MICA Flight Paramedic In-Hospital Rapid Sequence Intubation

"Can Paramedic skills work within the Hospital environment?"

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Presentation Overview

- Brief intro to Air Ambulance Victoria and MICA Flight Paramedic
- Study genesis and design
- Findings and brief discussion
- A few, but not too many statistics
- Implications
- Summary

Background : Air Ambulance Victoria (AAV) Overview

HEMS (Rotary)

- Five throughout Victoria
- Staffed by MFPs, Pilot and Crewman
- HEMS 5 ‘Retrieval’ with option of Medical Staffing

Fixed Wing

- Four available
- One dedicated to MFPs
- Option of Medical staffing

Background : Defining the AAV MICA Flight Paramedic

Survey of active MFPs revealed an average of:

- 20 years of service as Paramedic
- 8 years of service as a Flight Paramedic
- 780 cases undertaken in the role of MFP

Majority have additional qualifications

- Nursing
- Science
- Education
- Military Medic service

Primary Retrieval - 45%

- Trauma
- Remote medical emergencies
- Multi casualty incidents etc

Secondary Retrieval - 51%*

- Time Critical IHTs
- Remote hospital retrieval
- Ventilated patient transfers

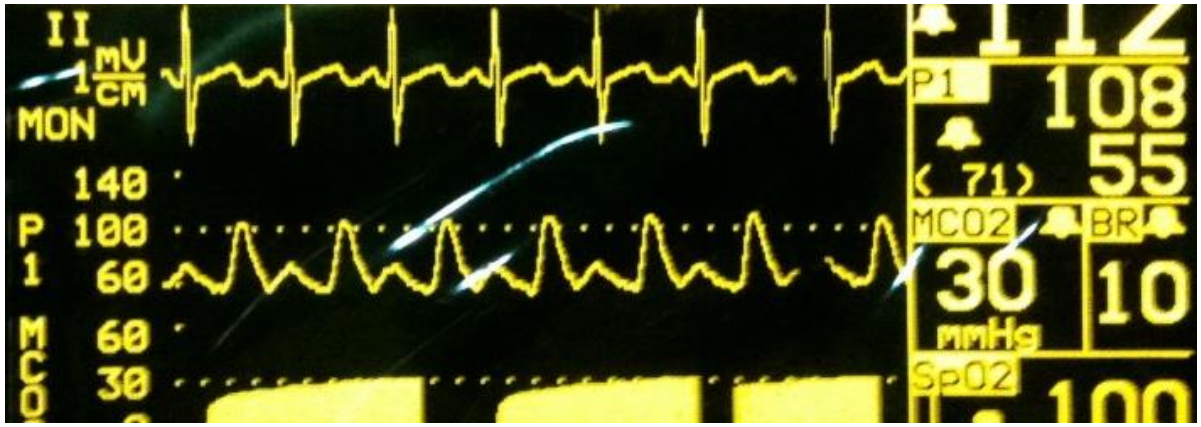
Search and Rescue – 4%

- AMSA/Aussar response
- Motor Cross
- Marine SAR

Background : AAV Ventilated IHT's

What we already knew

- 23% of HEMS and emergency Fixed Wing workload
- Majority conducted by MFPs with assistant (2008)
- Clinically, operationally and logistically challenging
- Time consuming



Development of the Pilot Study (2008)

Broaden our understanding of the ventilated IHT:

- The complexity of the patient
- Physiological status of our patients
- Case types and frequency
- Workload

Review MFP performance by the following criteria:

- Adherence to Goal Directed Therapy
- Skills / tasks implemented
- At hospital time

Pilot Study - Inclusion/Exclusion Criteria

Inclusion criteria

- Hospital to hospital transport.
- Ventilated/Intubated patient (prior egress)
- Documentation for case (expected)

