
- Demographics, LOS, mortality, diagnosis, system failure
Results

- 689 patient files reviewed
- 3444 patient days
- 72 patients received any VP were included in study
Results

All patients who received noradrenalin >3.8 µg/kg/minute or Adrenaline administered >9.6 µg/kg/minute died.

When administering doses of >0.5µg/kg/hour, there is a 96% probability for patient death.
<table>
<thead>
<tr>
<th>variable</th>
<th>VP Concentration≥ 2microg/kg/min (N=24)</th>
<th>VP Concentration&lt;2microg/kg/min (n=45)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>46± 4.6 (S.E.)</td>
<td>55±3(S.E.)</td>
<td>P=0.06</td>
</tr>
<tr>
<td>Gender</td>
<td>Male 17</td>
<td>29</td>
<td>Total 46</td>
</tr>
<tr>
<td>APACHE score on day of ICU admission</td>
<td>28 ±1.5 (24)</td>
<td>22.6 ± 1.2 (45)</td>
<td>P=0.004</td>
</tr>
<tr>
<td>Mortality</td>
<td>Live 4</td>
<td>32</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>LOS in ICU</td>
<td>12.3 days ±2.9</td>
<td>15 ±2.2</td>
<td>p&gt;0.05</td>
</tr>
<tr>
<td>Hospital LOS</td>
<td>23 days± 5.8</td>
<td>36.6 days ±4.4</td>
<td>P=0.07</td>
</tr>
<tr>
<td>Lactate</td>
<td>1.7 ±0.7</td>
<td>1.9 ±0.8</td>
<td>P=0.05</td>
</tr>
<tr>
<td>Ph</td>
<td>7.32 ±0.02</td>
<td>7.37±0.01</td>
<td>p&gt;0.05</td>
</tr>
<tr>
<td>Alk Phosphate</td>
<td>117±21.4</td>
<td>76±8.1</td>
<td>P=0.03</td>
</tr>
<tr>
<td>Ggt</td>
<td>86.7 ±19.5</td>
<td>58±6.8</td>
<td>p&gt;0.05</td>
</tr>
<tr>
<td>LDH</td>
<td>1717±545</td>
<td>1728±522</td>
<td>p&gt;0.05</td>
</tr>
</tbody>
</table>
Results

- Mortality during ICU stay was 46%
- There were 33 patients who survived their ICU stay.
- The Kaplan-Meyer curve showed that patients receiving <0.5 μg/kg/min had a 60% six year survival
- 22 patients were still alive 6 years later
Multiple logistic regression most significant variable for mortality was the maximum concentration of vasopressor (p=0.009).
Results

The elderly (over 75 years of age) and the young had the same survival rates when receiving vasopressors.

Therefore the same care efforts for young and old patients alike.
Results

- No significance between the duration of VP administration (low concentration) and survival
Results

The six year ANOVA analysis for mortality showed that the factors that significantly increase mortality were age $\geq 75$ years ($p<0.007$), a higher APACHE II score upon ICU admission, ($p<0.0043$).
Implications

- As a result of our study, physicians in our unit have discontinued using "extreme" doses of vasopressor drugs.
Conclusions

- Nurses frustration together with the belief that patients care should be improved
- Lead to an attempt to influence medical treatment in an EVIDENCED BASED fashion
- We are hoping that this effort is a beginning in open avenues of multi-disciplinary communication
Thank you

- julie@hadassah.org.il