BRIEF COMMUNICATIONS

Where are our patients? Retrospective cohort study of acute medical unit admissions during and prior to the COVID-19 pandemic

Peter W. Lange [iD],[1,2] Meg Gazzard,[1] Samantha Walker,[1] Joshua J. Hilton,[1] Shasha Haycock,[1] Jessica F. R. Wagstaff[1] and Grantley A. Ward[1]

[1]Department of Medicine and Aged Care, @AgeMelbourne, The Royal Melbourne Hospital, The University of Melbourne Parkville, and [2]Department of Medicine and Radiology, The Royal Melbourne Hospital, Melbourne Medical School, The University of Melbourne, Melbourne, Victoria, Australia

Correspondence
Peter W. Lange, The University of Melbourne, Melbourne Medical School, Department of Medicine and Radiology, The Royal Melbourne Hospital, Grattan Street, Parkville, Vic. 3050, Australia.
Email: peter.lange@mh.org.au

Abstract

Admissions to hospital have declined markedly during the COVID-19 pandemic in Australia. This may be due to patients not presenting with acute illness or managing their chronic illness at home. We reviewed a cohort admitted to the Acute Medical Unit of the Royal Melbourne Hospital during and before the pandemic and found admissions were more acutely unwell and more comorbid. This may lead to worse outcomes for those not presenting, as well as those presenting late. We recommend a public health campaign to encourage Australians to present to hospital if unwell.

During the current coronavirus disease 2019 (COVID-19) pandemic, non-COVID-19 admissions to the general medical service of the Royal Melbourne Hospital have decreased from a mean seasonally matched daily of 15 patients to 9 ($P = 0.07$, Poisson distribution). This pattern has been noted around Victoria, Australia,[1] and worldwide,[2] resulting in late presentations of treatable conditions and poor outcomes.[3] The reason behind this pattern is unclear and there is currently no literature in this area.

Hypotheses for this trend include the following: (i) patients with mild illness are not presenting; (ii) patients with concerning symptoms are not presenting for investigation; (iii) multi-morbid patients are more compliant with management of their chronic illnesses and avoiding acute exacerbations requiring hospitalisation; (iv) social isolation is resulting in decreased communicable disease with less acute exacerbation of chronic illness as a consequence; (v) residential care facilities are treating residents within their facility rather than transfer to hospital.

Decreased hospital admission rates raise the concern that patients may be failing to present to hospital with acute illness or concerning symptoms. The present study aims to compare the acuity and reason for current presentations, with presentations from the same period in 2019.

Patients admitted under the Acute Medical Unit at the Royal Melbourne Hospital between 1 and 31 March 2019 and 1 and 31 March 2020 were included for comparison.

We performed a retrospective audit using two validated instruments to measure the acuity of presentations: The acute physiology and chronic health evaluation (APACHE) III score[4] and the Charlson comorbidity score.[5] The APACHE III assesses initial risk stratification for severely ill hospital patients. Possible scores range from 0 to 299 points, with a 5-point increase in APACHE III score associated with a statistically significant increase in the relative risk of hospital death.[4] The Charlson Comorbidity Index predicts mortality by weighting comorbid conditions.[5] These scores were calculated for each patient from medical record data at time of admission.

Additional data collected from medical records included patient age, gender, place of residence and reason for admission. Reason for admission was classified as acute physiological derangement, concern over diagnosis, cognitive decline, functional decline or psychiatric. Concern over diagnosis was defined as a patient admitted due to suspicion of a dangerous medical condition being present, for example, chest pain raising concern for acute myocardial infarct. However, if this was accompanied by an acute physiological derangement, this

Table 1 Characteristics of the cohorts and analysis

Characteristic	COVID-19 pandemic, $n = 64$	Non-pandemic, $n = 51$	P-value
Demographics			
Gender, female (%)	33 (51.6)	33 (64.7)	0.110†
Age, mean (SD) (years)	79.89 (11.20)	79.71 (10.55)	0.930‡
Resides in residential care normally (%)	7 (10.9)	7 (13.7)	0.534†
Reason for presentation			0.803†
Acute physiological change (%)	33 (51.6)	28 (54.9)	
Concern over suspected diagnosis (%)	17 (26.6)	11 (21.6)	
Acute change in cognition (%)	2 (3.1)	1 (2.0)	
Acute change in physical function (%)	9 (14.1)	10 (19.6)	
Psychiatric (%)	3 (4.7)	1 (2.0)	
Subset	$n = 24$	$n = 24$	
Charlson Comorbidity Index (SD)	6.15 (2.73)	4.92 (2.08)	0.0429*‡
APACHE III score (SD)	33.60 (12.50)	28.46 (10.54)	0.0652‡

*Significant ($P < 0.05$). †Fisher exact t-test. ‡Student t-test. SD, standard deviation.

would be classed to the latter category. Reason for admission was classified by a resident medical officer and then reviewed by a consultant physician (PWL). Urine output and results of arterial blood gas evaluation were not often available in these general ward patients and therefore were not included in scores.

To estimate the required number of cases to audit, initial data on APACHE III scores in our cohort outside pandemic conditions were analysed with a mean of 30.33 and SD of 9.634, hypothesising a 10-point difference in scores (corresponding to a 10% change in risk of mortality with APACHE III scores in this range) α 0.05, β 0.9, would require cohorts of 21 per group for 42 overall. Noting the available cases, adequate power was expected to be attained.

Data analysis was performed using STATA 15.1 (StataCorp, College Station, TX, USA). Data from 115 consecutive patients beginning at the start of the identified periods were collected: 64 (2020) and 51 (2019). Demographic data and reason for admission were compared using Fisher exact test with no significant difference between the two groups (Table 1). APACHE and Charlson scores were analysed using unpaired t-test for an initial 48 patients, 24 from 2019 (non-pandemic) and 24 from 2020 (COVID-19 pandemic). APACHE III scores and Charlson comorbidity scores were approximately normally distributed. There was a non-significant trend to more severe scores in mean APACHE score (30.33 (SD 9.64) in 2019 versus 33.7 (SD 11.87) in 2020, $P = 0.0652$) that approaches the 5-point difference noted

to change mortality[4] and a statistically and clinically significant difference in Charlson Comorbidity Index (5.88 (SD 2.29) in 2019 versus 6.26 (SD 2.57) in 2020, $P = 0.0429$), indicating approximately one additional comorbid condition per three patients, between these two groups.

Discussion

Our study demonstrates that patients admitted to the Acute Medical Unit of RMH during the COVID-19 pandemic may be more comorbid than in a matched period prior to the pandemic. There was also a non-significant trend towards more acute illness. In this study, we were unable to show that the reasons for admission were different, but this is not sufficient evidence to argue against that hypothesis.

These findings, if reflected in the general population, suggest that patients with milder illnesses and/or more modest degrees of comorbidity than our current inpatients, may not be presenting to hospital for admission, potentially resulting in late presentations of treatable illness and poor outcomes.[3,6] These patients may be concerned about burdening the hospital system or acquiring COVID-19 as inpatients.[1]

We recommend a public health campaign to encourage patients to continue to attend hospital if they feel unwell, regardless of the presence of the COVID-19 pandemic.

References

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