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Characterization of the intrahospital transport of critically ill patients

Caracterização do transporte de pacientes críticos na modalidade intra-hospitalar

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Keywords
Transportation of patients; Patient transfer; Critical care; Inpatient; Patient care team

Descritores
Transporte de pacientes; Transferência de pacientes; Cuidados críticos; Pacientes internados; Equipe de assistência ao paciente

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Abstract

Objective: Characterizing the transport of critically ill patients in an adult intensive care unit.
Methods: Cross-sectional study in which 459 intra -hospital transports of critically ill patients were included. Data were collected from clinical records of patients and from a form with the description of the materials and equipment necessary for the procedure, description of adverse events and of the transport team.
Results: A total of 459 transports of 262 critically ill patients were carried out, with an average of 51 transports per month. Patients were on ventilatory support (41.3 %) and 34.5 % in use of vasoactive drugs. Adverse events occurred in 9.4% of transports and 77.3 % of the teams were composed of physicians, nurses and nurse technicians.
Conclusion: The transport of critically ill patients occurred in the morning period for performing computerized tomographies (CT scans) with patients dependent on mechanical ventilation and vasoactive drugs. During the transports the equipment was functioning, and the adverse events were attributed to clinical changes of patients.

Resumo

Objetivo: Caracterizar o transporte de pacientes críticos em unidade de terapia intensiva adulto.
Métodos: Estudo transversal onde foram incluídos 459 transportes de pacientes críticos na modalidade intra-hospitalar. Os dados foram coletados nos prontuários clínicos dos pacientes e em um formulário com a descrição dos materiais e equipamentos necessários ao procedimento, descrição de ocorrências adversas e da equipe que realizou.
Resultados: Foram realizados 459 transportes de 262 pacientes críticos com média de 51 transportes por mês. Eram pacientes em suporte ventilatório (41,3%) e 34,5% em uso de drogas vasoativas. Em 9,4% dos transportes ocorreram eventos adversos sendo 77,3% das equipes compostas por médico, enfermeiro e técnico de enfermagem.
Conclusão: Os transportes de pacientes críticos ocorreram no período da manhã, para realização de tomografia computadorizada, com pacientes dependentes de suporte ventilatório e drogas vasoativas. Os equipamentos durante o transporte estavam funcionando e, os eventos adversos ocorridos foram atribuídos a alterações clínicas dos pacientes.

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Introduction

The intrahospital transport of critically ill patients is associated with doing diagnostic or therapeutic exams in critically ill patients and requires replacement of support and monitoring equipment, in addition to continuing the drug infusion and transfer to a hospital stretcher.[1,2]

The intrahospital transport is a period of instability and risk to patients, with the possibility of complications related to technical failures, physiological changes of patients, duration of transport, and with the team that performs it.[3-5]

Furthermore, it must be taken into account that the sectors for which the patient is referred to not always have the same equipment that the intensive care unit. In this context, the indication, planning, implementation and stabilization after the procedure are of extreme importance in order to minimize complications and unnecessary risks to the patient.[3] The indication is medical and should be done by assessing the condition of patients and the risks and benefits of the procedure to which they will be submitted.[6] Transportation must ensure continuity of critical care and, therefore, must be efficient and safe in order to prevent the deterioration of patient's condition.[3]

Doing some diagnostic tests that involve the need for transporting critical patients alters the therapy in 24-39% of cases, hence it is necessary to weigh the risks and benefits.[7]

The planning should be guided by the following triad: stabilization - especially of the respiratory and cardiovascular systems -, appropriate equipment and transport team.[3,6] At this stage, the intersectoral communication is essential because the place of destination of patients must be ready to receive them.[3]

Execution refers to the transport itself, and the main goal of this phase is to maintain hemodynamic stability and avoid iatrogenic complications that may worsen the clinical picture.

The analysis of aspects related to the intrahospital transport can contribute to enhance patient safety in order to minimize the risks.

The aim of this study was to characterize the transport of critically ill patients in the intensive care unit of a tertiary public hospital.

