

Interhospital transport of pediatric patients requiring emergent care: current status in Turkey

Acil bakım gerektiren çocuk hastaların hastanelerarası taşınması: Türkiye’de durum

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BACKGROUND

This study was designed to evaluate the current situation of interhospital transport of pediatric patients requiring emergent care.

METHODS

Using a clinical prospective and multicenter design, 1,666 interhospital transports of pediatric patients were evaluated in 18 centers. Non-emergency transports and newborn transports were not included, so 854 transports were eligible for evaluation. Data were collected by means of a comprehensive form filled by a physician at the receiving hospital.

RESULTS

The physicians who gave the decisions for the transports were pediatricians in 60%, general physicians in 15.4%, and residents in 6%, while no identification existed in 159 transports (18.6%). The receiving hospitals were not notified prior to the transport in 79.3%. Pretransport information about the patients were adequate in 26.1% and inadequate in 31.8%; no information was available in 42.1%. Ambulances were used in 64.4% of the transports, of which only 16.2% was fully equipped. Unqualified or inexperienced personnel were in charge in 42.8% of the transports. In 26.3% of the transports, the patients arrived at the receiving hospital in an agonized state.

CONCLUSION

It appears that there are no established guidelines for the emergency transport of pediatric children in Turkey.

Key Words: Ambulances; child; critical illness; patient transfer.

AMAÇ

Bu çalışmada ülkemizde acil bakım gerektiren çocuk hastaların hastanelerarası taşınması uygulamaları değerlendirildi.

GEREÇ VE YÖNTEM

Bu çokmerkezli ve prospektif çalışmada 18 merkezde gerçekleştirilen 1666 adet hastanelerarası taşınma değerlendirildi. Acil durumu olmayan hastalar ve yenidoğanlar elendikten sonra çalışmaya uygun olmayan hastalar ve yenidoğanlar elendikten sonra çalışmaya uygun olmayan hastalar 854 adet taşınma incelemeye alındı. Veriler, taşınma işleminin bitiminde hastayı kabul eden bir hekim tarafından doldurulan ayrıntılı bir bilgi formu aracılığıyla toplandı.

BULGULAR

Hastanın nakline karar veren hekimlerin %60’ı çocuk hastalıkları hekimi, %15.4’ü pratisyen, %6’sı asistandı. Yüz elli dokuz işlemde (%18.6) hekim kimliği belirlenemedi. Hastayı alacak hastanelerin %79.3’üne taşınma öncesinde haber verilmemişti. Kayıtlarda taşınma öncesine ait hasta bilgileri %26.1’inde yeterli, %31.8’inde yetersiz idi; %42.1’inde hastaya ait bilgiye rastlanmadı. Taşınmaların %64.4’ü ambulansla gerçekleştirildi; ancak bunların yalnızca %16.2’si tam donanımlı idi. Taşınmaların %42.8’ine eşlik eden personel deneyimsiz ya da bu konuda eğitilmiş değildi. Hastaların %26.3’ü hastaneye ulaştırıldığında agonize durumdaydı.

SONUÇ

Türkiye’de acil çocuk hastaların taşınması ile ilgili getirilmiş standart kurallar olmaması önemli bir sorundur.

Anahtar Sözcükler: Ambülan; çocuk; kritik hastalık; hasta transferi.

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The third and fourth level interventions that are applied in advanced children emergency and intensive care units have resulted in decreased morbidity and mortality in many diseases.^[1] The regionalization of emergency and intensive care units and the fact that most pediatric diseases and injuries do not occur near a tertiary care center prompt most critically ill or injured children to travel long distances to seek definitive care. The concept of transporting critically ill patients has been widely recognized and accepted in the past decade and much has been published concerning mortality, techniques, procedures and interventions, complications, physiologic deterioration, and team composition.^[2-9] According to the American Academy of Pediatrics, a pediatric transport system should be capable of rapidly delivering advanced and skilled pediatric critical care to the patient's bedside at the referring hospital and of maintaining that level of care during transport to the receiving hospital. Specific recommendations have been developed for pediatric transport systems.^[4]

Currently, many pediatric transport systems exist in Turkey and emergency transport applications of pediatric patients have yet to be standardized. This matter was brought into question as a common complaint by many centers during the Pediatric Emergency Medicine and Intensive Care Meeting in year 2001.^[10,11]

This multicenter study was designed to evaluate the state of emergency pediatric interhospital transports in Turkey.

