Dr Ben Johnston
Aviation Medicine

Saturday, June 11, 2016

14:00 - 14:55  WS #144: Managing In Flight Emergencies
15:05 - 16:00  WS #156: Managing In Flight Emergencies (Repeated)
Managing In-Flight Medical Emergencies

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Occupational and Aviation Medicine
www.otago.ac.nz/aviation_medicine
Overview

- What type of medical events happen on aircraft?
- Medicolegal aspects
  - Should I get involved?
  - Indemnity?
  - What is my role?
- The environment and equipment
- What help is available
- Take Home Messages and checklist
3.3 Billion Airline Passengers in 2014

302 seats… 15,000 km … 36,000 ft
Medical Incidents: Rates

- All medical incidents:
  - 70.4 per million RPK
  - 159 per million passengers

- Emergencies:
  - Range from 5 to 100 per million passengers

- Deaths:
  - <1 per million passengers

Mahoney et al, Av Sp Env Med, Dec 2011
Symptom-Based Categorization of In-Flight Passenger Medical Incidents

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The Spectrum of In-flight Cases

- Neurological: 32%
- Gastro: 23%
- Respiratory: 8%
- Cardiovascular: 8%
- Infectious/Communicable: 4%
- Allergy: 4%
- Injury/External: 3%
- Mental: 3%
- All Other: 15%

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Medical Incidents: Most Common

- Transient unconsciousness 41%
- Nausea / Vomit / Diarrhoea 20%
- Breathing difficulty 16%

Mahoney et al, Av Sp Env Med, Dec 2011
Symptom-Based Categorization of In-Flight Passenger Medical Incidents
Non-serious (no diversion/no death) events and RPKs
Medical Incidents: Most Serious

- Unconscious with slow / no recovery 3.4%
- Chest pain 2.3%
- Seizure 1.1%
- Labour <0.1%

Mahoney et al, Av Sp Env Med, Dec 2011
Symptom-Based Categorization of In-Flight Passenger Medical Incidents
Medical diversions

- Cardiovascular: 65%
- Neurologic: 37%
- Respiratory: 13%
- Gastrointestinal: 9%
- Ob/Gyn: 3%
- All other: 10%

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Serious (diversion/death) events and Pax carried

R² = 0.8264
Is there a Doctor on Board?

~ 50% of Air NZ flights have a medically trained person on board.
Applicable Law

糍 In aircraft with doors open
  – Law of local country applies
糍 In aircraft with doors closed
  – Law of country of registration applies
糍 Your legal duty to render assistance depends on applicable law
In New Zealand

“If asked to attend a medical emergency….a doctor must respond. This is both an ethical and legal obligation… If a doctor chooses not to attend he or she may be required to defend that decision in the event of a charge of professional misconduct or criminal prosecution”

“A doctor asked to look after a person in a medical emergency has a legal duty to provide the necessaries of life to that person”

MCNZ A Doctors Duty to Help in a Medical Emergency, Aug 2006
Should I Get Involved?

“Rarely there will be times when attending a medical emergency is impossible or unsafe for the doctor or the patient”
- Already attending another emergency
- Geographical location is such that someone else can respond more promptly
- Has been drinking alcohol or taken medication or other substances to a level that may adversely influence the doctors competence
- Personal safety of the doctor is at risk

MCNZ A Doctors Duty to Help in a Medical Emergency, Aug 2006
“There are different levels and areas of competence and a doctor may not have the necessary skills to assist with anything more than basic first aid in a medical emergency... If he doesn’t have the appropriate skills he will present himself as a citizen with some knowledge of emergency first aid. Nothing less would be acceptable”

MCNZ A Doctors Duty to Help in a Medical Emergency, Aug 2006
“In consideration of your voluntarily agreeing to provide emergency in-flight medical treatment/advice at the request of Air New Zealand, the company agrees to indemnify you against any liability, claims, suits proceedings that may arise or result from any medical malpractice, error or mistake you commit in good faith in the course of providing the emergency medical treatment/advice and which is not covered by any insurance you may maintain”
In The UK

- There is no duty for physicians to render assistance.
- If you do assist, the ‘Bolam Test’ applies to standard of care.
  - If you present yourself as a doctor, care provided must reach ‘the standard of a responsible body of medical opinion’.
In the United States

- Duty of care arising from ‘special relationships’
  - Spouses, children, employees
  - Carriers, for their passengers

- No duty on Drs or other healthcare workers to provide care
  - Duty to call 911

- ‘Good Samaritan’ Legislation
  - Does not apply if you accept payment
Roles and Responsibilities

- Trained in FA, CPR & AED
- May assist as translator, chaperone
- Can call MedLink
- Can administer GTN, Ventolin and Epipen under MedLink direction
Roles and Responsibilities

- In charge
- Diversion decision rests with Capt. alone
- Authority to release Physicians Kit for use
- Can call MedLink
Roles and Responsibilities

- Assess
- Assist
- Advise
- Within individual scope of practice and competence
Issues with Environment

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Altitude

- Flight Altitude: 28-40,000 ft
- Cabin Altitude: 6-8,000 ft
- Automatically controlled to maintain a safe & comfortable environment
Cabin Altitude 8000 ft: Oxygen

- \( \downarrow P_aO_2 \) to 65mmHg
- Equivalent to 15% oxygen
  - Hypobaric/hypoxic hypoxia
- Healthy individuals experience 3-4% \( \downarrow S_AO_2 \)
Where can you go?

