IS THERE A NURSE ON BOARD?

RESPONDING TO IN-FLIGHT MEDICAL EMERGENCIES

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OBJECTIVES

- ✓Recognize how altitude can exacerbate human health disorders.
- ✓List factors to consider when weighing the decision to respond to a flight attendant's request for assistance by medical professionals
- ✓Identify common resources available to support emergency care delivery on board a US-based commercial aircraft.
- ✓Differentiate medico-legal considerations when flying on a US-based airline vs. an international airline registered outside the US

CONSIDER THIS SCENARIO…

- Flight to Sacramento, CA from Philadelphia, PA
- Women in seat directly across the aisle appears ill
- Flight attendants are speaking with her
- She suddenly becomes rigid and a generalized, tonic / clonic seizure begins
- Flight attendants request help from medical professionals

EPIDEMIOLOGY OF IN-FLIGHT MEDICAL EMERGENCIES

- 2.7 million airline passengers on > 44,000 flights/day in US
- > 4 billion global commercial airline passengers annually
- True global incidence of in-flight medical emergencies (IFMEs) uncertain
  - No mandatory reporting unless flight was diverted (including US)
- Estimated incidence 16 IFME's per 1 million passengers in US
- Incidence ~ 1 IFME per 600 flights in US
- Most managed by flight crew without assistance (trained in first aid)
- Flight crew request HCP assistance in 30% to 35% of events

Source: CDC Yellow Book 2024

EPIDEMIOLOGY OF IN-FLIGHT MEDICAL EMERGENCIES

- Most common in-flight medical events in order of frequency:
  - Syncope / pre-syncope
  - Gastrointestinal
  - Respiratory
  - Neurologic / seizures
  - Cardiovascular
  - Allergic reactions
- In-flight death rate reported at 0.2% - 0.3% of IFMEs

AIR TRAVEL FUN FACTS: PHYSIOLOGY OF ALTITUDE

- Cruising altitude of commercial aircraft is 30,000 – 45,000 ft
- Cabin pressure typically 6,500 – 8,000 ft
  - Fraction of inspired oxygen content (FiO2) remains 21%, but…
  - With ascent, atmospheric pressure drops by 25% to 30%
- As altitude increases, partial pressure of oxygen decreases by 3% to 5% or more, even in healthy people
- Can worsen hypoxia, esp. for travelers with pulmonary & heart disease

AIR TRAVEL FUN FACTS: PHYSIOLOGY OF ALTITUDE

- Boyle's Law: When temperature and mass are constant, the volume of gas varies inversely with the absolute pressure (P X V = P' X V')

➢ Gas expands within closed body compartments with ascent:

➢ Consider…

  - Sinus and ear pressure
  - Bowel gas
  - Tooth pain
  - Pneumothorax
  - Surgically-created cavities and gas insufflation (laparoscopy /colonoscopy) – do not fly until approved by surgeon

WEIGHING THE DECISION TO RESPOND

- Healthcare professional licensure / certification / scope of practice?
- Knowledge, skill and capability to respond?
- Relative contraindications:
  - Excessive fatigue / sleep deprivation?
  - Alcohol intake?
  - Medication use that can impact cognition?
    - Sleep aid or anxiolytic use?

APPROACH TO AN INFLIGHT EMERGENCY

- Identify yourself & state healthcare credentials, experience
  - May be asked to provide proof of licensure or certification
- Ask injured / ill traveler or family for consent to evaluate & intervene
  - If traveler is incapacitated, act on implied consent in emergency
  - Request flight crew provide first aid kit with gloves, supplies for standard precautions, and basic assessment / interventions

APPROACH TO AN INFLIGHT EMERGENCY

- Assess / manage ABC's or CABC's if hemorrhage present (primary survey)
- Evaluate vital signs and obtain pertinent health history
  - Protect patient privacy to best extent possible
- Perform targeted physical assessment & interventions as indicated
  - Inform flight crew of possible communicable disease
- Request contact with ground medical consultation for guidance (not required by FAA in US, but recommended)
  - Consultation may be required to obtain / use in-flight medical kit

