

# Psychiatric aeromedical retrieval -towards best practice-

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# Disclosures

- Financial : None declared
- Academic :
- 1.Part of this talk is currently undergoing further study “Ketamine sedation for psychiatric aeromedical retrievals” HREC approval, Queensland Health , Cairns District

# Objectives

- Review current practices and literature
- Assessment of psychiatric patients for transport
- Physical restraint use
- Transport escort principles
- Transport sedation principles
- Discuss intubation for psychiatric retrievals
- Case presentation



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## Man opens plane door at 33,000ft and jumps out

Pilot makes emergency landing in Canada after passenger jumps to his death from small aircraft

**Alexandra Topping** and agencies  
guardian.co.uk, Friday 17 April 2009 08.39 BST  
[Article history](#)

A man travelling on a small passenger plane wrenched open the door of the aircraft while it was flying at 33,000ft over northern [Canada](#) and leapt to his death, according to police.

The cabin of the aircraft suddenly depressurised and the pilot was forced to make an emergency landing with the door of the plane still ajar.

The 20-year-old passenger had become unruly during the flight and the aircraft's pilots had struggled with him but were unable to prevent him opening the door and jumping out.

The Adlair Aviation plane with two pilots and two passengers was flying from Yellowknife to Cambridge Bay, a remote community in western Nunavut, when the man jumped on Wednesday night, said Staff Sgt Harold Trupish of the Royal Canadian Mounted Police.

The Beechcraft King Air 200 twin-turboprop was about 110 miles from

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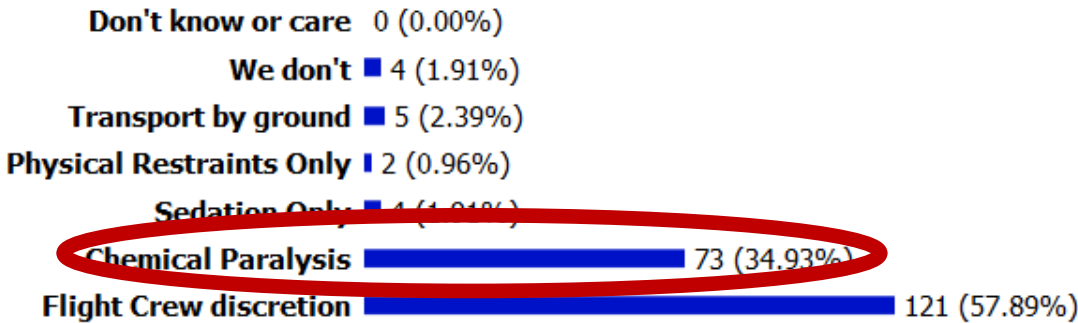
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## How does your program transport severely combative patients?



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### Calendar







## RFDS OVERVIEW

### *RFDS Bases*

#### 8 Operational Bases

- **Clinic / Retrieval Base**
  - Cairns (est 1972 relocated from Charters Towers)
  - Charleville (est 1942)
  - Mt Isa (est 1965 relocated from Cloncurry)
  - Townsville (est 1996)
- **Retrieval Only Bases**
  - Brisbane (est 1995)
  - Rockhampton (est 1995)
  - Bundaberg (est 2002)
- **Clinic Only Bases**
  - Longreach (est 2004)

## Beechcraft Super King Air B200 SE

- \* Average Cruise Speed - 480 km/hr
- \* Max Range ~3,400 km
- \* Max Altitude – 35,000 ft
- \* Fuel Consumption – 340 Lt JetA1 /hr



- \* 2 Stretcher Capacity with comprehensive Medical Equipment Cabin Fit



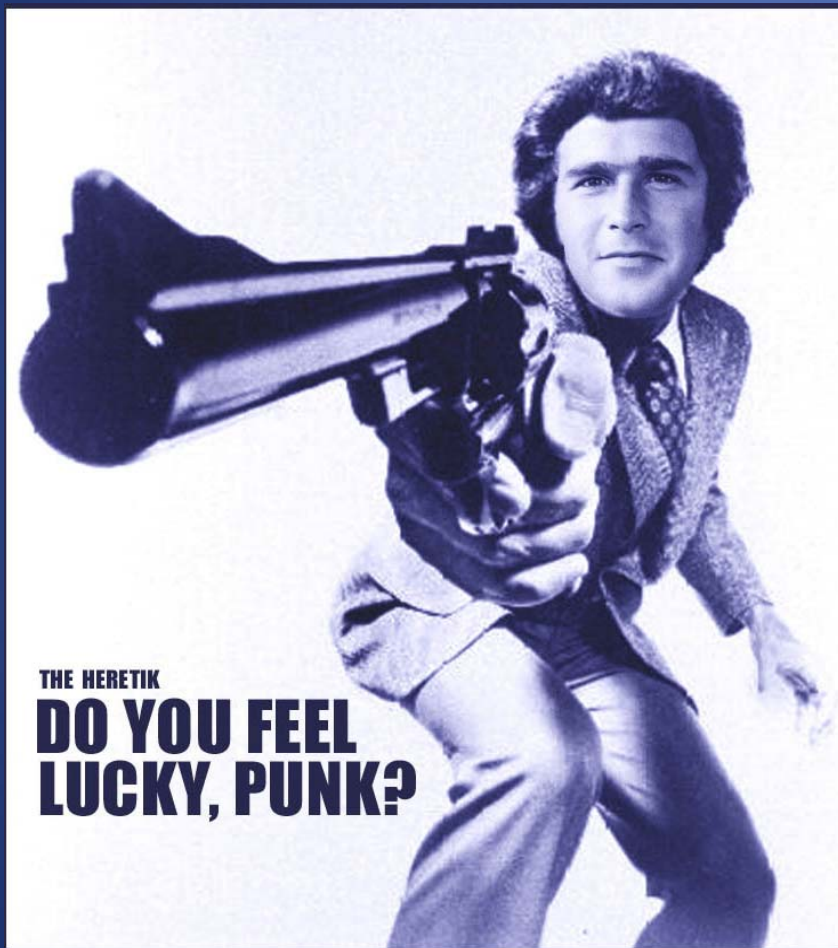
**Royal Flying Doctor Service of Australia (Queensland Section)**  
**Number of Evacuations by Transport Type and Crew Mix**  
**All RFDS Bases**  
**1 January 2007 - 31 December 2009**