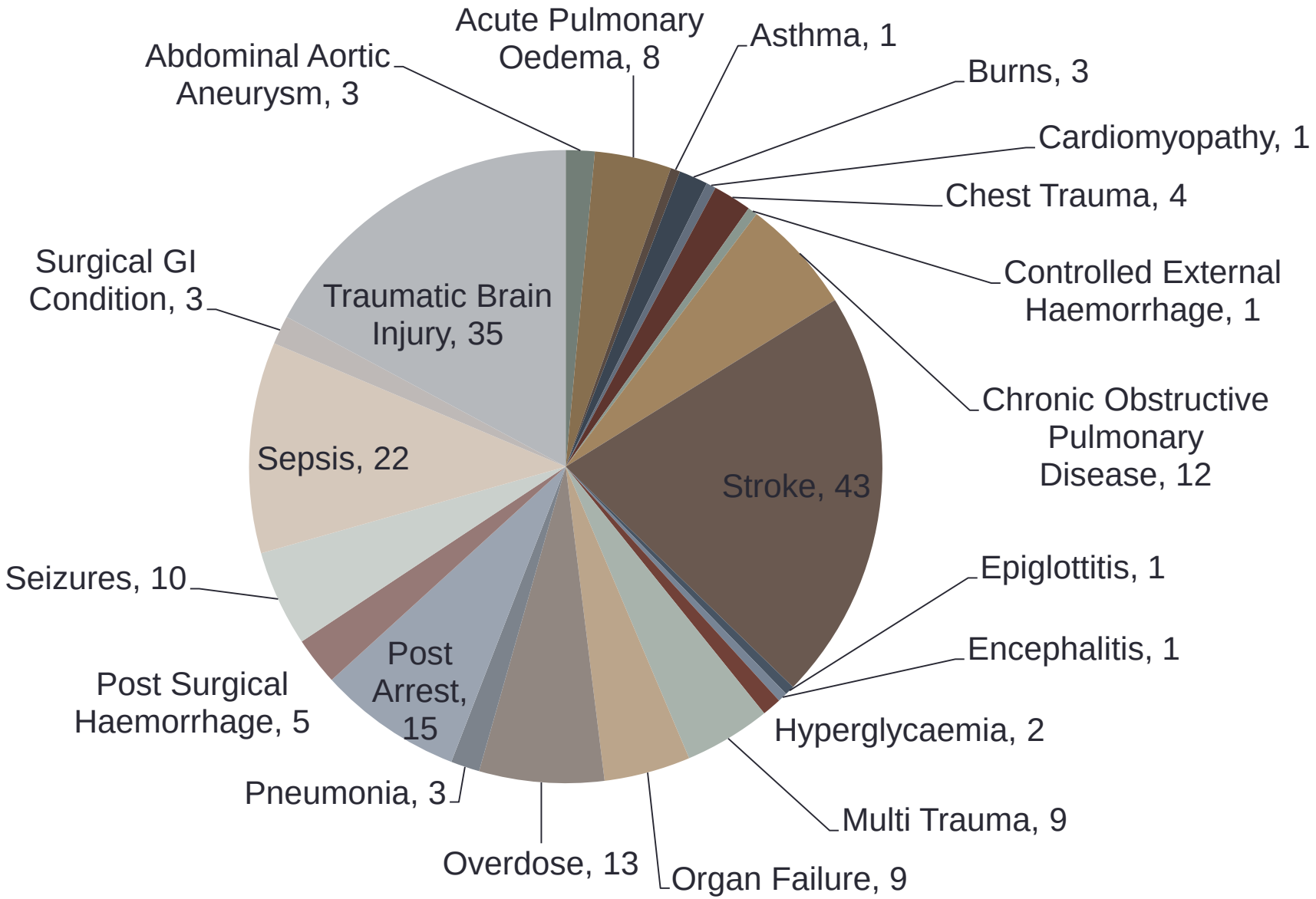
***All* cases** occurring 2007-2008

Exclusion criteria

- Medical escort
- Hospital via rendezvous at airfield to hospital
- Deceased at hospital
- Patients <14 year old

n=204

Pilot Study (n=204) – Case Type / Frequency



On arrival of MFP at Transferring Hospital (n=204)

