

Audit

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The Quality of transport of adult critically ill patients during inter hospital and intra hospital transfers in a tertiary care facility

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ABSTRACT

Introduction: Critically ill patients are in a dynamic and often precarious physiological state. Adverse events are frequently encountered during transfer of them. A prospective audit was conducted to assess the quality of inter and intra hospital transport of critically ill adults in a tertiary care hospital in Sri Lanka.

Methodology: All adult critically ill patients transfer in and out to MICU and ETU Teaching Hospital Anuradhapura were studied for a period of three months. A questionnaire based on The Faculty of Intensive Care Medicine (FICM) guidelines utilized as it is the latest guideline available revised in 2019.

Results: Out of 60 transfers analysed, serious adverse events such as cardiac and respiratory arrests were encountered.

Conclusions: The overall quality of the transfer process was found to be suboptimal, necessitating proper training in defective areas.

Keywords: *Transport, critically ill Adults, inter and intra hospital*

INTRODUCTION

Following initial resuscitation and stabilization in hospital, critically ill patients may frequently require transfer to other units or hospitals. Transfer of a patient from one hospital to another is known as an inter-hospital transfer and transfer of patient to another department in the same hospital is known as an intra hospital transfer (2). Indications for such transfers include the non-availability of specialized investigation, personnel or treatment at the referring unit or the lack of availability of a critical care bed (1).

The transport itself should be as safe as possible and should not cause any harm to the patient (3). Critically ill patients are in a dynamic and often precarious physiological state (4). Adverse events are frequently encountered during transfers of this category of patients. Fanara et al noted that the overall incidence of adverse events during inter-hospital transfer reported in the global literature was approximately 68% with serious adverse events occurring in between 4.2% - 8.9%.⁴ The rates of cardiac arrest during transfer were reported as 0.38% to 1.6% (5). Haemodynamic and



respiratory complications are among the most common complications during transfer of critically ill patients with artificial airways (6). Problems with ventilation, blood pressure control, and arrhythmias are common according to the current evidence. Deterioration of the patient, especially when transferring to a higher level of care in the ICU, could be related to several factors, such as their underlying disease status affecting their respiratory and cardiovascular stability and functional status. Further, it is a well-known fact that seriously ill patients might get worse between the time of decision-to-transfer and the actual time of transfer (7). Monitoring facilities are limited during transfer and fewer (and less skilled) 'hands' are available on transfer as compared with the ICU environment (8).

In the United Kingdom, the Faculty of Intensive Care Medicine (FICM) guidelines apply to the secondary transfer of all critically ill adult patients, including those transferred from areas such as the Emergency Department, and Post Anaesthesia Care unit. They apply both to transfers between hospitals (inter-hospital transport) and to those transferred between departments within a hospital (intra-hospital transport) since similar levels of preparation, supervision and care are required for each.¹ In Sri Lanka the college of Anaesthesiologists and Intensivists introduced similar guidelines in Nov 2013 (9).

A clinical audit conducted by Ligtenberg et al in 2005 on quality of inter hospital transport of critically ill patients in the Netherlands, concluded that a number of preventable events had occurred during transport of critically ill patients. Adverse events have occurred in 34% of transfers and in 50% of these transports, pre-transport recommendations given by the intensivist of ICU were ignored. Approximately 30% of events were attributed to technical problems (5).

A similar audit was done in New South Wales, Australia in 2001 by Lovell et al reported that problems (minor or major) were encountered in 62% of transport episodes. 31% had problems related to patient factors and 45% had problems directly related to equipment and the transport environment (10).

We found paucity of audits or research done on this topic in Sri Lanka. The number of critically ill

patients being transferred annually to Teaching Hospital Anuradhapura is significant as it drains a large geographical area in the Northern territory of the country. Therefore, we conducted an audit on the quality of inter and intra hospital transfers of critically ill patients in Teaching Hospital Anuradhapura, Sri Lanka during a period of 3 months.

MATERIALS AND METHODS

During the clinical audit we assessed 60 intra and inter hospital transfers of critically ill patients in Teaching Hospital Anuradhapura. Data collection was done at the Emergency Treatment Unit (ETU) and Medical Intensive Care Unit (MICU) in Teaching Hospital Anuradhapura, Sri Lanka. All transfer ins and transfer outs to the MICU and ETU during the period of study were included. We excluded admissions of patients less than 18 years of age and the transfer out during intra hospital transfers to avoid duplication. During this period no inter hospital (transfer outs) transfers occurred from above units. Data collection was done using a questionnaire based on guidelines provided by Faculty of Intensive Care Medicine UK on Guidance On: The Transfer of The Critically Ill Adult in 2019. The questionnaire was filled by the admitting medical officer on arrival of the patient. Period of data collection was from 01st of September 2023 to 30th of November 2023.