GROUND-BASED MEDICAL CONSULTATION

- Available to all US flights & most international flights
- Can be used for medical direction for nurses and other HCPs
- Staffed by physicians experienced in flight environment
- All conversations recorded
- Captain turns over control of aircraft to co-pilot & engages with medical consultant, flight crew & HCP for decision-making
- Combination telemedicine & videoconferencing approaches possible

AIRLINE MEDICAL KITS

AIRLINE MEDICAL KITS

- Per US Code of Federal Regulations (14 CFR, Part 121; subpart X, 121.803 and Appendix A):
- FAA mandates all US domestic & international airlines with > 1 flight attendant must carry in passenger compartment:
  - First aid kit(s) -- quantity based on number of passenger seats
  - Specified medical equipment/supplies (incl. limited common OTC meds)
  - An approved AED marketed in US
  - An emergency medical kit with specified list of medications
  - Required contents are available online (CDC Yellow Book 2024)

AIRLINE MEDICAL KITS

- FAA only defines minimum medications, supplies & equipment
- Minimum medication list updated August 27, 2024 to add epinephrine autoinjectors (previous formulation was epinephrine vial + syringe)
- Airlines may stock more than minimum & add items not included on list
  - Significant variation exists between airlines
  - The Aerospace Medical Association Air Transport Medicine Committee reviewed FAA minimum contents and recommended additions in 2018; no changes except epinephrine autoinjectors have been made since 2004

AIRLINE MEDICAL KITS: REQUIRED MEDICATIONS

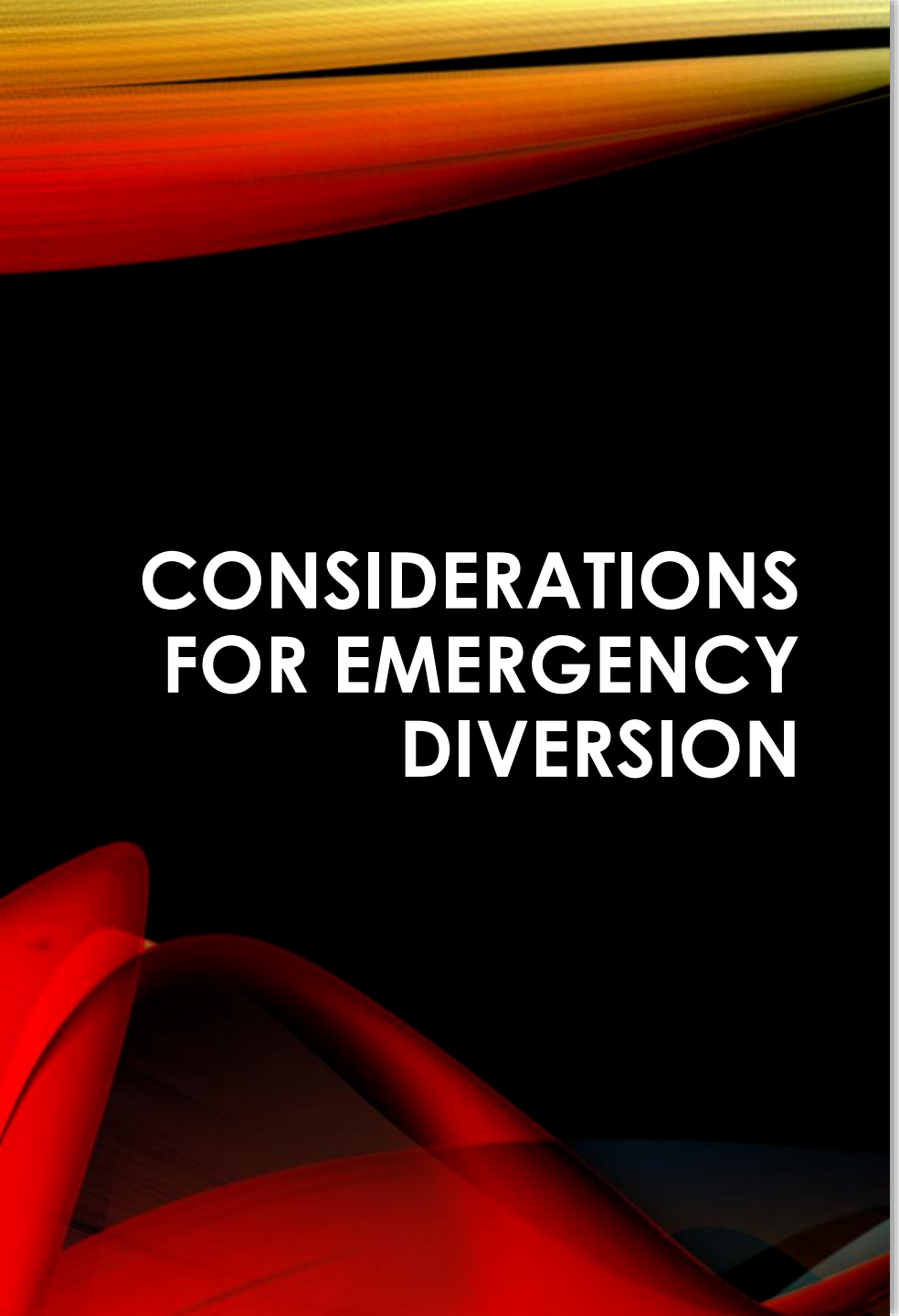
- Antihistamine (25 mg tablets and 50 mg injectable)
- Aspirin (325 mg)
- Atropine
- Bronchodilator, for inhalation
- Dextrose (50%) and saline, for infusion
- Epinephrine (1:1,000 and 1:10,000): New: Epinephrine Autoinjector
- Lidocaine
- Nitroglycerin tablets (0.4 mg)
- Non-narcotic analgesic (325 mg)

