Innovation in Cardiovascular Disease and Stroke

Building a Cardiovascular Center of Excellence

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 Gates

 Vascular Institute

 A Kaleida Health Facility



Impact of Cardiovascular Disease?



The 10 leading causes of death in the world



CDC

Centers for Disease Control and Prevention CDC 24/7: Saving Lives. Protecting People.™

Figure 3. Age-adjusted death rates for the 10 leading causes of death in 2012: United States, 2011–2012



NOTE: <u>Access data table for Figure 3</u> [PDF - 8 KB]. SOURCE: CDC/NCHS, National Vital Statistics System, Mortality.

Acute Ischemic Stroke...

"Please don't hurt my Brain...



Its my second favorite organ" Woody Allen # 4 cause of death#1 cause of adult disabilityCost- \$\$ & Social Incalculable!

Heart Attack ~ = Acute Ischemic Stroke Blocked cerebral vs blocked coronary artery

- Following same trajectory as AMI
- Cerebral/coronary occlusion
- Treatment with Lytics initially
- Time is Brain>>Time is muscle
- Revascularization is most effective
- Neuro is ten years behind Cardiology

Ischemic Stroke Pathophysiol & Treatment Save the Penumbra...Just like AMI







Core: Area damaged immediately after stroke Area surrounding core that is affected but can be saved if treatment is given quickly enough

D Boehring





Hippocrates 460 BC



How We Select Patients: Triage of the Acute Stroke Patient

Clinical

- Begins with recognition
- Cognition may be lost!!



Imaging

CT Perfusion-Based Patient Selection

Is the Brain Viable??



Patient 1: has "penumbra" and likely to benefit from intervention



Patient 2: has volume loss (*arrow*) and no "penumbra"

Most Important- Time Is Brain Meaning What??

In each minute we lose: -1.9 million neurons, -14 billion synapses (connections) -12 km (7.5 miles) of nerve fibers

New Data from 2015 Trials : If we reopen a major occluded artery-

Within 2 hours: -Recovery rate is 90% !! After 6 hours: -Recovery rate is 20-30% !!!!





Remove the Clot



Thrombectomy Methods

Pharmacologic:

- IV tPA
- IA tPA

Mechanical:

- Retrievable stent
- Aspiration
- Combination

 -aspiration +/- stent

Endovascular Therapy: New Standard of Care Number Needed to Treat (NNT)

In order to have 1 additional stroke patient be independent at 90 days



Time Really IS Brain...

2 Hour Window for Optimal Results



Challenges

- 2 Hour Onset-Revasc Goal
- Patient & Physician awareness
- Inertia
- Cataclysmic specialty shift
- Reimbursement
- Man Power
- Technology
- Systems of care



>16 Million strokes per year world wide

~1Million stroke in North America ~350,000 pts are potential candidates for intervention 650 Stroke active 24/7/365 neurointerventionalists

2 Hour Goal!

How can we achieve this?

Intervention close to site of onset !!

What Else Do We Need for Stroke?

- Better <u>Retrievers</u>
- More effective <u>aspiration</u>
- Reduce distal embolic burden (eg, balloon guide, flow reversal)





And...



Onset to Revascularization -ER door to CT- 5 min -Door to CT Images- 10 min -Door to needle <30 min -Door to Revasc <60 min

- Improved work flow / "door-to-needle" times
 - Pre-hospital notification / preparation
 - New Imaging technology...CTP & Intervention in ER



Canon 4D CT Angio in ER (Door to needle < 30 min)

Impact of cardiovascular disease

- 1 in 3 adults (81.1 million in US) live with 1 or more types of cardiovascular disease.
- Leading causes of death and disability in the world
- Hundreds of billions of \$\$ economic loss every year.



Neuro, Cardiac, Peripheral

Same Diseases Same Arteries -Vascular highway Similar Tools

Why are we not together ?

Why a Vascular Center?

Number One Crippler and Killer Heart Head Legs

Vascular Disease Specialists Work in Silos

Cell Biologists

Engineers

Physicists

Radiology

Neurosurgery

Vascular Surgery

Cardiology



Goal #2: Change the Treatment Paradigm



Future Vascular Care Delivery?....Synergies?

GOAL # 3

JACOBS INSTITUTE

COLLISIONS. COLLABORATION. INNOVATION.

Independent Center for Innovation in CV Disease

Innovation in Health Care Delivery & Technology Vascular Center of the Future?

Gates Vascular Institute A Kaleida Health Facility

University at Buffalo The State University of New York

CENTER FOR TRANSLATIONAL RESEARCH







Vascular Institute The Vision...

- Free-standing facility
- Connected to hospital
 - Partnered with Great Lakes Health and UB
- Physician led and governed
- Minimally invasive treatment and prevention of vascular disease
- Vascular disciplines and scientists together
- Jacobs Institute: Independent Center
 Focus = Collaboration & Innovation

Gates Vascular Institute

Canon Stroke an

Jacobs Institute

Cath Labs

Vasc O

Hote

Emergency

Center

A REAL PROPERTY.

STREET,

Gates Vascular Institute \$300M 1 Acre Floorplate

Fourth Floor- 15 Cath Labs on One 1-Acre Floor Plate



Patient Access





JI Innovation Center (i2R)

Not for Profit, Independent from Partners "Sandwiched" Philanthropically funded



JACOBS

INST

- Create a nidus for innovation by...
- Creating an Ideal Environment where Entrepreneurs & Industry can develop products without Expense, Beaurocracy or Loss of IP

Collisions. Collaboration. Innovation.

i2R

What is Different and Unique?

University & Hospital Partnerships without control



Building Construct

Innovation in the heart of a multidisciplinary clinical and research center Funded by Philanthropy in an Independent Not For Profit Institute

i2R Goals

Innovation...new technology For profit companies Self sustaining JI and i2R Creation of a Med Tech Hub

Idea to Proof of Principle

THE CENTER FOR ENTREPRENEURSHIP AT THE JACOBS INSTITUTE: Converting ideas into innovation, companies and jobs.



BUSINESS

FROM IDEA TO PROOF OF PRINCIPLE

SCIENCE

RISK REDUCTION

VALUE CREATION