- All study patients were intubated and ventilated
- 39% - required two or more infusions
- 37% - had a HR > 100 bpm
- 19% - had a SBP < 100mmHg
- 10% - required significant MFP ETT intervention
- 10% - had a MAP < 65mmHg
- 10% - had an uncontrolled internal haemorrhage
- 10% - of patients were < 35^{o}c (excluding post arrest pts)
- 8% - presented hypoxic (SPO_2<92%)
- 5% - had an $ETCO_2$ > 50mmhg (excluding permissive hypercapnia)

Summary of Pilot Study Findings

- *Consistent compliance to Goal Directed Therapy*
- *High acuity, independent clinical decision making*
- *Consistent, comprehensive improvements in patient vital signs*

In Addition

8.8% (n=18) - *the MFP performed the intubation*

Brief Overview of Rapid Sequence Intubation in AAV

MFP RSI constitutes the following;

- Patient preparation
- Pre & Post induction sedation
- Paralysis *(Suxamethonium followed by NMB)*
- Intubation with stratified failure protocol
- Mechanical ventilation
- Physiological targets

Air Ambulance specific

- Adaption to Aero-medical environment
- Alternate induction pharmacology

Second Study Developed (2012) "In Hospital MFP RSI Study"

Study Parameters

- Same inclusion/exclusion criteria as initial study
- Extended the study time frame

With the intent

- Anomaly or trend?
- Improve reliability of the findings
- Understand our performance & service delivery

Results

- 330 cases reviewed (including original 204)
- n=28

MFP In-Hospital Rapid Sequence Intubation

MFP Intubation Rate

8.5 % (N=28) *(8.9% in Pilot Study)*

100% ETT success

- All had accompanying sedation
- Paralysis where indicated
- On first attempt

Grade view

	n	%
Grade 1	24	85.7
Grade 2	2	7.1
Grade 3	1	3.6
Grade 4	0	0
NA	1	3.6

Placing Intubation Success Rate into Perspective

Concurs with analysis of Victorian MFP/MICA Paramedic intubations

100% (n=20) RSI success for MFP Propofol induction

Bridge, Adam, Maloney - AAV (2010)

100% (n=51) RSI success for MFP Paediatric RSI

Hunter – HEMS 1&5 (2005-2010)

100% (n=248) success rate for all RSIs

Ambulance Victoria RSI Review (Jan to Jun 2008)

97.4% (n=850) success rate for *all AV* RSIs

Ambulance Victoria 2012-2013 (12mnths)

MFP as the Clinical Leader?

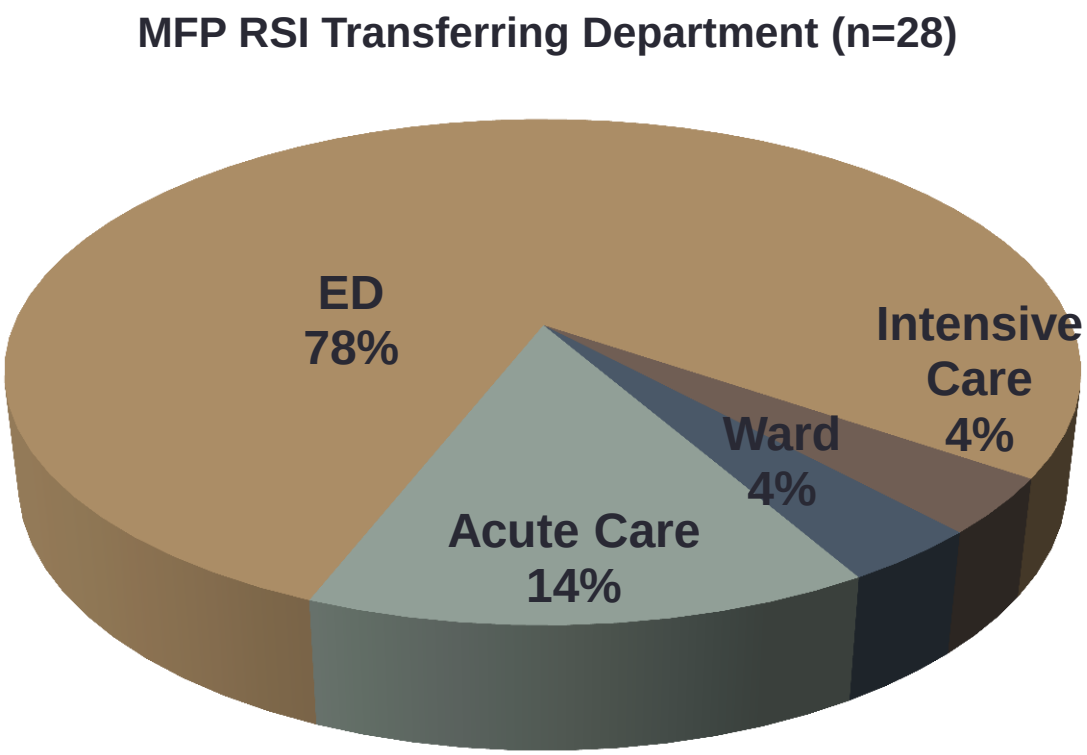
Qualitative data supporting MFP clinical leadership

