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Adverse Clinical Events During Intrahospital Transport by a Specialized Team: A Preliminary Report

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Abstract

Background—Caring for patients during intrahospital transport is a high-risk activity. Few data exist on the use of specialized transport teams similar to the teams used for out-of-hospital transport.

Objective—To describe the experience with a dedicated, intrahospital transport program, to report the rate of clinically significant adverse events, and to examine types of adverse events, interventions provided, and outcomes.

Methods—Patient transports within an academic quaternary-care hospital from November 2007 through April 2008 were retrospectively reviewed. Adverse events were defined as extubation, code team activation, death, sustained arrhythmia, hypoxia exceeding 5 minutes, hypotension exceeding 20% of baseline systolic or diastolic blood pressure and requiring intervention, use of physical restraints, or acute change in mental status.

Results—A total of 3383 charts were reviewed (91.8% of all completed transports). The overall rate of adverse events was 1.7% (59 events). Most events were related to hypoxia (25/59) and blood pressure changes (25/59). One extubation and one code team activation occurred. Most interventions involved adjustments to oxygen therapy (22/59) and vasopressor management (18/59). Only 12 (20.3%) of the transports with adverse events were aborted, more often during magnetic resonance imaging ($\chi^2 = 6.86$, $df = 1$, $P = .01$) and in older patients (mean [SD], 70.8 [14.2] vs 58.7 [14.9] years; $P = .02$).

Conclusions—The rate of clinically significant adverse events during patient transport by a specialized team is relatively low. Further studies are needed to compare effectiveness and mortality benefits between intrahospital transport teams and traditional transport teams.

Transporting a critically ill patient within the hospital creates a work environment that is both challenging and highly stressful, even for experienced providers. Critically ill patients are often cared for in unusual environments such as hallways, elevators, and procedure areas

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not typically designed for critical care monitoring or interventions. The unique qualities of providing critical care in a transport environment have already been established in previous studies.¹⁻⁴ Practice guidelines have been established in an attempt to define the standard of care for the intrahospital transport of critically ill patients more clearly.^{1,5-8} Providing critical care to patients while on the move outside of the intensive care unit (ICU) has been associated with adverse events ranging from technical events to severe, life-threatening events, whether moving patients within the hospital or between facilities.⁹⁻²⁰

The reported incidence of adverse events during intrahospital transport ranges from 6% to as high as 70%.¹⁶ When the definition of adverse events is restricted to clinically significant events such as changes in vital signs, unplanned extubations, or cardiac arrest, the adverse event rates reported have been as high as 8%.^{12-14,16-19} It is not completely clear what factors play a role in these published adverse event rates, although in 1 published study,¹⁶ up to one-third of events were thought to be related to equipment. Because these studies do not describe the use of specially trained, dedicated transport providers, it could be inferred that the transport itself requires an additional set of knowledge and skills beyond that of standard critical care in the ICU setting. There are valid arguments for having the staff who are caring for patients remain at the bedside during transport off the unit. Such advantages could include intimate knowledge of the patients' needs, awareness of recent clinical changes pertinent to those involved with care at the transport destination, and familiarity with ongoing monitoring and treatment goals. Such a model may be appropriate in a clinical setting where providing dedicated critical care transport services within an institution is logistically and financially impractical.

Providing care to patients on the move outside the intensive care unit is associated with life-threatening events.

Use of dedicated teams for transporting patients in out-of-hospital environments such as ambulances and helicopters has been studied and described in the literature.⁹⁻¹¹ Use of such a specially trained team could be a highly desirable service within a hospital for multiple reasons. In addition to potential reductions in the number of adverse events, such dedicated transport teams could potentially allow ICU staff to remain in their respective units and focus their efforts there. The concept of using dedicated transport teams within various patient care units or departments within a hospital has been studied.^{2,3} These studies²⁰⁻²² mostly describe critical care providers such as physicians, ICU nurses, and respiratory therapists whose primary roles are not dedicated to transport care and have reported benefits compared with transports performed by nonspecialty hospital staff. Full-time, dedicated intrahospital transport programs have not been previously described in the literature. Little has been published about how such a team is designed, trained, or operates within a hospital. It is also uncertain whether using such a model in hospital transport care provides any advantage over conventional teams formed to provide intrahospital transport. The purpose of this study is to describe the experience of a dedicated, intrahospital transport team. Specifically, we examine the rate of clinically significant adverse events and describe the types of events encountered, the medical interventions, and the outcomes associated with aborted transports.

