ASTR

ORIGINAL ARTICLE
pISSN 2288-6575 • eISSN 2288-6796
https://doi.org/10.4174/astr.2023.105.2.114
Annals of Surgical Treatment and Research

Observations and experiences of pediatric surgeons working on the field in the first 7 days of the Kahramanmaraş earthquake

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Purpose: This study aims to share our experiences and problems, and to suggest solutions as pediatric surgeons who took part in the teams that went voluntarily to the region hit by the Kahramanmaraş earthquake during the first 7 days after the disaster.
Methods: This study conveys our observations made at Kahramanmaraş Sütçüimam University Faculty of Medicine Hospital, where we worked as a volunteer team between February 7 and 14, 2023.
Results: During the first few days, there were registration problems due to lack of electricity, water, and internet, as well as issues with sterile surgical environments. In the following days, a lack of auxiliary health personnel was revealed as the main difficulty.
Conclusion: Since coordination is important when working as a team in the aftermath of an earthquake, staff from the same center should be deployed together if possible, and a team leader should be selected. Alternative recording systems should be established in case of power outages and computer problems. Secretaries, auxiliary health staff, and technicians should be included in the team in addition to doctors and nurses.
[Ann Surg Treat Res 2023;105(2):114-117]

Key Words: Earthquakes, Emergencies, Pediatrics, Surgery

INTRODUCTION

At 4:17 a.m. and at 1:24 p.m. on February 6, 2023, Turkey's southern provinces were struck by 2 devastating earthquakes measuring 7.7 and 7.6 on the Richter scale. The earthquakes were centered in the district of Pazarcik and Elbistan in Kahramanmaras province, respectively. They destroyed or damaged houses and buildings, affecting more than 14 million people. More than 40,000 people lost their lives, and thousands were left homeless. Immediately after the earthquakes, 602 ambulances, 187 National Medical Rescue Team crews, and 2 ambulance planes from outside the region reached the affected districts, carrying a total of 2,256 emergency medical personnel. In the following days, 114 emergency response units and 25 field hospitals were established; 19,000 people, of whom 13,000 were physicians, served in fixed units in the disaster area. If we add 74,000 health workers and 47,000 other members of staff, the number of Ministry of Health personnel in the region was approximately 140,000 [1]. In other words, approximately one out of every 8 relevant employees of the Ministry of Health was in the area. After the second earthquake, a team of 45 individuals, including anesthesiologist, orthopedists,

Received April 14, 2023, **Revised** June 17, 2023, **Accepted** July 10, 2023

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neurosurgeons, general surgeons, thoracic surgeons, and pediatric surgeons, was formed on a voluntary basis under the coordination of the Ministry and Gazi University. This team reached Kahramanmaraş Sütçüimam University (KSU) Faculty of Medicine Hospital at 4 a.m. on February 7, 2023.

In this article, we want to share our experiences, the problems, and suggest solutions as pediatric surgeons who took part in the teams that went to the region voluntarily in the first 7 days of the earthquake.

METHODS

The study protocol was approved by the Institutional Review Board of Gazi University (No. 2023-472). Written informed consent was obtained from the patient for the publication of this report and clinical image.

The first team of Gazi University, which departed on the evening of February 6, 2023, arrived at KSU Faculty of Medicine Hospital on February 7, at 4 a.m. The first team brought with them sterile surgical and medical supplies, anesthetic drugs, and heaters. Since the hospital was less affected by the first earthquake, patients from other clinics, including newborn and pediatric patients, were taken there, and staff continued to work. However, after the second earthquake, the hospital was evacuated. When our first team arrived, there was no water, electricity, or heating. First of all, the units that needed urgent support were determined in the meeting with the hospital's administrators, and the required health workers were identified. Then, 11 teams consisting of doctors, nurses, anesthesia technicians, and healthcare personnel were formed on a voluntary basis by interviewing the administrators of the Faculty of Medicine, Gazi University. The program was made in the form of changing the teams every 4 days.

