

Characteristics of ICU Patients Who Died Or Were Readmitted Within Seven Days of Transfer

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Abstract

As an initial step in the investigation of patients at risk of early death or readmission to ICU following transfer we reviewed 6,193 consecutive admissions to two adult intensive care units occurring during four calendar years from 1989 to 1993. Date of hospital death or discharge was obtained for the entire population from the admitting department information system and entered into a prospectively maintained ICU Information System (Critical Care Manager 2.2). Of the 5,227 live transfers, 129 patients died within seven days of transfer. Of these 113 had been identified as having undergone discontinuation of therapy and were therefore eliminated from further analysis. The analysis includes 129 patients who died (Group I) and 212 patients who were readmitted to ICU within seven days of initial transfer (Group II).

	ICU SURVIVORS	GROUP I	GROUP II	
N	5,227	129	212	
Age	58.3 ± 18.5	66.8 ± 14.6*	59.9 ± 17.1	*p<0.005
APACHE II	16.7 ± 6.8	24.3 ± 7.0*	19.0 ± 6.7*	*p<0.001
LOS	3.6 ± 7.8	5.6 ± 7.6*	5.5 ± 7.1*	*p<0.05

Group I patients were older, and had higher acuity than the other two groups. Review of diagnostic readmission in patients initially presenting with pneumonia, upper GI haemorrhage or septic shock. The commonest readmission diagnoses for Group II patients included cardiopulmonary arrest (13.5%), pneumonia (12.1%), septic shock (8.1%) and postoperative respiratory failure (9.4%).

Objective

To identify patients at risk for early readmission or death following transfer from ICU.

Method

Setting

University teaching hospital with separate 10 medical and surgical level III intensive care units.

Data Collection

We prospectively collected individual patient data (Critical Care Manager 2.2) for consecutive admissions over a 4 year period beginning January 1, 1989.

Demographic - Name, age, admission diagnoses, date of admission, date of discharge, length of stay, medical record number, encounter number, ICU survival.

Acuity of illness - Worst APACHE II score in the first 24 hours following admission.

Early death or readmission was defined as occurring within 7 days of transfer.

Patients who died within 7 days of transfer were retrospectively identified from the hospital admitting department information systems and their charts were reviewed. Patients undergoing cardiopulmonary resuscitation were defined as active treatment.

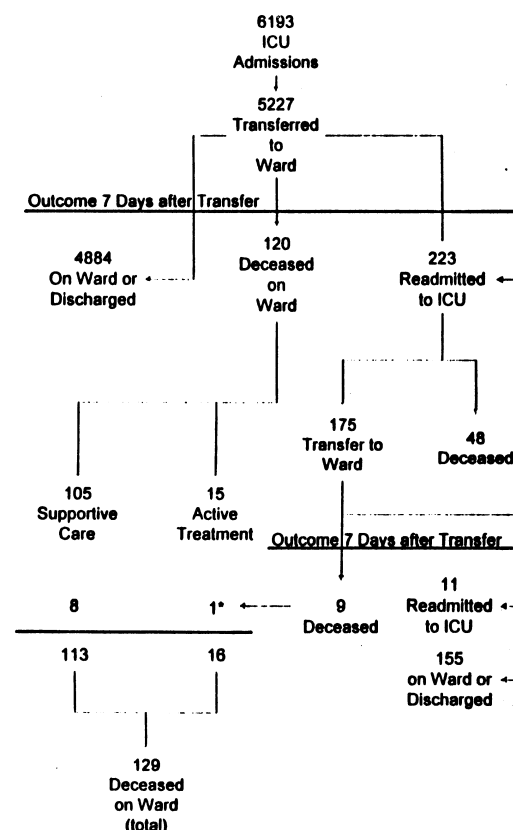
Age, Admitting APACHE II Score and Length of Stay - All Groups

	ICU Survivors	Patients who will require readmission*	Readmitted Patients**	Died on Ward* (Supportive)	Died on Ward* (Active)
N	5227	212	223	113	16
Age	58.3	59.9	59.8	66.9	66.0
APACHE II	16.8	19.0	22.6	25.0	18.9
LOS	3.6	5.5	5.7	5.2	8.4

* Initial ICU admission

** Subsequent ICU admissions

$p < 0.05$



Incidence of Readmission and Death Following Transfer from ICU

Admission Diagnosis	ICU Survivors	Number Readmitted (%)	Number Died on Ward Active Tx (%)
Coronary Art Bypass	778	5 (0.6)	2 (0.3)
Aorto-Iliac Surgery	364	14 (3.9)	2 (0.5)
Congest Heart Failure	255	5 (2.0)	1 (0.4)
Cardiac Arrest	225	8 (3.6)	3 (1.3)
Head Injuries	196	8 (4.1)	0
Septic Shock	145	12 (8.3)	2 (1.4)
Laparotomy	134	8 (6.0)	0
Aortic Valve Repair	125	2 (1.6)	0
Craniotomy	115	4 (3.5)	0
Other Cardiac Surgery	105	3 (2.9)	0
Upper GI Bleed	97	14 (14.4)	0
COPD	93	5 (5.4)	0
TCA Overdose	84	0 (0)	0
Postop Resp Failure	72	4 (5.6)	0
Other	2208	120 (5.4)	6 (0.3)
Total	5227	212 (4.1)	16 (0.3)