Methods

Study Setting

Johns Hopkins Lifeline provides critical care transport services for The Johns Hopkins Medical Institutions, which includes Johns Hopkins Hospital, a 918-bed facility consisting of 8 ICUs (122 ICU beds total), 7 telemetry units, and various other medical/surgical units. Johns Hopkins Hospital is the designated referral center in the state of Maryland for pediatric trauma, burns, and all eye emergencies, and it maintains certification as an

American College of Surgeons level I trauma center. Created in 1992, Lifeline provides advanced life support and critical care transport services for patients being referred to and leaving the institution via ground ambulance, helicopter, and fixed-wing aircraft. Lifeline established the intrahospital or “in-house” transport team in 2002 to provide transport of critically ill patients mostly from the various ICUs to procedure areas such as computed tomography, magnetic resonance imaging, and interventional radiology. Since that time, the in-house team has expanded to facilitate the transport of all cardiac monitored patients and participates in institutional rapid responses to precode conditions when available.

Lifeline transport teams consist of an emergency medical technician-basic, an emergency medical technician-paramedic, and a registered nurse, all of whom work in concert with a medical director and perform a mean of 7000 to 7500 intrahospital transports annually. The paramedics and nurses on the team are all Advanced Cardiac Life Support, Pediatric Advanced Life Support, Neonatal Resuscitation Program, and International Trauma Life Support certified. Most providers have also gone through enhanced training courses with certifications such as a critical care paramedic, critical care nurse, transport nurse, and flight medicine transport for paramedics and nursing. Providers use a variety of tools to transport patients, including cardiac monitor/defibrillator, intravenous pumps, portable ventilators, and endtidal capnographs. All members of the team undergo a lengthy orientation process and are educated in the use and transport of a variety of medications in addition to ventricular assist devices, intra-aortic balloon pumps, and other medical devices. Mandatory education and training occurs monthly. Clinical skills competencies are recertified annually and tracked by the education/training section of the organization. All providers are expected to keep their respective certifications up to date and are tracked for compliance by the education/training section in order to remain on active clinical status.

Four transport categories are described by policy at the Johns Hopkins Hospital (Table 1). Level I and level II patients are considered to be stable and require no specific medical interventions or monitoring. These patients are transported by a patient escort service. Level III patients require mainly medical or cardiac monitoring only and are typically transported by a team consisting of a paramedic and an emergency medical technician-basic. Level IV patients require advanced medical care and monitoring. They typically require ongoing management with vasoactive infusions, changes in ventilation settings, or other medical management. These patients are transported by a team consisting of a transport nurse, a paramedic, and an emergency medical technician-basic. The teams stay with each patient to render care and support during each procedure unless relieved by a physician. Institutional policy dictates that specific levels of providers be present during the transport of high-level patients. Traditionally, such transport requires a nurse from the ICU or the general care area and possibly house staff or an attending physician to accompany the patient with whatever resources they have. As an alternative, Lifeline provides the institution with dedicated transport teams that have equipment appropriate for level III and level IV transports without the requirement for other nurse or physician staff because the members of the transport team are dedicated to the patient for the duration of the transport.

Study Design and Subjects

Charts of 3383 intrahospital transports of adult patients at Johns Hopkins Hospital in the 6 months from November 2007 through April 2008 were retrospectively reviewed. The transports reviewed constituted 91.8% of all transports that occurred during the study period. The remaining transports that were not reviewed (8.2%) represent completed transports for which documentation was missing. Standard documentation was done on paper and constituted the “transport record.” Typical clinical data such as demographics, vital signs, interventions, consultations, and transport times are recorded on the chart in a flowsheet format. All types of adverse events are typically identified through self-reporting by Lifeline

providers at the time of occurrence and during routine chart reviews for quality assurance performed by other team members. Quality assurance occurs through a peer review process by which a team member (a registered nurse or paramedic) is assigned to review charts from a previous day and apply guidelines set forth by the program's medical director. If the reviewer was unsure whether an event should be considered a qualified adverse event (ie, protocol deviation without obvious adverse outcome), the chart was still flagged by the reviewer. All flagged charts were reviewed again by the program's medical director. Also, an anonymous online reporting system for near-miss/sentinel events that is managed institutionally can trigger a review from the unit that is reported on and follow-up by the institutional sentinel events committee. If the committee deems such an event to be one of clinical significance, a root-cause analysis is performed and results are reported to hospital administration.

