



MAYO CLINIC  
Medical Transport

# Kaye Melmeth





# Kaye Melmeth

- Raised in rural NSW
- Career highlights
  - Trained at Manning River District Hospital
  - Royal Newcastle Hospital
  - Midwifery Training at Royal Women's Hospital
  - Intensive Care Training at St. Vincent's Hospital
  - 1978 NSW Air Ambulance





# Kaye Melmeth

- Flight Nurse Career 28 years!
  - Founding member of ISAS
  - Founding member of FNA and served as president and secretary
  - Established the Aviation Medicine Nursing Course
  - Helped develop Industry Standards
  - Developed standards, safety systems and training programs in her own program



# Kaye Melmeth

- Awarded the Meritorious Medal in 2002 for her contribution to the NSW Air Ambulance Service
- In 2006 Alpha Mike Sierra was dedicated to her extraordinary career







VH-AMS

Ambulance Service of NSW



King Air



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# A mother's flight to survive.





## Objectives: Peripartum cardiomyopathy: A mother's fight to survive.

- Recognize signs symptoms of peripartum cardiomyopathy.
- Review treatment options for patients with peripartum cardiomyopathy.
- Understand the use of fixed wing transport in the critically ill.







# December 21, 2007

- **10:12 AM** – Call comes in to Oliver County Dispatch. (South Central ND)
- Unresponsive 25 year old female, CPR in progress.
- Oliver County Ambulance dispatched to a scene.
- ALS (Mercer County Ambulance) intercept called for.





# Arrival to Scene

- At **10:27AM**, Oliver County Ambulance arrives to find CPR in progress by Mike Ginther on his wife Tanya Ginther lying on the garage floor. Scene 12 miles from base.
- AED = Shock advised, Shocked x1 immediately.
- **10:36 AM** After a short ground time (**9 minutes**), Tanya was transported.





# Mercer County Ambulance

- Mercer County Ambulance (ALS) arrives **10:36 AM**, paramedic, jumps in with Oliver County for transport to Sakakawea Medical Center in Hazen, ND.
- IV established with LR infusing.
- Assisted breathing enroute via BVM.
- CPR resumed, no shock advised.





## Sakakawea Medical Center, Hazen ND

- Arrived at **10:58 AM.**
- ACLS drugs given.
- Intubated and sedated.
- Stabilized with return of pulses.





# Sakakawea Medical Center to Saint Alexius, Bismarck

- **12:10 PM** – Departure of Mercer County Ambulance enroute to Bismarck. (45 miles)
- Roads conditions were horrible – snowing, blowing, and cold.





# St. Alexius, Bismarck

- **1300 PM** Arrival to ED
- Continuous resuscitation
- Admission to CCU





# Saint Alexius- CCU

- Right IJ Triple Lumen
- Art-Line
- NG & Foley
- Coronary Catheterization
  - Negative for CAD
  - Received numerous shocks and CPR
  - Balloon pump placed
  - Hypothermia Protocol





# 24 hour post admit

- Warmed and sedation lightened
- Moves all four extremities
- CT Head Negative
  
- **1705** Call to MAYO Cardiology
  - Transfer options?
  - Anticipated transplant recipient
  - Expected Left ventricular assist device to bridge to transplant
  
- **1800**
  - V-fib arrest ----- Numerous shocks & CPR





## December 22, 2007

- 1716 – Mayo MedAir Weather Check
- Bismarck, ND to Rochester, MN
- Beech Jet 400
  - Length of Flight
  - Runway Length
  - Patient/Passengers
  - Balloon Pump and Liquid Oxygen







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# Dispatch Report

- 25 year old female
- Post VF arrest
- Balloon Pump
- Multiple Pressors
- Ejection Fraction of 5%







# Past History

- 2 months post partum – uneventful vaginal delivery.
- No medical or surgical history.
- Past two weeks complained of feeling light-headed, palpitations, and shortness of breath.
- Stomach flu at the end of pregnancy, “terribly sick for a week,”
- Loading car for Christmas vacation





# Crew

- Greg Neumann NREMT-P, Holly Tlougan RT, and Tim Alden, RN
- Pilots: Dustin Anderson and Robert Myers







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# Departure to Bismarck

- 1931 - Enroute
- 2101 - Landed (90 minute flight)\*
- 2150 – Bedside at St. Alexius





# Approx 2200

- Pulseless V-Tach
- Spontaneously converts – 20 seconds CPR
- NSR with PVC's
- Loaded with 100 mg Amiodarone
- Labs redrawn
- Call to Medical Control
- **2300** - Enroute to Aircraft





# IV Medications

- **Levophed** – 15 mcg/min
- **Dobutamine** – 8mcg/kg/min
- **Vasopressin** – 0.15 u/min
- **Amiodarone** - .5 mg/min
- **Fentanyl** – 50 mcg/hr







# Enroute Vitals

- BP – 82/55
- HR – 89 SR with PVC's
- Ventilated
- Goal MAP >70
- Temp 38.2
- **Balloon Pump**
  - 100% Aug.
  - 1:1 frequency
  - **Ventilator** : AC 16, Peep 5 PS10 60% O2 Tv 450



