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 amphetamine 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 abuse

- 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
- “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 4/7
- 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
- 1/5

No active intervention possible in 3 CF adults

- 1 Acute fatal massive gastric bleed (heroin/methadone)
- 1 Aspiration pneumonia/respiratory/cardiac arrest (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 FEV1% predicted (range of increase 15-25%)
- Death 4/7

Age at time of death

- Age 20-25 yrs 2/7
- Age 26-30 yrs 1/7

Survivors

- All three survivors are alive to date (1-8 yrs)
- 2 awaiting transplantation assessment (FEV1 % predicted < 30%)
- 1 FEV1 % 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

4. ↑ increase 15-25%
5. ↑ awareness has led to
6. ↑ education, recognition and the offer of psychological/physical rehabilitation/treatment for substance use/abuse
7. ↑ Sensitive discussion may lead to the offer of early referral for counseling/rehabilitation
8. ↑ AHRF occurring secondary to SA should be recognised early and treatment offered appropriately, which may improve outcome for CF adults.