

INCIDENTES E EVENTOS ADVERSOS NO TRANSPORTE INTRA-HOSPITALAR EM TERAPIA INTENSIVA

INCIDENTS AND ADVERSE EVENTS IN INTRA-HOSPITAL TRANSPORT IN INTENSIVE CARE

INCIDENTES Y EVENTOS ADVERSOS EN EL TRANSPORTE INTRAHOSPITALARIO EM TERAPIA INTENSIVA

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RESUMO

Objetivo: identificar os incidentes e eventos adversos no transporte intra-hospitalar em terapia intensiva. **Método:** estudo descritivo, prospectivo, quantitativo, cuja coleta de dados ocorreu com 103 transportes e envolvendo 100 profissionais de saúde que atuavam em uma unidade de terapia intensiva de um hospital público. Os dados foram obtidos por meio de um roteiro de observação e analisados descritivamente. **Resultados:** a maioria dos incidentes encontrados foi com equipamentos e os eventos adversos observados foram relativos às alterações fisiológicas. **Conclusão:** o transporte intra-hospitalar é considerado um procedimento de risco para o paciente, cujas complicações podem ser minimizadas com a elaboração de protocolos institucionais e de capacitações da equipe para realização de um transporte seguro.

Descritores: Transporte de pacientes; Unidade de terapia intensiva; Enfermagem.

ABSTRACT

Objective: to identify incidents and adverse events in intra-hospital intensive care transport. **Method:** a descriptive, prospective, quantitative study, of which data collection occurred with 103 transports and involving 100 health professionals who worked in an intensive care unit of a public hospital. The data was obtained through an observation script and was analyzed descriptively.

Results: the majority of the incidents found were with equipment and the observed adverse events were related to the physiological alterations. **Conclusion:** Intra-hospital transportation is considered a risky procedure for the patient, whose complications can be minimized through the elaboration of institutional protocols and the team's qualifications to carry out safe transportation.

Keywords: Patient Transportation; Intensive care unit; Nursing.

RESUMEN

Objetivo: identificar los incidentes y eventos adversos en el transporte intrahospitalario en terapia intensiva. **Método:** estudio descriptivo, prospectivo, cuantitativo, cuya recolección de datos ocurrió con 103 transportes e incluyendo 100 profesionales de salud que actuaban en una unidad de terapia intensiva de un hospital público. Los datos fueron obtenidos por medio de un guión de observación y analizados descriptivamente. **Resultados:** ocurrieron incidentes y eventos adversos durante la realización del transporte. La mayoría de los incidentes fueron con equipos y los eventos adversos observados fueron relativos a las alteraciones fisiológicas. **Conclusión:** el transporte intrahospitalario es considerado un procedimiento de riesgo para el paciente, cuyas complicaciones pueden ser minimizadas con la elaboración de protocolos institucionales y de capacitaciones del equipo para la realización de un transporte seguro.

Descriptores: Transporte de pacientes; Unidad de terapia intensiva; Enfermería.

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INTRODUCTION

In the hospital environment, the Intensive Care Unit is a subsystem where patients with diseases, with varying severity levels, hemodynamically unstable and in need of continuous intensive care, are hospitalized⁽¹⁾. In this environment, technological advances have modernized techniques and equipment, through which precise, immediate procedures are performed and professionals are trained to intervene in the patient's clinical situation⁽²⁾.

The performance of some procedures and examinations, necessary to the patient, however, cannot be offered at the bedside. In such cases, in-hospital transportation becomes necessary, an extension of care provided, but it presents risks to the patient regarding the occurrence of incidents and adverse events⁽³⁾. The incident is an event or circumstance that could have resulted in or resulted in unnecessary harm to the patient; is a complication from health care. The adverse event is the damage caused to the patient resulting from an incident⁽⁴⁾. Intra-hospital transport studies show the occurrence of incidents and adverse events such as: saturation fall, accidental extubating, accidental loss of the venous catheter, hemodynamic instability, increased intracranial pressure and equipment failures⁽³⁻⁴⁾.

