An Audit of Introduction of POCT and Retrospective Review of Patients Admitted with COPD

Introduction

- Influenza A and B cause significant mortality and morbidity each winter.[1] This is most significant amongst patients with underlying respiratory condition such as chronic obstructive airways disease (COPD).
- In the last four years Newcastle upon Tyne Hospitals (NUTH) have used a point of care test (POCT) which has allowed early detection of influenza in patients admitted with influenza symptoms and exacerbation of conditions such as COPD. This has confirmed the growing recognition that a large number of patients admitted with acute exacerbation of COPD (AECOPD) during the winter months have influenza A or B leading to the exacerbations.
- Little is known about the effect of influenza on morbidity and mortality of COPD admissions. This study investigated this effect, with the aim that the information gained will be useful in guiding management of patients admitted and may allow identification of risk factors for deterioration and further improve knowledge of influence of influenza on COPD admissions during the winter months.

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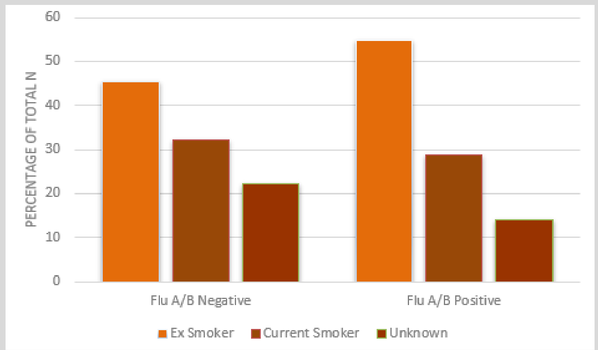
HYPOTHESIS:
Influenza increases risk of poorer outcomes in patients with COPD

Population Characteristics

- All patients who were admitted AECOPD to the Medical Assessment Unit at the RVI and tested for influenza between 01/12/17 and 30/04/2018 were screened (n=295) and out of these 115 were identified as influenza A or B positive (38.9%).
- The cohort had a mean age of 73 years (SD 9.53) and was 57.3% female.
- No statistically significant differences were seen in age, gender, or smoking status between influenza A or B positive and negative patients.



Smoking status of patients in flu A/B positive and flu A/B negative cohorts

Predictors of Outcomes

- Data were collected retrospectively using eRecord and were fully anonymised.
- Several predictors of outcome were recorded in order to assess the severity of the patient's condition when they were admitted. These included eosinophil count, C-Reactive Protein (CRP), white cell count (WCC), pH, presence of consolidation or bronchial thickening on chest-ray, whether the patient had acute oxygen therapy, atrial fibrillation (AF), and treatment given.

	Flu A or B Positive n = 115	Flu A or B Negative n = 180	OR (95% CI)	P Value
Eosinopenia (<0.05x10/l), n (%)	81 (70.4)	99 (55.0)	1.9 (1.19 - 3.2)	0.008
CRP>100, n (%)	24 (20.9)	59 (32.8)		0.19
WCC>11, n (%)	44 (38.3)	100 (55.6)		0.004
AF, n (%)	13 (11.3)	24 (13.3)	0.78 (0.37-1.59)	0.49
CXR Findings, n (%)				
Consolidation	8 (7.0)	35 (19.4)	0.31 (0.14-0.69)	0.005
Bronchial Thickening	15 (13.0)	23 (12.8)	1.02 (0.51-2.06)	0.95
pH, n (%)				
<7.35	14 (12.2)	21 (11.7)	1.05 (0.51 - 2.16)	0.89
<7.3	3 (2.6)	11 (6.1)	0.41 (0.11 - 1.5)	0.18
Acute Oxygen, n (%)	16 (13.9)	35 (19.4)	0.67 (0.35-1.28)	0.22
Treatment, n (%)				
Antibiotics	88 (76.5)	133 (73.9)		
Oseltamivir	66 (57.4)	0 (0)		
Antibiotics + Oseltamivir	45 (39.1)	0 (0)		

- Patients diagnosed with influenza A or B were significantly more likely to have eosinopenia ($p<0.05$).
- No significant difference in CRP, incidence of atrial fibrillation (AF), or likelihood of presenting with a pH of less than 7.35 or 7.3 was seen between influenza A/B positive and influenza A/B negative patients.
- Patients with a negative A/B influenza swab were significantly more likely to show consolidation on chest x-ray and a lower WCC, suggesting that the cause of the exacerbation may have a bacterial rather than viral cause.
- 57.4% of influenza A/B positive patients were given the antiviral oseltamivir, and 39.1% were given both antibiotics and antivirals.

Outcomes

- Outcomes recorded length of stay, ITU admission, use of non-invasive ventilation (NIV), and readmission or mortality within 90 days.
- Patients diagnosed with influenza were significantly less likely to be readmitted within 90 days compared to those without influenza. The use of NIV was approaching significantly more likely in influenza patients compared with influenza-negative patients.
- None of the outcomes were significantly more likely in patients diagnosed with influenza, suggesting that they had better outcomes than those without influenza A or B.

	Flu A or B Positive n = 115	Flu A or B Negative n = 180	OR (95% CI)	P Value
90 Day Readmission, n (%)	41 (35.6)	96 (53.3)	0.48 (0.3 - 0.78)	0.03
NIV, n (%)	20 (6.8)	19 (10.6)	1.78 (0.91 - 3.51)	0.09
ITU Admission, n (%)	4 (3.5)	9 (5.0)	0.68 (0.21 - 2.28)	0.54
90 Day Mortality, n (%)	12 (10.4)	34 (18.8)	0.5 (0.25 - 1.01)	0.69
90 Day Readmission or Death, n (%)	50 (43.5)	96 (53.3)	0.67 (0.42 - 1.08)	0.1
Length of Stay, days‡ IMedian(IQR)	4 (2-8)	5.5 (2-10)		0.16

CONCLUSION:
Patients admitted with AECOPD and an influenza-positive swab had either better or equivocal outcomes than those without the virus.
This may be due to more intensive management in influenza A/B positive patients, or due to baseline differences in risk.
Furthermore, reduced readmission may be attributed to the limited timescale and full recovery usually seen in influenza cases.

Future Work

- Further work is needed to investigate the cause of better outcomes in influenza A/B positive patients.
- We propose collecting data from paper records to compile a Dyspnoea, Eosinopenia, Consolidation, Acidaemia, and Atrial Fibrillation (DECAF) scores for each patient.
- DECAF scores are robust predictors of inpatient mortality in AECOPD patients[2] and will give more information on the severity of the patient's condition on admission.
- This data may help elucidate whether patients admitted with AECOPD and an influenza-positive swab present with more severe illness, therefore receiving more intensive management. This may explain their better outcomes when compared with influenza-negative AECOPD patients.

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References:
1. World Health Organization (2011) The 10 leading causes of death by broad income group, 2008. Fact sheet No. 310
2. Echevarria C, Steer J, Heslop-Marshall K, *et al* (2016) Validation of the DECAF score to predict hospital mortality in acute exacerbations of COPD *Thorax*;**71:**133-140.