The operating rooms were controlled and prepared by the first team so that sterile conditions could be achieved. All anesthetic and surgical devices were executed with generators, and the necessary area for emergency surgical procedures was created on the first day. We were included in the first 2 groups as a total of 5 pediatric surgeons.

RESULTS

One of the first difficulties encountered is the inability to establish a registration system for the injured and deceased due to a lack of electricity and internet connection. Although the electricity problem was solved on the first day, the necessary computer programs and recording system could not be opened because only the original hospital staff had the password; quest personnel could not use them in the initial days of the relief effort. During this time, an impromptu registration system was set up to collect information from the injured patients, recording it on paper; information about the deceased was gathered from their relatives. When this was not possible, the address where the injured or deceased had been found in the rubble was noted by the team. The dead whose identities could not be determined were recorded by numbering and photographing them and taking fingerprints. These issues were resolved when the original hospital staff returned to their duties.

In the first 2 days, there was a shortage of hospital personnel due to the death of their relatives, fear and anxiety about further earthquakes, and especially that the cleaning and secretarial tasks were carried out by qualified health workers. This problem was solved eventually when military personnel and additional support teams arrived, and when the hospital staff returned.

In the first 4 days, patients were treated only in the emergency rooms created on the ground floor. Later, other services started to gradually reopen.

As a pediatric surgery team, we started working with pediatricians in the pediatric emergency department 24 hours after the earthquake. For the first 3 days, we mainly worked with pediatricians from different hospitals. Afterward, we only worked with our hospital pediatricians, and we organized the pediatric emergency facilities into 2 groups each consisting of groups of 6 or 7 doctors, working for 12-hour intervals.

During the 7 days, we were there, 41 dead and 115 injured children were brought to the pediatric emergency room. Even on day 7, there were children and adults who were being extracted alive from the rubble. After first aid was administered to the injured children, most of those who were in stable condition were transferred to other centers by ambulances or air ambulances.

Each team working in the pediatric emergency department was experienced in first aid, intubation, central catheter, and chest tube insertion if necessary. The patients were evaluated in terms of crush syndrome and renal failure, and fluid-electrolyte support was given according to their condition. The X-rays, ultrasonography, and CT were performed according to the examination findings. Although we, as physicians, had the knowledge and experience to treat these patients, we referred them to other centers due to the lack of auxiliary staff, the closure of some centers and inpatient services, and the provision of facilities to future patients.

From the third day after the earthquake, in addition to the earthquake victims, we treated also suffering children who presented with complaints such as abdominal pain, gastroenteritis, carbon monoxide poisoning, and chronic disease problems. An appendectomy was performed on a 13-year-old boy who presented with abdominal pain and was discharged healthy on the first postoperative day. In addition, no amputations or fasciotomies were performed

Fig. 1. Right arm of earthquake survivor child with crush syndrome.

since postoperative follow-up was not possible at the time. The patients were swiftly transferred to well-equipped centers with facilities such as interventional angiography and hyperbaric oxygen therapy chambers, and the decision for surgical intervention was left to these centers. By taking this approach, we believe that the loss of limbs was reduced and that amputations were made from a more distal level. Based on this reasoning, we referred a 19-year-old female patient, who was a student of the Faculty of Medicine, Gazi University, pulled out of the rubble on the 4th day, to our hospital by air ambulance because her general condition was critical, and she was unconscious (Fig. 1). The patient's right arm was amputated despite all treatments, and her general condition is now good.

We observed that while working together, doctors from different centers held diverging opinions due to differences in approach to the follow-up and treatment of patients. We solved this problem by ensuring that staff from the same centers worked together and by choosing an experienced doctor who had worked in similar conditions as the team leader. For example, a pediatric surgeon and an anesthesiologist on the team were selected as leaders because they had both helped during the 1999 Marmara earthquake, as well as a hospital fire and military coup.