Lifeline provides intrahospital transport to all procedures and for all cardiac monitored patients.

After quality assurance review, providers are given feedback on the findings and specific cases get presented during monthly staff lectures on morbidity and mortality. The quality assurance system is overseen by the program's medical director, who maintains a database and routinely reports all events to department and hospital leaders. The quality assurance process was not yet in place during the study period, so transport charts were reviewed by a single reviewer (the program's medical director) for the occurrence of a "clinically significant" adverse event. Clinically significant events were defined as unplanned extubation, death or cardiac arrest, altered mental status, any sustained arrhythmia or change from baseline cardiac rhythm, sustained hypoxia defined as oxygen saturation less than 90% for more than 5 minutes, hypotension (defined as >20% change from baseline systolic or diastolic blood pressure that required interventions such as fluid resuscitation or medication administration/titration), institution of any vasoactive agents during transport team care, code team activation, institution of physical or chemical restraints by the transport team, or need for intubation after departing at any time during the care of the transport team. For this study, we excluded events that would be considered more technical in nature (eg, loss of an intravenous catheter or equipment malfunction) unless it resulted in one of the clinically significant events just listed. Our definition of clinically significant adverse events was based on previously published studies^{12–16,19–22} in which similar outcomes were assessed for patients undergoing intrafacility transport. That definition is included in the guidelines used for the peer chart review for quality assurance described earlier.

The rate of clinically significant adverse events during transport was 1.7%.

Charts identified as having a clinically significant adverse event were reviewed for other factors related to the complexity of each case such as the level of transport classification defined by the institution's patient transport policy, ongoing care including number of intravenous infusions running, type of ventilation being provided at time of transport, locations of transport origin and destination, type of event that occurred, interventions provided by the transport team, and whether the transport was aborted or not. This study was approved by the human subjects review committee of the institutional review board at the Johns Hopkins University School of Medicine.

Data Analysis

Descriptive statistics and frequencies were calculated for all data collected. Categorical data were compared by using χ^2 analysis, and continuous variables were analyzed by using a Student *t* test. Statistical significance was defined as a *P* value less than .05 for all tests, with 95% confidence intervals reported for all proportions. Minitab 14 statistical software for education (Minitab Inc, State College, Pennsylvania) was used for all data analysis.

Results

During the 6-month study period, a total of 59 charts were identified as having a clinically significant adverse event during transport. The resultant rate of clinically significant adverse events was 1.7%. Table 2 summarizes baseline characteristics of the 59 transported patients who had a clinically significant adverse event. Diagnostic radiology was the transport destination for 73% of those patients. With the inclusion of interventional radiology suites, 95% of those patients were ultimately transported to a location within the radiology department's study areas. As for clinical needs, the transported patients who had a clinically significant adverse event all had a fairly high acuity level. At the time of transport, 71% of those patients were intubated (42/59), 41% had both an arterial and a central venous catheter (24/59), and 63% had at least 1 ongoing infusion of medication (37/59). Most transports originated from an ICU; however, because the hospital has a separate pediatric transport team, relatively few calls came from the pediatric ICU. All transports were either level III or IV because it is the hospital's policy to use the specialized transport team for these types of patients. Only 17% of all identified adverse events (10/59) occurred during level III transports, and 83% of all adverse events (49/59) occurred during level IV transports. This disparity is not surprising because level IV transport patients are considered higher acuity than level III transport patients are considered.

Table 3 summarizes the types of adverse events encountered during this analysis. Overall, 67 events occurred in 59 transports; the most common events (75%) were related to either hypoxia or hypotension. Eight patients had 2 or more adverse events occur during transport. Only 1 patient was extubated and 1 code team was activated during this study period. Overall, 65 interventions were provided to the 59 patients who had a clinically significant adverse event during transport (Table 4). Six patients had 2 or more interventions performed during the same transport. More than half of all interventions were related to either respiratory or cardiovascular support. No transported patients died during the study period. Of the 59 transports in which an adverse event occurred, 12 transports were aborted because of concerns for the stability of the patient's condition. Thus, 80% of transports (47/59) were completed successfully despite the occurrence of an adverse event.