Methods

This is a cross-sectional study in an intensive care unit for adults with 25 beds in a tertiary public hospital in the interior of the state of São Paulo, southeastern region of Brazil. A total of 459 intrahospital transports of critically ill patients were done in the period between March and December, 2011.

The study variables were the following: sociodemographic, medical diagnostics, patient transport characteristics, adverse events during transport, type of procedures and constitution of the transport team.

Data were collected on the clinical records of patients and on a form available on the service. This form has a description of the materials and equipment necessary for the procedure, and the possible complications after its execution.

The data were analyzed by the SPSS 15.0 *for Windows*, classified and presented as absolute and relative frequencies.

The development of the study followed national and international standards of ethics in research involving human beings.

Results

During the study period 459 transports of 262 critically ill patients were done, with an average of 51 transports per month. Patients in critical condition were male (56.1%) with mean age of 57 years. The majority had medical and surgical disorders of various specialties, and mean hospital stay of 15.3 days in the adult intensive care unit.

In the morning period, 229 transports (49.9%) were carried out, among which 202 (44.0%) to undergo computerized tomography (CT) scan, 27 (5.9%) for a magnetic resonance imaging (MRI) and 140 (30.5%) for other exams, namely: ultrasound, radiographic, hemodynamic, endoscopic and electroencephalograms. In addition to these, 90 (19.6%) transports were done to the surgery center (Table 1).

The mechanical ventilator was used in 63.6% of cases, among which 76.3% were intubations and 23.7% were tracheostomies.

Table 1. Intrahospital transport of critically ill patients

Characteristics	n(%)
Período	
Morning	229(49.9)
Afternoon	217(47.3)
Evening	13(2.8)
Type of transport	
Diagnosis	369(80.4)
Surgery	90(19.6)
Destination	
T CT Scan	202(44.0)
MRI	27(5.9)
Other diagnostic exams	140(30.5)
Surgical center	90(19.6)

In the transports carried out, 159 patients (34.6%) were on vasoactive drugs; norepinephrine was used in 132 cases (28.7%), sodium nitroprusside in 12 (2.6%), trinitrate propanetriol in 10 (2.2%) and dobutamine in 5 cases (1.1%).

Regarding the transport team, 77.3% were composed of physicians, nurses and nurse technicians, 18.3% of nurses and nurse technicians, 2.9% of nurse technicians, and 1.5% of nurses.

In most transports (94.3%) a carrying case containing materials and drugs for emergencies was among the included materials; 95.2% of transports had a manual resuscitator and 88.4% had a multiparameter monitor.

The reported adverse events were attributed to patients (9.4%), institutional bureaucratic problems (1.1%) and technical failures with transport equipment (0.8%) (Table 2).

Table 2. Adverse events during the transport of critically ill patients

Adverse events	n(%)
Related to patients	
Hemodynamic	18(4.0)
Respiratory	12(2.6)
Neurological	10(2.2)
Gastrointestinal	3(0.6)
Related to the institution	
Cancellation of the exam	5(1.1)
Related to equipment	
Battery failure ('dead')	4(0.8)

Discussion

The limits of the results of this study are related to the cross-sectional method that does not allow establishing relations of cause and effect. On the other hand, the study results aim at contributing to the quality of the transport of critically ill patients in the institution.

Each hospital should assess the need to have a specialized team to carry out the transportation of patients because the evidence that the occurrence of adverse events decreases when this feature is used is scarce in literature.[8] The use of rating systems for patients according to severity of cases may have applicability in clinical practice, but the prediction of transport related risks is not well determined, because some are inherent in the transportation itself and independent of distance and time.

During the intrahospital transport of critically ill patients, the risks must be taken into account because patients may progress to cardiac arrest and death,[9] however some authors consider the transport safe and attribute the death to the severity of patients, regardless of carrying out the procedure or not.[10]

Patients in critical conditions benefit from the resources in the intensive care unit to ensure their hemodynamic stability and have the assistance of a trained and specialized staff. However, during intrahospital transport, the same security is not always preserved. In this study, the recording of incidents was low (11.3% of cases) when compared to other studies, even considering the previous planning, which entails checking the condition of the equipment and materials needed for the transport.