<b>Crew Mix</b>	<b>Primary Evacuations</b>	<b>IHT</b>	<b>Clinic Transport</b>	<b>Repatriation Transport</b>	<b>Total</b>
RFDS Nurse Only	1075	20054	71	259	21459
RFDS Doctor Only	13	31	23	0	67
RFDS Nurse and non RFDS Doctor (not students)	37	3197	0	10	3244
RFDS Doctor and RFDS Nurse	1953	4211	144	52	6360
<b>Total</b>	<b>3078</b>	<b>27493</b>	<b>238</b>	<b>321</b>	<b>31130</b>

**Royal Flying Doctor Service of Australia (Queensland Section)**  
**Number of Mental Health Transports by RFDS Base and Year**  
**All Bases**  
**1 January 2007 to 31 December 2009**

	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>Total</b>
<b>BN</b>	24	17	25	<b>66</b>
<b>BU</b>	9	4	5	<b>18</b>
<b>CS</b>	40	40	55	<b>135</b>
<b>CV</b>	10	5	6	<b>21</b>
<b>MA</b>	34	45	29	<b>108</b>
<b>RK</b>	16	25	33	<b>74</b>
<b>TL</b>	23	17	16	<b>56</b>
<b>Total</b>	<b>156</b>	<b>153</b>	<b>169</b>	<b>478</b>

# Current aeromedical practice



- Ad hoc assessments
- Gut feelings vs careful triage/history taking
- Guidelines often ignored
- Police escorts and restraints underutilised
- Low threshold for intubation for transport
- Must transport mentality

National safety priorities  
in mental health:  
a national plan for  
reducing harm



*effective*  
*appropriate*  
*efficient*  
*responsive*  
*accessible*  
*safe*  
*continuous*  
*capable*  
*sustainable*

## TABLE 4:

### Safe transport of people experiencing mental disorders

#### Objectives

Mental health consumers are safe during transportation.

Staff involved in transportation are safe.

Reduced adverse events associated with transport of people experiencing mental disorders.

Clear policies and protocols to ensure that the least restrictive safe transport of people experiencing a mental illness are used.

Known problem areas

Emergency transportation in mental health crisis situations.

Restraint use during transport.

Routine use of sedation during transportation regardless of circumstances.

Heavy sedation that requires consumers to be intubated is a major medical intervention that carries its own risks of adverse drug events.

Reliance on police to apprehend and transport consumers known to mental health services when alternative means are available.

Police transporting consumers without the support of clinical staff.

Adverse events associated with transport with or without restraint use, including adverse drug events.

Stigma experienced by consumers from emergency care providers.

Transport from and within rural/remote settings.

Timeliness of transport between hospitals, particularly between private and public mental health services.

# Legalities of air transport of psychiatric patients

- Pilot has final say –period. (**Civil Aviation Regulation 309**)
- CASA does not distinguish between voluntary or involuntary patient
- In QLD, Mental Health Act makes provision for police escort
- “Least restrictive” & “Reasonable means” are operating legal terms in current guidelines

# Aeromedical transportation of psychiatric patients: Historical review and present management.

Jones DR,Aviat Space Environ Med. 1980 Jul;51(7):709-16.

- Early Second World War, transport by ship solely.
- Problems exacerbated using this method
- Aeromedical classification system developed
- High to low risk categories
- Response to risk : nil to combined restraints & dedicated escort



# Airline Passenger Misconduct: Management Implications for Physicians

Kathleen Pierson, Yuri Power, Adeyinka Marcus, and  
Angela Dahlberg Aviat Space Environ Med 2007; 78:361–7.

- Report 3 cases of agitated passengers on international flights ( 2 psychotic, 1 ETOH intoxicated)
- Combined chemical and physical restraint considered safest method of managing extremely combative on airline
- Continuous medical monitoring vital for safety of restrained

Stephen Wheeler, MD, Bruce Wong, MD, Randy L'Heureux, BABES

# Criteria for sedation of psychiatric patients for air transport in British Columbia

Air Ambulance Program guidelines are designed to ensure the safety of paramedics, air crew, and patients.

**Table 1. Criteria for sedation of psychiatric or cognitively impaired patients.**

A patient with any one of the following requires sedation.

- ♦ Active psychotic disorder.
- ♦ Active paranoid disorder.
- ♦ Active mania.
- ♦ History of panic disorder or phobias relating to air travel or confined space.
- ♦ History of cluster B personality disorder.
- ♦ Depression with suicide ideation or hopelessness.
- ♦ History of violence.
- ♦ History of serious suicide attempt.
- ♦ Currently under arrest.
- ♦ History of poor anger or impulse control.
- ♦ Confrontational.
- ♦ Incapable of following instructions.
- ♦ Incapable of understanding instructions or events.
- ♦ Less than fully cooperative with staff.
- ♦ Views transport negatively.
- ♦ Certified under the Mental Health Act.
- ♦ Physically strong and large, and would be difficult to control in aircraft.

Note: The transport advisor (TA) makes the final decision on determining if these criteria apply to a patient. Air crews are authorized to refuse transport if they are unsatisfied with the level of the patient's sedation.

## Table 2. General recommendations for sedation.

Patient should receive three sedating agents at least 1 hour prior to departure from hospital so that further medication can be administered if the initial effects are subtherapeutic. It is not unusual for agitated patients to require repeated doses of a benzodiazepine and an antipsychotic.

- An antinausea agent, such as dimenhydrinate (50 mg IM) which has the added benefit of reducing motion sickness.
- A benzodiazepine, such as lorazepam (1–3 mg IM or sublingual).
- An antipsychotic, such as haloperidol (2.5–5 mg IM) or olanzapine (5–10 mg IM).

Intramuscular (IM) injection is recommended over oral administration as the absorption is generally quicker and the sedating effects of the drugs have a faster onset.

ardy. We authorized our flight paramedics to refuse any patient not adequately sedated and to leave for their next patient transfer. BCAS took this step because paramedic and crew safety are the over-riding concern,

# Inflight violent patient

- Risk prediction?
- Appropriate escorts?
- Preflight sedation?
- Preflight intubation?



# What are the greatest risk factors for violence?

- Intoxication
- Active mental illness :  
paranoid psychosis,  
delirium, mania
- Past history of violence

## The Intricate Link Between Violence and Mental Disorder

*Results From the National Epidemiologic Survey on Alcohol and Related Conditions*

*Eric B. Elbogen, PhD; Sally C. Johnson, MD*

**Conclusions:** Because severe mental illness did not independently predict future violent behavior, these findings challenge perceptions that mental illness is a leading cause of violence in the general population. Still, people with mental illness did report violence more often, largely because they showed other factors associated with violence. Consequently, understanding the link between violent acts and mental disorder requires consideration of its association with other variables such as substance abuse, environmental stressors, and history of violence.