When the characteristics of patients whose transports were completed are compared with those of patients whose transports were aborted, only 1 significant difference is apparent: patients whose transports were aborted were significantly older than patients whose transports were completed (Table 5). Fewer patients whose transport was aborted were intubated; however, this difference was not statistically significant. Aborted transports occurred significantly more often during transport for magnetic resonance imaging and significantly less often during transport for computed tomography. Aborted transports occurred more often than completed transports in patients coming from the neurological critical care unit, step-down units, or telemetry units but those differences were not statistically significant. Aborted transports occurred significantly less often among patients originating from the surgical ICU.

Conclusions

The Institute of Medicine's 1999 release of the report titled *To Err is Human: Building a Safer Health System* highlights the importance of preventable medical errors in the death of hospitalized patients. According to 1997 statistics, it is estimated that 44 000 to 98 000 preventable deaths of patients occur annually. The fact that these deaths far outnumber deaths due to motor vehicle accidents (43 458), breast cancer (42 297) or infection with human immunodeficiency virus/AIDS (16 516) gives better perspective on the seriousness

of this epidemic.²³ That report has led to a major focus by hospitals on implementing systems that reduce the number of medical errors and adverse events.

In response to a number of adverse events during transport of patients within Johns Hopkins Hospital, a root-cause analysis was done, which led to the recommendation that specialized personnel be used to transport all critically ill patients within the institution. In 2002, the intrahospital “in-house” transport program was developed as a component of the already existing transport program. In this study, we analyzed the outcomes of intrahospital transport for 6 months for an interim safety analysis report to the critical care committee of the Johns Hopkins Hospital. The overall adverse events rate of 1.7% that we found is well below the 8% rate of adverse events reported in other studies^{12,13} that used comparable event definitions. Our study is different from other reported studies on intrahospital transport in that we are the first to describe a system that uses a full-time, dedicated transport team.

The adaptation of models from the out-of-hospital transport environment (eg, emergency medical services and ground ambulance, helicopter medical transport) has led to a relatively successful model for the transport of critically ill patients within the walls of a large medical center. Just as a clinician must decide if the benefits of interhospital transport by ambulance or helicopter outweigh the risks of leaving a fairly controlled inpatient environment, the tenet of “first do no harm” to patients is also pertinent when deciding whether to subject a critically ill patient to the risks of leaving that inpatient environment for transport to another part of the hospital. The decision to send a patient to another part of a hospital for diagnostic or therapeutic interventions means that care providers must decide if their patient is stable enough and has sufficient resources to make this journey. Using our team model, we are able to bridge that gap of ongoing care and monitoring: continue the care already prescribed, continue ongoing monitoring, and provide further interventions as needed, depending on the situation. This service has provided our patients and their care providers a flexible and safe option for continued care during a needed diagnostic study or procedure.

Anecdotally, use of a dedicated transport program has allowed providers to obtain critical studies or procedures for patients who might otherwise not have gotten them because of clinical or logistical complaints. Intensive care nurses, respiratory therapists, and physicians have reported satisfaction with this model because it allows them to remain in the ICU to focus on other patients and other responsibilities. Direct communication between nurses and physicians in the units and the members of the transport teams ensures continuity of care.

The transport team model we use was developed from previously established models used for out-of-hospital transport.^{4–6} We believed that the movement of critically ill patients within the walls of a large quaternary-care facility poses similar risks of clinically significant adverse events in both of these environments.^{9,10} Staffing for our team is derived primarily from the transport program itself. We do not rely on the use of a hybrid team that includes different providers from sending units. We use specially trained transport nurses with an expanded scope of practice, paramedics trained in critical care, and other levels of emergency medical technicians. Education and training is a major focus because not all providers joining the team come from a transport background. Overall, the breadth of knowledge and skill on a given team greatly enhances patient care and the ability for teams to manage acute patient conditions during an intrahospital “road trip.” Close medical direction and quality assurance review allow the teams to function independently at a high skill level. Given the success we have had in transporting patients, our teams have also become integral to providing both code responses and precode rapid response team services.

Most of the adverse events reported in our study were respiratory or cardiovascular events: specifically, correcting hypoxia and interventions to support blood pressure. The focus of

training and education is mostly on recognition of developing events, which includes good assessment of patients and advanced critical-care monitoring. Skills training and interventions are focused on pharmacology and experience with vasoactive agents, aggressive fluid therapy, and advanced airway management techniques. One hypothesis to explain the success of our transport team model is that because a specialized team is dedicated to the patient, adverse events are recognized earlier, which results in early intervention and activation of resources.

