

Is there a Doctor Onboard? – In-Flight Medical Emergencies

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Disclosure

- Dr. Munzing has no relevant financial interests to disclose



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Goals & Objectives

- ❑ Understand availability of emergency medical equipment on US air carriers
- ❑ Explain and prepare for the medical volunteer role on an in-flight medical emergency
- ❑ Integrate additional resources when managing an in-flight medical emergency, including ground-based medical support
- ❑ Utilize guidelines in managing in-flight medical emergencies

Medical Emergencies



Overview

- Background
- Resources Available
 - Emergency Medical Kits
 - Ground-based Assistance
- Medical Conditions
 - Frequency
 - Specific Evaluation / Management
- Real-life Examples
- Discussion



Background

Prevalence of In-Flight Medical Emergencies (IME)? No agreed-upon classification system.

- 1 in 604 flights (requiring ground-based communication) – underreporting likely
- Estimates – 24 to 130 IME's per 1 million passengers
- Range - 260 – 1,420 IME's daily worldwide
- 1 of every 7,700 to 14,000 passengers

Medical Volunteers

Trained Medical Passengers

- **Physicians (MD/DO)* (~40 – 50% primary responder)**
- Dentists (DDS)*
- Physician Extenders (PA, RNP)*
- Emergency Medical Technicians (EMT)*
- Registered Nurses
- **Flight attendants alone - ~45% of incidents**
- Have ID – may be requested (license, business card, etc.)
- *Some airlines restrict use of Emergency Medical Kit to those with one of these specific credentials

Pathophysiology

- Airlines – Cabin pressurized to 11 – 12 psi = equivalent of altitude of 5000 to 8000 feet
- Expansion of gas-containing spaces – sinuses, middle ear, post-operative
- Mild hypoxia in healthy passengers (possibly pO₂ – 93%)
- Effects to passengers with chronic respiratory conditions, infections, etc.

Pathophysiology - Continued

- ❑ Thrombo-embolic – DVT / PE – hours to days after completing flight
- ❑ Lower limb thrombosis – high risk patients – up to 5% per flight
- ❑ Symptomless venous thromboembolism as high as 10% in flights 4+ hours
- ❑ Cabin air – dehumidified
- ❑ Exposure of allergens, infection

Medical Volunteers

- Primary Role – gather information, assess, communication assistance – ground-based support, administer treatment or procedures
- Legal Issues
 - Aviation Medical Act (“Good Samaritan”) – except gross negligence, willful misconduct, or seek compensation
 - Canadian Medical Association and Canadian Medical Protective Association (“Good Samaritan”) - assistance
 - Outside the US – varies



Medical Volunteers

- Duty to Act
 - US – no legal duty to act
 - Outside the US – varies
 - Many European countries - **required**