Thus, the indication for intra-hospital transport of patients should be evaluated in terms of their cost-benefit, since the basic reason is the need for technological resources not available at the bedside and expert opinion⁽⁵⁾.

Accordingly, the research question is: What is the occurrence of incidents and adverse events related to in-hospital transport of patients hospitalized in an Intensive Care Unit of a hospital in the Southeast region of Brazil? The objective of this study was to identify the incidents and adverse events in intrahospital transport in intensive care.

METHODS

A descriptive, prospective and quantitative approach. This was carried out in an adult intensive care unit of a hospital in the Southeast region of Brazil, a reference for the treatment of trauma.

The hospital has 30 beds of Intensive Care Unit, where most clinical and surgical patients are hospitalized, mostly neurological, in the postoperative period of cardiac and polytraumatic surgeries. The requested diagnostic

tests are directly related to clinical evolution and the need for diagnostic elucidation.

In this institution, among the examinations that require in-hospital transport, are: computerized tomography, endoscopy, colonoscopy, and the most frequent is computerized tomography.

The sample was non-probabilistic for convenience, whose calculation was based on the number of intra-hospital transport, carried out in 2011. During this period, the total intra-hospital transport was 564, with a monthly average of 47 transports. Data collection took place from February to May 2013. As the data collection period was stipulated in three months, the monthly average was multiplied by three, obtaining a total of 141 cases of intrahospital the sample calculation was carried out through the Web-based Teaching-Learning Program (SestatNet), with sample margin of error ± 5 and 95% confidence level, which resulted in 103 cases of intra-hospital transport.

The number of professionals participating in the study was 100, with ten nurses, 33 doctors and 57 nursing technicians, who followed 141 cases of intra-hospital transport of patients. Transported patients were older than 18 years, with or without invasive devices, to perform unconfirmed diagnostic tests at the bedside, and should be followed up by professionals in the Intensive Care Unit. The cases of in-hospital transport of patients for transfer between sectors, to the Surgical Center and to hospital discharge were excluded.

Data collection was done through a non-participant observation technique, based on the Observation Roadmap, built and validated by a pilot test conducted 15 days before the beginning of the data collection, with 16 cases of in-hospital transport that were not part Results and Discussion of data. During the period of data collection, one of the researchers remained in the Intensive Care Unit to fully follow the patient's movement that met the inclusion criteria. The team in the sector, when informed of the occurrence of intra-hospital transport, informed the researcher to follow up and record the data in the observation script.

The Observation Roadmap contained: social and demographic data; medical diagnosis of the patient; information on preparation, displacement and return, such as: location of the examination, professionals involved, presence of invasive devices (catheters, probes, drains and

oxygen masks), drugs and equipment used during in-hospital transport, adverse events (agitation, apnea, hypotension, arterial hypertension, drop in oxygen saturation and bleeding).

The data was analyzed through descriptive statistics, by means of the total of accompanied transports, percentage and 95% confidence interval, being categorized and presented in absolute and relative frequencies.

The study complied with the formal requirements contained in national and international standards for research involving human beings. The project was approved by the Committee of Ethics in Research with Human Beings, Certificate of Presentation for Ethical Appreciation (CAAE) 1102691290000121, with opinion number 154.992. It should be noted that each participant received and signed the Free and Informed Consent Term (FICT). The study was presented to the health team of the ICU shortly after the approval of the Human Being Research and Ethics Committee.