# In flight

- Episode of coughing
- NG placed to suction – Phenergan
- Sedation with Fentanyl & Versed
- Maintained MAP above 70
- Increasing PVC's





0027

- V-Tach
- Weak and thready pulse – Dropped pressure to 50's systolic via art-line.
- Cardioverted with 120 Joules (Zoll – Biphasic)
- Reloaded with 300 mg Amiodarone
- Rate around 100's



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- Bradycardia
- Rate to 45
- 1 mg atropine given
- Rate 130's for approx 5 minutes
- SR in the 70'-80's







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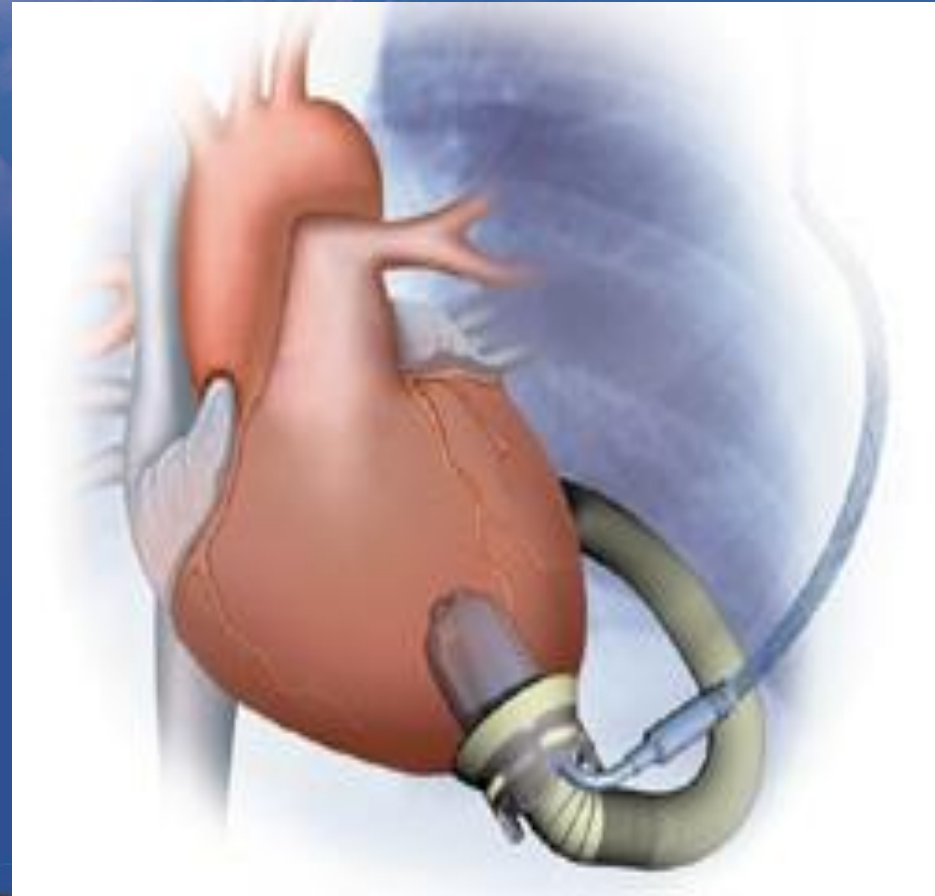
# Rochester, MN

- **0101** Landed  
- 71 minute flight
- **0145** in CCU at Saint Marys Hospital in Rochester.



# Follow-Up

- Three arrests overnight.
- Jarvik 2000 LVAD placed in the afternoon on the December 23<sup>rd</sup> for a bridge to transplant.
- Closure of patent foramen ovale
- Placed on Transplant list.





# Follow-Up

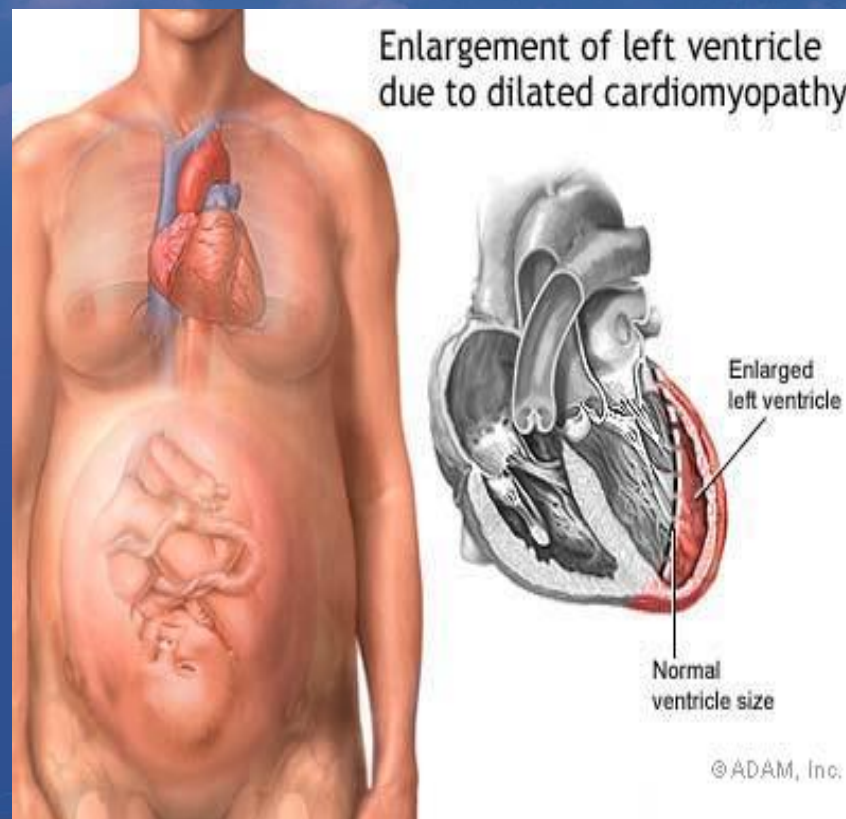
- Weaned off pressors.
- Extubated on 12/26/07.
- Echo 1/2/08
  - Significant improvement of LV function
  - LVEF of 53% with LVAD
- Dx – Peripartum cardiomyopathy with Non-specific lymphocytic Myocarditis





