Discharge home from critical care: safety assessment in a resource constrained system

Siyao Xing[1], Ashraf Roshdy[2,3], Jayachandran Radhakrishnan[4], Kevin Kiff[5], Jake Collins[6]

Abstract

Background High bed occupancy rates have delayed patient discharges from UK critical care units, especially in acute medical hospitals. As a result, more patients are discharged home directly from critical care (DH).

Methods In this observational, retrospective study, we quantify the trends in DH from 2013 to 2018, and assess readmission rates and outcome in this group when compared to patients discharged from a ward, from 2014 to 2016.

Results DH rates, as a proportion of critical care admissions, increased every year (2.47% in 2013 to 19.36% in 2018). In 2014–16, the most common admission diagnoses in DH patients were diabetic ketoacidosis (DKA; 35%), drug overdose (12%), seizures (8%) and respiratory failure (8%). DH patients were younger and had shorter critical care stay. Readmission rates in DH patients were comparable to the rest of the hospital. Patients with DKA and seizures were more likely to be readmitted.

Conclusions Our data suggest that direct home discharge from critical care is increasingly common but safe in selected patient groups.

Keywords: direct discharge, safety, triage

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Correspondence to:
Ashraf Roshdy
3 Cromwell Avenue
Bromley BR2 9GB
UK

Email:
ashrafroshdy76@hotmail.com

Introduction

Acute medical trusts in the UK National Health Service are reporting bed occupancy rates in excess of 90%, secondary to severe resource constraints.[1] The reduction in patient flow has affected critical care capacity. The UK has one of the lowest numbers of critical care beds per population in Europe and is vulnerable to capacity issues.[2]

The inability to step down patients from critical care in a timely manner has increased the number of patients discharged directly to the community from critical care. We report the trends in direct discharges from a District General Hospital with high susceptibility to capacity issues and evaluate the safety of this practice.

Methods

We conducted a retrospective, observational study of patients discharged directly into the community from the Critical Care Unit of Broomfield Hospital, a district general hospital with tertiary services, serving a population of more than 370,000 people in Essex. The study included all patients requiring Level 2 and 3 care.

The study was performed as a local quality assessment review and did not require ethical approval. The study was approved by the institutional audit board.

Data were extracted from an electronic database (Metavision version 5.46.44, iMDsoft, Germany), Intensive Care National Audit and Research Centre (ICNARC) audit data and from hospital records for all patients from January 2013 to the end of December 2018. Patients with planned readmission within 28 days and patients on end-of-life care were excluded from the study. All data were anonymised at point of collection.

Two groups of patients were identified from the records; patients discharged to community from critical care (DH) and patients discharged into the community from a ward (DW). First, we analysed the trend from 2013 to 2018. In order to analyse safety of the DH, we also obtained the discharge and readmission data for all the patients in the hospital from January 2014 to the end of December 2016. When patients were admitted with multiple conditions, the primary reason for admission was considered the main diagnosis. A z test of proportion was used to compare the 28-day readmission rates and mortality between the two groups. Standard descriptive

[1]Core Medical Trainee, Watford General Hospital, West Hertfordshire Hospitals NHS Trust, Watford, UK; [2]Consultant in Critical Care Medicine, General ICU, St George's University Hospitals NHS Trust, London, UK; [3]Consultant in Critical Care Medicine, Critical Care Department – Alexandria University, Egypt; [4–6]Consultant in Anaesthesia and Intensive Care Medicine, General ICU – Broomfield Hospital, Chelmsford, Mid Essex NHS Trust, UK

Table 1 Trends in direct discharge to home from critical care units (DH). DH (%) is the proportion of DH patients out of total admissions to critical care. Hospital readmission rates are for all patients (including those without critical illness) discharged from hospital care

Year	Home (n)	Hospital (n)	Died (n)	Total (n)	DH (%)	DW (%)
2013	16	560	70	646	2.477	86.69
2014	25	599	87	711	3.516	84.25
2015	85	770	104	959	8.863	80.29
2016	157	683	109	949	16.54	71.97
2017	155	744	119	1018	15.23	73.08
2018	169	622	82	873	19.36	71.25

DW: patients discharged into the community from a ward

statistical measures were used to describe the groups. Taylor changepoint analysis was used to describe DH trends.

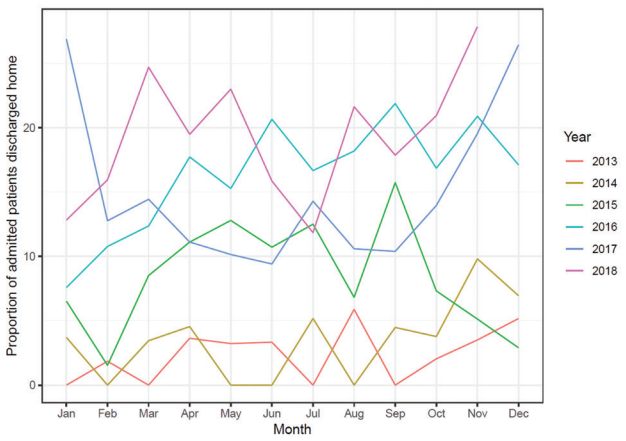
Results

Our data showed DH increased eightfold in the 6-year period. There was a simultaneous decrease in the number of patients discharged to a ward (Table 1). We also collected and analysed the monthly incidence (Figure 1).

