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Letter to the Editor

Clinical features of 95 sequential hospitalised patients with novel coronavirus 2019 disease (COVID-19), the first UK cohort

Sir,

Wang and colleagues recently reported in this journal the characteristics and prognostic factors of novel coronavirus 2019 (COVID-19) disease in 339 patients over 60 years of age presenting to Renmin Hospital of Wuhan University in Wuhan, China.¹ This highlighted the higher case fatality rate in this patient group with

19.2% dying within 30 days and frequent comorbidities including hypertension, diabetes and cardiovascular disease. Numerous other case series of hospitalised patients in China have provided valuable insight into the clinical features of disease, risk factors for severity and case fatality rate. These have informed diagnostic criteria, treatment strategies and public health policy worldwide. In the largest of these, patients over 65 years of age represented 27% of patients with severe disease and 49.2% of patients admitted to the intensive care unit.² To date there has been limited clinical data published outside of China and none from the epidemic in the UK which is estimated to be now nearing its peak (14th April 2020). It

Table 1
Patient demographics, comorbidities and symptoms.

Characteristic	N = 95 ¹	Alive N = 75 ¹	Dead N = 20 ¹	p-value ²
Age	75 (59, 82)	74 (56, 82)	77 (72, 85)	0.062
Gender				>0.9
F	35 (37%)	27 (36%)	8 (40%)	
M	60 (63%)	48 (64%)	12 (60%)	
Comorbidities				
All Cardiovascular disease	54 (57%)	36 (48%)	18 (90%)	0.002
Hypertension	35 (37%)	24 (32%)	11 (55%)	0.10
Ischaemic heart disease	21 (22%)	14 (19%)	7 (35%)	0.14
Cardiac failure	15 (16%)	8 (11%)	7 (35%)	0.014
Arrhythmia	13 (14%)	10 (13%)	3 (15%)	>0.9
Valve disease	6 (6.3%)	6 (8.0%)	0 (0%)	0.3
Cerebrovascular	8 (8.4%)	6 (8.0%)	2 (10%)	0.7
All Respiratory disease	31 (33%)	25 (33%)	6 (30%)	>0.9
Asthma	21 (22%)	17 (23%)	4 (20%)	>0.9
COPD	10 (11%)	6 (8.0%)	4 (20%)	0.2
Bronchiectasis	1 (1.1%)	1 (1.3%)	0 (0%)	>0.9
Obstructive Sleep Apnoea	8 (8.4%)	6 (8.0%)	2 (10%)	0.7
Gastrointestinal disease	11 (12%)	8 (11%)	3 (15%)	0.7
Endocrine disease	6 (6.3%)	4 (5.3%)	2 (10%)	0.6
Diabetes	37 (39%)	24 (32%)	13 (65%)	0.015
Malignancy	20 (21%)	17 (23%)	3 (15%)	0.6
Neurological disease	14 (15%)	11 (15%)	3 (15%)	>0.9
Renal disease	22 (23%)	16 (21%)	6 (30%)	0.6
Immunocompromised	1 (1.1%)	1 (1.3%)	0 (0%)	>0.9
Symptoms				
Fever	68 (72%)	56 (75%)	12 (60%)	0.3
Cough	70 (74%)	56 (75%)	14 (70%)	0.9
Shortness of breath	41 (43%)	27 (36%)	14 (70%)	0.013
Myalgia	13 (14%)	12 (16%)	1 (5.0%)	0.3
Confusion	20 (21%)	16 (21%)	4 (20%)	>0.9
Seizure	1 (1.1%)	1 (1.3%)	0 (0%)	>0.9
Headache	9 (9.5%)	9 (12%)	0 (0%)	0.2
Sore throat	6 (6.3%)	6 (8.0%)	0 (0%)	0.3
Chest pain	7 (7.4%)	6 (8.0%)	1 (5.0%)	>0.9
Diarrhoea	11 (12%)	7 (9.3%)	4 (20%)	0.2
Nausea and vomiting	13 (14%)	9 (12%)	4 (20%)	0.5
Abdominal pain	5 (5.3%)	4 (5.3%)	1 (5.0%)	>0.9
Constipation	4 (4.2%)	4 (5.3%)	0 (0%)	0.6
Anosmia	3 (3.2%)	3 (4.0%)	0 (0%)	>0.9

¹ Statistics presented: median (IQR); n (%).

