

# Acute hypercapnic respiratory failure secondary to substance abuse in cystic fibrosis adults

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## Background

Substance abuse (SA) may lead to

- ↑ risk of respiratory pump dysfunction through central nervous system depression and respiratory muscle fatigue (1, 2)
- ↑ risk of pulmonary pathology – e.g. pneumonia, pulmonary oedema, inflammatory pulmonary reactions (1)
- 7 CF adults presenting with acute hypercapnic respiratory failure (AHRF) had revealed SA during physiotherapy assessment/treatment.

## Aim

- To heighten awareness of SA amongst the CF team and CF Adults
- To heighten awareness of SA contributing to AHRF
- To promote sensitive assessment, discussion and enhance referral for treatment and counseling.

## Method

A retrospective search of the medical notes of 7 CF adults known to have experienced AHRF secondary to SA identified

- Substances abused,
- AHRF episodes/patient,
- Pulmonary/systemic complications
- Interventions
- Outcome.

## Results

15 episodes of AHRF secondary to SA were identified in 7 CF adults.

- 6/7 reported commencement of smoking cigarettes → cannabis age 9-16 yrs
- 5/7 reported commencement of smoking cigarettes, cannabis and alcohol age 9-16 yrs
- 1/7 reported daily use of cigarettes, alcohol, cannabis and amphetamines by age 20

### Substances used at time of AHRF secondary to SA

- Cannabis 5/7 commonly causes pulmonary oedema and bronchospasm
- Prescription analgesia 5/7
- Alcohol 5/7
- Heroin 3/7 commonly causes pulmonary oedema
- Methadone 1/7

### Reasons given for commencement of substance usage

- Expect to die young anyway 5/7
- Peer influences/friends were using it/wanted to fit in 5/7
- fun/pleasure 5/7
- to cope with depression 4/7
- because " I will never have any quality of life" 2/7

### Previous substances used

Cannabis 7/7  
Heroin 3/7 (Smoked/ inhaled 3/3, Intravenous heroin 2/3)  
Amphetamine 2/7  
Ecstasy 2/7  
Cocaine 2/7

### Pulmonary complications of AHRF secondary to SA

- severe bronchospasm 7/7
- haemoptysis 5/7
- respiratory arrest 4/7
- aspiration 2/7
- other effects e.g. dyspnoea, hypoxia 7/7

### Systemic complications of AHRF secondary to SA

- fatal gastric bleed 1/7
- cardiac arrest 4/7
- other effects tachycardia, headaches 6/7

### Age of onset of first episode of AHRF secondary to SA

- Age 20-25 5/7
- Age 26-30 2/7

### Total no. episodes of AHRF secondary to SA =15

- 1 single episode 6/7
- 9 episodes 1/7 heroin user

### Interventions in 15 episodes in 7 CF adults

- NIV 11/15
- Full ventilation 2/15
- Narcan/ Naloxone Hydrochloride injection indicated for the complete or partial reversal of narcotic depression, including respiratory depression 7/15 (6 episodes in 1 person)
- Airway Clearance Techniques and Exercise 12/15 1/15

### No active intervention possible in 3 CF adults

- 1 Acute fatal massive gastric bleed (heroin/methadone)
- 1 Aspiration pneumonia/respiratory/cardiac during sleep (methadone)
- 1 Respiratory/cardiac arrest during sleep prescription analgesia

### Patient outcome

- Full recovery from AHRF 3/7
- 3 survivors were all substance free at 12 months with an increased FEV<sub>1</sub> % predicted (range of increase 15-25%)
- Death 4/7

### Age at time of death

- Age 20-25 yrs 2/7
- Age 26-30 yrs 2/7

### Survivors

All three survivors are alive to date (1-8 yrs)

- 2 awaiting transplantation assessment (FEV<sub>1</sub> % predicted < 30%)
- 1 FEV<sub>1</sub> % predicted 30-40%

### Successful rehabilitation completed

- Heroin 2
- Cannabis 2

## Conclusion

Substance use/abuse leading to acute hypercapnic respiratory failure in CF adults, was highlighted

↑ Awareness has led to

- ↑ education, recognition and the offer of psychological/physical rehabilitation /treatment for substance use/abuse
- The development of an educational CF specific drug/substance information leaflet
- Sensitive discussion may lead to the offer of early referral for counseling/rehabilitation

AHRF occurring secondary to SA should be recognised early and treatment offered appropriately, which may improve outcome for CF adults.

### References

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