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Mortality Outcomes in 99,145 Patients Admitted for Ischaemic Strokes: A Statewide Population-Linkage Study

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Background: Temporal trends in mortality following admissions for ischaemic strokes (IS) in New South Wales (NSW), Australia, remain unclear as prior studies did not adjust for comorbidities.

Methods: All NSW residents admitted with a primary diagnosis of IS from 2002 to 2017 were identified from databases held by the Centre-for-Health-Record-Linkage. Mortality was tracked from the death registry to 31 December 2018, and adjusted for admission calendar-year, age, gender, referral source and comorbidities.

Results: The study cohort comprised 99,145 patients (median [interquartile range] age: 76 years [64–84 years]). Majority were admitted from emergency department (88.6%), with hypertension (42%), current/ex-smoker (26%), diabetes (18%), atrial fibrillation (15%), and ischaemic heart disease (6%) as the commonest cardiovascular comorbidities (median Charlson comorbidity index [CCI]=1 [0–2]). Cumulative crude mortality was consistently higher for females (Table). Adjusted odds ratio (aOR) for in-hospital mortality and hazard ratio (aHR) for 1-year mortality post-IS comparing patients admitted in 2017 to 2002 were 0.38 (95% confidence interval [CI]=0.34–0.43) and 0.62 (95% CI=0.58–0.66), respectively. Increasing age was an independent predictor for in-hospital and 1-year mortality (aOR=1.06, 95% CI=1.05–1.06; aHR=1.06, 95% CI=1.06–1.07, respectively). Other independent predictors of increased in-hospital and 1-year mortality included atrial fibrillation (aOR=1.32, 95% CI=1.26–1.38; aHR=1.20, 95% CI=1.16–1.23, respectively) and increasing CCI score (aOR=1.16, 95% CI=1.15–1.17; aHR=1.20, 95% CI=1.20–1.21, respectively). Male sex was associated with higher 1-year mortality (aHR=0.96, 95% CI=0.93–0.98, respectively) (all $p < 0.001$ unless stated otherwise).

Conclusion: Adjusted in-hospital and 1-year mortality post-IS have reduced by 62% and 38%, respectively, from 2002 to 2017. Females consistently showed poorer outcomes and factors contributing to this gender-gap in outcomes post-IS should be identified.

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mRNA COVID-19 Vaccine (mCV) Related Myocarditis in Monozygotic Dichorionic Diamniotic (DCDA) Twins

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Background: Pericarditis/myocarditis have been associated with mCVs, most commonly in males under 30 years old after the second dose, with a variety of aetiologies proposed including immunogenetics and hormonal. This case describes mCV-related myocarditis in identical DCDA twins.

Case Presentation: Two 17-year-old male DCDA twins presented to hospital 3 days after their second Pfizer mCV with myocarditis. They were born 6 weeks prematurely, via caesarean section with normal developmental milestones, up-to-date childhood vaccinations with no previous reactions. Twin 1 had childhood asthma. Of note, their mother developed urticaria following her second Pfizer mCV. Both twins developed pleuritic chest pain and palpitations, with twin 1 also describing dyspnoea. They had similarly elevated cardiac biomarkers, inflammatory markers and similar electrocardiograph and transthoracic echocardiogram (TTE) findings with normal biventricular function and no pericardial effusion (Table 1). Autoimmune, viral myocarditis workups, lymphocyte subsets and IgG subclasses were unremarkable. Both twins had elevated IFN- γ and IL-1b, while twin 1 also had raised IL-6 and thrombocytopenia. Consequently, they were diagnosed with mCV-related myocarditis. Symptoms resolved by 3-month follow-up after treatment with colchicine, ACE inhibitor and β -blocker, which were ceased after normal repeat TTE.