Diagnosis of Patients Who Required Readmission to ICU Within 7 Days of Transfer to Ward (N > 3)

Diagnosis	N	Readmission Rate (%)
Thoracotomy	10	14.9*
Upper GI Bleed	14	14.4*
Septic Shock	12	9.3
Radical Neck Dissection	5	8.2
Pneumonia	17	7.4
Laparotomy	3	6.0
Postop Resp Failure	4	5.6
COPD	5	5.4
Head Injuries	8	4.1
Aorto-Iliac	14	3.9

* $p < 0.05$

ICU Mortality

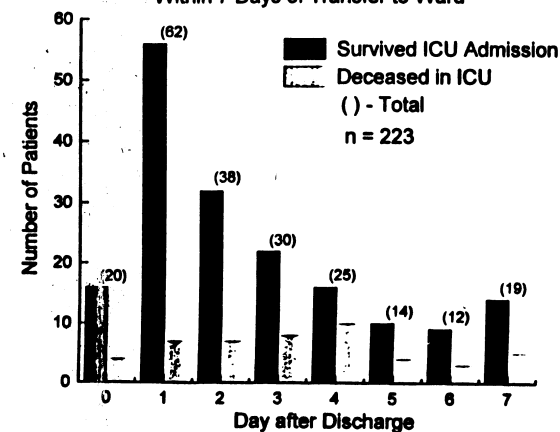
	Survived	Deceased	Mortality
Initial ICU Admission	5004	918	15.5 %
Readmitted to ICU Within 7 Days of Transfer to Ward	175	48	21.5 %

p = 0.032

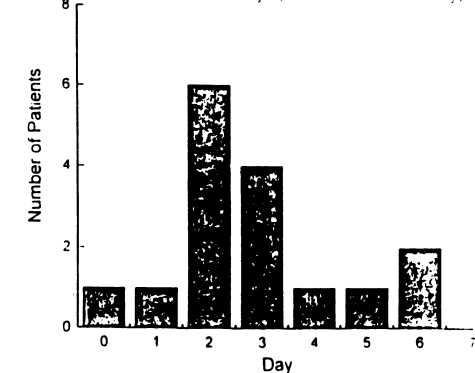
Readmission Diagnosis and Outcome of all Patients Readmitted to ICU Within 7 Days of Transfer to Ward

Readmission Diagnosis	N	%	Survived ICU	Alive 7 Days Post-Transplant
Cardiac Arrest	30	13.5	17	15
Pneumonia	27	12.1	22	21
Other Resp. problem	21	9.4	21	21
Postop Resp Failure	21	9.4	17	14
Septic Shock	18	8.1	13	13
Congestive Heart Failure	17	7.6	15	14
Upper GI Bleed	16	7.2	10	10
COPD	10	4.5	9	8
Pulmonary Embolus	5	2.2	4	4
Other	58	26.0	47	46
Total	223	100	175	166

Timing and Outcome of all Patients Readmitted to ICU Within 7 Days of Transfer to Ward



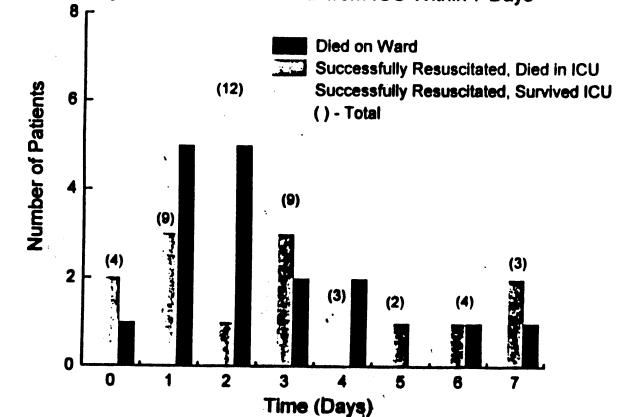
Time of Death of all Patients Transferred to the Ward
from ICU Within 7 Days (Active Treatment Only)



Initial Diagnosis of Patients Who Experienced a Cardiac Arrest on the Ward Within 7 Days of Transfer from ICU

Diagnosis	Number of Cardiac Arrests	Total Discharged from ICU	% of Cases
Cardiac Arrest	9	225	4.0
CABG	6	778	0.8
Aorto-iliac Surgery	4	364	1.1
Septic Shock	3	145	2.1
Post Op Resp Failure	2	22	2.8
Thoracotomy	2	67	3.0
MI	2	36	5.6
Other (n = 1)	18	3540	0.5
Total	46	5227	0.9

Timing and Outcome of Cardiac Arrests on all Patients Transferred to the Ward from ICU Within 7 Days



Conclusions

- 1) 41% of patients transferred from ICU required readmission within one week of transfer; 0.3% of patients receiving active treatment experienced a cardiac arrest and died on the ward within 7 days of transfer.
- 2) Patients admitted to ICU following thoracotomy (14.9%), upper GI bleeds (14.4%), septic shock (8.3%), radical neck dissections (8.2%) and pneumonia (7.4%) had the highest readmission rates.
- 3) Patients readmitted to ICU within 7 days of transfer to the ward had higher ICU mortality rates (21.5%) than patients initially admitted to ICU.
- 4) Cardiac arrest (13.5%), pneumonia (12.1%), post operative respiratory failure (9.4%) and septic shock (8.1%) were the most common readmission diagnoses.