- Exit row
- Galley area
Medical Equipment Available On-Board?

- Oxygen
- AED
- Physician’s Kit
- Specific Purpose Kits
- Cabin Crew Operating Manual (First Aid)
In-flight Oxygen

Emergency oxygen supply is for flight-related emergencies
- E.g. Sudden decompression
- Must not rely on this for pax
- Limited supply of medical $O_2$

Supplementary $O_2$ must be pre-arranged
- Oxygen concentrators
- Nominal cost for pax
- Not provided on ground (e.g. transits)
Emergency Oxygen

- 2 or 4 L/min
- Total 311 L
Physicians Kit

- Protocols on Use
- Info Booklet

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What Help is Available?

Ground-based medical assistance called if:

- Oxygen administered
- Physician’s kit opened
- Doctor called
- Diversion possible
Should we Divert?

- Isolation and limited medical facilities
  - Medical outcomes poorer

- Diversions:
  - Flight safety impact
  - Location, fuel, weather, medical facilities at destination
  - Stressful
  - Disruptive to other pax
  - Costly: to the airline and other pax
Anatomy of a Medical Event

Event Point

Contact Point

Decision Point

Origin
Advice
Diversion
Destination
## US In-Flight Diversion Data

<table>
<thead>
<tr>
<th>Category</th>
<th>Total No</th>
<th>Incidence (%)</th>
<th>Likelihood of diversion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neurologic</td>
<td>626</td>
<td>31</td>
<td>17</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>274</td>
<td>13</td>
<td>39</td>
</tr>
<tr>
<td>GI</td>
<td>201</td>
<td>9</td>
<td>10</td>
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<tr>
<td>Respiratory</td>
<td>173</td>
<td>9</td>
<td>17</td>
</tr>
<tr>
<td>Infection</td>
<td>165</td>
<td>8</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Cost per diversion: $US 50k
Total cost: $US 8.9m

Sirven et al, “Is there a neurologist on this Flight”, Neurology, 2002
In-Flight Emergency Checklist

☑ Introduce yourself
☑ Ask for the passenger’s consent to provide assistance
☑ Ask for a translator if needed
☑ Keep written records
☑ Use cabin crew as a chaperone
☑ Ask for physicians’ kit
In-Flight Emergency Checklist

- Be aware of your own condition eg fatigue, alcohol, sleeping tabs
- Practice within your area of expertise
- If you start providing assistance, don’t stop
- Ask about the airline’s ground-based medical assistance or other support
- If passenger critical, ask if diversion possible
In-Flight Emergency Checklist

☑ Beware of other passengers filming events in-flight
☑ Best not to request payment
☑ Ask for a liability release form from the airline
The airline, crew and passenger appreciate your willingness to assist.

You have an ethical and professional obligation to assist in NZ registered aircraft.

You are indemnified by Air NZ for care given in good faith.

In-flight medical incidents are common but most are minor in nature.
Take Home Messages

- A comprehensive standardised medical kit is on board all long haul aircraft
- Use other available spaces if required
- Use the In-Flight medical emergency checklist
Questions?
Contact Details

Air NZ Aviation Medicine Unit
Phone: +64 9 256 3924

MEDA Clearance enquiries
Phone: +64 9 255 7757
Fax: +64 9 336 2856
Email: MedaClearance@airnz.co.nz
Diagnostic impressions for Cardiovascular cases (NZ)

- Angina / Ischemic heart disease: 40%
- Chest pain not specified (atypical): 23%
- Cardiac arrhythmia not specified: 10%
- Swollen ankle / edema: 10%
- Death: 7%
- Atrial fibrillation / flutter: 4%
- Elevated blood pressure / hypertension: 3%
- Postural hypotension: 3%
Diagnostic impressions for Neurological cases (NZ)

- Syncope / Fainting: 51%
- Seizure / convulsion: 13%
- Headache: 9%
- Neurological disease, other: 9%
- Weakness/tiredness general: 9%
- Other non-specified: 7%
- Transient cerebral ischaemia: 1%
- Vertigo / dizziness: 1%
Diagnostic impressions for Respiratory cases (NZ)

- Shortness of breath / dyspnea: 50%
- Asthma: 37%
- Chronic obstructive pulmonary disease: 13%