# Peripartum Cardiomyopathy

- 1 in every 1,300 to 4,000 deliveries in the U.S.
- Risk Factors:
  - Age >30
  - Multifetal pregnancy
  - Preeclampsia
  - African descent





# Peripartum Cardiomyopathy

- **Diagnostic Criteria**
  - Cardiac failure developing last month of pregnancy or within 5 months of delivery.
  - No identifiable cause of the cardiac failure
  - Ejection fraction less than 45%



# Etiology – 3 main causes

- Myocarditis - viral
- Abnormal immune response to pregnancy
- Response to Hemodynamic stresses of Pregnancy





# Peripartum Cardiomyopathy : Myocarditis

- Study showed up to 76% as the cause. Midei et al. (1)
- Absent or muted immune response during pregnancy allow for unchecked viral replication thus increasing likelihood of myocarditis.





# Signs/Symptoms (Heart Failure)

- Dyspnea
- Fatigue
- Dizziness
- Pedal edema
- Orthopnea
- Palpitations
  
- \*Sudden Onset\* of symptoms



# Treatments

- Depends on severity and pre – post birth.
- Beta-Blockers, Lasix, Hydralazine, Nitrates
- ACE- Inhibitors – post pregnancy
- Anticoag therapy – post pregnancy if increased severity, usually EF <35%
- Usually able to taper in 6-12 months





# Follow-Up

- January 1, 2008 transferred to Rehabilitation unit.
- Discharged from Saint Marys Hospital 1/9/08 -18 days after admission.
- Jarvik 2000 was discontinued on 4/9/08 – 48% ejection fraction. Latest EF was 53%.
- Her heart healed itself without transplant.







# Anoxic Brain Injury

- Visual impairment secondary to occipital lobe anoxia 80/20.
- Neuro Consult: The medial occipital cortex is one of the most vulnerable areas to anoxia after cardiac arrest. Prognosis differs from pt to pt. MRI is the only test that may clarify.
- Visual Acuity improves to 20/20 within 6 months





## CPR facts and statistics - AHA

- About 80% of all out of hospital arrests happen at home.
- Immediate effective bystander CPR can double a victim's chance of survival.
- Approximately 95% of cardiac arrest victims die before reaching hospital.





## CPR facts and statistics - AHA

- Brain death occurs 4 to 6 minutes after cardiac arrest if no CPR/Defibrillation occurs during that time.
- If CPR not started, victim's chance of survival fall 7 to 10 percent for every minute delay.









# Mayo MedAir













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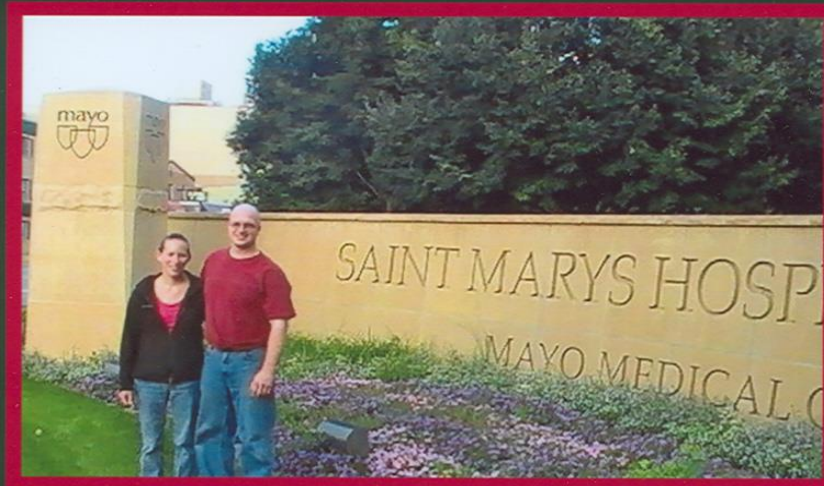




Merry Christmas



Love, The Ginther's  
Mike, Tanya, Clara, & Blaine







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# Thank You!

