MORTALITY IN THE BURNS SURVIVOR – FURTHER FOLLOW UP AND INTERVENTION IS REQUIRED

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Increased survival in acute stage

BUT...

Metabolic
- Ongoing ↑cortisol, catecholamines, total cholesterol
- ↓testosterone,
- Fatty liver, insulin resistance,
- ↑ work of heart, tachycardia

Function
- Catabolism, weakness, contractures
- Decreased fitness
- Decreased ADLs, poor return to work

QoL
- Depression, anxiety, PTSD
CARDIOVASCULAR RISK?

Increased risk of cardiovascular events

Endocrine
- DHEA
- Testosterone
- Cortisol

Metabolic
- Glucose
- Insulin resistance
- LDL
- Tryglycerides

Stress Factors
- Unemployment
- Financial stress
- Social isolation

Depression

Inflammatory markers

Cardiac Stress
- Myocardial O₂ consumption
- Tachycardia
QUESTIONS

- Is there a higher incidence of cardiovascular disease?
- Is there an increased/earlier mortality?
- What is this increased mortality due to?
PROJECT

Burns Database

Death register

Acquired inpatient data
PERCENTAGE OF DEATHS PER POPULATION – ABS DATA

Database 1999-2012
4,280 subjects
Deaths post discharge > 6/12 – 287 subjects

ABS 2013 0.45%
Burn Survivors, 8.9%
CAUSES OF DEATH IN THE BURNS SURVIVOR

** = p<0.001
CAUSE OF DEATH IN BURN SURVIVORS COMPARED TO AUSTRALIAN BUREAU OF STATISTICS

*p=0.03  **p=0.01

p=0.05
DEATH ACCORDING TO AGE GROUP IN THE BURNS SURVIVOR

Cox regression by age group p=0.05
Age < 40 years
TIME POST BURN TILL DEATH

**p<0.01

- < 40 years
- 41-60 years
- 61+ years
CAUSE OF DEATH/PRE MORBID CONDITIONS

Bar chart showing causes of death/pre morbidity conditions with categories including CV, Gastro/Liver, Self Harm, Major Trauma, Infection, Oncology, and None. Different colors represent different conditions.
CO-MORBIDITIES IN DEATHS FROM CV DISEASE

- None: 32%
- Cardiovascular: 16%
- Mental Health: 7%
- Drugs/Alcohol: 6%
- Other: 37%
GASTROINTESTINAL/LIVER DEATHS EXISTING CO-MORBIDITIES

**

- Drugs/Alcohol
- Other
- None

- Cardiovascular
- Mental Health

12
10
8
6
4
2
0
DEATHS DUE TO SELF HARM EXISTING CO-MORBIDITIES

Bar chart showing the distribution of deaths due to self-harm with existing co-morbidities. The categories are:
- Mental health
- Drugs/Alcohol
- Other
- None (No CV co-morbidities)

The chart indicates the number of deaths in each category.
DEMOGRAPHICS BETWEEN DECEASED AND ALIVE

AGE BETWEEN GROUPS

ALIVE
DECEASED

ALIVE
DECEASED

OR - NS

No

Alive
Deceased

Male
Female
COMORBIDITIES BETWEEN ALIVE AND DECEASED GROUPS

Slocum et al J Phys Med Rehab 2015
## Binary Logistic Regression

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>P-value</th>
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<tbody>
<tr>
<td>Gender</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>NS</td>
<td></td>
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<tr>
<td>TBSA%</td>
<td>NS</td>
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<tr>
<td>Employment</td>
<td>NS</td>
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<tr>
<td>Comorbidity</td>
<td>Wald² 6.2</td>
<td>p&lt;0.01</td>
</tr>
</tbody>
</table>

**Backward conditional method**
- Mortality (Yes = 1, No = 0) as dependent variable
- Overall model significant at $p<0.01$ level
- Model predicted 85.2% of responses correctly
TBSA% NS

Small burn

Renal failure

Neurological (Parkinson’s ∆, Epilepsy, Spinal injury)

Respiratory (COPD)

Severe Diabetes

Frailty - ↑ age, co-morbidities + ↓ function

Death
DISCUSSION

• Most frequent cause of death in patients aged < 40 years was intentional self-harm and major trauma (p<0.001)

• Concerning – although some had pre existing co-morbidities of mental health problems, an equal number did not

• Indicates that follow up for both those with existing MH problems and those without is warranted

• Predictors and times of increased vulnerability
DISCUSSION

• Most common cause of death 40-60 years - chronic liver disease (p<0.002)

• Even a small burn appeared to increase mortality in elderly and middle age when combined with a co-morbidity eg spinal injury, epilepsy, CKD, frailty

• Under rate systemic effect of a burn

• Surgical model – prevention of delirium, anaesthetic, pain relief
CONCLUSION

- High number of deaths from CV disease even in < 60 years and no pre-existing co-morbidity
- Do these findings warrant screening at follow up clinics?
- eg point of care systems and carotid intima median scans
CONCLUSION

• Limitation – existing co-morbidities may not have been documented on admission

• Hand searched charts and autopsy reports

• Even in times of reduced resources need increased follow up and predictor models
CAUSE OF DEATH/PRE MORBID CONDITIONS
METHOD

- Cross sectional study
- Assess risk factors/lipid profile
- Burns follow up clinic > 2 years post burn
- Invitation to attend RBWH
- Attended from 100+ km
Insulin resistance

Loss of LBM 2 years post-burn, ↓ whole body insulin-stimulated glucose intake

Hepatic glucose production ↑6x – from skeletal muscle proteolysis & adipocyte lipolysis

Severe hypoglycaemia
Glucose toxicity

Initial hypermetabolic response

Cytokines & catecholamines modify intracellular signalling pathways

Risk of CVD independent of BMI or Diabetes
ALERE CHOLESTECH LDX® ANALYZER

Point-of-care lipid profile and glucose testing.

Dale et al
Ann Pharmacother 2008

Carey et al
Ir J Med Sc 2006
LIPID PROFILE

Adult Treatment Panel III (ATPIII): Circulation. 2002;106:3143-421