*Arch Gen Psychiatry. 2009;66(2):152-161*

# RFDS risk assessment tool/protocol

- Active since 2006
- Screening tool
- Low risk score generally reliable
- High risk score could mean anything
- Useful to organise assessment preflight
- Should be repeated if things change

# RFDS risk tool evaluation

***Aeromedical Retrieval for mental health emergencies: a review of the Royal Flying Doctor Service (Queensland) risk assessment tool***

A / Professor Stephen Margolis  
Medical Officer

Dr Minh Le Cong  
Head of Education & Medical Officer



**RISK ASSESSMENT – THE TRANSFER OF THE DISTURBED PATIENT  
INCLUDING THE MENTALLY ILL PATIENT**

PATIENT'S NAME: \_\_\_\_\_ DOB: \_\_\_\_\_  
GENDER: \_\_\_\_\_ DAY/NIGHT FLIGHT: \_\_\_\_\_

SUBJECT AREA	Y/N	SCORE
Major violence to persons or property Comments:		12
Minor violence to persons or property Comments:		6
Violent command hallucinations Comments:		5
Preoccupation with violent ideas or threats of violence Comments:		5
Major acts of self harm ( eg firearm, major OD, hanging) during this episode Comments:		5
Major acts of self harm ( eg firearm, major OD, hanging) previous episode Comments:		2

**RISK ASSESSMENT – THE TRANSFER OF THE DISTURBED PATIENT  
INCLUDING THE MENTALLY ILL PATIENT**

SUBJECT AREA	Y/N	SCORE
Known to threaten to use weapons (firearm, knife, chain, razor etc). Comments:		5
Classified under Mental Health Act (Regulated) Comments:		2
Expressions of anger, frustration or agitation Comments:		2
Signs of Intoxication from drugs or alcohol Comments:		2
Poor orientation to place Comments:		2
Recent minor suicide attempt or self harm Comments:		2
History of Absconding in current admission Comments:		1

**RISK ASSESSMENT – THE TRANSFER OF THE DISTURBED PATIENT  
INCLUDING THE MENTALLY ILL PATIENT**

SUBJECT AREA		Y/N	SCORE
Major life situational crisis (current)			1
Comments:			
Recent change to controlling medication including non compliance			1
Comments:			
Paranoid Ideation			1
Comments:			
Physical capability for violence; age, gender strength, fitness etc.			1
Comments:			
Significant incapacity due concomitant injury /medical condition			-5
Comments:			
Score Total			

**RISK ASSESSMENT – THE TRANSFER OF THE DISTURBED PATIENT  
INCLUDING THE MENTALLY ILL PATIENT**

THE RISK ASSESSMENT RESULT IS (Circle one)

**HIGH RISK (>25)** FN, MO, 1 patient per flight, IV access, patient paralysed intubated ventilated and restrained.

**MEDIUM RISK (8-24)** FN, MO 1 patient per flight, patient sedated and restrained, IV access, may have Police or trained attendant

**LOW RISK (3-5)** FN, may require sedation, restrained, IV access, MO or another attendant, may be carried with another patient

**VERY LOW RISK (0-2)** FN, may be carried with another patient, patient allocated dedicated attendant.

This risk assessment tool is a dynamic instrument and the risk may change as a result of medical intervention/management prior to transfer. Night flights are to be avoided due to the limited available aviation options should a problem develop and the disorientating effect of night flying in some disturbed patients.

Additional Remarks:

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SIGNATURE \_\_\_\_\_ POSITION/TITLE \_\_\_\_\_

DATE/TIME \_\_\_\_\_

(@ type or classification under Mental Health Act (eg JCO, CCU etc) may determine transport requirements (escort /mode)

# Statistical analysis

- Correlation score and 'eyeball' view
  - $r^2 = 0.683$ ;  $p < 0.0001$
- Factors with highest correlation
  - Minor violence to property or person
    - $r^2 = 0.53$ ;  $p = 0.015$
  - Expressions of anger, frustration or agitation
    - $r^2 = 0.61$ ;  $p < 0.0001$

# RFDS QLD Revised Risk Assessment tool ,2010

SUBJECT AREA	Y/N	Score	Comments
Any known history of violence to persons or property?		10	
Any expressions of anger, frustration or agitation during course of hospital admission or preceding 24hrs?		5	
Multiple expressions of anger, frustration or agitation during current care, requiring special nursing or security measures or chemical restraint/sedation		20	
Signs of intoxication/withdrawal from drugs or alcohol during course of hospital admission or preceding 24hrs?		10	
Known history of substance abuse ( Alcohol, opioids, amphetamines, marijuana)?		5	
Known environmental stressors in last 7 days (personal loss, relationship crisis, financial crisis etc.)		5	

## **THE RISK ASSESSMENT RESULT IS (Circle one)**

**HIGH RISK (>25) FN, MO, 1 patient per flight, IV access, patient sedated and restrained, recommended Police or trained attendant, consider intubation and ventilation if failed adequate trial of pre-flight sedation**

**MEDIUM RISK (6-24) FN, MO, 1 patient per flight, patient sedated and restrained, IV access, may have Police or trained attendant.**

**LOW RISK (0-5) FN, may require sedation, restrained, IV access, MO or another attendant, may be carried with another patient.**

This risk assessment tool is a dynamic instrument and does not replace clinical judgement for a given clinical situation. The risk may change as a result of medical intervention/management prior to transfer. Night flights are to be avoided due to the limited available aviation options should a problem develop and the disorientating effect of night flying in some disturbed patients.