RESULTS AND DISCUSSION

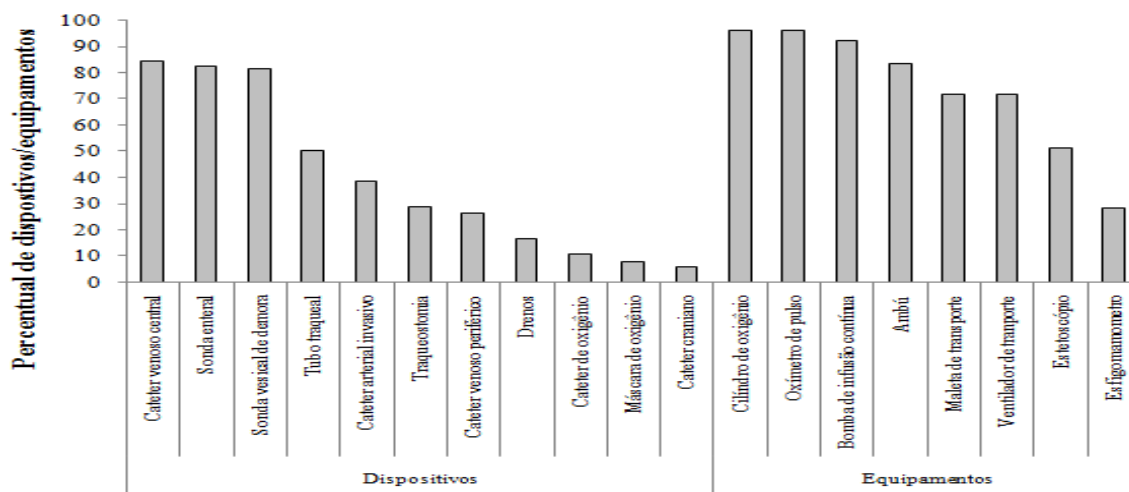
The majority of intra-hospital transport was of male patients, 61 (59.2%). Regarding age,

medical diagnosis and destination of transport, the majority of the patients, 55 (53.4%), were in the age range of 31 to 60 years; 20 (19.4%) and had as their most frequent destination the CT scan, 63 (61.2%), followed by endoscopy, 13 (12.6%) and electroencephalogram, 13 (12.6%).

In 84 (81.6%) cases of intra-hospital transport, three professionals were followed up. Among the professionals involved in transportation, it is noteworthy that, in 103 (100.0%), there was follow-up of the nurse; in 90 (87.4%) of a nursing technician and 96 (92.2%) of a physician. The pre-transport evaluation was performed by a physician in 38 (36.9%) of the patients transported and by nurse in 99 (96.1%). It was also verified that in 100 (98.1%) of the intra-hospital transport there was contact between the Intensive Care Unit and the patient's destination in order to confirm the accomplishment of the examination.

Figure 1 shows the presence of devices, most notably those with the highest percentages: central venous catheter, enteral catheter and bladder catheter and equipment: oxygen cylinder, pulse oximeter, and continuous intravenous infusion pump.

Figure 1 - Devices and equipment used in the in-hospital transport of patients hospitalized in an intensive care unit of the Southeast region of Brazil in 2013.



Source: Author data, 2013.

The incidents that occurred with the devices, according to Table 1, were: a disconnection and a loss of invasive arterial catheter; two unscheduled oxygen catheter withdrawals; a loss of central venous catheter; a loss of peripheral venous catheter; a disconnection and traction of delayed bladder

catheter. In the equipment, the following incidents occurred: the battery of the continuous intravenous infusion pump; end of cylinder oxygen gas; malfunction of the pulse oximeter and, seven times, the pulse oximeter battery.

Table 1 - Characterization of the incidents with devices and equipment used in the in-hospital transport of the patients hospitalized in an intensive care unit of the Southeast region of Brazil in 2013.

