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THE BIG MOVE: FIVE MASS TRANSPORT TO ANKARA CITY HOSPITAL

BÜYÜK NAKİL: ANKARA ŞEHİR HASTANESİNE BEŞ HASTANENİN TAŞINMASI

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ABSTRACT

AIM: It is a rare need for IHT that an existing hospital is scheduled to be closed. In this study, the process of Mass Transport due to the relocation of five different hospitals to a single target hospital is discussed.

MATERIAL AND METHOD: Meetings were held with hospital administrators to plan the Mass Transport and an emergency transport action plan was decided. During the planning phase of the Mass Transport, each hospital was examined separately and in-hospital and inter-hospital transfer routes were created. During the Mass Transport, spare ambulances were activated to avoid disrupting the daily workflow of emergency medical services (EMS). In addition, EMS administrations of nearby provinces were asked to send their spare ambulances to Ankara. While 1 driver and 2 paramedics were assigned to a stable patient transport team, 1 driver, 1 paramedic and 1 doctor were assigned to a critical patient transport team.

RESULTS: The patients who were transported from the clinics comprised 24.95% (n = 130) of all transported patients. Of all patients transported, 56.81% (n = 296) were males. The mean age of all transported patients was 46.33 ± 26.04 years (min-max; 0 - 93) (46.21 ± 26.45 years for females, 46.43 ± 25.56 years for males).

CONCLUSION: Pre-transport planning and measures are crucial for the safe transport of patients, especially in large-scale IHTs. In addition, an effective communication system ensures a trouble-free transport.

Key Words: *Emergency medical services, Transportation of patients, Ambulances*

ÖZET

AMAÇ: Bir hastanenin programlı olarak kullanım dışı kalması nedeniyle hastaların başka bir hastaneye nakledilmesi nadir görülen bir olaydır. Çalışmamızda beş farklı hastanenin tek çatı altında birleştirilmesi nedeniyle gerçekleştirilen büyük göç öncesi operasyon süreçleri anlatılmaktadır.

GEREÇ VE YÖNTEM: Büyük naklin planlanması için hastane yönetimleri ile toplantılar yapılarak acil nakil eylem planı oluşturuldu. Her hastane ayrı ayrı incelenerek hastane içi ve hastaneler arası transfer rotaları oluşturuldu. Nakil süresince Acil Sağlık Hizmetlerinin günlük iş akışlarını aksatmamak için sistemde yedek tutulan ambulanslar aktif hale getirildi. Ayrıca çevre illerde bulunan yedek ambulanslar da göreve çağrıldı. Nakil ekipleri stabil hastalar için 1 sürücü ile 2 paramedik; kritik hastalar için 1 sürücü, 1 paramedik ve 1 doktor olacak şeklinde oluşturuldu.

BULGULAR: Nakli gerçekleştirilen hastaların %24.95 (n=130) yatan hasta servislerindendi. Bu hasta grubunun %56.81 (n=296) erkekti. Hastaların genel yaş ortalaması 46.33 ± 26.04 (min – max; 0 - 93) (kadın 46.21 ± 26.45, erkek 46.43 ± 25.56) yıl olarak saptandı.

SONUÇ: Büyük çaplı hasta nakillerinde önceden yapılacak prosedürler, planlamalar ve alınan önlemler hastaların güvenli bir şekilde nakli için çok önemlidir. Bunun yanında etkili bir iletişim sistemi de naklin sorunsuz olmasını sağlayacaktır.

Anahtar kelimeler: *Acil sağlık hizmetleri, Hasta nakli, Ambulans*

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INTRODUCTION

Inter-hospital transport (IHT) of a patient is a compulsory practice for better service in case of insufficient facilities of a hospital. These deficiencies may be related to diagnostic tests, intensive care, operating room, or specialist physician care. IHT is usually performed for acute patients in need of critical care or advanced intervention. There is a need for establishing IHT as regional intensive care centers, centralize certain surgical procedures, and perform certain therapeutic interventions only in certain centers (1-4).

IHT is very risky due to the fact thatit interrupts the health care process of patients. Therefore, it is crucial that patients are closely monitored during transport. Measures should be taken to reduce the risks for transported patients. Establishing special IHT teams is reported to be effective in terms of reducing adverse events (3,5).