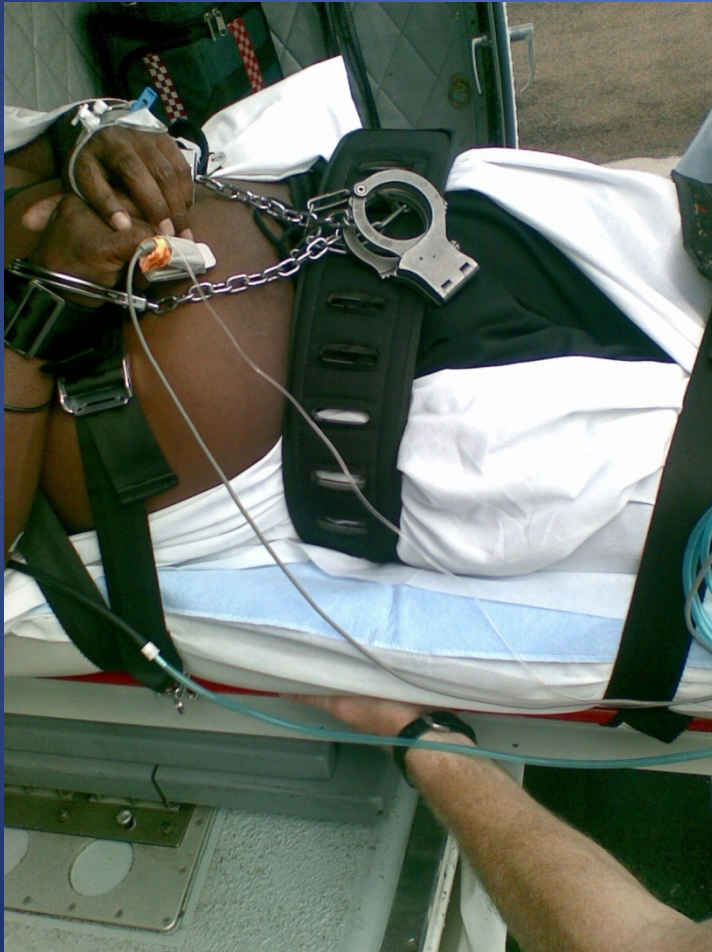
# Physical restraints



# Why don't we use this?



# Physical restraints in aeromedical setting



- RFDS QLD protocol
- Restraints – quick release, velcro fasteners, 4 points
- RFDS SA – body net
- Patient explanation if possible prior to use
- Police restraints
- Careful medical monitoring during use
- Avoid prone position
- Avoid patient struggling against restraints (SEDATE!!)



# Escorts – choosing the right crew

- Doctor ( background experience in acute mental health preferred + advanced airway skills + procedural sedation competency)
- Flight nurse ( familiar with restraints and protocol+ sedation nursing competency)
- Paramedic ( SA model)
- ALS training for all
- Police – role in this work?

# Police escorts

- Sanctioned under all state MHA for transport escorts
- Powers of detention
- Trained in restraint
- Deterrent effect
- Extra pair of hands



# Case illustration – Mr T

- 24yo Indigenous man
- Admitted with deteriorating behaviour and self care
- PMH : schizophrenia
- Tasking call : NZC says “Its your call but I’d tube this guy..he was moved last time on ketamine infusion..but..”

# Further history

- Currently in rural hospital with GP
- Under ITO
- Time is 1600. Flight time 30 min one way
- Current treatment : Olanzapine 20mg, diazepam 20mg, haloperidol 5mg IV, Clonazepam 2mg

# When you get there..

- Patient in doorway of room, yelling “I am not f\*##ing go to Cairns”
- Two police in attendance
- IV access x2

# What now?



# The limits of benzodiazepine and antipsychotic sedation

- Substance abusers often tolerant to first line sedatives
- ETOH abusers often tolerant to everything!
- Need to consider the realm of procedural sedation at this point...or general anaesthesia



# Ketamine sedation

- Powerful sedative
- Maintains respiratory drive to a degree
- Seems to work when first line sedatives fail
- Problems: hangover, nausea, delirium

## The combative multitrauma patient: a protocol for prehospital management

Eitan Melamed, Yahav Oron, Ron Ben-Avraham, Amir Blumenfeld and Guy Lin

**Objective** To describe the management of the combative trauma patient in the prehospital setting, and to suggest a protocol for management.

**Methods** A retrospective, prehospital case series conducted in Israel among military medical teams over the course of nearly 2 years, between January 2000 and October 2002. We collected a case series of patients who became combative following traumatic injury. Following data collection, we summoned an expert panel and developed a protocol for physicians and paramedics upon encountering a combative trauma patient.

**Results** Available data were found for 11 patients and these were included in the analysis. Most victims included in this study were injured under military or geographical

more agitated after administration. No adverse effects were recorded by the prehospital caregivers.

**Conclusions** In this article, an algorithmic approach to the treatment of the patient's agitation is outlined, using ketamine as the principal sedating agent, either alone or combined with midazolam. The combination of both drugs is suggested for the effective sedation of adult prehospital combative patient population. *European Journal of Emergency Medicine* 14:265-268 © 2007 Wolters Kluwer Health | Lippincott Williams & Wilkins.

*European Journal of Emergency Medicine* 2007, 14:265-268

Keywords: agitation, combative patient, ketamine, prehospital care, trauma

IDF Trauma Branch, Surgeon General Headquarters, IDF Medical Corps, Israel

## KETAMINE CHEMICAL RESTRAINT TO FACILITATE RESCUE OF A COMBATIVE "JUMPER"

John L Hick, Jeffrey D Ho

*Prehospital Emergency Care*; Jan-Mar 2005; 9, 1; Career and Technical Education

pg. 85

Eitan Melamed, MD, IDF Trauma Branch, PO Box 02149,

l; fax: +972 3 7377323;  
yahoo.com

2006 Accepted 20 January 2007

# Does ketamine worsen mental illness?

## The Schizophrenia Ketamine Challenge Study Debate

William T. Carpenter, Jr.

*subjects were drawn.* Biol Psychiatry 1999;46:1081-1091 © 1999 Society of Biological Psychiatry

## Long-Term Outcome of Patients Who Receive Ketamine during Research

Adrienne C. Lahti, Dale Warfel, Tamara Michaelidis, Martin A. Weiler, Kristin Frey, and Carol A. Tamminga

*Conclusions: In a controlled environment and paying close attention to subject safety features, administering subanesthetic doses of ketamine causes no adverse events and little distress to schizophrenic volunteers. This study strongly indicates that administering ketamine does not change any aspect of the course of schizophrenic illness.*  
Biol Psychiatry 2001;49:869-875 © 2001 Society of Biological Psychiatry

- Maybe in the short term
- No in the long term
- RFDS Cairns & Remote mental health service evacuation review committee
- Audit of ketamine use on psychiatric retrievals

ORIGINAL INVESTIGATION

**Psychia  
in psych**

Edward B. P  
Hyun-Sang C  
Laurence P. J  
Elizabeth O'  
D. Cyril D'Sc

*Conclusion* Ketamine administration at subanesthetic doses appears to present an acceptable level of risk for carefully screened populations of healthy human subjects in the context of clinical research programs that intensively monitor subjects throughout their study participation.