| Variables | n (%) | Incidents during transportation | | | | | | | | |
|----------------------------|----------|---------------------------------|----|----|----|---|----|-----|-----|-----|
| | | A* | B† | C‡ | D§ | E | F¶ | G** | H†† | I‡‡ |
| Device | | | | | | | | | | |
| Central venous catheter | 87(84.5) | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 86 |
| Enteric catheter | 85(82.5) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 85 |
| Permanent vesical catheter | 84(81.6) | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 82 |
| Tracheal tube | 52(50.5) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 52 |
| Invasive arterial catheter | 27(26.2) | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 26 |
| Tracheostomy | 30(29.1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 |
| Peripheral venous catheter | 27(26.2) | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 26 |
| Drains | 17(16.5) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 |
| Oxygen catheter | 11(10.7) | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 9 |
| Oxygen mask | 8 (7.8) | 0 | 0 | 0 | -0 | 0 | 0 | 0 | 0 | 8 |
| Cranial catheter | 6 (5.8) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| Equipments | | | | | | | | | | |
| Oxygen cylinder | 99(96.1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 98 |
| Pulse oximeter | 99(96.1) | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 91 |
| Continuous infusion pump | 95(92.2) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 94 |
| Ambu | 86(83.5) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 86 |
| Transport case | 74(71.8) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 74 |
| Transport ventilator | 74(71.8) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 74 |
| Stethoscope | 53(51.5) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 53 |
| Sphygmomanometer | 29(28.2) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 |

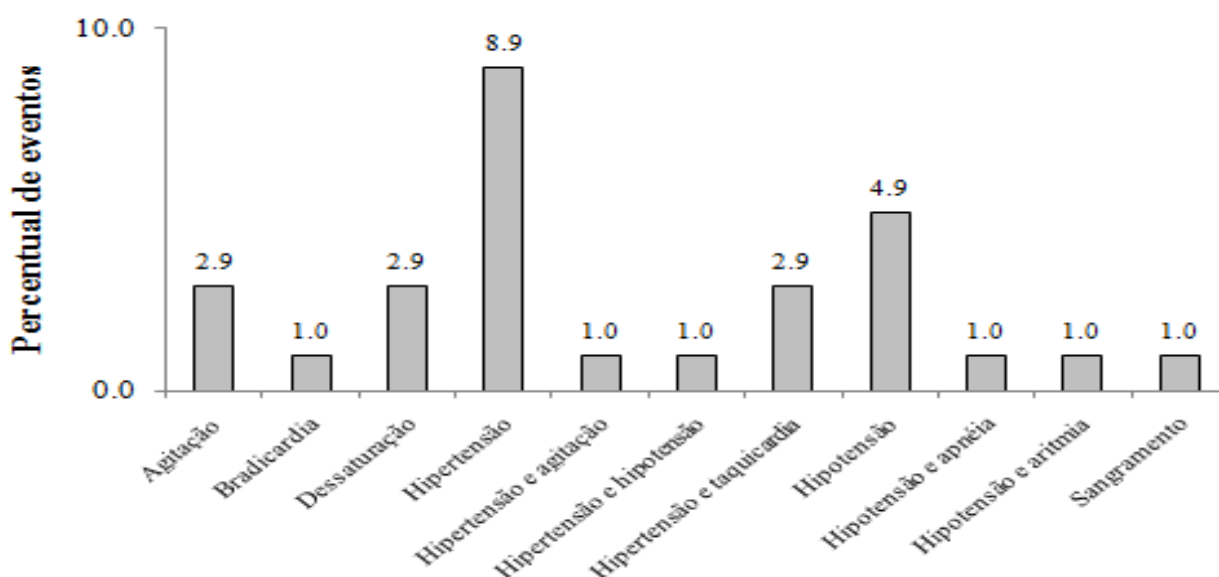
Source: Author data, 2013.

Disconnection; † deposition; ‡occlusion; §loss; ||traction; ¶Exextubation; **malfunctioning; † † battery or oxygen termination; ‡‡ does not apply or there;

Figure 2 shows the most frequently occurring adverse events: increase in blood pressure followed by drop in blood pressure. Agitation,

decreased peripheral oxygen saturation, increased blood pressure and heart rate occurred less frequently.

Figure 2 - Adverse events occurred during in-hospital transport of patients admitted to an intensive care unit in the Southeast region of Brazil in 2013.