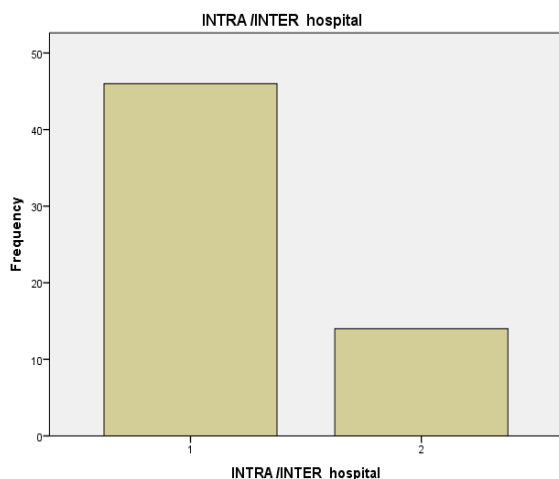
Statistical Analysis

All data was securely stored with password protection, encryption and with access exclusively to the investigators. Descriptive statistics were used to provide an overview of the socio-demographic profile of the study population. The data were analyzed using SPSS 27. P values ≤ 0.05 will be considered to be statistically significant for all tests.

RESULTS

A total of 60 transfers of critically ill patients were analysed and included in this study. Quantitative and qualitative data analysis was done and the association between variables were analyzed using Chi Square test and fisher's exact test.

Out of those 60 transfers, 76.7% were intra hospital transfers and 23.3% were inter hospital transfers. The majority of data were collected at MICU (78.3%) and the rest of the data were collected at ETU. (21.7%). MICU received 15 admissions from medical wards, 7 admissions from ETU, and 1 each from Cardiac ICU (CCU), Nephrology unit and local hospital. Due to lack of bed capacity in surgical ICU 2 post-operative patients were directly admitted to MICU from the operating theatre and 3 patients got admitted from surgical units as well. ETU received 13 critically ill patients from local hospitals of North Central province. Even though all medical admission should go through ETU, one admission directly came to MICU bypassing ETU. We do not have sufficient grounds to claim a significant relationship between transferring unit and the risk level of patients. (P value >0.05)

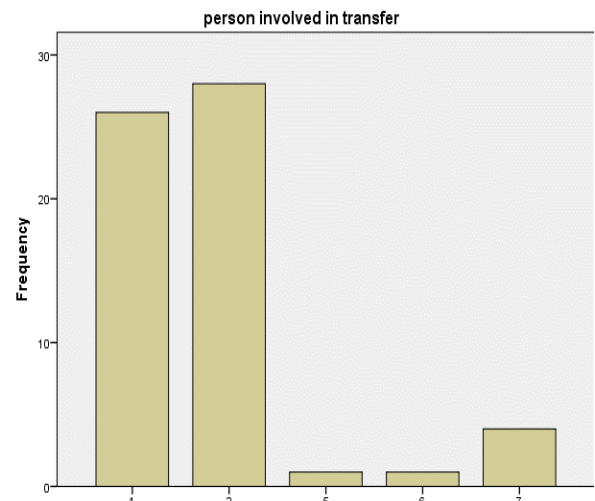


(1-Intra hospital transfers, 2-Inter hospital transfers)

Figure 1: Frequency of Intra/ Inter hospital transfers.

Most of the transfers occurred during daytime (76.7%) and only 23.3% of transfers has occurred during nighttime. The association between critical incidents during transfer and time of transfer was not significant (P value > 0.05). Most transfers were for specialized ICU care. The receiving team were not informed in one fifth of transfers, mostly they were from primary care hospitals. There was a significant association between occurrence of critical incidents and failure to contact the receiving team. (P value < 0.05) Majority of the transferred patients were of middle aged males (40%). We observed that 94.9% of the transfers took place with a doctor as the team leader.

However, one patient was transferred unaccompanied by any medical personnel.



(1-Airway competent doctor, 2- Doctor not competent in airway,5--Health care assistant, 6-Personnel with no Basic medical training, 7- None)

Figure 2: Person involved in transfer.

70% of patients transferred were in multi organ failure needing ventilatory and cardiovascular support. During the transfer only 13.3% required single organ support. Eighteen (18) airway and ventilatory related critical incidents were documented during our audit. Out of those most life threatening were one respiratory arrest and 1 impending respiratory arrest requiring immediate endotracheal intubation on arrival to ETU. Out of 36 intubated patients 3 patients tubes were dislodged and on arrival to MICU and were re-intubated by the receiving medical officer without incident.