# A Randomized Add-on Trial of an *N*-methyl-D-aspartate Antagonist in Treatment-Resistant Bipolar Depression

*Nancy Diazgranados, MD, MS; Lobna Ibrahim, MD; Nancy E. Brutsche, MSN; Andrew Newberg, MD; Phillip Kronstein, MD; Sami Khalife, MD; William A. Kammerer, MD; Zenaide Quezado, MD; David A. Luckenbaugh, MA; Giacomo Salvadore, MD; Rodrigo Machado-Vieira, MD, PhD; Husseini K. Manji, MD, FRCPC; Carlos A. Zarate Jr, MD*

**Conclusion:** In patients with treatment-resistant bipolar depression, robust and rapid antidepressant effects resulted from a single intravenous dose of an *N*-methyl-D-aspartate antagonist.

**Trial Registration:** [clinicaltrials.gov](http://clinicaltrials.gov) Identifier: NCT00088699

*Arch Gen Psychiatry.* 2010;67(8):793-802

# Our experience so far..

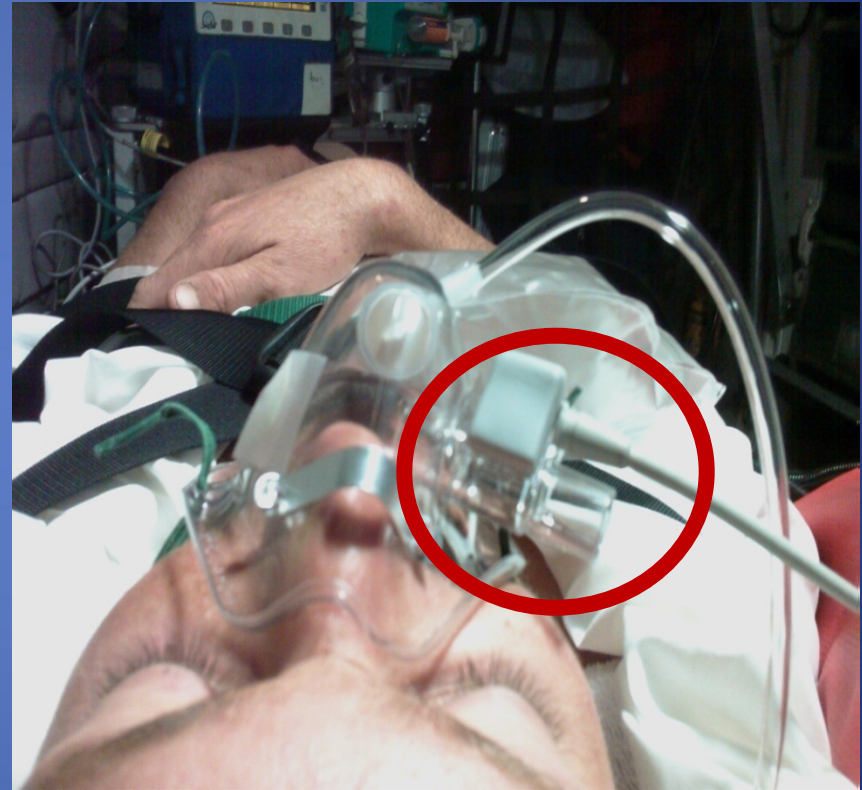
- 19 cases collated over 3 years
- Medium to very high risk scores
- One reported case of inflight vomit ( positioning required)
- One reported case of generalised muscle rigidity
- Initial bolus range : 10mg – 100mg
- Infusions : 20- 300mg /hr
- No reported cases of oxygen desaturation or hypotension
- No reported cases of airway interventions required ( OPG, NPG, intubation, jaw thrust)

# What about the 72hrs post ketamine sedation?

- Mild hypertension noted in about 10% for 1-6hrs
- No cases of worsening agitation attributable to ketamine ( pre-ketamine agitation =post ketamine agitation)
- One case of bradycardia (HR 40) and GCS 3 for 1 hr in ED post handover (polypharmacy in particular IV morphine likely cause!)

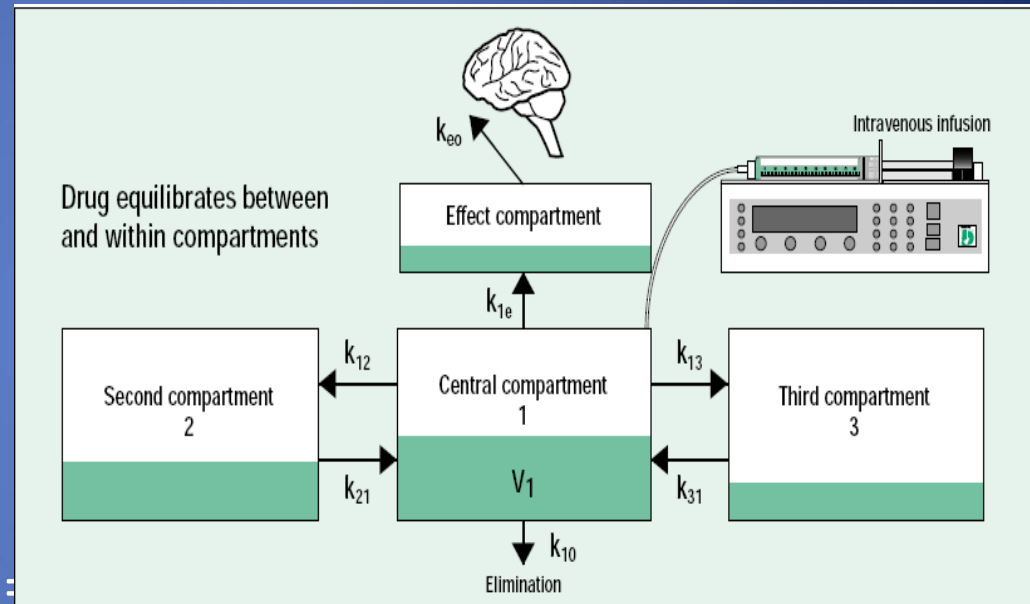
# Ketamine sedation tips

- 0.5-1.5mg/kg initial IV dose ( best preflight test dose)
- Adjuncts : midazolam, atropine(optional)
- Monitoring : cardiac rhythm, SaO2, BP, ETCO2 ( see image)
- Preketamine sedation vital in minimising delirium (IMPORTANCE OF ADEQUATE PRE-TRANSPORT SEDATION)



# The future??? Propofol TCI

- Infusion protocol
- Conscious sedation, very effective
- Very safe if done right as offset time very short
- Need ENOUGH PROPOFOL for trip!
- PREHOSPITAL EXPERIENCE = ZERO



# Remifentanil TCI

- Ultrashort acting synthetic high potency opioid
- Infusion based protocol
- Anaesthesia/ICU experience extensive
- Prehospital experience = zero
- Psychiatric sedation experience unheard of
- Novel use in the transport setting?