It is a rare need for IHT that an existing hospital is scheduled to be closed. In this study, the process of Mass Transport due to the relocation of five different hospitals to a single target hospital is discussed.

MATERIAL AND METHOD

After the City Hospital had been built and put into service in Ankara, the capital city of Turkey, 5 different hospitals in the city were closed and all patients were transported to this City Hospital. In this study, the planning and operation process, and the results of this transport were evaluated.

Ethics committee approval of the study from Yıldırım Beyazıt University, Turkey (29.05.2019-21).

1. General Characteristics of the Hospitals

Designed as a health complex, Ankara City Hospital consists of 6 separate blocks and 1 main mass, and each block operates as a different branch hospital **(Supplementary figure 1)**. Total area of the hospital is 1,024,826 m2. The emergency room of the hospital has an area of 34,354 m2 and has 115 stretchers. There are 2641 clinic beds (1295 for surgical clinics and 1276 for medical clinics) and 653 intensive care beds (191 for surgical clinics, 144 for medical clinics, 168 for reanimation clinic and 150 for newborn clinic). The capacity status of the closed hospitals areshown in **Table 1.**

Figure 1.Ankara City Hospital Map

2. Planning and Operation

a)General Principles

Meetings were held with hospital administrators to plan the Mass Transport and an emergency transport action plan was decided. According to this action plan:

1. Three days prior to the scheduled transport date, the hospitalization and elective surgery program was restricted to patients who required urgent intervention and hospitalization.

Table 1. Transport dates and bed capacities of the closed hospitals

	Transport date	Adult Intensive Care Beds	Child Intensive Care Beds	Neonatal Intensive Care Beds	Total Intensive Care Beds	Clinic Beds	Total Number of Beds
Atatürk Training and Research Hospital	06.02.2019	68	0	0	68	417	**485**
Yüksek İhtisas Training and Research Hospital	09.02.2019	105	0	0	105	337	**442**
Numune Training and Research Hospital	25.05.2019	83	0	0	83	868	**951**
Dışkapı Pediatric Hematology and Oncology Hospital	24.08.2019	0	40	18	58	214	**272**
Dr. Zekai Tahir Burak Women Health Training and Research Hospital	31.08.2019	25	0	130	155	346	**501**
Total		281	40	148	469	2.182	2.651

2. Hospitals were visited before the transport to determine entry and exit points, patient delivery and waiting areas, and ambulance parking areas to be used during the transport operation.
3. The number of ambulances and personnel required for transport, transport routes, transport time, the quality of the personnel to be included in the transport teams, how to perform the transport operation of patients with special status, technical support and logistics teams were determined by conducting desk-based assessments.

For transport routes, Traffic Control Department of the Ankara Provincial Police Directorate was interviewed and the measures to be taken were decided.

b) Ambulance Staff and Equipment
During the Mass Transport, spare ambulances were activated to avoid disrupting the daily workflow of emergency medical services (EMS). In addition, EMS administrations of nearby provinces were asked to send their spare ambulances to Ankara. While 1 driver and 2 paramedics were assigned to a stable patient transport team, 1 driver, 1 paramedic and 1 doctor were assigned to a critical patient transport team. A total of 567 personnel were employed during the transport (126 for Atatürk Training and Research Hospital, 124 for Yüksek İhtisas Training and Research Hospital, 85 for Numune Training and Research Hospital, 122 for Dr. Zekai Tahir Burak Women's Health Training and Research Hospital, 110 for Dışkapı Pediatric Hematology and Oncology Hospital).

While 27 of the ambulances used for transportation were fully equipped EMS ambulances, 3 were specialized ambulances capable of carrying obese-intensive care patients, 9 were ambulances capable of carrying 4 patients at one time, and 8 were ambulances with incubators. Technical maintenance of all ambulance vehicles and calibration of the devices inside were performed before the start of the transport operation. During the operation, ambulances parked in predetermined areas. The ambulances were directed to the patient delivery points when patients were ready and traveled to the target hospital (Ankara City Hospital) with 8 or 10 ambulances in a convoy after receiving patients. Thus, the waiting time of the ambulances at the patient delivery point was minimized.

In order to intervene in the event of possible ambulance failures or to supply medicines and medical supplies, 10 support personnel were available in the gardens of the existing hospitals during the operation.

