



## Review

# Surgical Experiences from Europe's Largest Liver Transplant Institute during the February 6, 2023 Cataclysmic Turkish Earthquake

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### Abstract

From disasters, we have to deduce some lessons to implement in centers where major surgeries are performed. The Inonu University Liver Transplant Institute is located in the province of Malatya in southeast Turkey. On February 6, 2023, Malatya suffered two devastating earthquakes, one with a magnitude of 7.8 and another 10 h later, with a magnitude of 7.6, and subsequently thousands of aftershocks, some greater than magnitude 6. The city center looked like a complete rubble with ruined buildings and main roads. From this disaster, we deduced some lessons such as emergency action plans and psychological support programs should be done, people in senior management must be at work and should not leave the hospital, and etc. This was a significant disaster. As the largest transplant center in Europe, the Inonu University Liver Transplantation Institute has attempted to survive. We now need to move quickly to regain the quality of our previous services.

**Keywords:** Devastating disaster, Earthquake, Liver transplantation program, Learned lessons, Malatya, Türkiye

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Malatya Inonu University Liver Transplant Institute has performed 3600 liver transplants since its founding in 2002, 90% of which are Living Donor Liver Transplants (LDLT). The institute is Europe's largest volume liver transplant center (ELTR data), which performed 280 liver transplants in 2022.<sup>[1,2]</sup> The "Malatya criteria"<sup>[3,4]</sup>, later "expanded Malatya criteria"<sup>[5]</sup> on hepatocellular cancer and liver transplant were defined by the institute. The institute has 116 patient beds, 36 ICU beds, 12 OR, interventional - diagnos-

tic radiology and ERCP units, and outpatient departments that only liver patients attend, with the master's and doctoral programs. We are one of the few centers to have performed 5 simultaneous LDLTs and then 4-way liver paired exchange.<sup>[6]</sup>

The institution is located in the province of Malatya, in the southeast of Turkey. Malatya is also the apricot capital of the world with 70% production. On February 6, 2023, Malatya suffered two devastating earthquakes, one with a

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magnitude 7.8 and another 10 hours later, with a magnitude 7.6, and subsequently thousands of aftershocks, some greater than magnitude 6. People felt the first earthquake at 04:17 in the morning. The nurses on duty at the ICU hugged each other in the middle of the unit and began to cry. The doctor on duty checked the ventilators, reassuring the nurses and staff. Despite this, all the nurses and staff remained in the institute, but the ward patients were taken out of the hospital by their relatives. It was snowing outside and the temperature was -12 degrees Celsius. People spent the night either warming up by lighting a fire outside or in their cars. A 38-year-old man died of CO poisoning inside his car. When the sun began to shine, no one had entered their house in the city with a population of 750,000. As the next day dawned, it became clear that there were serious building collapses in the city and the extent of the damage caused by the earthquake began to emerge. The buildings more than 30 000 were uninhabitable or too damaged with 10,000 reduced to rubble, as was the city center and many roads. Many historical monuments were destroyed in this city, which holds more than seventy percent of all apricot

production in the world (Figs. 1 and 2).

The hospital staff believed the hospital to be safe (built to be resistant to magnitude 9 earthquakes), so they flocked back to Turgut Ozal Medical Center and the Liver Transplantation Institute with their families. Life began to go on in the hospital since then. All patients and staff entered the hospital, trying to adapt to normal daily work. Unfortunately, at 13:30, the second earthquake with a magnitude of 7.6 occurred. The hospital was feared to be in danger of collapse. All the staff and patients in the hospital immediately removed themselves. Patients from outside the city, if they did not have serious problems, left the city with their relatives in their cars. Only the intubated ICU patients and their nurses and staff stayed in the hospital. All staff and patients gathered on the helipad. A shuttle bus brought in front of the ground floor was heated for pediatric transplant patients and the children were treated there.

Everyone started living outside or in their car at night. The next day, most doctors, nurses, and staff moved their families out of Malatya. Medical staff who were physically well but could not tolerate the event psychologically were not



**Figure 1. (a, b)** City center before the earthquake. **(a)** Grand Mosque, **(b)** Grand Bazaar.



**Figure 2. (a, b)** City center after the earthquake. **(a)** Grand Mosque, **(b)** Grand Bazaar.

forced to stay in the hospital or city. No water, bread, fuel, or solid food was available. Only soups can be served in the hospital. On the evening of February 6, pasta was cooked and distributed as bread was unavailable. Only breakfast supplies were distributed on February 8.

We tried to shield the patients from the extent of the disaster. However, many relatives were left under the rubble and died. During patient visits, many patients forgot their problems and cried for their relatives. We comforted them. During this time, the director of the Liver Transplantation Institute (SY), the head of the Department of General Surgery (BI), and the director of the Turgut Ozal Medical Center (AB), who are transplant surgeons, and the Rector of the University (AK), who is an otolaryngologist, did not leave the hospital for 26 days. This attitude created confidence in employees. All of us shared food or clothing donations from outside the province with us in a fair manner. Serious aftershocks still continue on the 26<sup>th</sup> day of the earthquake. Tent and container city were created, and ecological village studies began. However, no one could enter their homes for fear of house collapse and more injuries.

On the 8th day of the earthquake, we considered writing our scientific articles in process and turned this forced free time to advantage. However, each aftershock had a negative effect on their mental activity. On the 12<sup>th</sup> day of the earthquake, we had a comprehensive meeting with our Liver Transplant Team and decided to continue with our normal surgical function. Thus, we decided to bring the center back into life. Patients awaiting transplants have been repeatedly reviewed, and LDLT was started on day 14 of the earthquake. As of today, we have made 6 LDLTs.

From this disaster, we deduced some lessons:

- Emergency action plans should be established against such major disasters, and frequent rehearsals should be conducted.
- Psychological support programs should be applied to doctors, nurses, and staff to be more resilient in such disaster situations.
- Hospital buildings should be inspected primarily by competent institutions in terms of earthquake resistance, and necessary measures should be taken according to the results.
- Psychological support is particularly important for the patients. In the absence of a psychologist, the surgeon and nurse should provide psychological support.
- All challenges (limited food, clothing, and hygiene supplies) must be shared with the team. Staff should believe that managers never have privileges with everything shared.
- Leisure time should be used in part for research and writing. Colleagues should be instilled with this motivation, not just due to unexpected free time but also for their psychological well-being.
- People in senior management, such as directors, chairmen, and rectors, must be at work and should not leave the hospital.
- The team should spend most of the time getting together to support each other and keep thoughts away from the disaster for mental well-being and to help people's spirits.

This was a significant disaster. The institute has attempted to survive. We now need to move quickly to regain the quality of our previous services.

#### Disclosures

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