ACCURACY OF ROUTINE ANTIBIOTIC SUSCEPTIBILITY TESTING OF SPUTUM SAMPLES IN ADULT CYSTIC FIBROSIS (CF) PATIENTS COLONISED WITH PSEUDOMONAS AERUGINOSA (PSA)

**Methods**

For each sputum sample, 40 colonies proportionately representative of morphological subtypes (mean 2, range 1–4) on the Psa selective plates were cultured onto Columbia plates. From these, single colonies were mixed with sterile distilled water to attain a standard optical density (10 MacFarland units), and 10 µl spread onto iso-sense plates and incubated overnight with tobramycin, meropenem, colomycin, cefotaxime, ciprofloxacin, and piperacillin/tazobactam antibiotic discs. Antibiotic sensitivity (break point 50% of isolates) was determined by the zone of inhibition as per standardised BSAC protocols. In total, 6240 analyses were performed.

**Results**

Although there was 100% concordance with the number of morphological subtypes of Psa with the routine laboratory, on multiple antibiotic susceptibility testing in 260 cases (25%) increased resistance was discovered. Overall, mean concordance between the routine diagnostic lab methodology and multiple antibiotic sensitivity testing was 70% (median 80%, IQR 60–100). However, in 15% of cases concordance was <50%, suggesting that more detailed testing may have altered the choice of antibiotics used.

**Conclusion**

This study shows that routine microbiological methodology under-represent antimicrobial resistance in Psa when patients are chronically infected. This may in part explain the clinical experience, and underlines the need for better microbiological techniques to aid the clinician in caring for these complex patients.

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**SOCIAL DEPRIVATION AND CLINICAL OUTCOMES IN ADULT CF PATIENTS**

**Methods**

We used the postcode-based Index of Multiple Deprivation (IMD) which takes into account seven domains (including income, education, housing and health-related outcomes), to assign Lower Super Output Areas (LSOAs) in a range of 0–32 486 (where a lower LSOA indicates increased deprivation) to adult patients attending our centre. LSOAs were then correlated with spirometry, BMI, clinic attendances, number and length of inpatient spells, treatment burden, diabetes, and ultimate outcome between 2004 and 2009. Data were analysed using the χ² test and bivariate correlations to calculate Pearson’s coefficient, where appropriate.

**Results**

Of 219 patients (mean age 27.8 years, range 17–65, 99 females), 113 (57%) lived in the lowest 20% of LSOAs (compared to only 20% nationally). We found no correlation between IMD score and FEV1, BMI, hospital admissions, diabetes and death, but there was an inverse relationship (r² = −0.153, p<0.05) with the mean length of inpatient stay.

**Conclusion**

Although many of our adult CF patients live in very deprived areas, this seems to have little impact on their health over a 5-year period, but this is at the expense of more inpatient care, a surrogate marker for more intensive treatment. It is therefore likely that these patients will consume more healthcare resource, and this may need to be factored into any proposed national policy allotting funding towards this complex group of patients.

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**AN INVESTIGATION OF MUTATOR PSEUDOMONAS AERUGINOSA IN CHRONICALLY INFECTED CYSTIC FIBROSIS (CF) PATIENTS TREATED FOR PULMONARY EXACERBATION**

**Methods**

Six patients with CF, chronically infected with *P. aeruginosa*, were treated before and after 2 weeks antibiotic treatment for exacerbation. Culture, antibiotic susceptibility testing and pulsed-field gel electrophoresis (PFGE) typing were performed using published methods.

**Results**

168 *P. aeruginosa* isolates were tested (average 14 per sputum). Three patients had no mutators before or after antibiotics and three cultured mutators before and after antibiotics. One to four PFGE pulsotypes and two to six morphotypes were found in each sputum.