Thirty-one (51.6%) transfers were carried out by non-airway trained medical officers and emergency airway equipment was not available for 26.7% (n=16) transfers. A significant association was found between critical incidents and unavailability of airway equipment (P value < 0.05). Commonest airway incident observed was desaturation (n=12) . Twenty percent (20%) of patients were transferred on high dose of vasopressors (Noradrenaline > 0.2 Ug/Kg/min).Out of which, only 43.3% of patients received vasopressor via central venous line. There was one incident of accidental removal of the central

venous line during transfer. However, 3.3% of patients got admitted without any form of intravenous access.

It was noted that 6.7 % of intra hospital transfer patients had an arterial line in situ to monitor blood pressure during transfer. None was found in inter hospital transfer patients even though they were hypotensive or were on high doses of vasopressors on arrival. This may be due to the lack of equipment or trained personnel to insert invasive devices.

Significant cardiovascular related complications noted were hypertension (n=8), hypotension (n=4, 1 incident of unrecordable blood pressure) and cardiac arrest (n=2). On arrival to ETU 2 patients were in cardiac arrest necessitating cardiopulmonary resuscitation.

Four patients were admitted with GCS < 8 without a secured airway. Lowest blood sugar monitored was 82 mg/dL.

Majority (90%) of patients received oxygen during the transfer, however we found 4 incidents where the oxygen cylinder was empty on arrival. Eight (8) incidents of multipara monitor failure were recorded during the audit. We found that 23.3 % of patients were transferred without emergency resuscitation equipment or emergency resuscitation medication, which was extremely concerning. The association between occurrence of critical incidents and above factor was significant (P value <0.05).

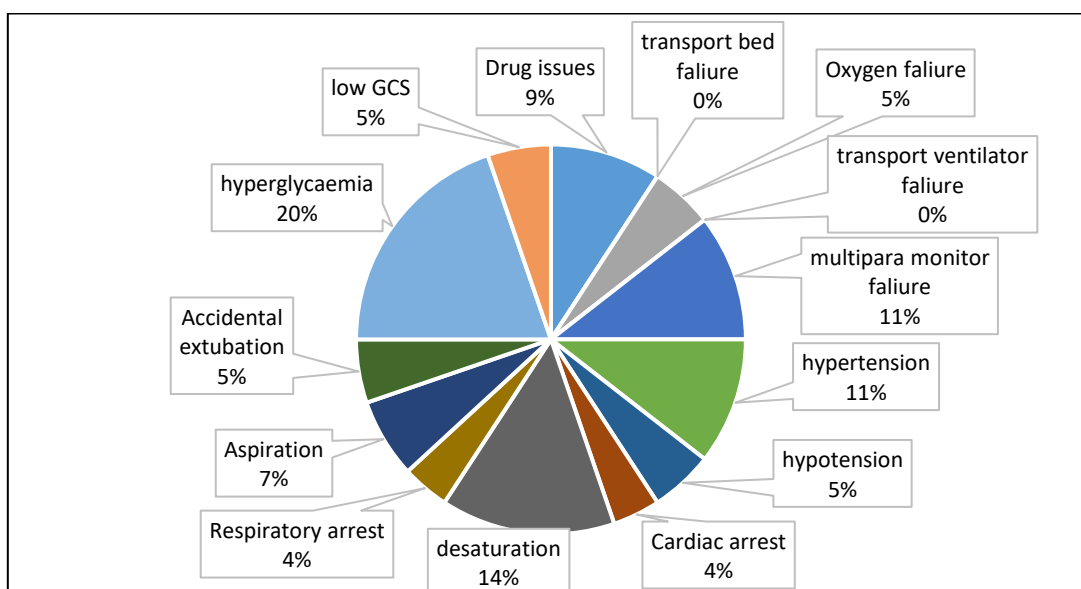


Figure 3: Percentage of complications occurred in transfer of critically ill patients

CONCLUSIONS

The overall quality of transfer of critically ill patients was suboptimal in many aspects compared to the FICM guidelines. The main inadequacy was that the patient was accompanied by non-airway trained personnel (mostly intern house officers.) Serious adverse events such as two cardiac arrests, a respiratory arrest and many near misses were encountered during the three months audit period.

The importance of safe transfer of critically ill patients should be reinforced. We emphasize the need to have proper training on the defective areas through education, workshops and training sessions to minimize morbidity and mortality due to the transfer process. By improving these standards, it may be possible to achieve the standards expected by the FICM guidelines.

A re-auditing to assess improvements made following proper training is required.

Author declaration

Authors' contributions:

Study concept and design: D.G.P., Acquisition of data: H.S.S.P., Analysis and interpretation of data: D.G.P. and H.S.S.P., Drafting of Manuscript: D.G.P. and H.S.S.P.

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The authors declare that there is no financial or non-financial conflict of interest.

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The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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