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Original Research

In-Flight Pharmacological Management of Patients with Acute Mental Health Disturbance



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A B S T R A C T

Objective: Patients can be transferred many hundreds of kilometers with acute mental health disturbance for specialist mental health services in Western Australia.

Methods: A retrospective notes review of Royal Flying Doctor Service Western Operations records was undertaken over a 4-month period. Patients were identified from the transfer database by mental health diagnosis. Benzodiazepine and antipsychotic doses were converted into a reference drug per class for comparison.

Results: One hundred ten patients underwent air transfer in a total of 130 flights. Over 80% of patients were involuntary patients being transferred for specialist psychiatric evaluation and management in an inpatient mental health unit. Over half of the patients required no in-flight sedation, and around 80% of patients were managed with standard doses of first-line agents (haloperidol, midazolam, and diazepam). A small number of patients required alternative agents for refractory sedation, most commonly ketamine and propofol. There were no statistically significant differences for in-flight medication by sex, ethnicity, or substance misuse status.

Conclusions: The rate of in-flight incidents including violence remained low. Transfers of patients with acute mental health disturbance are challenging, and quality preflight assessment and in-flight care are required to minimize the associated risks.

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Air medical evacuation of psychiatric patients was initially described from a theater of war¹ and is generally considered to have been first undertaken during World War II. Flaherty² described air evacuation of psychiatric casualties from Guadalcanal and noted that psychotic patients posed a greater danger to air safety than psychoneurotic patients and that the physical and psychological stressors of air medical evacuation could exacerbate the condition of psychotic patients. During World War II, the principles of risk assessment, mechanical restraint, appropriately trained escorts, use of sedation, and sympathetic handling were established. To this day, these principles remain applicable to the transportation of mentally disturbed patients, both civilian and military.¹

Paraldehyde or barbiturates were used as sedatives during World War II psychiatric evacuations¹; however, the deep sedation associated with these agents has led to these agents being superseded by newer agents, predominantly atypical antipsychotics and benzodiazepines. The risks of toxicity, especially arrhythmias with antipsychotics and respiratory depression with benzodiazepines, ensure these drugs must be used judiciously to bring benefit and not harm.

The Royal Flying Doctor Service Western Operations (RFDSWO) has been undertaking air medical transportation of patients with acute mental health disturbance in Western Australia since 1982.³ Langford⁴ reviewed 122 Royal Flying Doctor Service (RFDS) patient transfers over a 6-month period. Ninety-four percent of patients transferred were involuntary patients referred under the Mental Health Act.⁵ Most patients (70%) were recorded as having received preflight sedation, and 86% were transferred by an RFDS nurse and police escort. Just over half of the patients in Langford's study received in-flight sedation, most commonly intravenous midazolam.

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Table 1
Demographics of Patients With Acute Mental Disturbance Transferred by the Royal Flying Doctor Service Western Operations

Demographic	n	%	Mean Age (y)	SD Age (y)	Mean Weight (kg)	SD Weight (kg)	Recorded Illicit Drug Use (n)	Recorded Illicit Drug Use (%)
All	110	100	36.0	15.2	77.2	18.0	39	34.5
Male	72	65.5	36.1	14.7	80.6	19.3	27	37.5
Female	38	34.5	35.5	16.4	70.4	12.8	12	31.6
Aboriginal/Torres Strait Islander (ATSI)	51	46.4	31.6	11.8	75.8	19.2	23	45.1
Non-ATSI	59	53.6	36.5	15	78.3	17.0	16	27.1
ATSI male	33	30	31.9	11.9	80.4	20.6	16	48.5
ATSI female	18	16.4	31.1	12.1	71.1	11.0	7	38.9
Non-ATSI male	39	35.5	36.2	14.7	82.6	16.8	11	28.2
Non-ATSI female	20	18.2	36.7	14.9	69.9	14.4	5	25

SD = standard deviation.