In our study, only 20% of transports that had adverse events were aborted. Thus, overall, the vast majority of critically ill patients are successfully transported, and even 80% of the patients who had an adverse event during transport successfully completed their planned trip. Again, this result highlights the potential benefits of using a specialized team in performing these transports beyond the reduction in the frequency of adverse events. It keeps nursing staff in their units to manage other patients; physician staff can focus on other duties while their patients are properly cared for in diagnostic areas; and diagnostic resources are better used because intended studies get completed.

The overall adverse events rate is well below the 8% rate reported in other studies.

It was not surprising to find that transports of nonintubated patients were aborted more often than were transports of intubated patients. Additionally, aborted transports originated more often in patients coming from the neurological critical care unit, step-down units, and telemetry units. This distribution may reflect the fact that many of these patients from those units were not intubated. One could argue that an intubated ICU patient with multiple infusions is medically complex and at high risk for adverse events. In practice, however, some of our most high-risk patients are those coming from the ICU or step-down unit who require a diagnostic study but have not yet shown any indication for intubation and do not have an altered level of consciousness that requires pharmacological intervention and thus is not intubated. These patients are usually destined for some type of diagnostic study such as magnetic resonance imaging or pulmonary ventilation/perfusion scanning. These patients benefit the most from our transport services because such patients do not necessarily meet ICU standards of care but could become patients who require an ICU level of care during the transport and diagnostic study.

Some of our most high risk patients come from the intensive care unit or step-down unit who have not yet shown any indication for intubation.

Our study had a few limitations: it was a retrospective review of consecutive transport charts by 1 reviewer. In order to minimize any selection bias, all charts were reviewed and the guidelines for inclusion based on the adverse events definition were adhered to strictly. In this retrospective review, we looked only at 6 months of data, which encompassed almost 3400 transports, only 59 of which involved adverse events. This small number may have underpowered our analysis of the adverse events cohort. This limitation was due mostly to the amount of time and resources that would have been required to review more charts.

Our definition of adverse events specifically addressed those events considered clinically significant. This definition was chosen because we thought that if some technical mishap occurred, its impact would be less important unless it resulted in some clinical change in the patient's condition. Thus, we thought that focusing on clinically significant events would be more representative of the actual adverse events rate and would also include technical, logistical, or human events that directly resulted in deterioration of a patient's condition. The definition is not arbitrary and is based on previously published works^{12-16,19-22} that were focused on clinically significant adverse events.

We reviewed the rate of clinically significant adverse events specific to our institutional setting. Because this study was retrospective and our results were compared with previously published studies with adverse events rates specific to other clinical settings, it cannot be concluded that our model has proven benefit over other models without better prospective, comparative studies. Our model does appear to result in an acceptably low rate of adverse events given the number of transports performed at our institution and the overall acuity of the critically ill patients at our hospital.

Further studies should be done to assess the impact of specialized transport teams and compare outcomes for patients transported by such teams with outcomes for comparable patients transported by nondedicated transport providers. In addition, studies on the incremental benefits of various provider skill levels should be pursued, as should studies of the financial impact that such transport teams would have for an institution. In conclusion, we experienced low rates of clinically significant adverse events when we used a specialized team dedicated to transporting patients within our hospital; however, other models may exist that can achieve equally low rates of adverse events.

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Table 1

Institutional criteria for level III and level IV transport requirements

Level III transport criteria
Vasoactive agents are not being actively titrated nor is need for titration anticipated
<i>or</i> Discontinuation of a vasoactive agent, which does not result in hemo- dynamic instability
<i>or</i> Stable ventilatory support settings with no anticipated manipulation:
Fio ₂ 40%
PEEP 5 cm H ₂ O
<i>or</i> Ventilator-set respiratory rate 20 breaths per minute
In nonintubated patients who require respiratory assistance, the following must apply:
Fio ₂ 50%
Respiratory rate 25 breaths per minute
Level IV transport criteria
Continued manipulation of vasoactive infusions to maintain hemodynamic stability <i>or</i>
Continuation of a vasoactive agent to maintain hemodynamic stability <i>or</i>
Ventilator support for <i>adult</i> patients with the following settings:
Fio ₂ > 40%
PEEP > 5 cm H ₂ O
Ventilator-set respiratory rate > 20 breaths per minute
<i>or</i> Intense monitoring required for potential respiratory dysfunction in nonintubated patients:
Fio ₂ requirements > 50%
Respiratory rate > 25 breaths per minute

Abbreviations: Fio₂, fraction of inspired oxygen; PEEP, positive end-expiratory pressure.