MATERIALS AND METHODS

This prospective and multicenter study was performed in 18 centers where a total of 1,666 interhospital transports of pediatric patients (age range 1 month to 16 years) took place between May 2001 and June 2001. Non-emergency transports and newborn transports were not included, so 854 transports were eligible for evaluation (Table 1).

Data were collected by means of a comprehensive form filled by a physician at the receiving hospital, including such items as the patient's age, the name of the referring hospital, the reasons for transport, the specialty of the physicians who gave the decision for transport, duration of the transport, diagnosis of the patient, notifications made prior to transport, the adequacy of pretransport informa-

tion, the mode of transportation, the members of the transport team, and the condition of the patient at the time of arrival at the receiving hospital. At the end of the study all forms were collected at a single center and evaluated by the same person.

In some of the forms responses regarding relevant issues were missing; hence, the analysis of each question was made with the exclusion of missing responses, resulting in diverse total numbers for each question.

RESULTS

The study included 854 emergency pediatric interhospital transports. The mean transport time was 53.3±59.5 minutes (range 2 to 450). The referring hospitals were Ministry of Health hospitals in 49% (n=406), social insurance hospitals in 32.1% (n=266), private hospitals in 15.7% (n=130) and university hospitals in 3.1% (n=26).

The physicians who gave the decisions for the transports were pediatricians in 60% (n=511), general physicians in 15.4% (n=132), and residents in 6% (n=52). In 159 transports (18.6%) the specialty of the physician who decided to transfer the patient could not be determined.

The receiving hospitals were not notified prior to the transportation in 79.3% (n=667). In 174

Table 1. Distribution of transports among centers that participated in the study (n=854)

Centers	n
Medicine Faculty of Çukurova University	280
Medicine Faculty of Orhangazi University	93
Lütfi Kırdar Kartal Training and Research Hospital	89
Medicine Faculty of Ege University	67
Medicine Faculty of Erciyes University	57
Dr. Behçet Uz Children's Hospital	53
Bakırköy Social Insurance Hospital	44
Medicine Faculty of Akdeniz University	39
Medicine Faculty of İstanbul University	35
Medicine Faculty of Trakya University	23
Medicine Faculty of Uludağ University	20
Medicine Faculty of İnönü University	16
Medicine Faculty of Marmara University	15
Medicine Faculty of Gazi University	11
Medicine Faculty of Kocaeli University	4
Medicine Faculty of Ankara University	3
Dr. Sami Ulus Children's Hospital	3
Okmeydanı Social Insurance Hospital	2

Table 2. The type of emergencies for patient transports

Emergency	n	%
Neurologic	186	21.7
Pulmonary	157	18.3
Infectious	120	14.0
Toxicologic	115	13.5
Trauma	74	8.7
Hematologic	35	4.1
Cardiac	35	4.1
Abdominal	20	2.4
Gastrointestinal	19	2.2
Renal	19	2.2
Endocrine	16	1.9
Metabolic	5	0.6
Psychiatric	1	0.1
Other	52	6.1

transports (20.7%), pretransport notifications were made by telephone calls in 83.3% (n=145), a written statement in 7.5% (n=13), by sending the family members with the patient in 6.9% (n=12) or by radiophone in 2.3% (n=4). Of note, 10 transports (1.2%) were performed even though the receiving hospital had notified the referring hospital that no bed had been available.

The type of emergencies are summarized in Table 2.

Pretransport information about the patients were adequate in 213 cases (26.1%) and inadequate in 260 cases (31.8%). No information was available in 344 cases (42.1%).

Emergency transports were made by ambulances belonging to the referring hospital, 112 emergency service, or to private institutions in 550 cases (64.4%) (Table 3).

The equipment that was available on the ambulances during the transport process are shown in Table 4. No data were available concerning the equipment in 143 cases (26%).

Table 4. Equipment on the ambulances (n= 550)

Equipment	n	%
Stretchers, oxygen, and aspirator	155	28.2
Stretchers and oxygen	141	25.6
Fully equipped	89	16.2
Only stretchers	22	4.0
No available data	143	26.0

Table 3. Methods of the transports (n=854)

Methods	n	%
Referring hospital ambulance	378	44.2
Accompanied by family members	281	32.9
112 emergency service ambulance	129	15.1
Regional private ambulance	30	3.5
Ambulances (no data on institution)	13	1.5
Taxi	20	2.3
Other	3	0.4

Unqualified or inexperienced personnel were in charge in 42.8% of the transports (n=233) (Table 5).

During transport, vascular access was established in 64.8% of the patients. Airway/respiratory system management during transports is summarized in Table 6.