Int J Emerg Med (2009) 2:47–49

DOI 10.1007/s12245-009-0085-z

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BRIEF RESEARCH REPORT

## **Thiopentone sedation for sedation of acutely agitated, violent, intoxicated patients: Evaluation of 2 cases**

**Marten C. Howes · Werner Janse van Rensburg**

Thiopentone was selected in these two cases as the most suitable sedative. The patients had no known exposure to barbiturates, the drug was readily available, and its use and side effect profile were well known to the ED consultant.

# Ketofol

## 50:50 mix ketamine/propofol

- Novel sedative cocktail
- Synergistic = lower doses needed
- Propofol minimises hallucinatory and emetogenic effects
- Ketamine minimises respiratory and CVS effects

Retrieval study waiting to be done!!!!



# Dexmedetomidine

- Potent alpha 2 agonist, ICU and anaesthesia use
- Ketamine like sedation
- Sympatholysis
- Infusion based protocols
- Expensive
- Prehospital experience =zero

# RFDS retrieval sedation guidelines 2010

- Addition to Clinical Practice guidelines
- Collaborative work between RFDS and Cairns remote psychiatric service consultants (Professor Ernest Hunter, FRANZCP, Dr Bruce Gynther, FRANZCP)
- Expert input from retrieval anaesthetist (Dr Peter Schuller, FANZCA) and ED physicians (Dr Geoff Ramin, FACEM, Dr Steve Rashford, FACEM, Dr Mark Elcock, FACEM)

- Objectives:
- Provide standardized clinical approach for the sedation of a patient requiring aeromedical transport who is acutely disturbed
- Maintain minimum standards of sedation assessment and monitoring in the aeromedical and retrieval setting
- Enhance patient and transport team safety

- Handover
- Airway assessment
- Resuscitation gear preparation
- Monitoring
- Medical assessment
- Fasting status
- Sedation/Agitation scoring
- Target sedation level/score

**TABLE 1. RICHMOND AGITATION–SEDATION SCALE**

Score	Term	Description
+4	Combative	Overtly combative or violent; immediate danger to staff
+3	Very agitation	Pulls on or removes tube(s) or catheter(s) or has aggressive behavior toward staff
+2	Agitated	Frequent nonpurposeful movement or patient–ventilator dyssynchrony
+1	Restless	Anxious or apprehensive but movements not aggressive or vigorous
0	Alert and calm	
–1	Drowsy	Not fully alert, but has sustained (more than 10 seconds) awakening, with eye contact, to voice
–2	Light sedation	Briefly (less than 10 seconds) awakens with eye contact to voice
–3	Moderate sedation	Any movement (but no eye contact) to voice
–4	Deep sedation	No response to voice, but any movement to physical stimulation
–5	Unarousable	No response to voice or physical stimulation

## Procedure

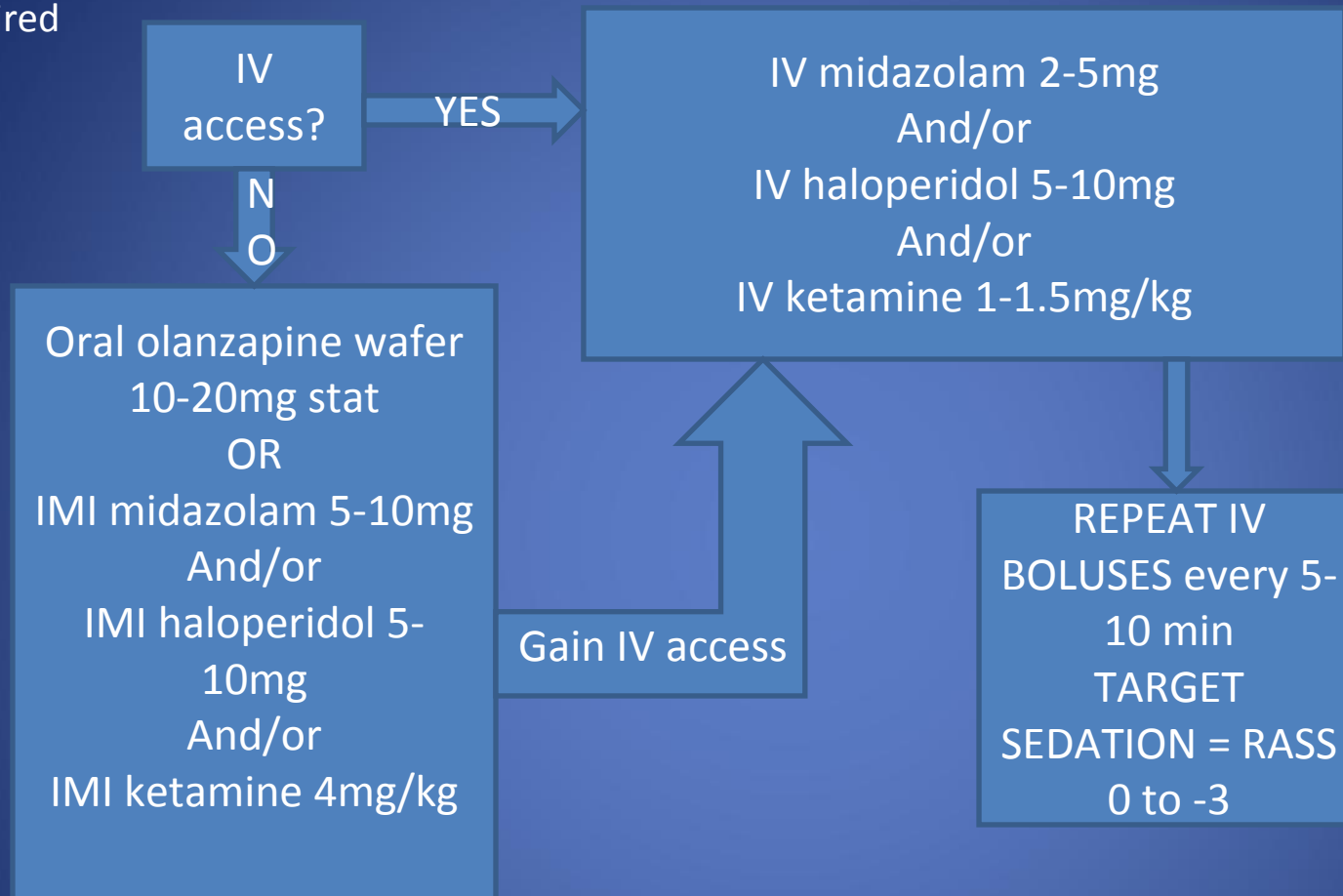
1. Observe patient. Is patient alert and calm (score 0)?  
Does patient have behavior that is consistent with restlessness or agitation (score +1 to +4 using the criteria listed above, under DESCRIPTION)?
2. If patient is not alert, in a loud speaking voice state patient's name and direct patient to open eyes and look at speaker. Repeat once if necessary. Can prompt patient to continue looking at speaker.  
Patient has eye opening and eye contact, which is sustained for more than 10 seconds (score –1).  
Patient has eye opening and eye contact, but this is not sustained for 10 seconds (score –2).  
Patient has any movement in response to voice, excluding eye contact (score –3).
3. If patient does not respond to voice, physically stimulate patient by shaking shoulder and then rubbing sternum if there is no response to shaking shoulder.  
Patient has any movement to physical stimulation (score –4).  
Patient has no response to voice or physical stimulation (score –5).