Table 2

Characteristics of all patients with adverse events during transport

Characteristic	Value
Sex, No. (%) of patients	
Male	37 (63)
Female	22 (37)
Total	59 (100)
Age, mean (SD), y	61 (15.4)
Level of transport, No. (%) of patients	
III	10 (17)
IV	49 (83)
Total	59 (100)
Transport origin, No. (%) of patients	
Medical intensive care unit	23 (39)
Surgical intensive care unit	15 (25)
Step-down unit	10 (17)
Neurological intensive care unit	9 (15)
Pediatric intensive care unit	1 (2)
Telemetry	1 (2)
Total	59 (100)
Transport destination, No. (%) of patients	
Computed tomography	30 (51)
Magnetic resonance imaging	13 (22)
Interventional radiology	7 (12)
Nuclear medicine	6 (10)
Other	3 (5)
Total	59 (100)
Initial vital signs, mean (SD)	
Score on Glasgow Coma Scale	10.4 (4.2)
Systolic blood pressure, mm Hg	129.2 (27.4)
Diastolic blood pressure, mm Hg	66.4 (13.7)
Pulse, beats per minute	87.4 (19.6)
Respiratory rate, breaths per minute	22.9 (7.8)
Oxygen saturation, as shown by pulse oximetry, mean (SD), %	96.7 (3.3)

Table 3

Types of adverse events encountered

Adverse event	No. (%) ^a
Hypoxia > 5 minutes	25 (37)
Hypotension	25 (37)
Significant electrocardiographic changes	7 (10)
Altered mental status	5 (7)
Need for restraints	3 (4)
Extubation	1 (1)
Code team activation	1 (1)
Total.	67 (100)

^aPercentages may not total 100 because of rounding

Table 4

Types of interventions provided

Intervention	No. (%)^a
Supplemental oxygen	22 (34)
Vasoactive agent	18 (28)
Medical	9 (14)
Intravenous fluid replacement	7 (11)
Sedation	4 (6)
Technical intervention	2 (3)
None	2 (3)
Intubation	1 (2)
Total	65 (100)

^aPercentages may not total 100 because of rounding.

Table 5

Comparison of patients with aborted and completed transports

Characteristic	Completed (n = 47)	Aborted (n = 12)	<i>P</i> ^a
Sex, No. (%) of patients			
Male	31 (66)	6 (50)	.32
Female	16 (34)	6 (50)	.32
Total	47 (100)	12 (100)	
Age, mean (SD), y	58.7 (14.9)	70.6 (14.2)	.02
Level of transport, No. (%) of patients			
III	7 (15)	3 (25)	.41
IV	40 (85)	9 (75)	.41
Total	47 (100)	12 (100)	
Transport origin, No. (%) of patients			
Medical intensive care unit	19 (40)	4 (33)	.75
Neurological intensive care unit	6 (13)	3 (25)	.29
Surgical intensive care unit	14 (30)	1 (8)	.04
Pediatric intensive care unit	1 (2)	0 (0)	>.99
Step-down unit	7 (15)	3 (25)	.41
Telemetry unit	0 (0)	1 (8)	>.99
Total	47 (100)	12 (100)	
Transport destination, No. (%) of patients			
Computed tomography	27 (57)	3 (25)	.04
Magnetic resonance imaging	7 (15)	6 (50)	.01
Nuclear medicine	4 (9)	2 (17)	.40
Interventional radiology	7 (15)	0 (0)	.33
Other	2 (4)	1 (8)	.50
Total	47 (100)	12 (100)	
Initial vital signs, mean (SD)			
Score on Glasgow Coma Scale	10.6 (3.9)	9.6 (5.4)	.53
Systolic blood pressure, mm Hg	129.4 (27.0)	128.1 (30.3)	.89
Diastolic blood pressure, mm Hg	67.6 (14.1)	62.1 (10.9)	.16
Pulse, beats per minute	88.4 (20.4)	83.7 (16.6)	.41
Respiratory rate, breaths per minute	22.6 (7.4)	24.2 (9.5)	.59
Oxygen saturation, as shown by pulse oximetry, mean (SD), %	96.9 (3.1)	95.7 (4.3)	.38
Respiratory parameters, No. (%) of patients Intubated	35 (74)	7 (58)	.30

^a*P* < .05 considered statistically significant.