DISCUSSION

Twelve years ago, Japan experienced one of the world's worst disasters. At 2:46 p.m. on March 11, 2011, an earthquake with a magnitude of 9 on the Richter scale struck the country. The epicenter, which occurred at a depth of 24.4 km, was on the eastern coast region of Tohoku. The earthquake, which lasted for about 3 minutes, caused a tsunami. The effects of these events were devastating. Even though Japan is known for its measures against earthquakes, nearly 20,000 people died. In Turkey's Kahramanmaraş earthquake, over 40,000 lives were lost and millions of people were affected [2]. Japan survived its disaster with fewer deaths than Turkey, even though the earthquake had a magnitude of 9, lasted for about 3 minutes, and caused a massive tsunami. The reasons the event in Turkey caused so much damage include two major earthquakes occurred in the same region only 9 hours apart from each other, and the epicenter of the Kahramanmaraş earthquake being at a depth of 7 km, while the Japanese one originated at a depth of 24 km. Another factor is that Japan has taken earthquake-related precautions and built suitable structures that are resistant to such events [1,2].

The experiences of Burnweit and Stylianos [3] in the Haiti earthquake of January 12, 2010 (magnitude 7 on the Richter scale) may be an option of how earthquake support should be for developing countries. Rich nations can provide long-term services by offering field hospitals to developing countries whose facilities are already limited and where the healthcare system has collapsed due to earthquakes [3]. Even in countries such as South Korea, the government has developed programs to reduce trauma-related mortality [4]. In nations such as Japan and Turkey, which have reliable medical facilities and are relatively accustomed to earthquakes, this approach is useful only during the first few days of the disaster. Afterward, the State and the healthcare system react and no longer need outside help. When the Kahramanmaraş earthquake hit, Turkey immediately sent its rescue teams (including volunteers) to affected areas. In the first week, elective and aesthetic surgeries were canceled to free up health workers, and adequate use of healthcare equipment and medicines from other regions was arranged—just like in the coronavirus disease 2019 pandemic. From the first day, despite the situation being critical, all the patients were transferred to other centers by air and land and the burden of 11 regions was distributed across the country. Thus, the pain was shared.

Immediately after the earthquake, volunteer teams reached the stricken areas, some with their own means and some with government assistance. Health personnel were sent by the Ministry of Health to regions where volunteers were few and needed. Nonemergency surgeries were canceled across the country as healthcare staff and equipment as well as medicines were required elsewhere. This was also done so that hospitals had enough beds for the earthquake victims.

As the earthquakes in Haiti and Iran have confirmed, in these kinds of disasters, the most common extremity traumas occur in children and adults. Surgical interventions (including amputations) are generally carried out in the affected area. During such interventions, infection rates are high and the decision to perform gross surgery is taken due to an

environment of panic [3,5]. Therefore, in developed countries with good healthcare systems, the decision regarding major surgical interventions should be left to the referral centers, where all treatment options are available, rather than the hospitals where the earthquake occurred. The reason for doing so is after a natural disaster, a country must cope with not only loss of life but also with care for the disabled.

The Kahramanmaraş earthquake highlighted the strength and usefulness of the Turkish healthcare system and its workers. Over 100,000 medical staff are still operating in the affected areas. In the event of an earthquake, in countries with robust and developed healthcare systems, medical personnel are ready to intervene, whether voluntarily or on assignment. Therefore, the main purpose should be to take measures to reduce the damage caused by natural disasters.

In conclusion, since coordination is important when working as a team in the aftermath of an earthquake, staff from the same center should be deployed together if possible, and a team leader should be selected. Alternative recording systems should be established in case of power outages and computer problems. Secretaries, auxiliary health staff, and technicians should be included in the team in addition to doctors and nurses.

ACKNOWLEDGEMENTS

Fund/Grant Support

None.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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