AIRLINE MEDICAL KITS

- Of note, FAA does not require items including, but not limited to:
  - ”Universal precautions kit”
  - Naloxone
  - Thermometer
  - Glucometer
  - Pulse oximeter
  - Suction
  - Spacers for inhaled bronchodilators
  - Antiemetics or antidiarrheals
  - Antipsychotic
  - Laryngoscope, endotracheal tubes, Magil forceps
  - Tourniquets / hemostatic dressings

FLIGHT DIVERSION

- Cost of emergency landing / flight diversion $500,000 to $1,000,000 per incident
  - 11.1 diversions per 100,000 flights
- Decision made by captain on advice of flight crew, HCP responders, ground medical control, air traffic control
- Captain must consider:
  - Safety of all passengers, weather, fuel, airport safety & logistics, political unrest or enemy territory (international flights), healthcare resource availability



CONSIDERATIONS FOR EMERGENCY DIVERSION

- Chest pain / cardiac event
- Shortness of breath
- Stroke
- Severe abdominal pain
- Unremitting seizure activity
- Persistent unresponsiveness
- Severe agitation

MEDICO-LEGAL CONSIDERATIONS

- International travel: professional liability rules vary widely and may be based on airline's country of registry, aircraft's geographic location at time of incident, and if plane is in-flight or on ground
- Legality of RN & APRN scope of practice dependent on country of airline registry
  - A few countries do not allow any independent nursing action or intervention
- Some countries mandate a duty to respond for licensed healthcare practitioners (ex, Australia)
  - Not responding may be a criminal offense
  - There is no duty to respond law in US, Canada & UK

GOOD SAMARITAN LAWS

- Broad protection in US airline industry based on US Aviation Medical Assistance Act of 1998:

"An individual shall not be held liable for damages in any action brought in a Federal or State court arising out of the acts or omissions of the individual in providing or attempting to provide assistance in the case of an in-flight medical emergency unless the individual, while rendering such assistance, is guilty of gross negligence or willful misconduct."

GOOD SAMARITAN LAWS

- In the US, requires:
  - No pre-existing duty to provide care
  - No compensation or reimbursement for care
  - Flight crew requested the assistance
  - No gross negligence or willful misconduct
- Common in most countries, but not all:
- Internationally, a clinician responding to a medical emergency as an act of good will may still be at risk of litigation in some countries

MORE TO CONSIDER FROM CDC'S 2024 YELLOW BOOK

- In US, decision to respond is personal based on ethics
- Communicate any concerns to flight crew honestly
- Document medical encounter as required by airline policies
- Notify flight crew immediately if any items in airline medical kits, supplies and equipment are not present or functional
- During international travel, consider personal ethics and legal jurisdiction
- DNR: Not all airlines heed travelers' "Do Not Resuscitate" orders; flight crew may still attempt to resuscitate

QUESTIONS / DISCUSSION

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