Source: Author data, 2013.

The patients were males, in the adult age, and of the 103 intra-hospital transports, 63 were patients referred for computerized tomography, since the Intensive Care Unit is a reference in the care of polytrauma patients and patients who are victims of traumatic brain injury. These findings are in agreement with studies that indicate that the males, in productive range, undergo local and systemic changes due to the trauma. In more severe cases, lesions are more complex and surgical intervention is necessary to reduce intracranial pressure, reduce lesion space, and improve patient survival⁽⁶⁻⁷⁾.

The presence of the nurse in activities that imply risks to the patient ensures better decision-making in the face of unexpected situations that arise from in-hospital transportation. In situations of hemodynamic instability, the physician must be present throughout the course of intra-hospital transport. The number of professionals present in intra-hospital transport is in compliance with the recommended one, which is at least two and preferably one of them is a nurse⁽⁸⁻⁹⁾. In addition, patients with hemodynamic instability were followed up by a physician during in-hospital transport, one-way travel, the examination, and the return trip to the Intensive Care Unit.

The evaluation performed before the displacement facilitates the identification of avoidable problems and, for this reason, must be an activity of the nurse and the doctor, complemented by the communication between the sectors in this process. The information on the clinical conditions of the patient assists in the organization of the examination room and in the composition of the team itself, since, not always, the propaedeutic sectors are adequately prepared to receive unstable patients⁽¹⁰⁾.

In view of the risks that intra-hospital transport poses to patients, two points prevent adverse events: the provision of adequate equipment and the training of the teams for in-hospital transport. On the other hand, standardized actions to treat patients who perform in-hospital transport should integrate scientific knowledge into practice, such as pipeline guides and the use of checklists⁽¹²⁻¹⁷⁾. Thus, it is recommended that the patient is still evaluated in the Intensive Care Unit and the destination sector authorizes the referral of the patient to the examination. This study verified that there was a previous clinical evaluation in the majority of patients in the observed transport

and the respective confirmation with the destination sector. In this sense, the benefits and potential risks were analyzed so that undesirable complications did not occur during the displacement⁽¹¹⁻¹²⁾. Establishing communication between sectors is crucial for safe transportation, as it allows the exchange of information about the patient, the availability of the equipment and, consequently, reducing the waiting time of the patient in the destination sector. A study carried out with 259 intra-hospital transport of critical patients showed that, in 1.1% of transports performed, the examination had been canceled and the patient was transported⁽¹³⁾.

The devices and equipment used in the Intensive Care Unit, when in an in-hospital transport, must be in favorable operating conditions in order not to harm the patient. The central venous catheter and the delayed bladder catheter remain the most commonly used devices, due to the need for volume replacement, use of vasoactive drugs, central venous pressure control and strict urinary output control, among others. This reality is also demonstrated by a study that found tracheal tube (63.5%), central venous catheter (82.0%), bladder catheter (98.9%) and nasogastric tube (40, 7%) in patients before leaving the Intensive Care Unit⁽¹⁴⁾.

Regarding the equipment, the oxygen cylinder had greater use in intra-hospital transport, since most of the patients were on mechanical ventilation or needed non-invasive ventilation, as well as the pulse oximeter, since continuous information on saturation of the patient avoid hypoxemic events⁽¹⁴⁾. The decrease in SpO₂ is known to be the earliest and main sign of hypoxemia, which occurs in 25 (37%) of in-hospital transport⁽¹⁵⁾. Other equipment present in most intra-hospital transports was the continuous intravenous infusion pump, since there was a need for continuous infusion and strict control of vasoactive and sedative drugs. The accuracy of drug infusion, through the continuous intravenous infusion pump, provides patient safety. On the other hand, health professionals need to be trained in the use and proper functioning of this equipment⁽¹⁶⁾.