Table 2
Legalities of Transfers

Mental Health Forms	n	%	Demographic	N	%
Form 1 (referral order)	90	81.8	Police escort	87	79.1
Form 3 (transport order)	91	82.7	Mechanical restraint use recorded	84	76.4
Previously on community treatment order	3	2.7	Forms 1 & 3 completed by RFDS doctor	1	.9
Form 11 (revocation of community treatment order)	2	1.8	Patients restrained without transport order (Form 3)	0	0
Form 5 (detention for further assessment)	1	.9	Voluntary patients/"medical" diagnosis (eg, delirium)	15	13.6
Form 6 (involuntary patient order)	1	.9	In-flight violence	2	1.8

RFDS = Royal Flying Doctor Service.

In-flight violence over the period of 1986 to 2004 was low, with a quoted incidence of 1 in 350 transfers.

This study formed part of a larger follow-up project to review the management of patients with acute mental health disturbance who undergo air medical transportation with RFDSWO.

Methods

A retrospective review of patients transferred by RFDSWO was undertaken with the aim of obtaining a comparative cohort size to the 2004 audit. Patients were identified from the RFDS transfer database by mental health *International Classification of Diseases, Ninth Revision* diagnosis.⁶ Patients with mental health as the incident comorbidity rather than the primary diagnosis were excluded.

In order to obtain a comparative cohort size with the 2004 audit, a retrospective case notes review was completed for a 4-month period. The clinical transfer record and all other records held by RFDSWO were reviewed. All medications and therapy given while in the care of RFDSWO were considered as in-flight. Data were collated into a 1 line per patient transfer spreadsheet document. Statistical software was used to calculate *P* values from Mann-Whitney *U*⁷ and Fisher exact tests.⁸ In order to compare doses of benzodiazepines and antipsychotics given in flight, doses are converted into a reference drug per class.

Results

In this study, 111 patients were referred to RFDSWO for transfer. One patient was excluded because of being transferred by road ambulance to a nearby mental health unit when adverse weather rendered air medical transfer unsafe. One hundred ten patients underwent RFDS air transfer in a total of 130 flights, with cumulative RFDS care time exceeding 12 days. The RFDS transfer clinical record was available for all patients. The age of patients ranged from 11 to 86 years (mean = 34 years). [Table 1](#) details a demographic breakdown of the patients.

Schizophrenia, bipolar affective disorder, and other psychoses accounted for nearly three quarters of the diagnoses. One hundred eight patients were transferred from mainland Western Australia,

Table 3
In-flight Sedation Given by Medication

Medication	N	%	Median (mg)	Range (mg)
No sedation	59	53.6	—	—
Midazolam ^a	46	41.8	6	1-60
Midazolam, exclude intubated patients	43	40.2	5.5	1-20.5
Haloperidol	12	10.9	8.5	2-10.5
Morphine ^a	4	3.6	36	3-60
Morphine, exclude intubated patients	1	.9	3	—
Olanzapine	1	.9	10	—
Diazepam	6	5.5	10	5-20
Promethazine	4	3.6	25	10-50
Ketamine	7	6.4	125	30-750
Propofol	4	3.6	55	50-110

^a Data skewed by ventilated patients being sedated with morphine and midazolam.

1 patient from the Rottneest Island Nursing Post, and 1 patient from Christmas Island Hospital. Transfer legalities are summarized in [Table 2](#).

Medications are prescribed by RFDSWO doctors on the flight assessment when no doctor will be present on board. Additionally, planes are equipped with satellite phones so flight nurses can consult with ground-based RFDSWO doctors.

[Tables 3 and 4](#) summarize in-flight medications given during this study. Benzodiazepine equivalent doses are provided as diazepam milligrams using the dose equivalent scale described by Latt and Conigrove.⁹ [Table 5](#) summarizes nonpharmacologic management in flight. [Table 6](#) summarizes conscious level assessments before and after transfer. The notes review detailed a number of clinical incidents, which are summarized in [Table 7](#). All ventilated transfers of psychiatric patients in Western Australia are reportable to the chief psychiatrist.

Discussion

All patients transferred by RFDS in Western Australia are accompanied by a flight nurse. A police escort accompanies patients

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