Patient delivery points were established at the main entrance gate of each branch hospital on the campus of Ankara City Hospital. At these delivery points, teams consisting of 1 coordinator and 2 paramedics were deployed. These teams were responsible for safe delivery of the patients to the target hospital. They worked in coordination with hospital staff to transfer patients from ambulance stretchers to hospital stretchers, deliver the documents brought along with the patient, fill in hospital records, and transport patients to inpatient clinics.

c) Intra-Hospital Transfer Process
During the planning phase of the Mass Transport, each hospital was examined separately and in-hospital transfer routes were created. Elevators, exit doors, and delivery points to be used for patient transfer were determined.

Patients of the inpatient clinics who had a stable clinical status were transferred to ambulance stretchers at pre-determined patient delivery points in the main entrance of the hospitals. From different clinics, such patients were brought to the patient delivery points in groups of 8 or 10. Thus, traffic was prevented by using different elevators at the same time by taking patients from different clinics, and the chaos caused by the simultaneous exit of many patients from the same clinic was prevented. Ambulance teams were called to the patient delivery point and the patients were transferred to the teams there. Transferring patient from the clinic to the delivery point by hospital staff rather than ambulance teams saved time because they knew the layout of the hospital building well.

Critical patients hospitalized in intensive care units (ICU) were transferred from hospital beds to ambulance stretchers in the ICUs rather than at the delivery points. In order to reduce the timeit took to transfer patients from clinics to the delivery points, before the operation, patients were checked whether they were ready for the transport while elevators were inspected for proper operation. For the same purpose, a nurse and a stretcher carrier were provided to accompany the ambulance teams for each critical patient.

d) Inter-Hospital Patient Transport Process
The transport route for each hospital was determined in consultation with the Traffic Control Department of the Ankara Provincial Police Directorate. The number of intersections and traffic lights, traffic density, and weather conditions were taken into consideration when determining the route. Therefore, the most optimal routes for transport were determined, not the shortest ones **(Supplementary figure 2).**

Our focus in planning the patient delivery process was to prepare 8 or 10 ambulances simultaneously for transport as soon as possible. Each ambulance convoy was accompanied by a traffic police vehicle. While the ambulance convoy crossing the intersections, traffic flow was stopped by traffic police teams for other vehicles. Uninterrupted driving and safe route were provided with the measures taken.

e) Technical Support Services
Technical support areas were established in the gardens of existing hospitals in order to eliminate potential ambulance technical problems and provide medicines or supplies during the Mass Transport operation. Except for

tire pressure drop issues in three ambulances, there were no serious breakdown or ambulance accident that would prevent the use of ambulances during the operation.

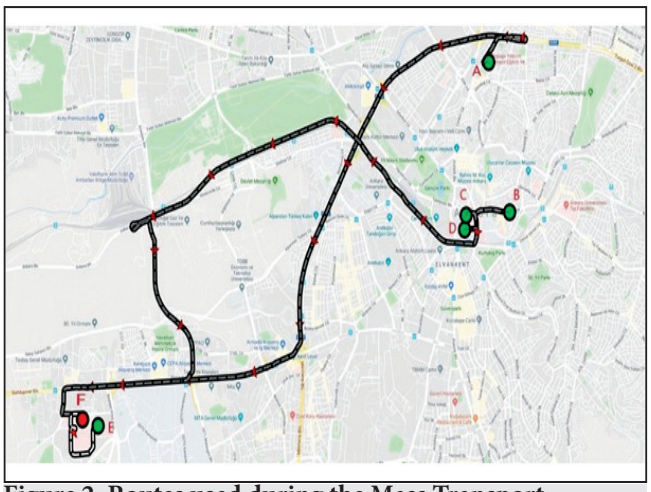

Figure 2. Routes used during the Mass Transport
A. Dışkapı Pediatric Hematology and Oncology Hospital, B. Dr. Zekai Tahir Burak Women's Health Training and Research Hospital, C. Numune Training and ResearchHospital, D. Yüksek İhtisas Training and Research Hospital, E. Atatürk Training and Research Hospital, F. Ankara City Hospital

f)Transport of patients with special medical conditions
Among the patients transported from the Yüksek İhtisas Training and Research Hospital, there were two patients with special conditions, one of whom had Extracorporeal Membrane Oxygenation (ECMO) and the other had received a lung transplant two days before the hospital relocation day. Two special transport teams were established for these patients. Two days before the scheduled transport day, intensive care ambulances were assigned to transport these patients; simulation was performed, needs were identified, additional devices and supplies were provided.