- Emergency sedation (unplanned) :
- **Goals:**
- Rapid control of agitation/dangerous behavior(RASS score +3 to +4)
- Allow safe assessment and treatment of a patient



Benzotropine 1-2 mg IVI/IMI(adult dose) should be available when giving haloperidol to treat possible acute dystonia

Flumazenil 0.2-0.5mg IVI(adult dose) should be available when giving midazolam if acute reversal is required



#### POST EMERGENCY SEDATION CARE

- Minimum sedation monitoring set should be established ( SaO<sub>2</sub>, cardiac rhythm, NIBP)
- Supplemental oxygen 2-4 L/min via nasal cannue or mask to maintain SaO<sub>2</sub> >94% at all times
- RFDS physical restraints to be placed if not already and secured to stretcher
- Position patient in 45deg head up if possible to maximize spontaneous ventilation and minimize risk of aspiration
- Perform rapid patient assessment for causes of acute agitation ( ABCDEFG) (Airway, Breathing, Circulation, Disability/Drugs, Environment/ECG, Full bladder, Blood glucose)

# Elective retrieval sedation

- This use of sedation is for planned agitation/behavioural management during aeromedical transport. The patient is usually under the Mental Health Act as an involuntary status but may not be.
- **Warning** : Elective sedation should be avoided in an intoxicated patient.



# Plan A

- Setup for procedural sedation (assessment, monitoring ,drugs, IV access)
- RFDS restraints
- Observe and sedate as needed

# Plan B

- Setup for procedural sedation
- Review prior sedation requirements
- Bolus IV sedation ( midazolam or ketamine, haloperidol) to achieve RASS 0 to -3
- Start infusion of maintenance sedative(midazolam or ketamine)
- PRN haloperidol or ketamine initially to settle rather than increasing infusion rate
- Observe effect of infusion for minimum 40 min at handover location

# Transport monitoring/nursing for sedated patient on infusions

- AS FOR A VENTILATED PATIENT
- NIBP, SaO<sub>2</sub>, Cardiac
- ETCO<sub>2</sub> ( how you ask??)
- 10 minutely observations including recording of RASS score and ETCO<sub>2</sub>
- **Bispectral Index Monitoring in Helicopter Emergency Medical Services Patients**
- Author Heegaard, William · Fringer, Ryan Charles · Frascone, R. J. · Pippert, Greg · Miner, James
- Published 2009 Journal Prehospital Emergency Care

# Intubation and ventilation



- Is this necessary?
- If so, what psychiatric emergency warrants such measures?
- Is this commonly done in the ED in Australia for psychiatric problems?
- Medical decision, not aviation decision

# Hospital Outcomes and Disposition of Trauma Patients Who Are Intubated Because of Combative-ness

*Farid F. Muakkassa, MD, Robert A. Marley, MD, Meredith C. Workman, MD, and Ann E. Salvator, MS*

**Background:** The purpose of this study was to determine whether trauma patients who are intubated because of combative-ness, and not because of medical necessity, have more complications resulting in longer lengths of stay.

**Key Words:** Trauma, Intubation, Psychiatric, Combative-ness, Pneumonia.  
(*J Trauma*. 2010;68: 1305-1309)

**Conclusion:** The results from this study indicate that trauma patients who are intubated because of combative-ness, and not because of medical necessity, have longer lengths of stay, increased incidence of pneumonia, and poorer discharge status when compared with matched controls. The outcomes of this group are similar to that of patients who are intubated because of medical necessity.

**Royal Flying Doctor Service of Australia (Queensland Section)**  
**Number of Ventilated Mental Health Transports by RFDS Base and Year**  
**All Bases**  
**1 January 2007 to 31 December 2009**

	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>Total</b>
<b>BN</b>	0	0	1	<b>1</b>
<b>BU</b>	0	1	0	<b>1</b>
<b>CS</b>	2	3	2	<b>7</b>
<b>CV</b>	1	2	0	<b>3</b>
<b>MA</b>	2	1	2	<b>5</b>
<b>RK</b>	1	0	3	<b>4</b>
<b>TL</b>	1	3	3	<b>7</b>
<b>Total</b>	<b>7</b>	<b>10</b>	<b>11</b>	<b>28</b>

How far are you prepared to go??



# What should we do?

- NAEMSP. National Association of EMS Physician Paper, Patient Restraint for EMS Systems. *Prehosp Emerg Care.* 2002;6(3): 340-345.

## POSITION PAPER NATIONAL ASSOCIATION OF EMS PHYSICIANS

### PATIENT RESTRAINT IN EMERGENCY MEDICAL SERVICES SYSTEMS

Douglas F. Kupas, MD, Gerald C. Wydro, MD

#### POSITION

The National Association of EMS Physicians (NAEMSP) recognizes that emergency medical services (EMS) personnel encounter agitated and combative patients, and these patients frequently require medical treatment and transportation. To minimize the possibility of injury to patients and EMS personnel, NAEMSP believes that all EMS systems should develop specific protocols for dealing with the violent or combative patient. Protocols may have input from EMS system administrators, providers, legal counsel, and law enforcement representatives, but review and approval by the EMS system medical director are essential.

In addition, the EMS service must assure that all EMS personnel are knowledgeable about the medical conditions that are associated with agitated or combative behavior and are trained to apply the principles of the system's prehospital patient restraint (PPR) protocol during patient care. Use of the

Dr. Kupas is at Geisinger Medical Center, Danville, Pennsylvania, and Dr. Wydro is at MCP Hahnemann University, Philadelphia, Pennsylvania.