² Statistical tests performed: Wilcoxon rank-sum test; chi-square test of independence; Fisher's exact test.

Table 2

Patient laboratory, imaging findings and respiratory support.

Characteristic	Normal Range	N = 95 ¹	Alive N = 75 ¹	Dead N = 20 ¹	p-value ²
C-reactive protein (mg/L)	<6	42 (18, 86)	36 (14, 67)	77 (53, 124)	0.001
Not measured		3	3	0	
Lymphocytes (x10 ⁹ /L)	1–4	0.79 (0.54, 1.23)	0.81 (0.52, 1.22)	0.73 (0.55, 1.26)	0.9
Not measured		3	3	0	
Neutrophil:Lymphocyte Ratio		6 (3, 11)	6 (3, 11)	7 (4, 11)	0.6
Not measured		3	3	0	
Ferritin (ug/L)	33–490	557 (235, 974)	493 (184, 948)	816 (592, 1706)	0.4
Not measured		68	54	14	
Alanine aminotransferase (U/L)	10–60	26 (19, 37)	26 (19, 38)	28 (17, 37)	0.7
Not measured		17	17	0	
Albumin (g/L)	35–50	31 (26, 34)	32 (27, 36)	30 (24, 32)	0.024
Not measured		16	16	0	
Troponin T (ng/L)	<14	25 (15, 65)	23 (15, 61)	31 (19, 66)	0.5
Not measured		60	50	10	
Creatinine (umol/L)	45–84	98 (69, 138)	87 (66, 120)	117 (102, 151)	0.014
Not measured		3	3	0	
Chest-X Ray Findings					0.008
Bilateral Consolidation		24 (27%)	14 (20%)	10 (50%)	
Unilateral Consolidation		25 (28%)	18 (26%)	7 (35%)	
No Consolidation		31 (34%)	28 (40%)	3 (15%)	
Not Performed		10 (11%)	10 (14%)	0 (0%)	
CURB65+ Score					0.001
0		11 (14%)	11 (18%)	0 (0%)	
1		16 (21%)	16 (27%)	0 (0%)	
2		29 (38%)	22 (37%)	7 (41%)	
3		15 (19%)	7 (12%)	8 (47%)	
4		5 (6.5%)	3 (5.0%)	2 (12%)	
5		1 (1.3%)	1 (1.7%)	0 (0%)	
Not calculable		18	15	3	
Respiratory support:					<0.001
Non-invasive ventilation		10 (10.5%)	4 (5.5%)	6 (30%)	
Invasive ventilation		6 (6.3%)	3 (4.1%)	3 (15%)	
Oxygen		38 (40%)	27 (37%)	11 (55%)	
None		39 (41%)	39 (53%)	0 (0%)	

¹ Statistics presented: median (IQR); n (%).² Statistical tests performed: Wilcoxon rank-sum test; Fisher's exact test.

is anticipated that age and the frequency of co-existing comorbidities in the UK population are likely to be strong drivers of outcome of and mortality in patients hospitalised with COVID-19 disease.

Here, we describe a retrospective single-centre study of all patients hospitalised with SARS-COV-2 infection from March 10th to March 30th within North Bristol NHS Trust, a large, regional teaching hospital in the UK. During this period, 95 cases were admitted to the trust and by the final day of follow up on April 6th, 21 patients (21%) had died, 44 patients (43%) had been discharged, and 30 (29%) were still inpatients. Of the 21 patients that died, 20 died within 14 days suggesting that most mortality occurs within two weeks. 7 patients were admitted to the intensive care unit, of whom 4 had died by the 6th of April, and 3 remained in intensive care. Length of stay for patients who were discharged from hospital was a median of 4 days (IQR 1–16), for those that died 8 days (IQR 6–9) and for those that remained inpatients 9 days (IQR 3–23). Longer length of stay was influenced by the timing of a positive test, which for 23 patients (24%) was more than 7 days after admission. Fifteen patients (16%) had a negative test preceding the positive result indicating some delay in diagnosis due to false negative results.