Eight ambulances with an incubator were assigned to the transport of patients in the neonatal clinics of the existing hospitals. Personnel with Pediatric Advanced Cardiac Life Support training were assigned to work in these ambulances.

Infection-positive patients with high risk of transmission were transported with the last two convoys on the day of the transport. The ambulances in which these patients were transported were de-contaminated at the Decontamination Unit of Ankara EMS immediately after transport.

g)Operation Control Room
A separate temporary Coordination Unit of 10 personnel was created in the Ankara EMS Control Room to ensure coordination during the Mass Transport and monitor the process. Communication during the operation was provided by radio and GSM calls in addition to the mobile device instant messaging application (WhatsApp Inc, Mountain View, California, USA). Ambulance teams reported to the Coordination Unit the name and diagnosis of the patient, and the target hospital department to which the patient will be transported via radio calls. Demographic data of the patient, the sending and receiving clinics, the sending and receiving health professionals, and the vital signs of the patient before and during the transport were recorded by EMS personnel. Ambulance movements were monitored by vehicle tracking system of Ankara EMS's Control Room.

h)Statistical Analysis
All data were analyzed using IBM SPSS for Windows version 25. Descriptive statistical methods (frequency, percentage, mean, standard deviation, min-max) were used to evaluate the study data.

RESULTS
During the Mass Transport, patients from 5 different hospital were transported to the Ankara City Hospital. Ambulance teams transported 521 patients from clinics and ICUs within the scope of the operation.

The patients who were transported from the clinics comprised 24.95% (n = 130) of all transported patients. Of all patients transported, 56.81% (n = 296) were males. The mean age of all transported patients was 46.33 ± 26.04 years (min-max; 0 - 93) (46.21 ± 26.45 years for females, 46.43 ± 25.56 years for males) **(Table 2 and 3).**

Table 2. Number of patients transported to Ankara City Hospital and their age characteristics

Sending Hospital	Number of patients transported	Age (Years) Mean ± SD	Age (Years) Min-Max
Yüksek İhtisas Training and Research Hospital	200	56.43 ± 17.83	1 - 92
Atatürk Training and Research Hospital	138	58.08 ± 16.78	17 - 89
Dışkapı Pediatric Hematology and Oncology Hospital	72	5.04 ± 5.56	0 - 22
Numune Training and Research Hospital	58	59.58 ± 18.24	23 - 93
Dr. Zekai Tahir Burak Women's Health Training and Research Hospital	53	18.89 ± 17.11	0 - 64
Total	521	46.33 ± 26.04	0 - 93

Table 3. Distribution of the number of patients transported to Ankara City Hospital according to the sending hospitals

	Transport from clinics **n (%)**	Transported from ICUs* **n (%)**	Total transported **n (%)**
Yüksek İhtisas Training and Research Hospital	153 (76.50 %)	47 (23.50 %)	200 (100.00 %)
Atatürk Training and Research Hospital	106 (76.81 %)	32 (23.19 %)	138 (100.00 %)
Dışkapı Pediatric Hematology and Oncology Hospital	43 (59.72 %)	29 (40.28 %)	72 (100.00 %)
Numune Training and Research Hospital	56 (96.55 %)	2 (3.45 %)	58 (100.00 %)
Dr. Zekai Tahir Burak Women's Health Training and Research Hospital	33 (62.26 %)	20 (37.74 %)	53 (100.00 %)
Total	**391 (75.05%)**	**130 (24.95%)**	**521 (%100.0%)**

*ICUs: Intensive care unit

Table 4. Distribution of patients transported during the mass transport by clinics and diagnostic groups.