- All cases were intubated by the MFP.
- 93% (n=26) cases documented the AAV induction protocol
- All supported within AAV guidelines
- Continuance of care remained the MFP's responsibility
- Qualitative assessment of PCR reflected decision making
- Hospital resources and dispatch request

Results : Transferring Hospital Details

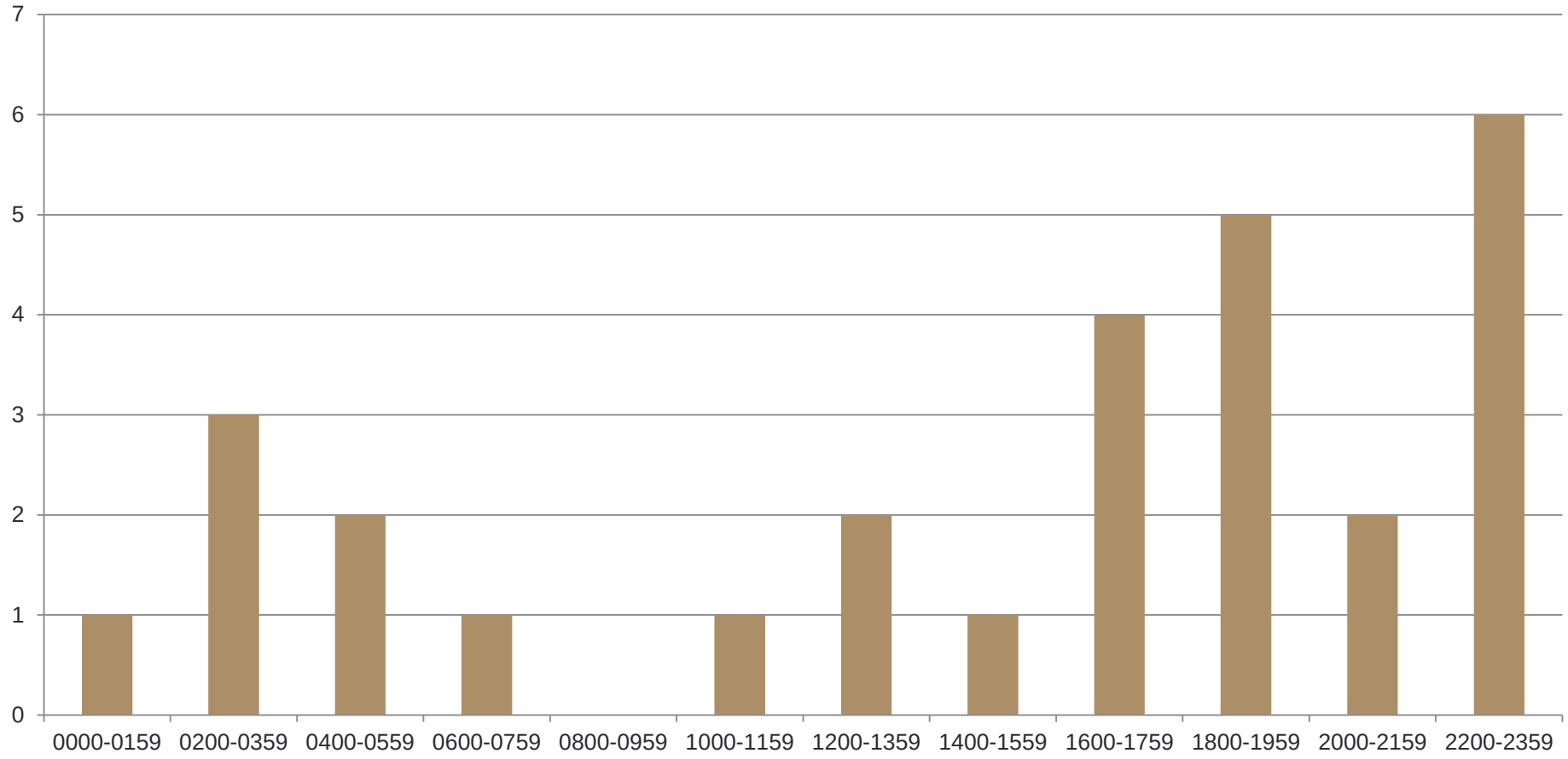
All Regional Centres

- Predominately small centres, though large centres were present
- Hospital Staff present on arrival