The demographics, symptoms, radiology, laboratory findings and comorbidities of our patient group are presented in [Tables 1 and 2](#). The median age of patients was similar in both patients alive at 14 days and those that had died, at 74 and 77 respectively. No differences by gender were observed, but there were more men in the study overall (63%). Cardiovascular and cerebrovascular disease was significantly more common in those that had died by 14 days (90% vs 48%) and of these; congestive cardiac failure was the most notably associated with non-survival (35% vs 11%). Dia-

betes was also significantly more common in those that had died at 14 days (65% vs 32%) whilst respiratory disease was equally distributed between the two groups (30% vs 33%). The most common symptoms were fever (72%) cough (74%) and shortness of breath (43%), followed by confusion (20%). Two patients presented with anosmia. This has recently been recognised as an early clinical feature in European patients³ and may be underrepresented in our cohort due to the frequency of advanced disease and confusion. Shortness of breath was the only symptom that was significantly more common in patients that died within 14 days ($p = 0.013$).

We found significantly higher CRP and creatinine in those that died in keeping with progressive inflammation and end organ damage. Median lymphocyte count was low in both groups, ALT was raised in 5 patients and Ferritin was > 2000 in 6 patients but was performed infrequently and showed no significant difference between survivors and non-survivors. We found little evidence of viral or bacterial co-infection with rhinovirus and human metapneumovirus in 2 of the 88 patients tested and one significant respiratory isolate (*K. oxytoca*). However, sputum culture and testing for Legionella and Pneumococcal antigens was performed infrequently. There were 3 positive blood cultures (*D. hominis*, *S. aureus* and *E. faecium*) none of which were felt to be respiratory in origin. 55 patients received antibiotic therapy, including 20 of the 21 patients that died and 2 patients received antivirals (Aciclovir for suspected meningoencephalitis). Consistent with evidence supporting the use of CURB65 as a predictor of mortality secondary to community acquired pneumonia⁴ we found a significantly higher median score in non-survivors versus survivors (2.5 versus 1 respectively). Patients who did not survive were more likely to have chest X-ray findings, and in particular, were more likely to have bilateral con-

solidation than unilateral. 40% of survivors did not have any radiological evidence of consolidation. Only 6 patients had a CT chest performed which may be useful in detecting early disease in patients that test negative by rtRT-PCR.⁵

To our knowledge, this is the first description of a UK cohort of patients with SARS-COV-2 infection and the largest descriptive study of the infection outside of China. We found a much higher median age and case fatality rate than that reported by other studies of all hospitalised patients with COVID-19. All the patients that died were over the age of 60 and only 4 were admitted to intensive care. Given the current availability of beds and ventilatory equipment in the hospital during this study this does not represent deficiencies of medical care. Rather it suggests that there was an anticipated deterioration in these patients in the context of poor premorbid state, and planned decision making around intensive care unit admission. NICE guidance published during this period endorsed the use of a Clinical Frailty Scale (CFS) Score in the assessment for critical care admission which has been shown to perform better than evaluation of cognitive function or comorbidity in estimating risk of death and has been validated in intensive care outcomes.^{6,7} Further assessment of its application to the COVID-19 pandemic is required and may be instrumental in guiding further public health policy, particularly in areas with a low prevalence where the suspension of health care services such as cancer services may be detrimental to other preventable health outcomes. In summary, despite limited stress on our health care service, around 20% of our hospitalised population died, with the majority dying outside intensive care with significant comorbidities. Further work is needed to characterise other UK cohorts.

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