BTS Winter Meeting

Gloucestershire NHS Foundation Trust Experience – COVID-19 Associated Mortality in Mechanical Ventilation vs Non Invasive Ventilation

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BACKGROUND

COVID-19 is associated with significant mortality and morbidity in high risk groups requiring ventilatory support as per the Intensive Care National Audit & Research Centre (ICNARC) [1]

Mechanical (IMV) and non-invasive ventilation modalities [Continuous positive airway pressure (CPAP) / High Flow Nasal Oxygen (HFNO)] support acute respiratory failure in COVID-19 but the mortality data comparing these modalities is limited

Gloucestershire NHS Foundation Trust admitted a total of 860 COVID-19 patients, 130 requiring ventilatory support between February-July 2020; the highest number in the South-West. Respiratory High dependency (HDU) and Intensive care units (ITU) were reconfigured in anticipation of clinical demand with HDU expanded to 31 beds compared to a normal capacity of 10 and ITU expanded to 36 beds, compared to a usual capacity of 12. Patients requiring CPAP only were managed on HDU unless deemed at high risk of deterioration to require IMV

METHODS

We conducted a prospective observational study to assess comparative mortality in all COVID-19 patients admitted to HDU/ITU with acute respiratory failure and treated with invasive mechanical versus non-invasive ventilatory modality (CPAP/HFNO)

Parameters assessed included age, gender, clinical frailty score (CFS), co-morbidities, smoking and resuscitation status. Comparative mortality was assessed statistically by calculating relative risk ratio and p-value using Welch's t-test

RESULTS

130 patients were treated with CPAP/HFNO, IMV or both. Only 1 patient was treated with HFNO with no mortality in this group

Overall mortality was 33% (n=43). Resuscitation status and treatment escalation plans were reviewed for all patients on admission

1.5% patients (n=2) had a pre-existing DNAR and CPR was not deemed appropriate for 23% patients (n=30)

62% patients (n=58) required IMV out of 72% patients (n=93) deemed suitable for it. Comparative mortality between all 3 subgroups is summarised in Figure 1

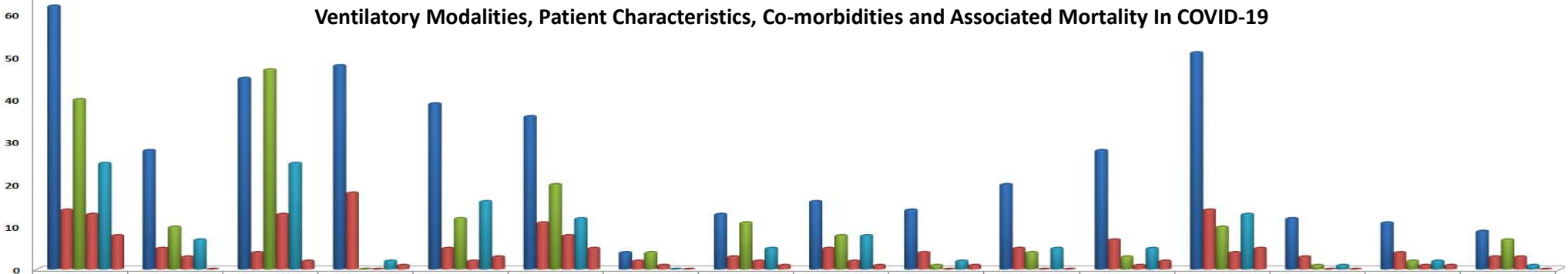
DISCUSSION

Overall mortality was higher among COVID-19 patients requiring IMV reflecting disease severity

Male gender, previous smoking history, airways disease, hypertension, diabetes, chronic kidney disease and immunosuppression were associated with higher mortality in patients requiring IMV

Interestingly CFS of >3 was associated with increased mortality in the CPAP cohort compared to CFS of <3 in the IMV cohort. This paradoxical finding is likely to reflect selection bias of patients deemed appropriate for IMV

Ventilatory Modalities, Patient Characteristics, Co-morbidities and Associated Mortality In COVID-19



	Gender		Clinical Frailty Score		Smoking Status				Co-morbidities							
	Male	Female	Score < 3	Score >3	Non smoker	Ex-smoker	Current	Unknown	Asthma/Chronic Obstructive Pulmonary Disease (COPD)	Obstructive Sleep Apnoea (OSA)	Obesity	Diabetes	Hypertension	Ischaemic heart disease (IHD)	Chronic Kidney disease (CKD)	Immunosuppression
CPAP Only	62	28	45	48	39	36	4	13	16	14	20	28	51	12	11	9
Mortality	14	5	4	18	5	11	2	3	5	4	5	7	14	3	4	3
CPAP & IMV received	40	10	47	0	12	20	4	11	8	1	4	3	10	1	2	7
Mortality	13	3	13	0	2	8	1	2	2	0	0	1	4	0	1	3
IMV Only	25	7	25	2	16	12	0	5	8	2	5	5	13	1	2	1
Mortality	8	0	2	1	3	5	0	1	1	1	0	2	5	0	1	0

REFERENCES

[1] ICNARC Reports. https://www.icnarc.org/Our-Audit/Audits/Cmp/Reports August 2020