Ground-Based Medical Consultants

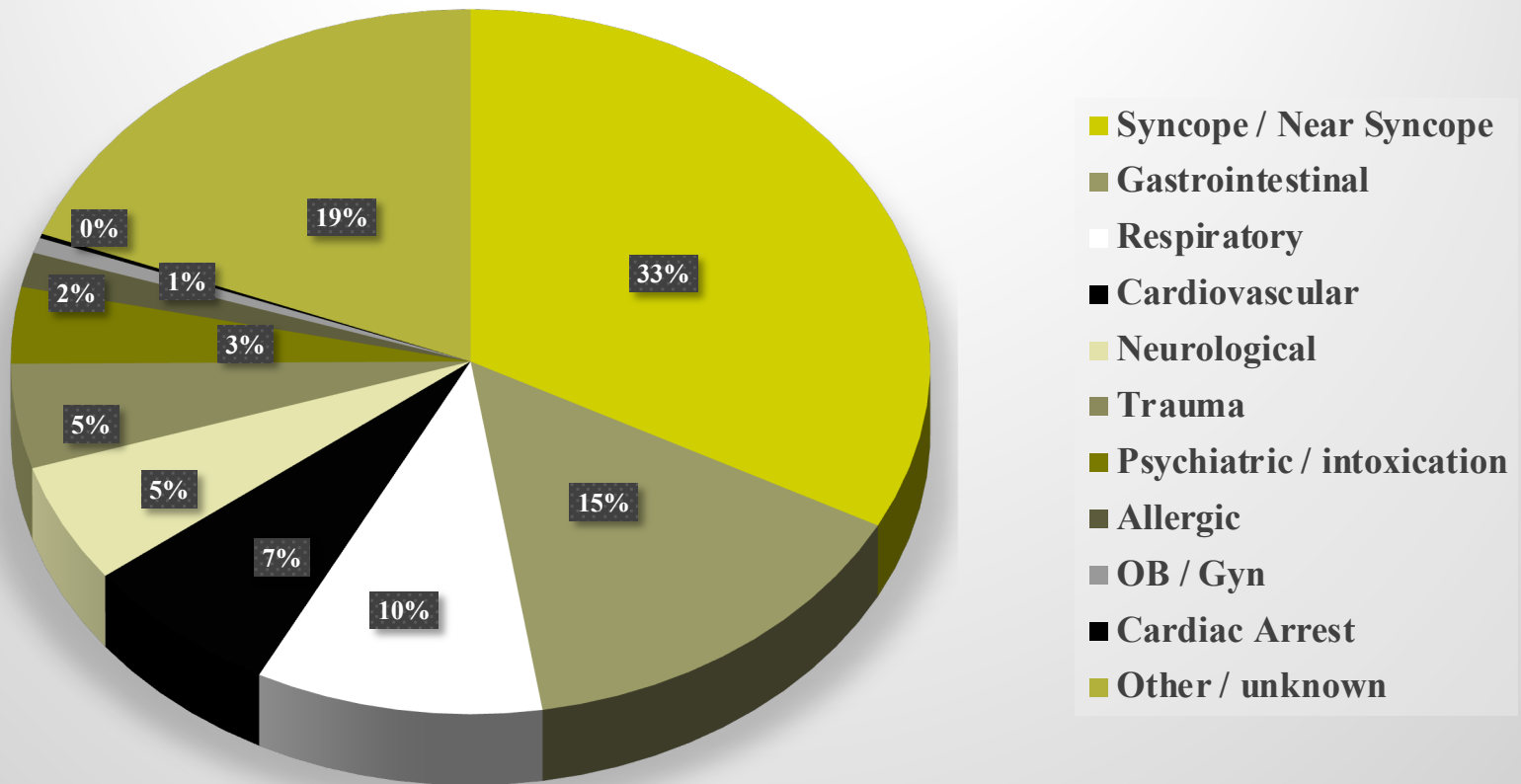
- Stat MD, Inc. (Pittsburgh)
- MedAire, Inc. (Phoenix)

IME Prevalence

<u>Category</u>	<u>Percentage</u>
Syncope / Near Syncope	33%
Gastrointestinal	15%
Respiratory	10%
Cardiovascular	7%
Neurological	6%
Trauma	5%
Psychiatric / intoxication	4%
Allergic	2%
OB / Gyn	1%
Cardiac Arrest	0%
Other / unknown	19%

IME Prevalence (for visual learners)

IME Category Prevalence



Emergency Medical Kit - (US)

□ Equipment

- AED – most have
- Airways
- Adhesive tape – 1”
- Alcohol sponges
- CPR mask
- IV administration set
- Needles
- Protective gloves



Emergency Medical Kit - (US)

□ Equipment – Cont.

- BP cuff
- Stethoscope
- Syringes
- Tape scissors
- Tourniquet (for IV)
- Manual resuscitation device, 3 masks
- Kit use instructions



Emergency Medical Kit - (US)

□ Medications

- Non-narcotic analgesic
- Antihistamine, 50 mg injectable
- Antihistamine 25 mg tablets (diphenhydramine?)
- Aspirin tablets – 325 mg
- Atropine 0.5 mg, 5 ml (not all have this)
- Bronchodilator, inhaler
- Dextrose, 50%/50 ml injectable

Emergency Medical Kit - (US)

□ Medications – Continued

- Epinephrine, 1:1000, 1 ml injectable
- Epinephrine, 1:10,000, 2 ml injectable
- Lidocaine, 5 mg, 20 mg/ml injectable
- Nitroglycerine tablets
- Saline solution, 500 mg
- [Epipen (outer thigh – 1.5 cm deep – 0.3 mg if > 66 lbs; 0.15 mg if 33 – 66 lbs)]



Emergency Medical Kit - (US)

- Non-required – some airlines include:
 - Burn dressings
 - Cord clamps
 - Disposable scalpel
 - Glucometer (if not check passengers)
 - Insulin syringe
 - Thermometer
 - Umbilical cord clamp
 - Urine catheter



Emergency Medical Kit - (US)