	Transported from clinics	Transported from ICUs*	**Total**	
Diagnostic groups	**n**	**n**	**n**	**%**
Cardiology	71	30	101	19.39
Oncology	78	11	89	17.08
Pulmonology	43	31	74	14.20
Gastroenterology	61	13	74	14.20
Urology	36	6	42	8.06
Neurology	19	14	33	6.33
Gynecology	27	--	27	5.18
Orthopedics	16	2	18	3.45
Brain Surgery	9	8	17	3.26
General Surgery	15	1	16	3.07
Infectious Diseases	12	2	14	2.69
Neonatal	--	8	8	1.54
Burns	1	2	3	0.58
Endocrinology	1	1	2	0.38
Genetics	1	1	2	0.38
Ophthalmology	1	--	1	0.19
Total	**391**	**130**	**521**	100.00

*ICUs: Intensive care unit

When the distribution of transported patients to the clinics was examined, it was found that cardiology, oncology and pulmonology patients were the first three groups [19.39% (n = 101), 17.08% (n = 89), 14.20% (n = 74), respectively] **(Table 4).**

DISCUSSION

IHT is a compulsory practice, usually due to the lack of specialist physicians in the current hospital or the lack of intensive care facilities and equipment. It is uncommon that a hospital is closed in a planned manner in order to transport all patients to another hospital. There is no study in the literature in which a large number of patients were transported between hospitals at the same time.

Systemic barriers to IHT lead to increased mortality, morbidity and care costs. Therefore, specific infrastructure, standardized procedures, and automated communication requirements are needed to design clinically oriented, quality and efficient transport systems (6). Before the Mass Transport, we carried out exercises to create specific transport procedures for each hospital, and even for each patient. Our aim was to shorten the patient transport processand provide optimal process management to maximize patient safety.

Transporting a patient between medical facilities without interrupting medical treatment is a difficult task (7). In the literature, it has been found that patients transport is associated with worse outcomes. (8). IHT; lack of hospital capacity, insufficient equipment and diagnostic tests, lack of appropriate intensive care and operating room facilities, or the need for a physician specific to the disease are made (1-4,9). Patient transport

is a rare condition because hospitals are moved to other hospitals and have not been identified in the literature. In this respect, we think that our study is different from other patient transport studies.

Communication was essential for smooth implementation of the transport process. During the transport, continuous communication between the control room, transport vehicles, hospitals, and coordinators was essential (7). A separate Coordination Unit has been established within the Control Room in order to avoid interrupting the daily operations of EMS and to better monitor the transport process. An active communication network was established between the Coordination Unit and the field coordinators and ambulance teams. Thanks to this system, we were able to monitor the health status of the patients and the locations of the ambulances and detect problems instantly.

Patient safety and hemodynamic stability were among the most important priorities during the entire transport process (10). All patients were evaluated by their physicians one day before and on the morning of the transport day to determine whether they were safe for transport. It was decided that 2 patients were not safe for transport, these patients were monitored until they were stable in the existing hospital. In the literature, patients are recommended to be transported under supervision of specially trained health care professionals such as doctors and nurses who have advanced life support training (10). All health care professionals involved in the operation were selected among those with advanced cardiac life support training. In addition, inpatients were accompanied by a nurse from the follow-up team, while ICU patients were accompanied by a doctor from the follow-up teamin order to ensure patient safety.

Prior to IHT, transmitting patient information from the sending doctor to the receiving doctor and/or from the sending nurse to the receiving nurse ensures that the target hospital is prepared for the transport (2). The key point of our mass transport was that the clinical follow-up of the transported patients was continued by their current physicians, even at the target hospital. However, to avoid any confusion, discharge reports prepared for each patient were sent to the healthcare professionals of Ankara City Hospital during the operation.

Documentation is an important but often neglected part of the transport process. Every stage of patient transport must be recorded. For this purpose, standardized registration forms should be used for transport (11,12). During the Mass Transport, the patient's name, diagnosis, vital signs, medical interventions during transport, the clinic of the patient, the branch hospital in Ankara City Hospital and the room where the patient was transported, and the sending and receiving healthcare professionals were recorded using standardized transport forms.

Optimal route planning is essential for fast and safe transport (13). During the transport, traffic arrangements were made on the route determined with the Traffic Control Department of the Ankara Provincial Police Directorate before the Mass Transport. Thus, Ankara City Hospital was reachable at optimum time through this route. There were no traffic accidents during the mass transport.

CONCLUSION

The most important factor in IHT is patient safety. Pre-transport planning and measures are crucial for the safe transport of patients, especially in large-scale IHTs. In addition, an effective communication system ensures a trouble-free transport.

Declaration of interest: None

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