CASE REPORT

Learning from errors: unnecessary intensive care unit admissions

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SUMMARY

An elderly man was transferred to our emergency department with reported ventricular tachycardia requiring intravenous amiodarone and intensive care unit admission. Device interrogation, the following day, revealed only frequent premature ventricular contractions and non-sustained ventricular tachycardia in a patient with a known history of these conditions. The patient underwent unnecessary invasive monitoring after being emergently transferred to our facility and admitted to the intensive care unit. Fortunately, our patient did not suffer any unwarranted side effects from intravenous amiodarone. This case reports on some negative consequences of inappropriate intensive care unit admissions and how they could have been avoided.

BACKGROUND

This case sheds light on the negative consequences of overuse of medical care for both patients and the healthcare system. Overuse of medical care is often not openly acknowledged as a medical error.

CASE PRESENTATION

An 89-year-old man with a history of hyperlipidaemia, atrial fibrillation, sick sinus syndrome and non-ischaemic cardiomyopathy (treated with an implanted defibrillator) presented to his local emergency department (ED) reporting shortness of breath. This was a chronic complaint, ongoing for over 2 years. On presentation, he reported that the dyspnoea was no worse than baseline. At the local ED, he was noted to have frequent premature ventricular contractions (PVCs) and a run of asymptomatic ventricular tachycardia. An infusion of amiodarone was initiated. His family was informed that his condition was serious and that he needed to be transferred, emergently.

INVESTIGATIONS

In our ED, telemetry revealed frequent PVCs with stable vital signs (figure 1). No evidence of ventricular tachycardia was sent from the transferring facility. A chest X-ray showed normal appearing lungs with no evidence of pulmonary oedema. ECG did not show any signs of acute ischaemia, biomarkers did not indicate a myocardial infarction and the remainder of his laboratory findings were unremarkable.

TREATMENT

The patient again reported shortness of breath, unchanged from his baseline. The critical care

unit was consulted to aid with the management due to the report of ventricular tachycardia and the amiodarone infusion. Despite no ongoing ventricular tachycardia, the patient was accepted to the critical care unit. In the intensive care unit (ICU), the patient continued to have frequent PVCs (figure 2). Cardiology was consulted the morning following admission where pacemaker device interrogation revealed frequent PVCs and non-sustained ventricular tachycardia (NSVT).

OUTCOME AND FOLLOW-UP

These findings were no different than the patient's prior documented rhythm. Review of his medical record revealed a history of ectopy with a PVC burden of greater than 30% ongoing for over a year prior to presentation. He had already undergone an extensive evaluation with stress testing, outpatient ambulatory monitoring and electrophysiology evaluation. Amiodarone was discontinued. The patient and his family were counselled regarding his diagnosis and the patient's care was transitioned out of the critical care unit. The remainder of the hospital course was uncomplicated and he was discharged to home after his shortness of breath spontaneously improved. It remained unclear if his condition had actually worsened or if his family had sought medical care due to a perception of worsening. At 1-year follow-up, the patient reported that he was doing well. He reported no device shocks, episodes of syncope or near syncope and his dyspnoea spontaneously resolved.

DISCUSSION

PVCs are a common disorder affecting up to 39% of healthy adults on 24 hours ambulatory monitoring and are usually benign.¹ A PVC burden of greater than 100 in 24 hours is seen in 4% of adults without

Figure 1 Initial ECG tracing in emergency department showing frequent premature ventricular contractions.

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Figure 2 ECG tracing in intensive care unit showing continued premature ventricular contractions.

recognisable heart disease.¹ Occasionally, PVCs can be a sign of ischaemic or structural heart disease and may warrant further evaluation or risk stratification. NSVT is arbitrarily defined as three or more sequential PVCs at a rate greater than 100 beats per minute.² This pattern is also commonly seen in diseased hearts and may warrant investigation. Routine suppression of ventricular ectopy in patients with postmyocardial infarction has been associated with higher risk of death.³ A high burden of PVCs can lead to a non-ischaemic cardiomyopathy and may warrant treatment to suppress ectopy.

Interrogation of the patient's defibrillator showed no episodes of ventricular tachycardia suggesting that the only rhythm disturbances he experienced were PVCs and NSVT. This patient was known to have frequent PVCs and NSVT, which had already been thoroughly evaluated. It is unclear if anyone, prior to evaluation by cardiology, adequately reviewed the patient's chart or communicated his chronic disease state to the facility where he presented. Furthermore, given the absence of any other acute findings, these chronic rhythm disturbances did not warrant treatment with intravenous antiarrhythmia drugs, transfer to our facility or admission to an ICU. Amiodarone, whether administered orally or intravenously, is associated with multiple potentially dangerous side effects including QT prolongation and hypotension. The patient and his family did not need to be put through the unnecessary stress of being told that his condition was an emergency, when, in fact, it was no different from baseline.

While admitting patients to the ICU may be a tempting way to 'be safe' in caring for patients, intensive care is an expensive solution. Critical care is estimated to account for 15% of overall hospital costs and 1% of the US gross domestic product.⁴ Critical care resource use is widely variable. In a report on the ICU admission patterns in the Veterans Affairs Health Care System, of 31 555 patients admitted directly to the ICU, the majority (53.2%) of patients had a 30-day predicted mortality of 2% or less (calculated using modified Veterans Affairs ICU score). Of the 118 centres involved in the report, the rate of ICU admissions for this cohort of patients, considered to be at lower risk, varied from 1.2% to 38.9%.⁵ In a separate study on 243 553 adult ICU admissions from 188 non-federal hospitals, 40% of cases had a predicted mortality risk of less than 10% (APACHE IV scoring system) and did not receive documented intensive treatments including mechanical and non-invasive ventilation, blood products, vasoactive medications or renal replacement therapy.⁶ Therefore, it comes with no surprise that in a survey of 1363 medical providers in adult ICUs, 22.5% of providers reported administering care in a patient for whom they thought was inappropriately admitted into an ICU on the day of survey administration.⁷

In addition to cost, inappropriate admissions to the ICU also have a number of other negative effects including physical and psychological harm to patients. Studies documenting harms to patients from inappropriate ICU admissions are few. It can, however, be inferred from previous studies, such as the Normoglycemia in Intensive Care Evaluation-Survival Using Glucose Algorithm Regulation (NICE-SUGAR) study, which showed that intensive glycaemic control in the ICU was associated with increased mortality, that such harms do exist.⁸ Our patient underwent inappropriate testing, such as an arterial blood gas, which is mandatory for new admissions to our Veterans Affairs ICU, underwent unnecessary medication administration, and suffered emotional stress (requiring a psychiatry consult later during hospital course). For this patient, an adequate review of the chart, a change in mentality away from defensive medicine and better communication with outside hospital providers could have prevented a series of unnecessary and potentially dangerous medical interventions.

Learning points

- ▶ There is a significant cost associated with intensive care unit admissions both to patients and to the healthcare system; thus, minimising unnecessary admissions is important.
- ▶ Unnecessary intensive care unit admissions can have detrimental effects to patients including drug administration and invasive monitoring and emotional distress.
- ▶ There is no role for routine suppression of ventricular ectopy postmyocardial infarction.

Contributors CAR was actively involved in the patient's care and analysed the patient's presentation and composed the initial draft of the manuscript. DEW was the attending physician involved in the patient's care and reviewed the initial draft of the manuscript and made edits and added further insights where necessary.

Competing interests None declared.

Patient consent Obtained.

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