The most common admission diagnosis in DH patients was diabetic ketoacidosis (DKA; 31%; n = 80), followed by drug overdose and respiratory failure (14.7% and 11.2%; n = 38 and 29, respectively).

Patients in the DH group were significantly younger than the DW group (mean age: 46.3 vs 65 years; $p < 0.0001$). The length of stay was statistically comparable in both groups. The 28-day readmission rates for the DH patients remained stable during the study period and comparable to the readmission rates in the rest of the hospital and to the DW patient group. However, the hospital data also includes patients with planned readmissions. A total of 24 (9.3%) patients in the DH group were readmitted within 28 days, with one patient readmitted twice. DH patients with respiratory failure, DKA and seizures were more likely to be readmitted (Table 2). Readmitted patients had slightly higher APACHE II scores in their first admission, but this was not statistically significant. One patient in the DH group died secondary to DKA with multiple comorbidities. The increase in DH was monotonic, and no change points were identified by Taylor analysis.

Figure 1 Monthly trend of discharging patients home during the period 2013–18 from the general intensive care unit in Broomfield hospital



Discussion

Transition of care usually raises safety concerns.[3,4] Discharge from critical care into the community represents a large transition gap in care, with proportionally larger safety issues. There is a paucity of evidence to address these concerns, which manifests as weak recommendations in the current intensive care unit (ICU) discharge guidelines.[5] Institutional policies vary greatly depending on bed availability, medical expertise, ward competencies, medico-legal issues and financial pressures. Objective tools to guide ICU discharge have been studied but have not found widespread use, and clinical judgment remains the cornerstone of discharge decisions.[6]

In our retrospective data analysis, we show that direct discharge to community from critical care is safe in well-defined patient cohorts. With careful patient selection, there is no difference in readmission rates compared to both patients who are discharged from critical care through a ward and noncritically ill patients discharged from the hospital. Mortality outcomes are also likely to be similar, even though our sample size does not have enough power to detect differences.

The patients who were discharged directly to community care had well-defined, easily reversible pathologies without significant comorbidities. DH patients received the same care packages as DW patients at discharge, including review by general practitioners or specialist services as appropriate. Readmission in DH patients can be explained by the natural history of recurrence in the clinical condition rather than an inappropriate discharge.

The decision to discharge a patient depends on the primary cause for admission. The process of discharge involves four steps: evaluation of readiness, planning, execution and follow up.[4] None of these steps are dependent on the location of the patient in the hospital. Therefore, planning for direct discharge in patients with delayed discharge follows the same process and entails no added risk to the patient.

Delayed discharge from critical care has a 'U' shaped association with mortality with an exponential increase in

Table 2 Common 28-day readmission diagnosis in patients discharged directly to home from critical care in the period 2014–16

Diagnosis	Readmission (n)	% (of diagnosis)
Respiratory failure	7	14.6
DKA	6	7.4
Seizures	4	22.2
Other	4	22.2
Substance abuse	2	4.9
Arrhythmias	1	6.2

DKA: diabetic ketoacidosis

mortality with prolonged delays.[7] Delayed discharge also reduces ICU capacity, which impacts patient care in other areas. In selected patients direct discharge does offer a valid option to mitigate capacity problems. While discharging patients directly to community is not ideal, it allows maximisation of patient flow in high-demand situations, and with careful considerations can be managed without additional patient risk.

It is likely that delayed discharges from critical care increases healthcare costs. Such costs have been traditionally difficult to identify. We estimate an additional cost of £950 per additional day of critical care instead of ward care, but this estimate is based on assumptions that cannot be extrapolated to other healthcare systems.[8,9]

There was a seasonal trend with a tendency towards increased direct discharges in the last 2 years. There was no clear association with the annual UK flu rates, suggesting local variation or other unmeasured epidemiological factors. Finally, comparing different healthcare systems with different resources and under variable pressures, data show a global trend of DH despite some discrepancies according to national and local factors.[10,11]

In this retrospective, observational study we have documented a rising trend in the number of patients discharged directly to the community from critical care. The outcome measures in these patients are the same as patients who have conventional discharges. With increasing demands for ICU capacity and difficulties in hospital capacity, direct discharge is effective and safe in well-defined patient groups. However, the increased trend can translate to DH of less stable patients, which warrants continuous auditing.

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