“...and the dead shall rise again.”

Head Up CPR

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Disclosures

• I am on the SAB of Advanced Circulatory Solutions the makers of EleGARD.
Seoul, South Korea
Effect of Gravity in Conventional CPR
Study Results: Perfusion Pressures

Coronary (CPP) vs. Cerebral (CerPP)

- Coronary (CPP): 7, *18, 28, *30 Head Down
- Cerebral (CerPP): *30 Head Down, *32

*p<0.001
Study Results: Vital Organ Blood Flow

Heart Blood Flow

- 30 Head Down

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Brain Blood Flow

- *p<0.05

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* indicates statistical significance at p<0.05 level.
Human Cadaver 1 Pressure Tracings

- Airway
- Aortic
- Right Atrial
- Intracranial Pressure
- Cerebral Perfusion Pressure
Representative Pressure Tracings: Details from Cadaver 2
What is the mechanism?

- Drains venous blood from the brain
- Lowers ICP
- Enhances R to L heart circulation (like sitting up with CHF)
- Reduces a concussion with every compression
Cerebral Perfusion Pressure

**Figure 3.** Cerebral Perfusion Pressure from baseline to 22 minutes in the CAD+ITD HUP, ACD+ITD SUP, C-CPR HUP, and C-CPR

*C-No pigs resuscitated with C-CPR

Ryu et al. Resuscitation
2016
Recent Discoveries

Over the last year we have discovered the importance of taking time to prime the heart and being careful not to lose that prime with a rapid raising of the patient’s head.
Cerebral Perfusion Pressures with Elevated CPR

ACD - Active Compression Decompression Cardiopulmonary Resuscitation
ITD - Impedance Threshold Device
HUP - Head Up Intervention
S CPR - Standard Cardiopulmonary Resuscitation
SUP - Supine Intervention
2min Rise - Elevation of the head and upper thorax 6 cm/min over 2 minutes
Sequential Elevation of Head and Thorax during CPR after 8 min of VF in a Pig
2-15-19

 VF Induction Spontaneous gasping Standard BLS CPR (30:2) Lift pig onto EleGARD (13 cm head elevation) Add ITD, Start LUCAS 2.0 End of elevation

 Intrathoracic Pressure

 Aortic Pressure

 Right Atrial Pressure

 Intracranial Pressure

 ECG

 ETCO2

 Coronary Perfusion Pressure

 Cerebral Perfusion Pressure

 defibrillation Amiodarone
Additional Experience with Elevation of the Head and Thorax During CPR

1. Don’t elevate the head too quickly.

2. Need to ‘prime the system’ before elevating head and heart. Two minutes of priming with the ITD in place.

3. There is an optimal elevation sequence and height: after 2’ of priming then elevate head and thorax over 2’
One of our first success stories
From Pigs to People

Now, we’re going to do a bunch more.
Field Trial Sites

- California
  - Alameda County
- Florida
  - Palm Beach County
- Minnesota
  - Anoka County
  - Ramsey County
- Ohio
  - Lucas County
- Tennessee
  - Memphis
- Washington
  - Whatcom County
Thank You.

Any Questions?

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EleGARD™ is a product of Advanced CPR Solutions