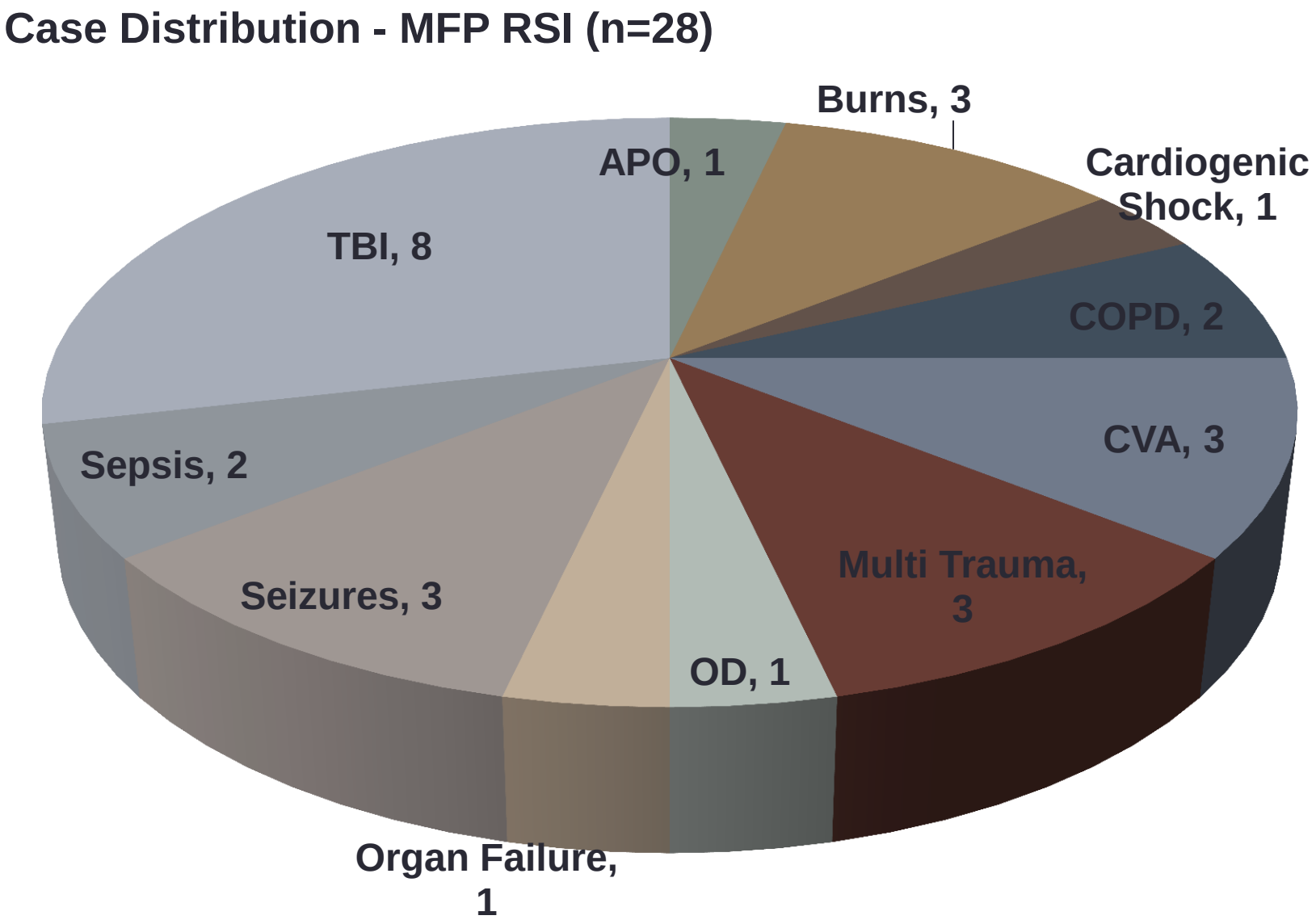


Results : Dispatch – MFP RSI Study

Distribution of cases Frequency versus Dispatch – MFP RSI Study (n=28)



Results : Case Type / Frequency



Results : Time Spent at Hospital

MFP RSI Study (n=28) Time At Hospital

- Mean **51 minutes** *(Initial Study **48min**)*
- *90% of cases moved within **72 min***

(Versus 79min for all cases)

Results : On arrival physiological status

Yet to intubated *(by definition)*

25% (n=7) patients with SPO_2 <= 92%

14% (n=4) had SBP < 100mmHg

11% (n=3) with MAP < 65mmHg

50% (n=14) had HR >100

18% (n=5) required CVS infusion

61% (n=17) GCS < 13

GCS	Indication for RSI
15	Respiratory Burns
15	SPO_2 < 92%
15	Respiratory Burns
15	SPO_2 < 92%
15	Respiratory Burns
14	SPO_2 < 92%
14	Spinal Cord Injury
14	SPO_2 < 92%
13	SPO_2 < 92%
13	SPO_2 < 92%
13	Combative TBI
12 to 3	GCS<13

Results: 'Post - RSI' Vital Signs

Cardiovascular

- Elevation in Heart Rate (n=28, mean change 13, $p<0.05$)
- No bradycardic patients (despite 4 pre-RSI)
- Hypotensive patients had higher BPs post RSI (n=4, $p=0.09$)
- No difference where SBP > 100mmHg (n=23)
- 1 became hypotensive - corrected

Respiratory

- Consistent elevation of SPO_2 in hypoxic patients

  (n=6, mean change 10%, $p<0.05$)

- No hypoxic episodes where pre RSI SPO_2 > 92%

‘At Destination’ Vital Signs Summary

Cardiovascular

- 100% Patients had SBP > 108mmHg
- Correction of hypotensive patients (n=4 , Mean 46, p<0.05)
- 96% (n=27) had MAP > 75mmHg
- Tachycardia reduction since RSI (mean 10, p<0.05)

‘At Destination’ Vital Signs Summary

Respiration

- 100% patients SPO_2 > 96%
- Consistent elevation of SPO_2 in < 92% patients

  (n=7, mean change 13%, p<0.05)
- 100% patients $ETCO_2$ between 30 - 42mmHg (excluding COPD)

Also

- All patients had sedation infusions
- Paralysis where indicated
- 5 patients had CVS infusions
- 27 had NG tubes

Goal Directed Therapy? - Traumatic Brain Injury (n=8)