- Non-required – some airlines include:
 - Antacid tablets
 - Diclofenac – injectable or tablets
 - Furosemide
 - Glucose gel / Glucagon
 - Ibuprofen / Ketorolac injectable
 - Meclizine
 - Metoprolol
 - Naloxone
 - Promethazine



First-aid Kit (Southwest Airlines)

- ❑ Adhesive bandage compresses – 1”
- ❑ Antiseptic swabs
- ❑ Ammonia inhalants
- ❑ Bandage compresses – 4”; triangular 40”
- ❑ Splints – arm and leg, noninflatable
- ❑ Roller bandage 4”
- ❑ Adhesive tape roll – 1”
- ❑ Bandage scissors



What do WE need to do?

1) assess your own capability

- per AAFP - alcohol, benzos, sleep aids, fatigue

2) history/physical to present to pilot/ground control

- aid in decision for diversion + coordinate ground aid

NOT required

- correct diagnosis
- textbook-perfect treatment
- knowledge of medicine outside of your scope of practice

Airline Diversion – It's Complicated

- Final decision – pilot and ground-based support
- Complicating Factors
 - Patient condition
 - Location and altitude (at cruising altitude – at least 30 minutes to land)
 - Availability of airport / emergency services
 - Airline costs
 - **Only about 11% of airline diversions result in a hospital admission**

Real-Life Examples

- 82 yo male – shortness of breath – 36,000 feet – Air France over Turkey
- 32 yo female – jaw dislocation non-traumatic, history of the same, painful
- 73 yo male, unconscious, Bangkok – taxiing to the runway to take off
- 28 yo female, 1st trimester pregnancy, mild vaginal bleeding, United States

Syncope – Near Syncope

Assessment

- Vaso-vagal
 - Cardiac
 - Pulmonary (pulse oximetry?)
 - Neuro – CVA / TIA
 - Endocrine – hypoglycemia (glucose meter?)
- Management



Cardiovascular

Assessment

- Cardiac history
 - Possible acute coronary syndrome
 - Possible arrhythmia
 - Possible dyspepsia
- Management



Gastrointestinal

- Assessment
- Management
 - Severe abdominal pain
 - Nausea / vomiting
 - Diarrhea
 - Dyspepsia

Respiratory Distress

- Assessment
 - Hx respiratory disease
 - Hx scuba diving
 - Extremity swelling
 - Infectious
 - Pulse oximetry (?)
- Oxygen – maximum 4 L/min
- Management

Neurological – CVA/TIA/Seizure

- Stroke-like
 - Focused history
 - Neuro exam
- Seizure
 - History
 - Specific symptoms
 - Duration
 - Responsive vs unresponsive
- Management

Cardiac Arrest

- Start CPR
- AED onboard
- If no response after AED – Epinephrine (0.1 mg/ml) – 1 mg IV
- Pilot and ground-based support to guide diversion, etc.



Other IME Categories

- Trauma
- Psychiatric
- Obstetrics / Gynecological
- Substance Abuse – Withdrawal
- Allergic Reactions

Common Emergencies

Dyspnea (10%)

AAFP - “check SpO₂, +O₂, consider albuterol” - (remember SpO₂ 93% can be normal)

Chest pain (7%)

AAFP - “vitals, +O₂, consider ASA/NG”

Stroke-like symptoms (5%)

AAFP - “history and physical (document deficits/time of stroke), O₂, diversion - no aspirin”

Common Emergencies

Seizures

- threshold lower - decrease in O2/disturbance in circadian rhythm/sleep with travel
- prevention of secondary trauma
- AAFP - “oral benzo vs patient’s own med, additional dose”

Traumatic injury

- tourniquet, splint (random materials)

OB issues (0.7%)

- IV fluids if hemorrhage/abruption suspected → immediate diversion

Discussion

- Examples from Attendees
- What might you bring with you on the flight?
 - Pulse ox?
 - Gloves?
 - Pen light?
 - EpiPen or similar?
 - Naloxone?
- Additional Resources?
- Q&A

Resources

- ❑ “In-Flight Medical Emergencies: A Review”, Christian Martin-Gill, et al, JAMA, December 25, 2018
- ❑ “Is there a doctor on board?”: Practical; recommendations for managing in-flight medical emergencies, David Kodama, MD, et al, Canadian Medical Association Journal (CMAJ), February 26, 2018
- ❑ Federal Aviation Administration (FAA) – faa.gov
- ❑ www.stat-md.org