Somatic survival of ventilator supported brain dead patients in Qatar- an observational study.

Saibu George MD

Saibu George¹, Merlin Thomas¹, Tasleem Raza¹, Ahmed Abdussalam¹, Shafeeq Thappy¹, Husain Ali¹
Affiliations: Hamad General Hospital, Doha, Qatar
Introduction

Brain death is a permanent cessation of all functions of the brain and requires confirmation of cessation of cerebral and brain stem function.
Introduction

- Somatic survival
- Global acceptance of brain death as death on clinical, ethical and legal grounds,
- Concept not fully understood by many physicians and the general population
Qatari law

- Brain death as death for the purposes of organ donation and cessation of medical support.
- Public acceptance is limited for withdrawal of care till the time of cardiac death.
Purpose

- Duration of somatic survival of brain dead patients
- Underlying etiologies
- Level of support
- Organ donation rates
Methods

- Ethical approval from Medical Research Centre, Hamad Medical Corporation, Doha, Qatar
- Retrospective study
- 10 years: January 2003 - December 2013
- At Hamad General Hospital, Doha, Qatar
- Brain dead patients (above 18 years) admitted to medical, traumatic and surgical intensive care units
- Data collected from medical records to the approved form
Brain Death Criteria HMC, Qatar

- Determination and Pronouncement of Death
  - Clinical Policy: CL 7213
  - Criteria for Clinical Diagnosis of Brain Death
    - 3.1.2.11.1 A prerequisite of brain death shall be:
    - 3.1.2.11.1.1 The absence of clinical brain functions when the proximate cause is known and demonstrably irreversible.
    - 3.1.2.11.1.2 Clinical or neuro-imaging evidence of an acute CNS catastrophe that is compatible with the clinical diagnosis of brain death.
    - 3.1.2.11.1.3 Exclusion of complicating medical conditions that may confound clinical assessment (no shock or severe electrolyte, acid-base, or endocrine disturbance).
    - 3.1.2.11.1.4 No drug intoxication or poisoning.
    - 3.1.2.11.1.5 Core temperature of over ≥ 36.5°C.
  - Observation Period:
    - 3.1.2.12.1 Coma or Unresponsiveness – No cerebral motor response to pain in all extremities
    - 3.1.2.12.2 Absence of brain stem reflexes:
      - 3.1.2.12.2.4 Corneal reflex and Facial Muscle movement to noxious stimulus.
      - 3.2.1.12.2.5 Pharyngeal and Tracheal reflexes
    - 3.1.2.12.3 Apnea-Testing shall be Performed once as follows:
  - Pronouncement of death in Brain Death:
    - 3.1.2.3 The official time of death is the time when the heartbeat is absent for 60 seconds by
  - Important to Note: Section 7 of the Qatari Law on Organ Transplant (21/1997) requires the following
Qualitative and quantitative data values were expressed as frequency along with percentage and mean ± SD with median and range.

Univariate Kaplan–Meier survival analysis was applied to estimate median somatic survival in each group.

A two-sided P value <0.05 was considered to be statistically significant.

All Statistical analyses were done using statistical packages SPSS 22.0 (SPSS Inc. Chicago, IL).
Results

- Total: 53 Brain dead patients
- One patient with longest somatic survival of 395 days post pulmonary embolism cardiac arrest, being an outlyer was excluded from analysis.
## Results

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>43 (81)</td>
</tr>
<tr>
<td>Female</td>
<td>10 (18.9)</td>
</tr>
<tr>
<td>Coronary care unit</td>
<td>1 (1.9)</td>
</tr>
<tr>
<td>Medical ICU</td>
<td>34 (63.0)</td>
</tr>
<tr>
<td>Trauma ICU</td>
<td>8 (14.8)</td>
</tr>
<tr>
<td>Surgical ICU</td>
<td>11 (20.4)</td>
</tr>
<tr>
<td>Organ donation</td>
<td>2 (3.8)</td>
</tr>
</tbody>
</table>
Results

Somatic Survival

- Median: 3 days
- Mean: 4.5 days.
- Brain death confirmed within
  - 24 hours of provisional diagnosis: 24% of patients
  - 48 hours in 18%
  - 72 hours in 56%
Kaplan Meir Survival analysis
# Results