Mortality rate was 0.5% (n=4) after completion of the transports (Table 7).

DISCUSSION

The fundamental terms to provide assurance during the transport of critical patients have been well-defined. The pediatric transport system should have its own medical director, its own protocol, a transport team specifically trained in pediatric critical care, and appropriate supplies for the care of patients.^[4,7,12,13] Ideally, the decision to transfer should be made by consultants after full assessment and discussion between the referring and receiving hospitals. In our study, it was observed that there were no standards concerning the emergency transport of pediatric patients, and that the decision of a transport was mostly made by the pediatricians.

The success of the transfer depends on the adequacy of communication between hospitals.^[4,12,13] Therefore, the receiving hospital must be informed before the transport. The referring physician is

Table 5. Composition of the transport team (n= 545)

Team members	n	%
No nurse or physician	191	35.0
Nurse	151	27.7
Physician	93	17.1
Nurse and physician	66	12.1
Nurse's aide	42	7.9
Physician and nurse's aide	2	0.1

Table 6. Airway-respiratory system management (n=775)

	n	%
Spontaneous breathing	520	67.1
No respiratory system/ airway management	151	19.5
Entubated	46	5.9
With airway	37	4.8
With bag and mask ventilation	21	2.7

responsible for direct verbal contact with the receiving physician. In our study, it was found that the receiving hospital was informed in only 20.7% of the transports, of which 85.6% was made by direct verbal communication.

The physician or hospital referring the patient should provide relevant information about the patient, including his/her name, age, weight, the pre-hospital history, the clinical status at presentations, the interventions made, the treatment, the present medical problems and clinic status of the patient.^[12] Our study showed that pretransport information about the patients was inadequate and that no information was available in 42.1% of the transports.

Factors to be considered in choosing a transport vehicle include space and vehicle availability, distance, facilities for monitoring and resuscitation, cost, and speed. Road transfer may be appropriate for most of the patients, having several advantages such as low cost, rapid mobilization, less weather dependency, and easier patient monitoring. Our findings showed that ambulance transport was the preferred method. However, a non-medical transport vehicle was used in 35.6% of the patients.

Our inquiry into the available equipment on the transport vehicles revealed that no standardizations were present. The only equipment was stretchers in 4% of the ambulances, and only 16.2% of the transports was performed in fully equipped ambulances.

A generally accepted concept does not exist as to the composition of the transport team accompanying

Table 7. The patients' status after completion of the transports (n=781)

Patients' status	n	%
Stable	572	73.3
Agonized	205	26.3
Dead	4	0.5

critically ill patients and the need for a physician on an individual critical care transport is controversial.^[5] It is suggested that transport teams should constitute a pool, from which selection of the team members is made from personnel trained in pediatric transport.^[4] It is essential that the team members accompanying the transport be experienced. Unfortunately, a significant number of transports (42.8%) in our study were made by inexperienced personnel.

The transport team should fully undertake the duty of implementing a safe and reliable transport because critically ill and injured children are more likely to survive when they receive care in a regional center having pediatric critical care settings.^[1]

It is also well-known that the transport of critically ill patients may be associated with increased morbidity,^[14] which may be attributable to difficulties in providing patient care in a transport vehicle or to the use of inexperienced personnel.^[8,14] Wallen et al.^[15] reported that adverse events occurred in 77% of intrahospital transports due to alterations in ventilation or oxygenation, and equipment-related issues. Therefore, prior to a transport, it may be necessary to stabilize the patient and ensure safe respiratory airways. Our results showed that respiratory support lacked in 19.5% of the patients and 26.3% was transported in an agonized state.

To our knowledge, this is the first large multi-center prospective study in Turkey concerned with the transport conditions of pediatric patients requiring emergent care, addressing serious shortcomings, as well. The limitations in this study arise from the fact that the forms were filled after the transport of the patients and the procedures before or after the transport were not recorded. Nevertheless, our findings may help contribute to establish appropriate protocols and guidelines to improve the transporting conditions of pediatric patients requiring emergent care.

It appears that there are no established guidelines in Turkey for the transport of pediatric children under emergency circumstances and that decisions are mainly left to the discretion of the referring physician. To improve the situation, all official and non-official authorities and organizations, including the Ministry of Health and the Society of Pediatric Emergency Medicine and Critical Care should take the initiative. In the first instance, a reliable and functioning communication link

should be established among all centers involved in the transport of patients. Even a very small improvement in the situation may save the lives of many children.

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