**Conclusions**

With extensive testing, mutators were found in three of six patients with chronic *P. aeruginosa* infection. The phenotypic and genotypic diversity observed means that multiple colonies of each morphotype should be tested to reliably detect mutators. Our method variation allows more extensive testing and may assist future clinical studies.
Lung function has been traditionally accepted as the primary monitoring tool in cystic fibrosis. The rate of change in lung function, however, is slowing and is now as low as 1% per annum. Alternative monitoring tools to assess disease severity are therefore required. Measuring neural respiratory drive (NRD) using diaphragm electromyography (EMG) provides a sensitive measure of load on the respiratory system. The invasive nature of this technique limits its application, however, measurement of NRD by sEMGpara is non-invasive and has potential clinical application in monitoring respiratory function in cystic fibrosis (CF).

**Hypothesis**

That NRD measured by sEMGpara%max can be used to assess the change of ventilatory mechanics during an infective exacerbation in CF.

**Methods**

Eight patients [median (range) 20 (20–25) years old, three females] with CF, admitted to hospital with an acute chest infection were studied. The studies were performed within 48 h of admission and on the day of discharge. At both time points spirometry and the studies were performed within 48 h of admission and on the day of discharge. At both time points spirometry and the studies were performed within 48 h of admission and on the day of discharge. At both time points spirometry and the studies were performed within 48 h of admission and on the day of discharge.

**Results**

The median (range) length of stay was 10 (5–22) days. There was a significant reduction in median (range) sEMGpara%max between the first measurement and discharge [19.5 (8–28)% vs 13.5 (6–18)%; p = 0.008]. The reduction in sEMGpara%max was coupled with an improvement in FEV1% predicted [41 (20–62)% vs 46 (34–65)%; p = 0.02] and VC% predicted [70 (38–79)% vs 74 (45–90)%; p = 0.035] on discharge.

**Conclusion**

These findings support the hypothesis that NRD measured by sEMGpara%max has potential as a clinical tool to assess changes in ventilatory function in patients with CF following an acute exacerbation.

**References**


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**P103 ORAL CONTRACEPTIVE USE DOES NOT AFFECT CF DISEASE SEVERITY**

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Several studies using a variety of in vitro models indicate that sex hormones such as oestrogen can alter ion transport across epithelial cells by either directly affecting CFTR or altering the activity of alternative chloride channels; such effects may in part explain the gender-difference in disease severity observed in some studies. However, published data are inconsistent with several studies postulating beneficial and others detrimental effects of oestrogen on CF ion transport abnormalities. A large proportion of women with CF regularly use oral contraceptives (OC), but the effect of OC use on disease severity has not been systematically studied. Here, we assessed the effects of OC use in a retrospective study. The data included annual follow-up information from 681 women born between 1957 and 1992 of whom 42% have taken OC for varying periods of time. Data regarding OC use is currently available from 1981 to 2010. We performed an inter-patient analysis comparing average yearly changes in %FEV1 and body mass index (BMI) and total days of intravenous (IV) antibiotic use over a 5-year period between matched cohorts of OC users (n = 57), median age at start of study period: 23 (16–45), median %FEV1; at start of study period: 56.2 (20.4–111.1), and OC non-users (n = 57) (median age at start of study period: 22 (17–44), median %FEV1 at start of study period: 48.4 (12.8–119.6)). We found no differences between the groups (median change in %FEV1: users: –1.37 (–11.5 to 10.4), non-users: –1.08 (–11.8 to 17.9); median change in BMI: users: 0.051 (–1.1 to 1.6), non-users: –0.065 (–1.5 to 3.5); median total days on antibiotics: users: 49 (0–506), non-users: 42 (0–378)). Next, we performed an intra-patient analysis of the same outcomes and a 3-year period on and a 3-year period of off OC in the same patient (n = 23–27), but again did not detect any differences in any of the clinical outcomes studied. In conclusion, OC use in CF females did not affect %FEV1, BMI or intravenous antibiotic usage in this study; our findings suggest that there is no evidence of a clinically significant effect on CF outcomes.