Table 1

Results	Twin 1	Twin 2
Troponin (ng/L)	2,299	2,545
CK (IU/L)	1,492	1,355
CRP (mg/L)	33	44
ESR (mm/hr)	36	46
IFN- γ (pg/mL)	0.38	0.09
IL-1b (pg/mL)	0.73	0.58
IL-6 (pg/mL)	5.19	3.24
TNF (pg/mL)	0.94	0.80
ECG	Lateral V4-6 1 mm ST elevation	Lateral V4-6 1 mm ST elevation
TTE	Normal left ventricular ejection fraction	Normal left ventricular ejection fraction

Discussion/Conclusion: The mechanism behind mCV-related pericarditis/myocarditis is unknown, with suggestion there is an immune-mediated trigger, molecular mimicry or anti-idiotypic antibodies. An immunogenetic risk is supported by this report in monozygotic DCDA twins. Knowledge of the underlying aetiology may allow predicting who is at risk of developing pericarditis/myocarditis following mCV, and to offer alternative vaccine platforms and anti-inflammatory treatments.

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mRNA COVID-19 Vaccine Related Myocarditis and Pericarditis in the Australian Capital Territory

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Background: COVID-19 vaccines have been crucial to control the COVID-19 pandemic. The Australian Capital Territory (ACT) has one of the highest vaccination rates internationally. Adverse events including myocarditis and pericarditis have been associated with mRNA COVID-19 vaccines [1,2]. We describe incidence and patient characteristics of mRNA vaccine related myocarditis and pericarditis referred to the only ACT tertiary hospital.

Method: We retrospectively reviewed medical records of patients admitted to Canberra Hospital from February 2021 to January 2022, with a discharge diagnosis of myocarditis or pericarditis. Inclusion criteria included CCU admitted patients, vaccination with at least one dose of mRNA vaccine, and definite or probable myocarditis or pericarditis as defined by the Brighton Collaboration [3].

Results: 93 patients were screened, of which 23 met inclusion criteria. Median age was 26 years (IQR 20–42), and 7 (30%) of the included patients were female. 10 patients (44%) had myocarditis, 10 patients (44%) had pericarditis, while 3 (13%) patients met criteria for both myocarditis and pericarditis. 21 (91%) received BNT162b2 (Pfizer-BioNTech) vaccine and 2 (9%) received mRNA-1273 (Moderna) vaccine. 18 (82%) cases occurred after the 2nd dose, 1 (5%) occurred after the 1st dose, 3 (17%) occurred after booster vaccination. Median peak troponin I in those with suspected myocarditis was 2,250 (IQR 731–10,144). Median peak CRP was 9 (IQR 3–38). Average length of stay was 1.2 days (SD 0.5).

Conclusion: Patients identified with mRNA vaccine related myocarditis and pericarditis were more commonly younger men who received the 2nd dose of a vaccine and had a short length of hospital stay.

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Multidisciplinary Breathlessness Service: Early Experience and Proposed Model of Care

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Background: Breathlessness is common in primary care and is the commonest symptom of pulmonary hypertension (PH). Multiple diagnostic tests and visits to primary care may delay diagnosis and initiation of disease-specific treatment. We designed a new multidisciplinary breathlessness referral pathway to enhance both diagnosis and treatment.

Methods and Results: The pilot phase (n=60, 65% female, mean age 65±13 years) comprised three components: clinical review, breathlessness investigation and case conferences (respiratory and cardiac, see Figure 1). Cardiac risk factors were common: hypertension, hypercholesterolaemia, diabetes, prior smoking and family history in 46%, 75%, 11%, 40% and 13%, respectively. Computed tomography coronary angiography effectively reclassified many patients to higher (CAC>100, 22% patients) or lower CV risk (CAC=0, 40% patients), although a small minority (7% patients) showed obstructive CAD. PH (eRVSP>30 mmHg) was common (37%) whereas moderate and severe PH was less common (8%). Three patients received a final diagnosis of pulmonary arterial hypertension (PAH), with two prescribed PAH-specific therapy. Many additional diseases were identified: arrhythmias and ≥moderate valvular disease in 16% and 14%, respectively; lung disease (obstructive in 23%, restrictive in 21%); and iron deficiency, thyroid disorders, cancer and/or prior chemotherapy (28%, 13%, 28% and 25%, respectively). After investigation, there were no patients with unexplained breathlessness.

Conclusions: A multidisciplinary breathlessness service is feasible and streamlines diagnosis. PH is common, including PAH requiring disease-specific therapy. These insights will assist in future models of care focussed on timely and efficient cardiorespiratory diagnosis and treatment decisions.