On the other hand, studies show that incidents involving devices and equipment are common, and catheter losses and the disconnection of catheters and tracheal tube are among the most cited. Regarding the equipments, problems with alarms and batteries of monitors and of continuous intravenous

infusion pump also stand out ^(4,15). In this study, problems with devices and equipment did not cause adverse events to the patient and were attributed to lack of maintenance of the energy source. The highest number of incidents was related to the end of the battery during transportation. It should be noted that the end of the pulse oximeter battery is an incident that can be prevented if there is a daily check of the equipment⁽¹⁵⁾.

Regarding the nature of the adverse events, there was a predominance of an increase in blood pressure, followed by a drop in blood pressure and a decrease in oxygen saturation, the result of which is similar to the studies that identified physiological changes during in-hospital transport⁽¹³⁻¹⁵⁻¹⁶⁾. As a more prevalent complication related to the patient, one study⁽¹⁴⁾ indicated a decrease in saturation in 30 (16.3%), hemodynamic instability in 15 (8.1%), agitation in 24 (13.0%), and arrhythmia in 2 (1.0%). Another study identified adverse events that occurred during in-hospital transport: blood pressure drop in 4 (3.3%), hypoxia in 4 (3.3%), bradycardia in 4 (3.3%) and cardiac arrest in 20 (16.7%)⁽¹⁶⁾.

One study has shown a predominance of adverse events as the main complications during in-hospital transport, such as alterations in oxygen saturation and blood pressure values, with rates of up to 70.0%, compromising patient safety ⁽¹⁷⁾. The clinical changes of the patient during in-hospital transport were associated with temporary instability and signaled the need for greater attention to the planning of actions that ensure control of these alterations, such as: control of the infusion of drugs in an intravenous infusion pump continuous use of the carrying case and continuous monitoring of peripheral oxygen saturation by means of the pulse oximeter.

Analyzing the general rate of incidents (with devices and equipment) and adverse events, with total in-hospital transport, it can be said that it corresponds to a high quantitative, which is similar to other studies^(4,16-17).

The results presented in this study make it possible to infer that the previous evaluation of the clinical condition of the patient; communication between sectors involved in the displacement; the existence of a form to record the occurrence of incidents and adverse events during the transportation phases; the training and maintenance of a team for intra-hospital transportation; the implementation of general

and specific measures for patient safety in the hospital environment with the elaboration of flowcharts, checklists and protocols can minimize incidents and adverse events, promoting greater safety during the intra-hospital transport process. In addition to these aspects, the results presented here guide that this practice can be carried out in a systematized manner and with adequate material resources, contributing to safety in nursing care with regard to intra-hospital transportation.

There were incidents that had as an outcome an adverse event; however, some limitations of the study are pointed out, such as: the non-inclusion of assessment instruments to prove the severity of the patient's clinical status and the limitation of the displacement between the Intensive Care Unit and the propaedeutic sector when intra-hospital can be performed among other sectors of the hospital, regardless of the clinical picture of the patient.

In addition to these aspects, the following can be included for analysis: time of professional experience, time of travel, length of stay in the field of propaedeutic, classification of adverse events to a greater or lesser degree, as well as follow-up of the patient's progression to determine whether the adverse event caused temporary or permanent damage to the patient. It is also suggested that the examinations at the bedside should be carried out, since the movement of serious patients, of their unit, to avoid diagnostic and/or therapeutic exams, outside the sector of origin.

CONCLUSION

Intra-hospital transport is an extension of care performed in the Intensive Care Unit; however, the results of the study show the risks to which the patients are exposed during the displacement, since it was verified the occurrence of incidents that had as an outcome an adverse event. Faced with this reality, the decision to transport must be based on the clinical evaluation of the patient, the team's capacity and the technological resources available to ensure continuous monitoring, as received in the Intensive Care Unit. Safety in in-hospital transport is a challenge that all professionals involved in this process should aim for, a simple measure that can be achieved by verifying the functioning of the devices, devices and equipment before drafting of flowcharts, checklists and protocols, and staff training.

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