<table>
<thead>
<tr>
<th>Aetiology</th>
<th>N(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intracranial Haemorrhage</td>
<td>24 (45.3)</td>
</tr>
<tr>
<td>Ischemic Stroke</td>
<td>9 (17)</td>
</tr>
<tr>
<td>Traumatic brain Injury</td>
<td>8 (15.1)</td>
</tr>
<tr>
<td>Cardiac arrest (HE)</td>
<td>5 (9.3)</td>
</tr>
<tr>
<td>Others</td>
<td>6 (13.3)</td>
</tr>
</tbody>
</table>
Results

<table>
<thead>
<tr>
<th>Aetiology</th>
<th>N(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meningoencephalitis</td>
<td>2(3.8)</td>
</tr>
<tr>
<td>Brain tumor with brain stem compression</td>
<td>1(1.9)</td>
</tr>
<tr>
<td>Smoke inhalation with diffuse brain edema</td>
<td>1(1.9)</td>
</tr>
<tr>
<td>Status asthmaticus</td>
<td>1(1.9)</td>
</tr>
<tr>
<td>Astrocytoma with edema</td>
<td>1(1.9)</td>
</tr>
</tbody>
</table>
Results

Organ Donation

- 2 families: accepted organ donation.
- 13 patients: not appropriate donors
- 28 patients: family refused organ donation
- 9 patients: declared dead prior to assessment
- 2 patients: relatives failed to be traced
- 1 patient pregnant lady
- 1 family: Withdrawal of care
- All patients → full intensive care inclusive of respiratory, hemodynamic, nutrition, and nursing care support was provided in view of family wishes.
Discussion

Somatic survival

- American Academy of Neurology (AAN) : 1995 practice parameters
- Irreversible coma (with a known cause), absence of brain-stem reflexes and irreversible apnea.
- Supplementary tests are only recommended in the presence of confounding factors.

Discussion

Somatic survival

- Approximately 50% of the cases: Provisionally diagnosed brain death in 24 hours
- Fulfilling criteria: 2-3 days
  - hemodynamic instability
  - electrolyte imbalances
  - other reasons.
Discussion

Somatic Survival

- UK study: 609 brain dead patients, the median somatic survival was 3.5-4.5 days

- Taiwan study: deeply comatose patients revealed that of the 73 brain dead patients → 81% cardiac asystole in 3 days

- Kuwait study: median survival of 6 days in 40 brain dead patients.

Tsu-pei Hung et al Journal of neurology, neurosurgery and psychiatry 1995
Al-Shammri S. et al · Eur Neurol 2003;49:90–93
Discussion

Etiology

- Primary structural brain damage.
- Intracranial hemorrhage (cerebral and subarachnoid), followed by ischemic stroke and traumatic brain injury.
- Other studies:
  - Direct traumatic injury to the head (e.g. road accident), subarachnoid hemorrhage and ischemic stroke.
  - Intracerebral hemorrhage, hypoxic-ischemic encephalopathy and infectious causes.

Saposnik G Neurology. 2000
Wijdicks EF Neurology. 2008
Discussion

- **Etiology**
  - 9% of the cases brain death is from cardiopulmonary arrest
  - Predominant damage in cardio pulmonary arrest is to the cerebral cortex and cerebellum if resuscitation fails for 5 min

LevyDE. Arch Neurol 1975
Weinberger LM, Arch Neurol Psychiatry 1940
Centre for Organ retrieval and transplantation
Organ donation

- Dismal during the study period.
- Family refused the same in nearly 87% of the cases.
- Complex factors: religious, cultural, populations dynamics (majority expatriates) and poor understanding of organ donation.
Discussion

Organ Donation

- Brain death concept has been endorsed by medical, ethical and legal bodies all over the world, including many Islamic states.
- There is an increasing trend for end stage liver and renal disease in the GCC countries.

Rady MY, HEC Forum 2013 March
Hassanien AAJRSRM Short Rep 2012 June
Lim YS. Clin Liver Dis 2008,
Discussion

Organ Donation

- While there is legal precedent for discontinuing life support over the family's objection, many rightly advocate delay, education, support, and negotiation in such cases.

Bernat JL Neurol Clin. 2004
Burkle CM Neurology. 2011
Conclusion

- Time of somatic death from brain death is relatively short.
- However it is the cause of major ICU resource utilization.
- Organ donations are crucial and the only viable therapy for many patients.
Redefine Public Education

1. Everyone is known by someone.  
   relationship [1-hr daily advisory, in our district 1:8]

2. Everyone talks to themself daily.  
   self-assessment [vs standardized testing]

re·define  make something different

pub·lic  concerning all the people

ed·u·ca·tion  learning experience

Don’t worry if you like it as it is. No need to get rid of anything when you can facilitate everything. It’s public education.
THANK YOU