Target SPO_2 > 96%

- All > 96%

Target SBP >120mmHg

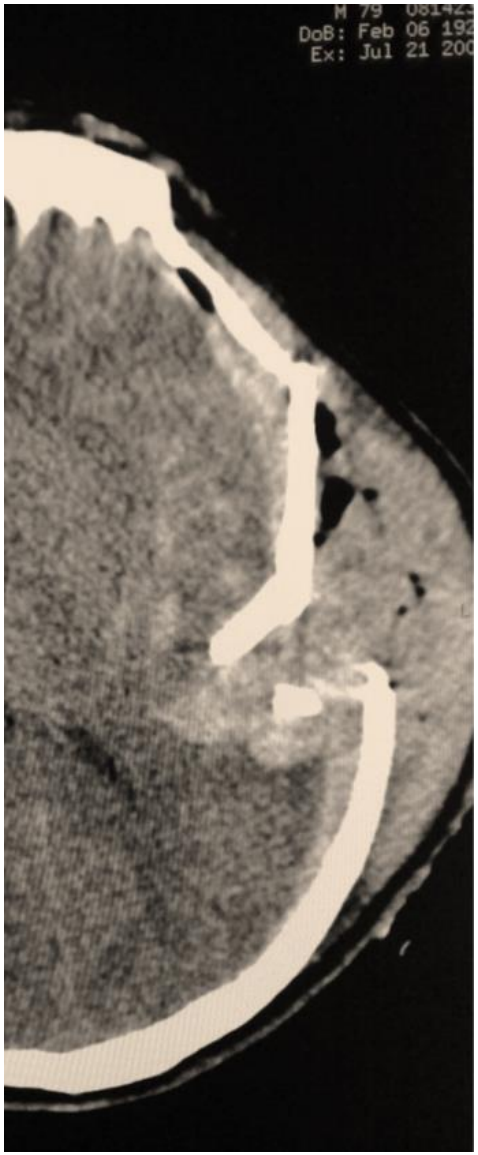
- All SBP > 110mmHg at destination
- 75% (n=6) above target
- BP support primarily by fluid

Target $ETCO_2$ between 30 - 35mmHg

- Range 32 - 42mmHg by destination

Other management goals

- All paralysed
- All had sedation infusions
- All had NG insitu



Answering the Study Question?

Can Paramedic skills be transferred into the hospital environment?

- Quantitative evidence of effective clinical management
- Goal directed therapy evident
- 100% successful intubation was achieved
- AAV guidelines support in-hospital indications
- Short in-hospital time
- Comprehensive Intensive Care management
- To a broad range of clinical conditions

Answering the Study Question?

Extending the research

- Taking advantage of ePCR data
- Developing research to explore this further.
- Addressing the limitations of current study

Wrapping up.... Significance of the Findings

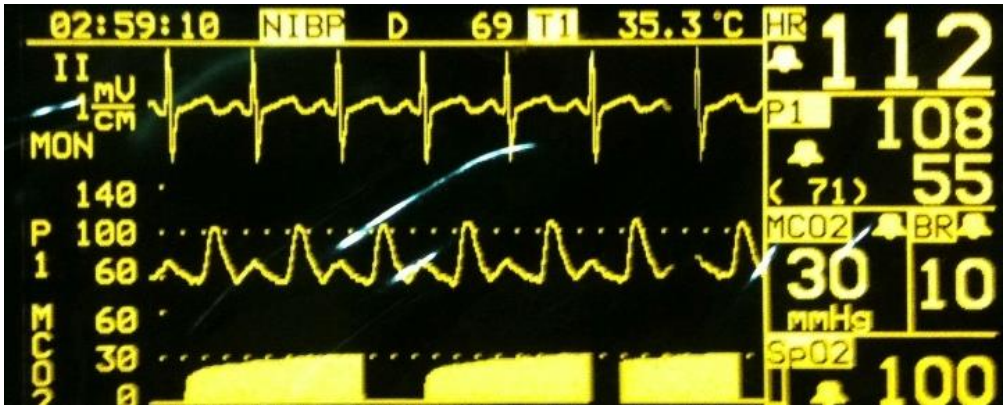
Air Ambulance Resourcing

- Rapid resource dispatch
- Crew matrix widely available
- Extension of well developed skill set
- Current AAV Guidelines supportive
- Adult Retrieval Victoria asset

Wrapping up.... Significance of the Findings

Supporting Regional Hospitals

- MFPs can effectively supplement hospital resources
- Workload relief
- Provide critical care services
- No ‘time of day’ constraints
- ‘Acceptance’ by regional hospitals



Significance of the Findings - The flip side...

These demonstrated expertise need to be

- Cultivated
- Maintained
- Audited/Researched
- Evaluated
- Governed / Supported

That is, extending the practice of Paramedics should not be an accidental process…


Thank you