The results showed that adverse events related to patients were the most prevalent (9.4%) and are supported by a study carried out at two tertiary hospitals, where among 58 transports, 67% had cardiorespiratory changes.[11] Another analysis showed 26% of physiologic changes in 452 analyzed transports.[12]

The prevalence of adverse events found in this study was consistent with the literature, in which the incidence of physiological complications ranged between 6 and 68%, given the diversity of the analyzed population, as well as the criteria used to define these changes.[13]

According to data, the service has efficient personal and material resources to minimize complications in transporting patients. However, it is possible that the records are underreport-

ed, considering the severity of patients and the high number of transports carried out monthly (average of 51).

The portable equipment to meet the needs of monitoring, continuous infusion of medications, and ventilatory support during the transport of critically ill patients must be in perfect working order and the battery charged.

In this study, in four events (0.8%), the reported technical problems of the equipment were due to battery failure during the procedure, which suggests lack of planning.

Regarding the physical structure, it is important to emphasize that the intensive care unit is located on the same floor that imaging diagnostics and other services. Moreover, these devices must be kept in the unit of origin and during the exam, connected to a power source. In an Australian hospital, a total of 191 complications occurred throughout a six-year period during the intrahospital transport of patients, among which 75 (39%) were related to equipment failures.

The staff accompanying the transport of patients may come from another hospital or be group of professionals who work in the intensive care unit; regardless of this fact, they must be skilled and trained to carry out the procedure efficiently and effectively.[14,15]

The organization of the transport of critically ill patients should be optimized from planning to execution. It is essential to define the components of the team and the number of professionals needed according to the clinical condition of the patient, but there must be at least two members, one being the nurse of the intensive care unit.[2]

The presence of the physician is required for the transport of hemodynamically unstable patients, mechanically ventilated, with invasive monitoring and in use of vasoactive drugs.[2] In this study, 77.3% of the transports were carried out with the participation of a physician, a nurse and a nurse technician. In the remaining transports, 84 were done with the presence of a nurse and a nurse technician, 13 only with the nurse technician and seven with the nurse only. The rationale for reducing the workforce can be attributed to the stability of the patient, but it does not meet the safety recommendations.

There must be effective communication between teams to avoid unnecessary displacement of patients and, consequently, exposure to risks. In 1.1% of the patient transports carried out, the exam had been canceled and the patient had already been transported.

The communication problems between the origin and destination units have been identified as one of the major factors contributing to the occurrence of adverse events during intrahospital transport, as shown on a study on this theme.[12] Therefore, communication is key during the planning of transport because it helps to reduce the waiting period for the exam, as well as the total time spent in the procedure.

As for the place of destination, 44% of patients were transported for a tomography exam, which is consistent with results from other studies.[11,12] For some authors, only the abdominal CT scan and angiography result in changes of therapeutic conduct, in case of patients victim of trauma.[6]

It was found that the equipment recommendations were followed during the transport. Adherence to the recommendations of required equipment for intrahospital transport was also evaluated in a study that identified the monitoring of oxygen saturation and blood pressure in 97% of cases, of heart rate in 90.5% of them, of cardiac monitoring in 84.5%, and of capnography in 75% of cases.[16] In situations where there is no multiparameter monitor available for transportation, it is recommended at the least the use of the pulse oximeter.

The intrahospital transport of critically ill patients is a complex procedure that requires proper consideration of risks and benefits, plus the previous planning to minimize the risks. It is essential that it is systematized, carried out by a qualified team and with adequate material resources.

Conclusion

The transport of critically ill patients occurred in the morning period to undergo CT scan, and pa-

tients depended on ventilatory support and vasoactive drugs. All the equipment used during transport was in working order and the adverse events were attributed to clinical changes in patients.

Collaborations

Meneguin S contributed to the project design, analysis and interpretation of data, drafting the article, critical revision of the intellectual content and approval of the final version to be published. Alegre PHC collaborated with the project design, data collection and data analysis. Luppi CHB participated in drafting the article and critical review of the relevant intellectual content.

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