Approved by the NAEMSP Board of Directors February 25, 2002. Received February 28, 2002; accepted for publication February 28, 2002.

Address correspondence and reprint requests to: Douglas F. Kupas, MD, Department of Emergency Medicine, Geisinger Medical Center, 100 North Academy Avenue, Danville, PA 17822-2005, e-mail: [dkupas@geisinger.edu](mailto:dkupas@geisinger.edu).

PPR protocol should undergo quality improvement review with specific filters for the appropriateness of restraint for the patient, the type of restraint utilized, and the care provided to the patient during transport.

The NAEMSP believes that the following principles should be incorporated in an EMS system PPR protocol:

1. The safety of EMS personnel is the paramount factor during PPR, followed by the importance of protecting patients from injuring themselves or others.
2. Every EMS service should have a PPR protocol that is applicable to all violent or combative patients.
3. The protocol should outline the indications for patient restraint. The policy should be consistent with state laws and local EMS protocols regarding patient refusal of care and the EMS system's responsibility to care for patients with psychiatric or behavioral emergencies.
4. Patient dignity should be maintained during restraint, and the method of restraint should be individualized to use the least restrictive method of restraint that protects the patient and EMS personnel from harm.
5. The protocol must include a patient assessment to identify

and manage medical conditions that contribute to a patient's violent behavior. Such conditions include, but are not limited to, hypoxia, hypoglycemia, alcohol or drug intoxication, stroke, and brain trauma.

6. The protocol must address the types of restraint devices that will be used (verbal, physical, or chemical), when each will be used, who can apply them, and when direct medical oversight must be involved.
7. Direct medical oversight may be required for combative patients who refuse treatment, for orders to restrain a patient (before or immediately after restraint), or for orders for chemical restraint (before or after medication is administered).
8. The PPR protocols should address the type of physical restraints that are permissible. Any restraint used should allow for rapid removal if the patient vomits or develops respiratory distress. Patients should never be transported while hobble-d, "hog-tied," or restrained in a prone position with hands and feet behind the back. Patients should never be transported while "sandwiched" between backboards or mattresses. Restraint techniques should never constrict the neck or compromise the airway.

# NAEMSP

- Chemical restraint:
  - Butyrophenones and/or benzodiazpines are most frequently used.

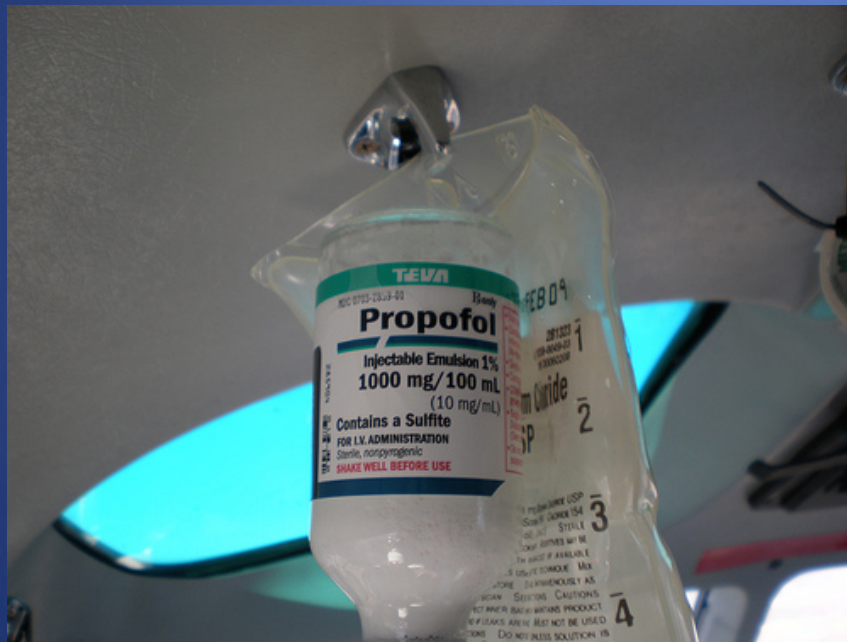
# NAEMSP

- Chemical restraint:
  - “Neuromuscular blockers with endotracheal intubation should never be used solely for the purpose of restraining violent behavior.”

# When would I consider intubation for transport?

- IF 4 or more of the following:
- **No chance of police escort**
- **Urgent need for transport**
- **Inadequate or no preflight sedation**
- **Active psychosis**
- **Flight duration >60min**
- **INTOXICATED STATE**
- **CO-MORBID MEDICAL ILLNESS**

# Tips if you decide to intubate..



- Secure decision for receiving unit prior to RSI (can get very complicated and political!!!)
- Standard psychiatric medicines usually not a problem with standard RSI drugs
- Once tubed, try to avoid NMB
- Use short acting sedatives (milk of amnesia)



# What are the risks of procedural sedation?

- **Procedural sedation in the community emergency department: initial results of the ProSCED registry.** Sacchetti et al. Acad Emerg Med, 2007;14(1):41-46.
- 980 patient sedations
- 4.1 % any complication rate
- No change in patient disposition
- Ketamine, Propofol least complications
- Fentanyl, midazolam highest complications

# QLD Coroner's report, Mr AF, 1<sup>st</sup> December 2001

- Suicidal mental health patient, cut both wrists
- Required pepper spray by police
- Brought into RBH ED, ETOH intoxicated++
- Combative +++
- Sedated with ?IMI midazolam?haloperidol
- Began vomiting+++
- Aspirated and died despite oral ETI attempts with suxamethonium and a surgical airway attempt by ED staff
- Autopsy: gastric content aspiration, BAL 0.27

# Primum Non Nocere-whatever you decide to do!



# Remember Mr T??

- Decision to proceed with RSI
- Preparations made
- Consult with ED and RFDS senior
- ED say tube, RFDS senior says setup for tube but try one dose of ketamine
- 70mg IV bolus ketamine given
- Excellent sedation
- Transported with restraints and further dose of 50 mg

# Summary

- Current air transport of psychiatric patients lacks consistency in planning and execution
- Proper transport preparation and planning stems from adequate assessment during the planning and handover phases of the psychiatric patient

# Summary

- The aeromedical and psychiatric literature suggests appropriate escort, chemical and physical restraint are sufficient
- The resort to intubation for high risk transports should be the rare exception rather than the accepted practice

# I hope I have...

- Given you something to think about
- Motivated you to consider research into this area
- Provided a glimpse at one model of better practice

# Questions/Comments??



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